Ministry of Transport and Public Works

# Malawi National Transport Master Plan

## Final Report

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# Acronyms

| | |
|---|---|
| **AADT** | Annual Average Daily Traffic |
| **ACCF** | Africa Climate Change Fund |
| **AfDB** | African Development Bank |
| **ADL** | Airport Development Limited |
| **ADT** | Average Daily Traffic |
| **ADS-B** | Automatic Dependent Surveillance – Broadcast |
| **AGL** | Airfield Ground Lighting |
| **AF** | Adaptation Fund |
| **AHL** | Auction Holdings Limited |
| **ANRP** | Annual National Road Programme |
| **ASBU** | Aviation Systems Block Upgrade |
| **ATC** | Air Traffic Control |
| **ATM** | Air Traffic Management |
| **BADEA** | Arab Bank for Economic Development in Africa |
| **BOT** | Build Operate Transfer |
| **BOOT** | Build Own Operate Transfer |
| **BRT** | Bus Rapid Transit |
| **CAFAM** | Clearing and Forwarding Agents in Malawi |
| **CBD** | Central Business District |
| **CEAR** | Central East African Railways |
| **CLN** | Corredor Logistico Integrado de Nacala |
| **CMIs** | Corridor Management Institutions |
| **CNS** | Communications, Navigation and Surveillance |
| **COF** | Certificate of Fitness |
| **COMESA** | Common Market for Eastern and Southern Africa |
| **CPD** | Continuing Professional Development |
| **CPF** | Central Processing Facilities |
| **CRVA** | Climate Risk and Vulnerability Assessment |
| **DA** | Donor Agencies |
| **DC** | District Council |
| **DCA** | Department of Civil Aviation |
| **DCCMS** | Department of Climate Change and Meteorological Services |
| **DoDMA** | Department of Disaster Management Affairs |
| **DEA** | Department of Environmental Affairs |
| **DEPD** | Department of Economic, Planning and Development |
| **DFBOT** | Design, Finance, Build Operate, Transfer |
| **DGSA** | Dangerous Goods Safety Administrator |
| **DLG** | Department of Local Government |
| **DMS** | Department of Marine Services |
| **DMU** | Diesel Multiple Unit |
| **DRC** | Democratic Republic of Congo |
| **DRTSS** | Directorate of Road Traffic and Safety Services |
| **DTIMPs** | District Transport Infrastructure and Management Plans |
| **DVLA** | Driver and Vehicle Licencing Authority |
| **EITI** | Extractive Industries Transparency Initiative |
| **ERP** | Economic Recovery Programme |
| **ESIA** | Environmental and Social Impact Assessment |
| **EU** | European Union |
| **FESARTA** | Federation of East and Southern African Road Transport Associations |
| **FF** | Freight and Forwarders |
| **FFAM** | Freight and Forwarders Association of Malawi |
| **FISP** | Farm Input Subsidy Program |
| **FORS** | Fleet Operator Recognition Scheme |
| **GCF** | Green Climate Fund |
| **GDP** | Gross Domestic Product |
| **GCI** | Global Competitiveness Index |
| **GHG** | Greenhouse Gas |
| **GoM** | Government of Malawi |
| **GNSS** | Global Navigation Satellite Surveillance |
| **HDM-4** | Highway Development and Management System |

| | |
|---|---|
| **HGV** | Heavy Goods Vehicles |
| **ICAO** | International Civil Aviation Organisation |
| **IFIs** | International Financial Institutions |
| **IGWP** | Income-Generating Public Works Programme |
| **IHS** | Integrated Household Survey |
| **ILS** | Instrument Landing System |
| **IMO** | International Maritime Organisation |
| **IMT** | Intermediate Means of Transport |
| **IRAP** | International Road Assessment Programme |
| **IRI** | International Roughness Index |
| **ISO** | International Standards Organisation |
| **JICA** | Japan International Cooperation Agency |
| **JTSR** | Joint Transport Sector Review |
| **KF** | Kuwait Fund |
| **KIA** | Kamuzu International Airport |
| **Km** | Kilometres |
| **KPIs** | Key Performance Indicators |
| **LDCF** | Least Developed Countries Fund |
| **LDF** | Local Development Fund |
| **LGV** | Light Goods Vehicles |
| **LPG** | Liquefied Petroleum Gas |
| **LIHACO** | Lilongwe Handling Company |
| **MACRA** | Malawi Communications Regulatory Authority |
| **MCCL** | Malawi Cargo Centres Limited |
| **MDBs** | Multilateral Development Banks |
| **MALTIS** | Malawi Traffic Information System |
| **MASAF** | Malawi Social Action Fund |
| **MERA** | Malawi Energy Regulatory Authority |
| **MoFEPD** | Ministry of Finance, Economic Planning and Development |
| **MGDSII** | Malawi Growth and Development Strategy II |
| **MGDSIII** | Malawi Growth and Development Strategy III |
| **MaITIS** | Malawi Traffic Information System |
| **MHC** | Malawi Housing Corporation |
| **MOAM** | Minibus Owners Association of Malawi |
| **MoLGRD** | Ministry of Local Government and Rural Development |
| **MoTPW** | Ministry of Transport and Public Works |
| **MOU** | Memorandum of Understanding |
| **MPC** | Malawi Ports Company |
| **MPS** | Malawi Police Service |
| **MRA** | Malawi Revenue Authority |
| **MSC** | Malawi Shipping Company |
| **MST** | Main, Secondary and Tertiary |
| **MT** | Metric Tonnes |
| **MTSI** | Malawi Transport Skills Initiative |
| **MWK** | Malawian Kwacha |
| **NCIC** | National Construction Industry Council |
| **NDP** | National Decentralisation Policy |
| **NDRP** | National Disaster Recovery Programme |
| **NES** | National Export Strategy |
| **NMT** | Non-Motorised Transport |
| **NOCMA** | National Oil Company of MAlawi |
| **NOx** | Nitrogen Oxides |
| **NRA** | National Roads Authority |
| **NRSCM** | National Road Safety Council of Malawi |
| **NRRS** | National Road Safety Strategy |
| **NSC** | North-South Corridor |
| **NSO** | National Statistics Office |
| **NSTA** | National Surface Transport Authority |
| **NTC** | National Transport Committee |
| **NTMP** | National Transport Master Plan |
| **NTP** | National Transport Policy |
| **OECD** | Organisation for Economic Co-operation and Development |
| **OSBP** | One Stop Border Post |
| **PBN** | Performance Based Navigation |
| **PIDA** | Programme for Infrastructure Development in Africa |

| | |
|---|---|
| **PM** | Particulate Matter |
| **PPP** | Public Private Partnership |
| **PSA** | Production Sharing Agreement |
| **PVHES** | Plant and Vehicle Hire and Engineering Services |
| **RA** | Roads Authority |
| **RAMRAM** | Rail and Maritime Regulatory Authority of Malawi |
| **RDA** | Road Development Authority |
| **RDM** | Road Data Management |
| **RECs** | Regional Economic Communities |
| **RFA** | Roads Fund Administration |
| **RIA** | Regulatory Impact Assessment |
| **RIDMP** | Regional Infrastructure Development Master Plan |
| **RIDP** | Rural Infrastructure Development Programme |
| **RLW** | Registered Laden Weight |
| **RMI** | Road Maintenance Initiative |
| **RSI** | Road Side Interviews |
| **RSP** | Road Sector Programme |
| **RTA** | Road Traffic Accidents |
| **RTA** | Road Traffic Authority |
| **RTD** | Road Traffic Department |
| **RTG** | Rubber Tyred Gantry |
| **RTOA** | Road Transport Operators Association |
| **RTP** | Road Traffic Police |
| **SADC** | Southern Africa Development Committee |
| **SATCC** | Southern African Transport and Communications Commission |
| **SATTFP** | South Africa Trade and Transport Facilitation Programme |
| **SDG** | Sustainable Development Goal |
| **SDI** | Spatial Development Initiative |
| **SEA** | Strategic Environmental Assessment |
| **SEZ** | Special Economic Zone |
| **SSRPC** | Sub-Saharan Regional Pipeline Corporation |
| **SWOT** | Strengths, Weaknesses, Opportunities and Threat |
| **TCC** | Tobacco Control Commission |
| **TCM** | Transport, Communications and Meteorology |
| **TEU** | Twenty Foot Equivalent Unit |
| **TNM** | Telekom Networks Malawi |
| **TSIP** | Transport Sector Investment Programme |
| **TSPIMF** | Transport Sector Performance Monitoring Indicators Framework |
| **TVU** | Train Vehicle Unit |
| **UAS** | Unmanned Aircraft Systems |
| **UATA** | Urban Areas Transport Authority |
| **UNFCC** | United Nations Framework Convention on Climate Change |
| **US** | United States |
| **USD** | United States Dollar |
| **UTM** | Unmanned Traffic Management |
| **VIS** | Vehicle and Inspection Services |
| **VMS** | Vessel Management System |
| **WB** | World Bank |
| **WHO** | World Health Organisation |
| **ZRL** | Zambian Railways Limited |

# Foreword

Transport plays a key role in determining the international competitiveness of Malawian products. It also has an impact on domestic prices of staple foods contributing not only to the cost of production through to the cost of distributing farm inputs but also the cost of getting agricultural produce to the market.

As the Ministry of Transport and Public Works, our main goal is to reduce transport costs and ensure that transport does not constrain the economy.

In our efforts to attain this goal we have formulated a comprehensive National Transport Master Plan designed to guide the sustainable development of an integrated multi modal transport sector for the next 20 years. The scope of the masterplan covers all modes of transport: roads and road transport, urban and rural transport, railways, marine, civil aviation and pipeline.

The National Transport Master Plan (NTMP) provides measures to reduce transport costs and improve the sector's contribution to GDP. This will be done through increased utilisation of cheaper modes of transport. The NTMP, therefore, fosters a shift from road transport to rail for imports and exports along the major corridors. It further addresses current pressing issues such as road safety by targeting non-motorised transport on the highly trafficked main roads. The NTMP also looks forward to meeting the transport needs of a changed economy in which growth sectors such as mining, oil and tourism will be fostered through improved transport links by implementing a major programme of rural roads upgrading.

In addition, the NTMP provides strategies and a range of projects for urban transport designed to reduce costs, foster walking and cycling and move towards high capacity mass transit in our main cities. Perhaps most importantly the NTMP takes account of the risk that climate change poses to transport infrastructure and services and includes proposals for both mitigation and adaptation measures.

Government wishes to acknowledge the support of the World Bank in developing this Master Plan. I also wish to acknowledge all who have participated in the many consultation exercises across the whole country that took place during the development of the NTMP. The views and contributions of all key stakeholders have been well received.

Government is committed to the implementation of the NTMP, however we recognise that its successful implementation requires all stakeholders – government, private sector, development partners and civil society- to fully play their roles. Indeed, the NTMP contains a number of specific proposals for improved co-ordination between stakeholders in order to facilitate the achievement of this goal.

**Jappie Mhango**

Minister for Transport and Public Works
Lilongwe, December 2017

# Preface

Transport is essentially an enabling sector in that it supports and facilitates the development of other productive sectors within Malawi, especially agriculture, tourism, mining, trade, and potentially oil and gas.


The National Transport Policy recognises that strengthening the development of medium to long term strategies is key for guiding the sector in order for transport to effectively play its role in the economy.

This document is the first National Transport Masterplan (NTMP) for Malawi and as such marks a paradigm shift in which we expect the country's transport sector to move forward over the next 20 years. It articulates the overall integrated multi-modal transport plan for Malawi, along with summaries of sub-sectoral proposals. This NTMP recognises the important links between the transport sector and other sectors of the economy. It acknowledges that its implementation must ensure a full engagement between the transport sector and these key economic sectors so that the productive development of our country can be realised.

The NTMP is based on comprehensive and extensive surveys of all transport modes across the country, and built on estimates of future demand for both passengers and freight, developed from a strategic transport model for Malawi.

The preparation of the NTMP has been a highly consultative, through engagement of a wide range of stakeholders from both the public and private sectors, civil society and development partners. Consultations took place at all stages of NTMP development, from assessing transport needs, developing strategies, through to evaluating initiatives and individual projects.

I wish to place on record my thanks to the consultants who prepared the NTMP – WS Atkins and EY Malawi. Their thorough understanding of the issues and challenges faced by the transport sector has enabled them to develop a plan which is robust and meets the future needs of the sector. I wish also to thank all the stakeholders who engaged with my Ministry and the consultants during the NTMP preparation. Their views, knowledge and expertise has been key to the successful development of the plan. I particularly wish to thank my Director of Transport Planning, Mr. John B.M. Phiri, and his staff, especially Mr. Ganizani Liwewe and Mr. Andrew Mthiko, who worked tirelessly with the consultants for 18 months as the plan was prepared. Their guidance to the consultant is highly appreciated.

**Francis B Chisinga**

Principal Secretary,
Ministry of Transport and Public Works
Lilongwe, December 2017

**Bycicle taxi on the M1 through Mzuzu.**

# Executive Summary

## Background

The Government of Malawi, with support from the World Bank, has developed this National Transport Master Plan (NTMP), which provides a clear framework for delivering sustainable interventions to enhance the transport sector across Malawi for the period between 2017 and 2037.

The NTMP sets out infrastructure proposals across all transport sub-sectors in Malawi: road, rail, inland water, civil aviation, and urban transport. It covers freight and passenger networks and services, and identifies multi-modal proposals for integrating the transport sub-sectors. The NTMP also provides a prioritised time-bound plan for introducing and developing policy and regulatory measures, institutional and organisational reforms, and capacity-building through the training and enhancement of capabilities in all sub-sectors.

The NTMP has been formulated to support the future enhancement of Malawi's economy. Its vision is "The development of a co-ordinated and efficient transport infrastructure that fosters the safe and competitive operation of viable, affordable, equitable and sustainable transport services". An international comparison reveals that the cost of transport in Malawi is high, which constrains Malawi's economy in two ways: (i) it increases the price of imported products such as fuel, fertiliser, and raw materials; and (ii) it reduces the competitiveness of Malawi's exports.

## Current condition of the Malawi economy

Malawi's **economy** is in a recovery stage after a major fall in GDP from US$7.9 billion in 2011 to US$5.4 billion in 2013. According to the Ministry of Finance, Planning and Economic Development, Malawi attained an annual GDP growth rate of 3.1% in 2015. GDP increased by an estimated 5.1% in 2016 from 2015 values[A]

[A] *Ministry of Finance, Planning and Economic Development.*

[B] *IRI: International Roughness Index, a standard indicator for road surface condition .*

## Current condition of the transport infrastructure

The national **classified road** network totals 15,451km, comprising Main (21.7%), Secondary (20.2%), Tertiary (26.7%), District (22.7%) and Urban (8.7%) roads. Only 26% of the national classified road network is paved. According to 2014 data almost 82% of the paved road network in Malawi is in a good or fair condition (IRI[B] <5.0). The key issues for the road transport sub-sector include:

- Presence of bottlenecks, causing congestion and delays on the road;
- Lack of road capacity in some areas and limited segregated pedestrian facilities, causing major safety issues;
- Insufficient non-motorised transport friendly infrastructure;
- Limited availability of all-weather roads, which constrains accessibility for road users, particularly in rural areas;
- Lengthy and inefficient procedures at border crossings;
- Lack of a comprehensive rural transport strategy;
- Funding constraints hindering adequate construction and maintenance of roads; and
- Weaknesses in the relevant organisations' capabilities to adequately manage the road network.

**GDP is estimated to have increased by 5.1% in 2016.**

**Only 26% of the national classified road network is paved.**

- Malawi's **rail** network is not comprehensive and only serves the central and the southern regions of the country. Most of the network is used predominantly for freight, with only the Limbe-Balaka-Nayuchi sections offering passenger services. The issues surrounding the rail transport sub-sector are:
  - Lack of extensive network coverage throughout the country;
  - Skill gaps and shortage of local expertise and resources in key areas of rail operation and management;
  - Need for strengthening the institutional framework of the Ministry of Transport and Public Works (MoTPW);
  - Lengthy and inefficient procedures at border crossings;
  - Gaps in the regulatory framework; and
  - Lack of integration with other transport modes in the country.
- **Inland water transport** is predominantly based on Lake Malawi, which is approximately 550km long and 75km wide. It is the second deepest lake in Africa. The lake houses four ports, all of which are in poor condition. The Shire River, the largest river in Malawi with a length of 400km, connecting Lake Malombe to the southern regions, also has the potential to play a significant role for the inland water transport system. The issues surrounding the inland water transport sub-sector are:
  - Lack of integration with other modes of transport, and as a result Lake Malawi is not being used to its full potential;
  - Poor navigation systems resulting in slow vessel speeds;
  - Gaps in its regulatory framework, such as the absence of an independent safety regulator;
  - Lack of maintenance of both vessels and port infrastructure resulting in high inefficiency and safety issues;
  - Inadequate institutional capacity for the efficient operation and management of the infrastructure; and
  - Unsuccessful participation of private sector investors to date.

**There are 33 airfields in Malawi, which include two major international airports and five secondary airports with international access.**

- The **civil aviation** sub-sector in Malawi is not fully developed. There are 33 airfields in Malawi, which include two major international airports, five secondary airports with international access, and 26 airfields with basic airstrips on grass or low-grade materials. International cargo operation by air is limited in Malawi. The key issues surrounding the civil aviation sub-sector are:
  - Limited funds available for infrastructure maintenance;
  - Lack of world class safety standards;
  - Absence of critical infrastructure including navigation aids;
  - Unprofitability of Malawi Airlines;
  - Small international and local markets;
  - Limited cargo operations; and
  - Weaknesses in governance and deployment of modern regulations.
- Malawi's four major cities, namely Lilongwe, Blantyre, Mzuzu and Zomba, currently make up 16% of the national population. The **urban transport** sub-sector of this master plan is built around these four cities. Whilst the proportion of the urban population is relatively low, the combined contribution to GDP of the two major urban areas, Blantyre and Lilongwe, is approximately 31%. Public transport in all of the four cities is predominantly minibus-based. The key issues surrounding the urban transport system are:
  - Unregulated fares of minibuses, causing a demand driven variable fare regime for the end-users;
  - Unregulated routes of minibuses, resulting in an inefficiently planned public transport system in cities;

**The four major cities of Malawi currently make up 16% of the national population.**

- Limited reach of the minibus services in wider urban areas due to poor road conditions;
- Lack of sufficient road capacity in certain areas, causing high peak hour congestion;
- Lack of adequate bypass or relief roads to avoid the mix of through traffic and local traffic in urban centres, which not only increases congestion but also road accidents;
- Poor road maintenance and poor design standards of roads and junctions, which negatively impacts the day-to-day travel of road users, including by posing a safety hazard;
- Inadequate facilities for non-motorised modes of transport, especially pedestrian facilities, which causes major safety issues; and
- Fundamentally, the absence of an appropriate institution to enable better co-ordination, management, and policy direction for Malawi's cities.

## Cross-cutting issues

Malawi's transport infrastructure is susceptible to the negative impacts of extreme weather events, including those associated with climate change, which is increasing their frequency and severity. Transport infrastructure typically has a long operational life that can span decades but the impacts of extreme weather events, such as flooding and drought, can significantly reduce its resilience. Reliable, efficient and safe transport infrastructure underpins sustainable economic and social development and so it is essential that the adaptive capacity of transport infrastructure is increased and that steps are taken to manage greenhouse gas (GHG) emissions from Malawi's transport sector. The NTMP contains required investments and associated planning for climate change adaptation and mitigation activities. One of the key challenges that the MoTPW is facing to respond to the risks and opportunities associated with climate change is the lack of its own related capacity and limited co-ordination with relevant Government agencies. An extensive exercise was conducted to focus on this cross-cutting issue to make the NTMP resilient to current and future adversities such as climate change, both in terms of improvements to physical infrastructure and required changes to the regulatory, policy and institutional framework.

Other cross-cutting issues include the need for enhanced social inclusion, including explicit consideration of its gender dimension, current limitations to which are hindering access to basic services such as healthcare and education and in particular for vulnerable sectors of the population. It is essential that collective and targeted measures are adopted to meet the needs of diverse social groups.

## Existing governance and institutional framework

The various roles and responsibilities within Malawi's transport sector are distributed across a range of public bodies and private sector organisations at the national and local level. MoTPW is the principal steward of the multi-modal transport system, its policies, and regulations. Along with MoTPW's agencies and departments, other external agencies involved in the planning and operation of the transport sector in Malawi include development partners, district and city councils and private sector or concessioners. The current issues surrounding the institutional framework of the transport sector in the country are:

- Acute llimitations regarding funding, organisational capacity, technical and managerial skills and strategic planning and programming competencies at almost every level;
- Limited joint working within and across public bodies, with limited mechanisms for information sharing and joint policy formulation;
- Centralisation of local decisions within the Government of Malawi;
- The National Road Safety Steering Group, a key part of the Directorate of Road Traffic and Safety Services' (DRTSS) expanded remit, has yet to be established and lead multi-agency action to tackle Malawi's acute road casualty record;
- An apparent weakness of bilateral and regional actions to secure Malawi's transport goals and relatively loose institutional arrangements to secure delivery and achievement of outcomes; and
- Limited capacity within MoTPW to address climate change issues within the sector.

## Future growth of Malawi

The future growth of transport demand across Malawi will be driven by national economic and demographic changes, which include:

- A doubling of population size between 2016 and 2036 from 16.8 million to 33 million;
- An increase of employment from 5.3 million in 2016 to 9.8 million in 2036. The proportion of urban employment is expected to gradually increase from 11% in 2016 to 15% in 2036 with increased urbanisation;
- Growth of the tourism sector in Malawi, where the contribution of the sector to the economy between 2016 and 2036 is expected to grow by 6.5% per annum, and by 8.5% per annum thereafter; and
- Growth of the overall economy, which is expected to increase steadily between 2016 and 2036 at a rate between 5.1% and 6.7%. Whilst growth within the next ten years would be towards the higher end of the range, it would slow down thereafter.

The above factors will directly influence the growth of both domestic and international transport demand for Malawi. Private transport demand is forecast to grow by 3.5% per annum, and public transport demand by 3.2% per annum over the next 20 years. The table below presents passenger demand (based on a 12 hour day) growth by mode between 2016 and 2036. Freight demand is forecast to grow at a steady rate of 4.8% per annum.

## Key strategic goals of the NTMP

Three strategic objectives have been set to support the vision and guide the development of the NTMP. They are:

- Reduce transport costs and prices across all modes;
- Improve the safety of transport infrastructure and services; and
- Enhanced and sustainable passenger and freight transport systems.

The achievement of these strategic objectives will be guided by the pursuit of the following operational objectives:

- To facilitate a modal shift from road to rail and inland water transport;
- To mainstream safety and security considerations into transport projects, policies and related processes;
- To increase citizens' access to all-weather roads;
- To improve intermodal integration;
- To enhance the connectivity of rural areas, including to support continued growth of the agricultural sector;
- To foster transport systems which support the development of oil and mining sectors;
- To improve the resilience of transport infrastructure and services;
- To develop the domestic freight industry; and
- To reduce dependence on Mozambique for access to international markets.

**Growth in transport demand (12 hour day)**

| Private Transport | | | Public Transport | | |
|---|---|---|---|---|---|
| 2016 | 2036 | Annual average change | 2016 | 2036 | Annual average change |
| 116,000 | 232,000 | **3.5%** | 261,000 | 490,000 | **3.2%** |

## NTMP components and proposals

The key physical infrastructure components of the NTMP are shown in the table below.

| Sub Sector | Main plan components |
|---|---|
| **Roads** | ▪ Maintenance of the road network<br>▪ Rehabilitation of all failing sections of the network<br>▪ Upgrading 1,418 km of rural roads to assist agricultural production and improve rural accessibility<br>▪ Introduction of over 500 km of segregated cycle/pedestrian facilities on high trafficked roads |
| **Rail** | ▪ An extension of the railway line from Beira Port (Mozambique) northwards from Mutarara into Malawi, in stages<br>▪ A spur line from Mbeya to Chilumba |
| **Inland Water Transport** | ▪ Improved port facilities at Nkhata Bay and roll-on roll-off freight services to Mbamba Bay on the Mtwara Corridor<br>▪ Introduction of a regular freight service between Chilumba and Liwonde<br>▪ Construction of a wet port at Liwonde |
| **Civil Aviation** | ▪ Measures to improve safety and security to world class standards<br>▪ Runway and apron improvements at Chileka and Kamuzu International Airport to accommodate larger aircraft, and terminal capacity increases<br>▪ Developing some rural airfields for tourist use<br>▪ Handing over unused airfields to local authorities and the private sector |
| **Urban Transport** | ▪ Concession bus routes in high patronage corridors to large buses<br>▪ Construction of Lilongwe eastern and western bypasses<br>▪ New urban expressway in Blantyre<br>▪ Major programme of improved pedestrian and cycle facilities in Lilongwe, Blantyre, Zomba and Mzuzu<br>▪ Improved traffic management and traffic signal provision in Lilongwe and Blantyre<br>▪ Bus Rapid Transit scheme in Lilongwe |

The main institutional proposals are listed in the table below.

| Institution | Proposal |
|---|---|
| **Urban Areas Transport Authority** | New autonomous agency with legal powers to grant franchises for high capacity bus routes with low emission vehicles |
| **Road Haulage Industry Council** | New agency designed to strengthen the domestic trucking industry and to reduce transport costs, through a system of registration, grading, and capacity building |
| **RAMRAM** | New agency, Rail and Marine Regulatory Authority of Malawi, to manage concessions in a co-ordinated fashion |
| **National Transport Council** | Inter-ministerial committee designed to ensure the successful implementation of the NTMP to foster economic growth |
| **Ministry of Transport and Public Works** | Re-structuring to accommodate dedicated roles and leadership regarding rural transport, urban transport, and international corridors |

The main proposals for policy and strategy level changes are listed in the table below.

| Sub Sector | Main plan components |
|---|---|
| **Roads** | ▪ Increase fuel levy to 20% of the pump price<br>▪ Ring fence RFA's income to the rural roads<br>▪ Introduce a carbon tax for road users<br>▪ Improve road safety awareness through updating the school curriculum<br>▪ Improve regulation and its enforcement |
| **Rail** | ▪ Improve business planning process<br>▪ Capacity building for the department of rail and the proposed Rail and Marine Regulatory Authority (RAMRAM) |
| **Inland Water Transport** | ▪ Introduce new routes for the ferry service<br>▪ Develop an asset management plan<br>▪ Improve safety regulations |
| **Civil Aviation** | ▪ Set up a second airport handling company<br>▪ The Government to sell its stake in Malawi Airlines |
| **Urban Transport** | ▪ Introduce design guidelines for urban roads<br>▪ Develop standards for low emission vehicles<br>▪ Adoption of sustainable urban transport policy |

## Integrated options and appraisal

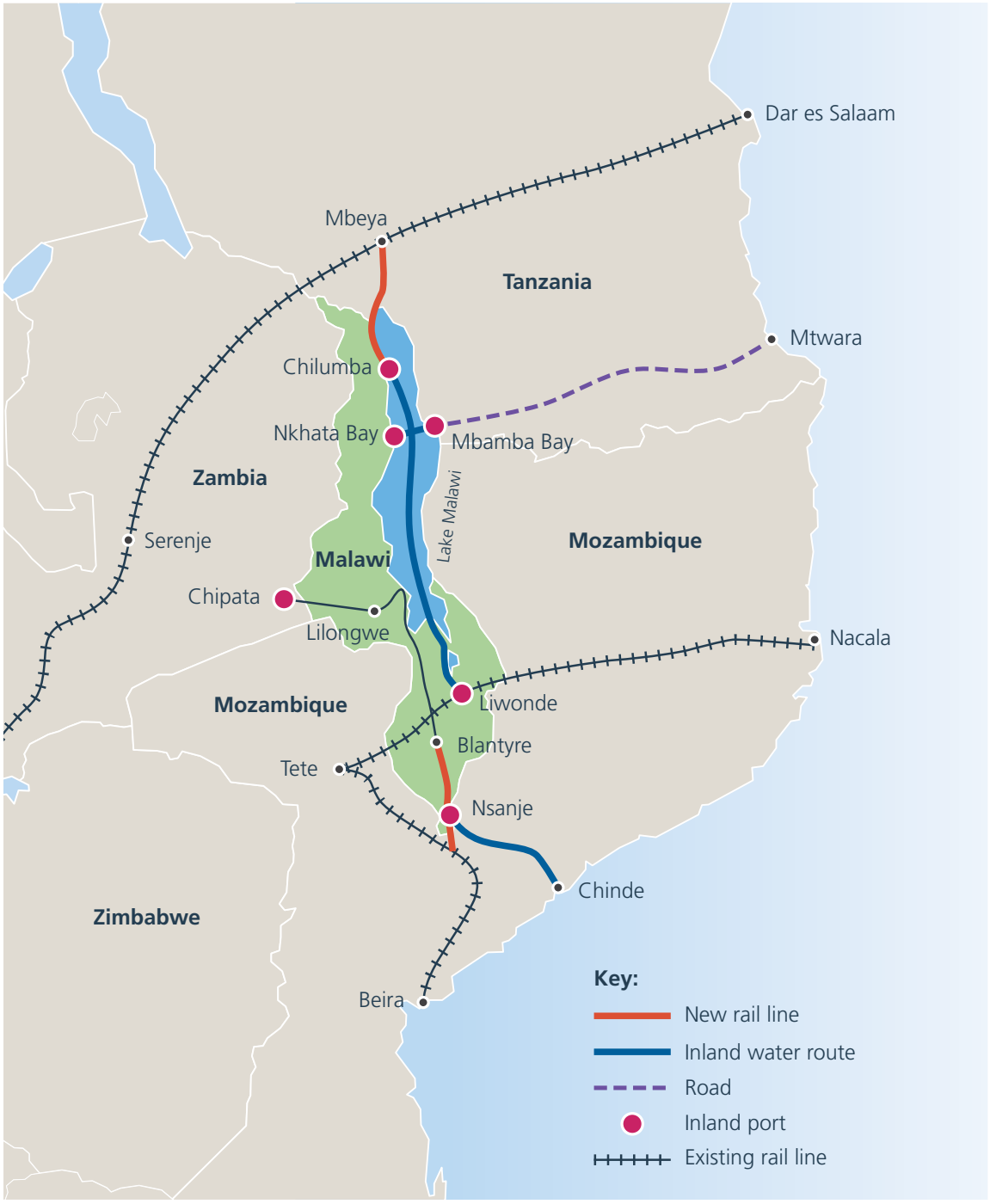
In developing an integrated option, a total of four alternative scenarios were considered. They are presented in the table below.

| Scenario | Schemes | Net Present Value (US$ million)* |
|---|---|---|
| **Integrated Scenario 1** | **Rail:** Beira-Nsanje<br>**Dry port:** Salima<br>**IWT:** Chilumba-Nkhata Bay-Salima-Liwonde | 177 |
| **Integrated Scenario 2** | **Rail:** Beira-Bangula<br>**Rail:** Moatize avoiding line<br>**Road:** M1 dualling – Songwe to Blantyre<br>**IWT:** Chilumba-Nkhata Bay-Salima-Liwonde | 70 |
| **Integrated Scenario 3** | **Rail:** Beira-Limbe direct<br>**Rail:** Chilumba-Mbeya<br>**IWT:** Chilumba-Nkhata Bay-Salima-Liwonde<br>**IWT:** Nkhata Bay-Mbamba Bay<br>**Road:** Blantyre Expressway | 212 |
| **Integrated Scenario 4** | **Rail:** Beira-Limbe direct<br>**IWT:** Chilumba-Nkhata Bay-Salima-Liwonde<br>**IWT:** Nkhata Bay-Mbamba Bay | 128 |

*Net Present Benefits minus Net Present Costs

All of these options have been appraised in terms of the benefits that they could generate. The third integrated option came out as the best option, yielding the highest benefit. The figure below presents a summary of the preferred Integrated Plan (Scenario 3).

Considering the benefits that it would generate, Scenario 3 is by far the best scenario amongst the four integrated alternatives. The cost of this scenario is high owing to the high cost of the railway link between Bangula and Limbe. An alternative lower cost scenario would be to construct the line only up to Bangula from Beira and additionally the Moatize Avoiding Line, which are part of Scenario 2. It would, however, yield lesser benefit than Scenario 3. Therefore, the recommended integrated scenario is Scenario 3.



## Impact of the Plan

High transport costs are an inhibitor to both international trade and domestic freight, and as a landlocked county Malawi relies heavily on road transport, a fact which contributes towards persistently high transport costs. The impact of the proposed interventions promotes a strategic modal shift from road to rail and inland water transport, where larger quantities of cargo can be moved at a lower cost, are shown in the table below:

| Transport cost savings US$ million | Economic benefits US$ million | Total saving US$ million | % Cost saving of inland transport | Saving as % GDP |
|---|---|---|---|---|
| 87 | 189 | 276 | 9.0 | 1.7 |

The master plan places a heavy emphasis on safety issues and seeks to address them for every transport sub-sector. The road sub-sector addresses the issue from the grass route level through schemes like raising awareness and improving driving skills. The NTMP proposes to promote international safety standards for the design and operation for all modes. The plan also proposes several institutional changes, including the establishment of a National Road Safety Authority.

The measures set out in the NTMP have focused on a core principal of increasing sustainability in the transport sector. The NTMP, as a whole, will have positive environmental and social impacts in terms of improving and strengthening regulatory structures and policy and providing a clear direction for future planning, development, monitoring and enforcement. The measures proposed, including upgrading, maintenance and new developments, have the potential to improve efficiency, connectivity, access and equity.

The actions have been considered in the context of impacts on social dimensions including gender, income, mobility and age. They collectively meet the needs of diverse social groups, and infrastructural, institutional and regulatory measures are proposed to design these considerations into the transport sector planning and operation in the long-term.

## Plan costs

The action plan for implementation is programmed into short-term (FY2017 to 22), medium-term (FY2022 to 27) and long-term (FY2027 to 37) plans. The cost of implementing the NTMP is estimated to be US$9.15 billion. The table overleaf presents the list of proposals which inform this total investment figure.

## Proposed interventions, implementation timeframe and cost estimate (US$ '000)

| | FY2017 FY2022 | FY2022 FY2027 | FY2027 FY2032 | FY2032 FY2037 | Total |
|---|---|---|---|---|---|
| **Road Sub-Sector** | | | | | |
| Major projects | 581,000 | 464,500 | 688,000 | 600,500 | 2,334,000 |
| Minor capital works and programmes | 734,680 | 743,900 | 748,900 | 725,500 | 2,952,980 |
| District transport infrastructure and management | 6,500 | 12,000 | 12,000 | 12,000 | 42,500 |
| Institutional and regulatory | 10,250 | 3,350 | 3,350 | 3,350 | 20,300 |
| **Total of Road sub-sector** | **1,332,430** | **1,223,750** | **1,452,250** | **1,341,350** | **5,349,780** |
| **Rail sub-sector** | | | | | |
| Major projects | 344,000 | 412,000 | 733,000 | 726,000 | 2,215,000 |
| Minor capital works and programmes | 38,000 | 13,000 | 5,000 | 5,000 | 61,000 |
| Institutional and regulatory | 14,250 | 6,250 | 6,250 | 6,250 | 33,000 |
| **Total of Rail sub-sector** | **396,250** | **431,250** | **744,250** | **737,250** | **2,309,000** |
| **Inland Water Transport sub-sector** | | | | | |
| Major projects | 10,000 | 72,000 | 30,000 | 65,000 | 177,000 |
| Institutional and regulatory | 10,250 | 1,250 | 1,250 | 1,250 | 14,000 |
| **Total of Inland Water Transport sub-sector** | **20,250** | **73,250** | **31,250** | **66,250** | **191,000** |
| **Civil Aviation sub-sector** | | | | | |
| Major projects | 225,150 | 120,000 | 98,500 | 58,500 | 502,150 |
| Minor capital works and programmes | 11,500 | 117,000 | 68,500 | 4,500 | 201,500 |
| Institutional and regulatory | 10,850 | 3,450 | 0 | 0 | 14,300 |
| **Total of Civil Aviation sub-sector** | **20,250** | **73,250** | **31,250** | **66,250** | **191,000** |
| **Urban Transport sub-sector** | | | | | |
| Major projects | 39,000 | 100,000 | 111,000 | 101,000 | 351,000 |
| Minor capital works and programmes | 32,500 | 52,000 | 47,000 | 47,000 | 178,500 |
| Institutional and regulatory | 9,500 | 1,000 | 0 | 0 | 10,500 |
| **Total of Urban Transport sub-sector** | **81,000** | **153,000** | **158,000** | **148,000** | **540,000** |
| **Transport corridors** | **9,000** | **9,000** | **9,000** | **1,000** | **28,000** |
| **Cross-cutting issues** | **4,750** | **4,250** | **4,250** | **4,250** | **17,500** |
| **Total estimated cost of the NTMP** | **2,091,180** | **2,134,950** | **2,566,000** | **2,361,100** | **9,153,230** |

## Plan financing

The cost of the NTMP programme at US$9.15 billion is very high but is an accurate representation of the funds required for the sector to address maintenance and development expenditures that will result in an improved transport sector for Malawi. Of the total requirement, the sub-sectoral requirements between 2017 and 2037 are:

- Road sub-sector: US$5.35 billion;
- Rail sub-sector: US$2.31 billion;
- Civil Aviation sub-sector: US$718 million;
- Inland Water Transport sub-sector: US$191 million; and
- Urban Transport sub-sector: US$540 million.

An additional US$45.5 million will be required to address other cross-cutting issues and regional corridor development.

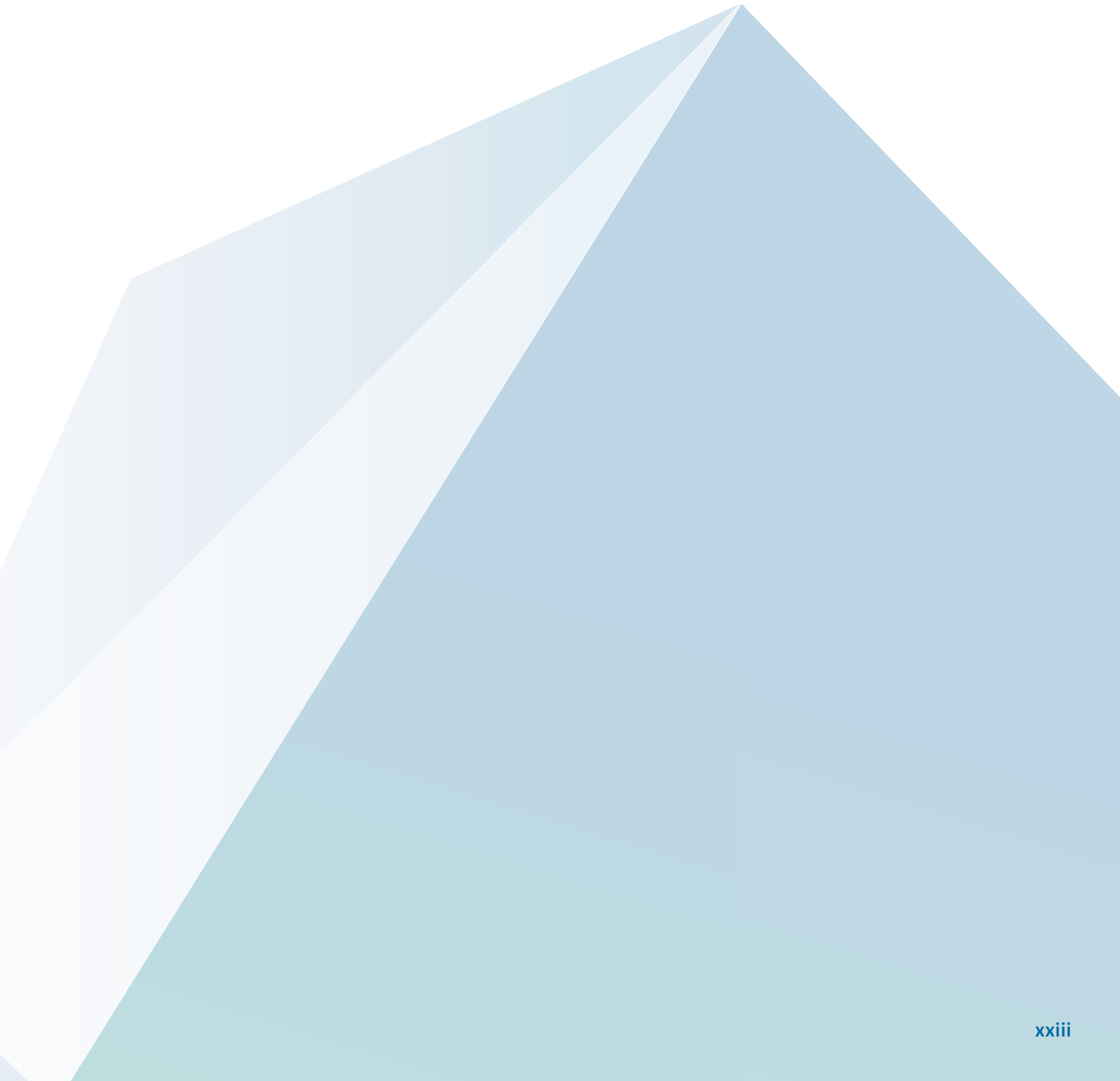
There are several funding sources and potential financing streams available for funding the NTMP programme. The main development partners in the country are the World Bank (WB), the African Development Bank (AfDB), European Commission (EC), Japan International Cooperation Agency (JICA), Republic of India, People's Republic of China, Kuwait Fund, Arab Bank of Economic Development in Africa (BADEA) and Organisation of the Petroleum Exporting Countries (OPEC) Fund.

Public sector funding for transport infrastructure projects is not only through the MoTPW. Programmes such as the Agriculture Sector Wide Approach have financed upgrading, rehabilitation, and maintenance of rural roads. It is therefore important to consider wider beneficiaries from the mining and agricultural industries for example as a source of funding. In addition, the Government can consider issuing bonds to raise capital for project funding.

**Cost of the NTMP programme US$9.15billion.**

There is scope for private sector participation in the NTMP implementation, which can be arranged through PPP or different transfer options such as Build Operate Transfer (BOT), Build Own Operate Transfer (BOOT), concession and privatisation.

Specifically, for cross-cutting issues like climate change, there are several global and regional funds that the Government of Malawi can consider, including the Adaptation Fund (AF), The Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF), Africa Climate Change Fund (ACCF), and the Green Climate Fund (GCF).



Dedza to Monkey Bay (S127) descending escarpment with good roadside drainage.

ATKINS

Malawi National Transport Master Plan

# A: Analysis and proposals

Final Report

Good condition of
the track near Maleule.

# 1 Introduction

## 1.1 Introduction to the National Transport Master Plan

The Government of Malawi commissioned WS Atkins in February 2016 to carry out a study and prepare a National Transport Master Plan (NTMP). The primary objective of the study was to develop a plan to guide the sustainable development of an integrated multi-modal transport sector over the period 2017 to 2037.

The study has identified the requirements of the sector in terms of the transport provision required for freight and passenger services under each mode of transport and potential inter-modal transfer facilities. The NTMP is intended to include a prioritised time bound plan for institutional (organisational, policy and regulatory) reform and capacity building in all sub-sectors. This master plan covers integrated transport, as well as the sub-sectoral modes of road, rail, inland water, urban and rural transport and aviation. It has been developed working with the concerned agencies and organisations, in both the public and private sector, as well as civil society.

**This NTMP is in three parts:**

- **Analysis and Proposals**
- **Reform Action Plan**
- **Transport Sector Investment Plan**

## 1.2 Background

Malawi is a landlocked agrarian country, with one of the lowest levels of per capita income in the world. Gross National Income per capita (Atlas Method) was US$371 in 2011. With a population of 16.7 million (2016) and a land area of some 45,560 sq. miles, it is one of Africa's most densely populated countries (World Bank, 2012). Malawi has limited natural resources and is highly vulnerable to shocks, given its undiversified production and export structure, and is prone to droughts and floods. Despite improvements in food security nation-wide, the country is still experiencing frequent food shortages, especially in the southern part of the country. It is poorly integrated into the region, both in terms of trade and physical infrastructure. Its economy lacks diversification, with a high concentration in few primary commodities, which renders it vulnerable to weather and terms of trade shocks.

Between 2006 and 2010, Malawi experienced steady growth, restoration of donor support and a stable macroeconomic environment. After experiencing a period of uneven growth, episodes of high inflation, high interest rates and unpredictable donor inflows in the early part of the decade, over 2006 to 2010, the economy of Malawi grew by nearly seven percent p.a., inflation remained between six to eight percent p.a., and there was a relatively stable balance of payments with manageable current account deficits. Agriculture remains the backbone of the economy, accounting for about 85 percent of employment, and about 80 percent of the country's foreign exchange, about 60 percent of which comes from tobacco alone. Malawi's economy depends upon the effectiveness of international corridors for the import and export of its goods. Agricultural produce, primarily tobacco, is exported and fuel, fertilisers, processed food products and consumer goods are all imported.

Despite the strong economic performance in the last decade, poverty remains widespread and concentrated in rural areas. According to the recently published report of the Third Integrated Household Survey (IHS3 2010/11), the incidence of poverty as measured through the headcount index has declined only slightly from 52.4 percent (IHS2 2004/05) to 50.7 percent. The poverty levels for urban areas declined from 25.4 percent in 2005 to 17.3 percent in 2011, whereas it picked up slightly in rural areas from 55.9 percent to 56.6 percent during the same period. Income also remains unevenly distributed (the Gini-coefficient deteriorated from 0.39 in 2005 to 0.45 in 2010), reflecting inequities in access to assets, services and opportunities across the population.

The country ranks 134 out of 138 countries in the Global Competitiveness Index (GCI), with the ranking of 137 for macroeconomic environment and 135 for infrastructure. The World Bank's 2017 Doing Business report ranks Malawi 110 out of 190 economies, which is low in comparison with some of its Southern African Development Community (SADC) neighbours (eighth out of 15 SADC countries).

**Malawi is a landlocked agrarian country, with one of the lowest levels of per capita income in the world.**

Enabling Malawi to benefit more fully from the large export and growth opportunities offered by the regional and global economy requires improving the business environment; reducing the infrastructure deficit, especially energy and water supply; facilitating trade and regional integration; making credit more available and affordable, especially to smallholders; and addressing the skills gap. Governance and accountability problems also need to be addressed. Improving the business environment will depend on policy certainty and predictability, and the removal of legal and regulatory hurdles.

**Malawi's gross National Income per capita (Atlas Method) was US$371 in 2011.**

**Malawi has a population of 16.7 million (2016).**

**Malawi has a land area of some 45,560 sq. miles.**

## 1.3 **Transport context**

Malawi's transport network comprises road, rail, air and inland water transport. Roads currently carry more than 70 percent of internal freight and over 90 percent of international freight traffic. Rail was historically the main mode for international freight transport, but line closures hastened a decline which has only recently been reversed. Currently the majority of cargo, even bulk freight, is transported by road despite long distances to the ports, with Beira being the closest at 825 km. For reasons of reliability, many exporters prefer to use the Port of Durban despite an additional 1,150 km and two extra border crossings, which add to transport costs. A reduction in transport and trade costs is very much needed in order to increase the competitiveness of Malawi's produce in domestic, regional and global markets.

Government investment in the transport sector over the past twenty years has focused on the road mode. This emphasis reflects: (i) the historic closure of the only rail connections through Mozambique, but also the road links along the same corridors; (ii) the corresponding need to develop the road infrastructure to the north to improve links to Dar es Salaam Port in Tanzania; (iii) an active road transport lobby in Malawi; and (iv) the flexibility offered by road transport. Investment decisions have been driven by the need to minimise the cost of transport, given the constraints. The rail and inland waterway modes experienced considerable difficulties in continuing their operations, and even maintaining their market share in the face of strong competition from road transport. In addition, inadequate maintenance led to deterioration in the condition of infrastructure, which led to unreliable services, which led to further loss of traffic.

Transport costs and prices have high impact on the Malawian economy. Transport costs are seen to constrain Malawi's economy in two ways: (i) they increase the price of imported products such as fuel, fertiliser and raw materials; and (ii) they reduce the competitiveness of Malawi's exports. Accordingly, they have a significant impact on Malawi's economic development and on the cost of living. Previous research has shown that there are distinct differences between the unit costs for international and internal transportation. Whilst international transport costs have an influence across the economy, the relatively high cost of internal freight transport has a major impact on agricultural commercialisation given the low value of much unprocessed agricultural produce.

The Malawi Growth and Development Strategy (MGDS II) 2011 to 2016 has been the overarching document for transport sector management and development, within the framework of the 2014 National Transport Policy. Important transport sector plans including: (i) the 2010 to 2020 Road Sector Programme (RSP), (ii) the Transport Sector Investment Programme (TSIP) of June 2012, (iii) the Roads Authority's (RA) Five Year Strategic and Business Plan 2011 to 2016 and (iv) the Strategic Plan for the Ministry of Transport and Public Works (MoTPW), these have all been affected by the consequences of the 2011 economic crisis. Furthermore, contractual over-commitments in the road sub-sector have severely constrained the implementation of a substantial part of these plans, which appear to have set overly ambitious output targets in relation to available funding and implementation capacity.

## 1.4 How the NTMP was prepared

This plan was prepared in three main, and broadly consecutive, stages:

**1. Review**

**2. Analysis and forecasts**

**3. Option Development and appraisal**

Overlaid on these stages were stakeholder consultation exercises as shown schematically in Figure 1.1. The results of these consultations inform critical elements of the plan, at each stage of the plan development process.

This report is the first multi-modal plan for Malawi that has been developed using on demand forecasts. These were based on the first nationwide comprehensive transport survey. The surveys carried out in 2016 recorded:

- Traffic volumes by class of motorised and non-motorised vehicle (and where possible, pedestrians) over a 16-hour period (06.00 to 22,00 hours) at 155 locations;
- Roadside interviews of all classes of motorised vehicles over a 12-hour period (06.00 to 18.00 hours) at 102 locations;
- Origin-destination and boarding and alighting surveys of railway, coach, minibus and ferry passengers at major terminals, ports, stations, and on-board;
- Axle loads at eight locations;
- Stated preference surveys of private and public transport passengers at 18 locations;


- Transport usage and user characteristics of rural transport at nine locations in the three regions;
- International air passengers at Chileka and KIA airports;
- Road journey times at 20 locations; and
- Minibus patronage and origin-destination surveys at nine locations in Lilongwe.

The results of the surveys were used to create estimates of demand for 2016, and demand forecasts at five year periods up to 2036.

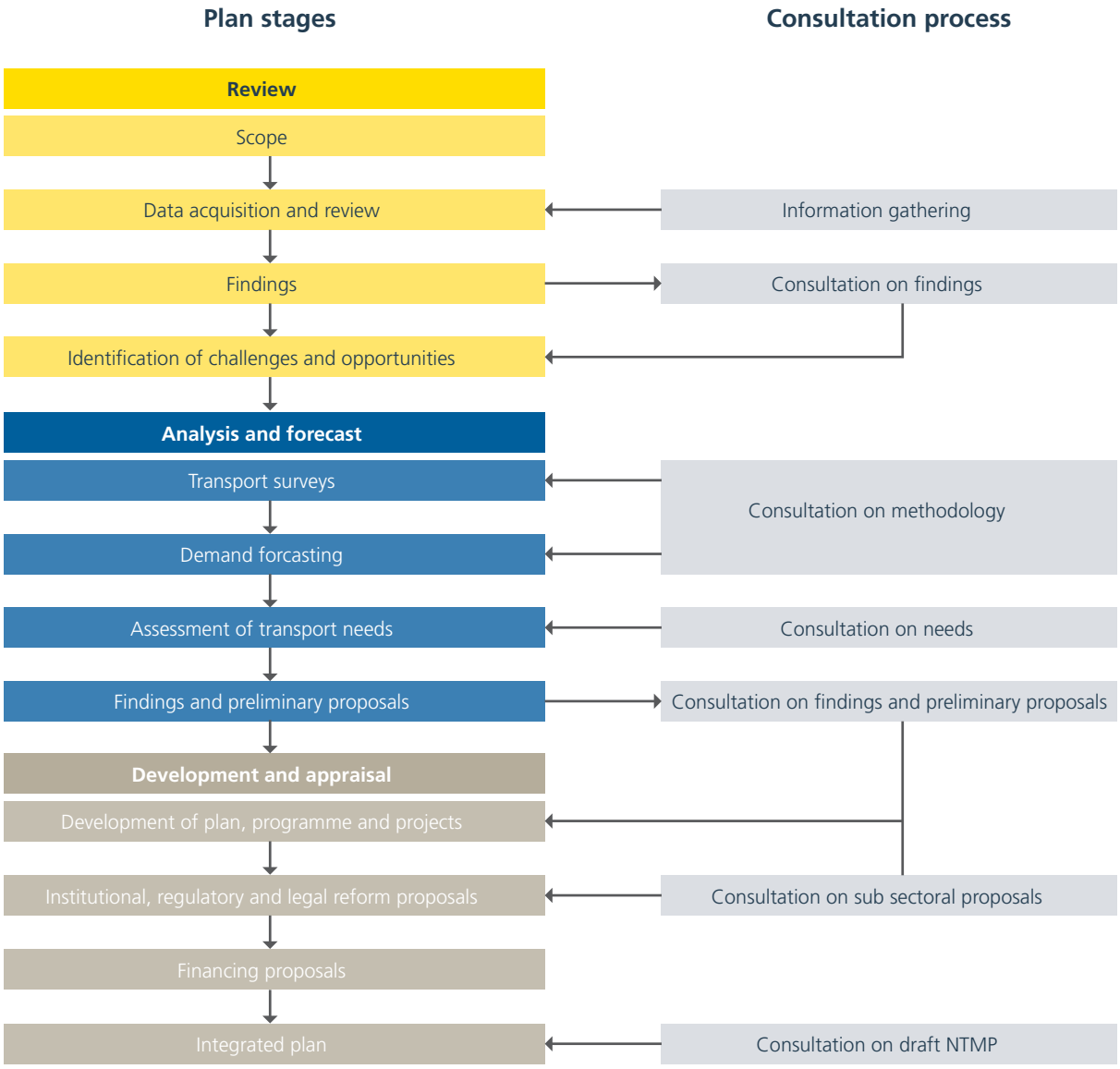
A freight model was developed to allow forecasts to be made of containers and other cargo by road, rail and inland water transport to and from Malawi from and to ports. This model is used to estimate changes in overall transport costs in response to various interventions.

A road transport model was developed to test the impact of both road infrastructure interventions, and the effects of modal shift from road to other modes.

## 1.5 Stakeholder input

Consultations were held all over the country, as shown in the full list of meetings (Appendix A) and reflected in Figure 1.1 overleaf.

**Figure 1.1 Stages of NTMP development and consultation**



Maleule station track.

# 2 Current conditions

## 2.1 Introduction

This chapter of the report presents the baseline condition of the transport infrastructure in Malawi. The analysis is built on the data collected from different stakeholders and site visits carried out by the consultants. The NTMP has been built for the next 20 years, 2017 to 2037.

### 2.1.1 Economy

The Malawi economy is currently at a recovery stage after a major downfall in 2013. The most recent data from the World Bank shows that at 2017 values, the GDP was US$7.9 billion in 2011 which fell to US$5.4 billion in 2013[1] . In addition to the world economic downturn, unfavourable weather conditions, which affected the agricultural production, impacted the macroeconomic growth.

Recent output growth in Malawi has outperformed the rest of Sub Saharan Africa, as shown in Figure 2.1.

There are a number of factors affecting the growth of GDP of the country. The major contributors are macroeconomic instability of the country and critically the infrastructure deficit. Business is adversely impacted by the high interest rates and the high cost of utilities. A power deficit affects productivity. In addition, the infrastructure deficit constrains the growth of Malawi's GDP. These limitations directly acted as a throttle to economic growth in 2015 and continue to cause a slow recovery. Figure 2.2 shows a reasonable growth of GDP in real term. Inflation, however, has been high which has caused a lot higher GDP at current prices (nominal).

**Figure 2.1 Regional output growth**

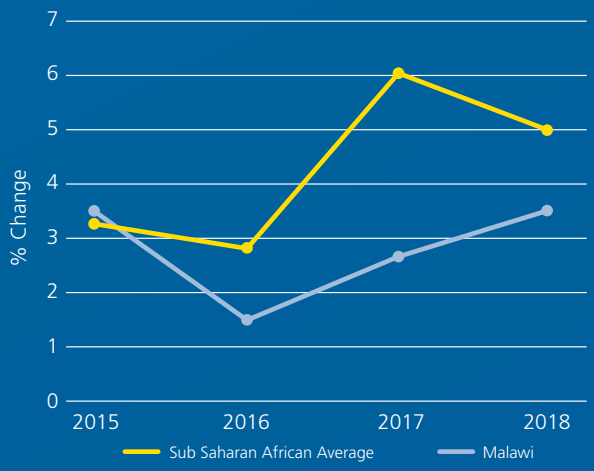
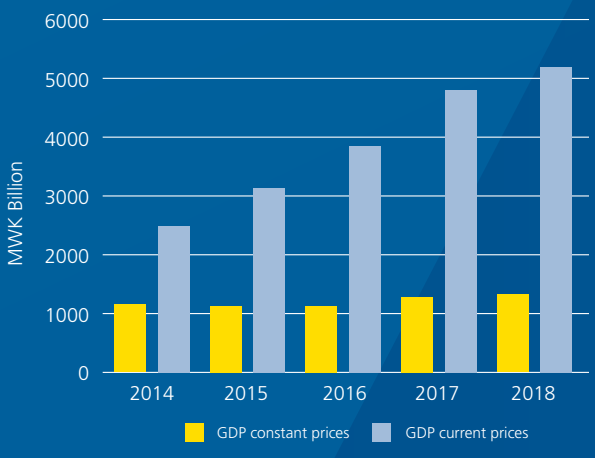



**Figure 2.2 Recent GDP growth of Malawi**




**The Malawi economy is currently at a recovery stage after a major downfall in 2013.**

1 *Source: The World Bank data for Malawi.*

According to the Ministry of Finance, Planning and Economic Development, in 2015 Malawi attained GDP growth of 3.1%. Initial estimates for GDP growth in 2016 from the same source indicates that the economy will expand by 5.1%, an increase from the rate registered in 2015. Sectors that have experienced the highest growth rates recently are wholesale and retail trade, accommodation and food services (tourism), and information and communications. Table 2.1 shows how the key sectors have been growing in Malawi and their expected contribution to the overall GDP in 2017.

While the GDP forecast shows a good and steady growth from 2015 to 2017, the recovery is expected to slow down in 2018. The reasons for the variation of sectoral growth, as presented in the Table 2.1 overleaf, are summarised below:

- **The agricultural sector** shrunk in 2016 due to the adverse weather conditions such as the late onset of rains, the uneven distribution of rainfall and dry spells which negatively affected the sector. Switching to alternative crops by tobacco farmers is expected to boost the country's foreign exchange earnings position. In 2018, agriculture is projected to grow by 3.4 percent in anticipation of continued good weather conditions. The export values in 2017 of traditional exports are shown in Figure 2.3. Tobacco remains by far the most important export crop, contributing 65% of export value. According to 2018 projection, the growth, however, is expected to slow down.
- **The mining and quarrying** sector growth has been driven by the production of minerals and coal. The growth was lower than expected in 2016 due to delays in the commencement of production of Kanyika Niobium Mine by Globe Metals and Mining in Mzimba. The resumption in production of uranium at the Kayelekera Uranium Mine is expected to take place during 2018, as international uranium prices rise.
- **The manufacturing** sector struggled due to energy challenges, declining aggregate demand and limited availability of raw materials for industrial production. The agricultural sector supplies most of the raw materials for industrial production. Growth of the sector will mainly be due to increase in aggregate demand, availability of raw materials and stability and availability of foreign exchange.

**According to the Ministry of Finance, Planning and Economic Development, in 2015 Malawi attained GDP growth of 3.1%.**

In 2018, the sector's growth is projected to remain strong with a growth of 6.0 percent.

- **The electricity, gas and water** sector experienced modest growth rates due to the challenges in hydropower production, which was affected by low water levels of the Shire River and lack of implementation of critical projects. A slight increase of the growth rate is expected in 2018.
- **The construction** sector registered moderate growth of 3.4 percent in 2016. Growth of the sector was affected by the accumulation of the government arrears.
- **The wholesale and retail trade** sector growth is expected to improve in 2017. The improvement is mainly attributed to favourable weather conditions, which has resulted in increased disposable income. In addition, stability of the Kwacha against the currency of major trading partners, is also expected to contribute to the growth of the sector. In light of these underlying factors, the sector is projected to grow by 6.6 percent in 2017.
- **The transport and storage services** sector was estimated to have slowed down in 2016. The major contributing factor was mainly low agricultural production which has a direct impact on the sector. On the other hand, distribution of relief items increased demand for transportation and storage services. As a result, the sector registered a growth of 4.7 percent.
- **The accommodation and food services** sector remains strong. In 2016, the sector had a growth of 5.7 percent. The introduction of more flights into Malawi by major airlines is positively contributing to the growth of the tourism industry. Activities in accommodation and food services are expected to increase by 4.6 percent and 3.9 percent in 2017 and 2018, respectively.

**Table 2.1 Annual sector growth (percentage) and sectoral contribution to GDP**

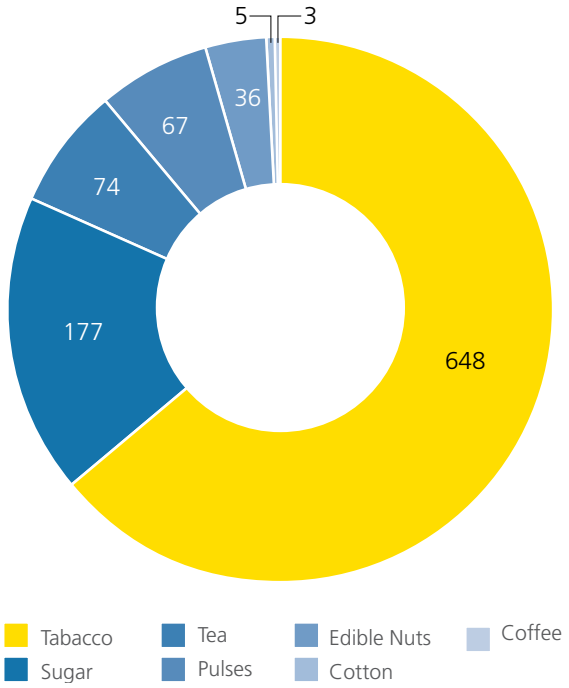
| Sector | 2013 | 2014 | 2015 | 2016* | 2017* | 2018* | 2017 Contribution to GDP |
|---|---|---|---|---|---|---|---|
| Agriculture, forestry and fishing | 6.2 | 6.3 | -1.6 | 3.2 | 6.9 | 3.4 | 27.7 |
| Mining and quarrying | 6.9 | -4.6 | 1.1 | 0.4 | 1.6 | 2.3 | 0.8 |
| Manufacturing | 5.6 | 6.3 | 3.8 | 3.4 | 5.4 | 6.0 | 9.4 |
| Electricity, gas and water supply | 5.5 | 3.0 | 2.3 | 2.7 | 4.0 | 4.5 | 1.2 |
| Construction | 2.0 | 4.8 | 3.4 | 2.1 | 3.5 | 5.9 | 2.8 |
| Wholesale and retail trade | 7.9 | 6.3 | 4.7 | 5.6 | 7.9 | 3.8 | 15.8 |
| Transportation and storage | 5.3 | 4.8 | 4.6 | 6.6 | 4.6 | 5.9 | 2.8 |
| Accommodation and food services | 5.1 | 5.9 | 5.6 | 6.2 | 6.5 | 3.9 | 1.9 |
| Information and communication | 7.5 | 12.2 | 8.5 | 5.4 | 6.4 | 3.5 | 4.3 |
| Financial and insurance services | 3.8 | 5.5 | 6.9 | 4.7 | 6.8 | 8.1 | 5.4 |
| Real estate activities | 2.5 | 3.7 | 1.6 | 3.1 | 2.9 | 2.7 | 7.3 |
| Professional and support services | 5.5 | 7.4 | 4.6 | 7.7 | 3.0 | 5.2 | 0.3 |
| Public administration and defence | 2.7 | 5.1 | 6.3 | 6.1 | 6.2 | 7.2 | 2.1 |
| Education | 5.4 | 4.0 | 5.9 | 7.4 | 6.7 | 6.7 | 2.8 |
| Health and social work activities | 5.1 | 4.2 | 3.5 | 7.6 | 6.7 | 6.2 | 2.7 |
| Other Services | 5.5 | 5.4 | 5.9 | 5.5 | 4.3 | 5.3 | 5.0 |
| **GDP at constant market prices** | **6.3** | **6.2** | **3.1** | **5.1** | **7.0** | **5.0** | |
| **GDP at current prices** | **23.8** | **31.5** | **26.5** | **21.5** | **23.6** | **12.4** | |

*Projection
Source: NSO and DEPD

- **The information and communication sector** grew in 2015 by 4.0 percent, due to an increase in network coverage and new entrants on the market. In addition, the innovations to access services such as transferring money and social networks on mobile phones have positively contributed to the growth of the sector.
- **The financial and insurance services** sector is estimated to remain robust in 2017 and continue to grow in a steady rate in 2018. Reduction in the policy rate is expected to increase private sector credit and reduce non-performing loans. The policy rate is currently at 22 percent and is expected to decline further, depending on the inflation path.
- **The real estate** sector is estimated to have grown by 3.1 percent in 2016. Some of the factors that contributed to the growth was the rural-urban migration. The sector is projected to sustain growth of 2.8 percent and 2.7 percent in 2017 and 2018, respectively. Moreover, the additional dwelling units are expected to be constructed in the country by the Malawi Housing Corporation (MHC). This will contribute to the growth of the sector.
- **The professional and support services** sector was expected to grow in 2016 and continue to grow in 2017, albeit at a slower rate. The sector is sensitive to the amount of legal work being undertaken.
- **The public administration and defence** sector is expected to grow by 6.1 percent in 2016. The subsequent growth in 2017 and 218 is expected to be slightly higher than 2016.
- **The education** sector is expected to continue to grow in 2017, owing to the good performance of private schools.
- **The human health and social work activities** sector is estimated grow in 2017 as a result of the increased number of in-patients in public and private hospitals. In addition, most private hospitals have increased fees and the number of people seeking health services in private hospitals has also increased.

In terms of the **transport sector**, Malawi's transport network, as detailed previously, comprises road, rail, air and inland water. The sections that follow introduce each of these four modes in turn as well as urban transport, rural transport and road safety, which is a major concern facing the sector.

**Figure 2.3 Values of traditional exports, 2017, US$ million**




Source: Annual Economic Report 2017, Ministry of Finance, Economic Planning and Development

## 2.1.2 Road

Malawi's classified road network comprises of 15,451km of roads, which includes Main (21.7%), Secondary (20.2%), Tertiary (26.7%), District (22.7%) and Urban (8.7%) roads. This statistic is based on the 2009 Road Data Management (RDM) survey. Only 26% of the national road network is paved[2]. Whilst most Main roads are now paved, the vast majority of the Secondary and Tertiary roads are unpaved. Main roads provide the strategic linkage across the country. Figure 2.4 shows the Main and the Secondary roads of the country.

The condition of the paved road network is considerably better than that of the unpaved road network, as shown in Table 2.2. The condition of unpaved roads tends to be compromised by dusty conditions, uneven surfacing and potholes, while paved roads across the country exhibit signs of general wear-and-tear and shoulder degradation. Unpaved roads are also particularly susceptible to flooding and drought, instances of which have become more frequent and severe in recent years, something that has been attributed to climate change. In 2015, for example, flooding submerged, weakened and in some instances completely removed the soil and culverts that support some of Malawi's roads, tunnels and bridges.

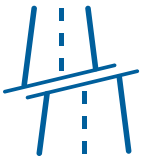
2 *Source: based on Roads Authority data (2013).*

In 2010, 26% of the classified road network was in a 'poor' condition, and while some of this network has since been upgraded and maintained, there is also potential for general deterioration. Approximately 60km of the paved highway is either rehabilitated or resealed annually. However, without more frequent rehabilitation and periodic maintenance the condition of the paved roads is likely to worsen. These data are based on the International Roughness Index (IRI) and do not take account of other factors such as shoulder condition, which are important to non-motorised transport on rural roads.

More recent data was collected in 2014 for the paved network. Table 2.3 shows summary roughness conditions for the paved network in 2014.

IRI data for the M1 has been extracted from the RDM and is shown in Table 2.4. The M1 is, on average, in better condition than the paved network as a whole, particularly the Lilongwe-Blantyre section.

**Malawi's classified road network comprises of 15,451km of roads.**



**In 2010, 26% of the classified road network was in a 'poor' condition.**

**Table 2.2 Condition of Malawi's classified road network as of June 2010**

| Road class | Paved | | Unpaved | | Total | |
|---|---|---|---|---|---|---|
| | Km | % | Km | % | Km | % |
| Good | 2,426 | 60 | 5,000 | 44 | 7,426 | 48 |
| Fair | 1,361 | 33 | 2,654 | 23 | 4,015 | 26 |
| Poor | 286 | 7 | 3,274 | 33 | 4,010 | 26 |
| **Total** | **4,073** | **-** | **11,378** | **-** | **15,451** | **-** |

Source: Roads Authority (2013)

**Table 2.3 Summary of the road condition, paved network, 2014**

| | Good | Fair | Poor |
|---|---|---|---|
| | IRI < 3.5 | IRI 3.5 – 5.0 | IRI > 5.0 |
| % | 30.3 | 52.5 | 17.2 |

Source: RDM

**Table 2.4 Road condition of the M1, 2014**

| Road section | Good | Fair | Poor | Total |
|---|---|---|---|---|
| | IRI < 3.5 | IRI 3/5 – 5.0 | IRI > 5.0 | |
| Karonga - Mzuzu | 64.1 | 179.3 | 28.3 | 271.7 |
| Mzuzu - Lilongwe (Town Hall) | 63.8 | 244.6 | 42.8 | 351.3 |
| Lilongwe - Blantyre | 180.2 | 113.6 | 13.3 | 307.1 |
| Blantyre - Nchalo | 11.0 | 34.2 | 27.9 | 73.1 |
| Nchalo - Nsanje | 33.3 | 48.9 | 1.0 | 83.2 |
| **Totals** | **352.5** | **620.7** | **113.3** | **1086.5** |
| % | 32.4 | 57.1 | 10.4 | 100.0 |

Source: RDM

## Figure 2.4 Main and secondary road network


**Legend**

- Main Roads
- Secondary Roads
- Major Cities
- Major Lakes
- Country Borders

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The key issues surrounding the Malawi road network are summarised below:

- The road condition is impacted by **high traffic volumes** at certain sections of the network, as well as by **overloaded vehicles**. Overloading is a major threat to the road condition.
- While the extent of the road network is considered to be sufficient, some of the links in the network are **capacity constrained**.
- A number of community roads are **not well suited to non-motorised vehicles** for safety reasons.
- Some areas in the network present **major safety issues** due to limited capacity, which causes greater conflict between motorised and non-motorised vehicles. The main urban areas provide albeit **limited segregated pedestrian facilities**. The road network in rural areas has no such facilities and is subject to higher road safety challenges. Safety levels are also poor at road-rail level crossings.
- The number of culvert and bridges are **insufficient** and the widths of the majority of them on district roads are too **narrow**.
- **The proportion of all-weather roads is low** (only 26% were paved in 2009). In 2010 it was estimated around 74% of the rural population lived more than 2km away from all-weather road (World Bank 2010). Roads are susceptible to major weather events and impacts due to climate change.
- The road maintenance is severely affected by a **lack of funds**. The current expenditure on road maintenance is below the required level to sustain the infrastructure.
- **Low standard of construction of unpaved roads**. Most of the unpaved rural road network has an earth surface, a considerable proportion of which is either constructed from poor strength natural sub-grade material or is entirely unimproved. In the wet season roads without proper drainage and clearance become very difficult to access.

- **Vulnerability to extreme weather conditions**, such as drought and flooding, which are increasing in their frequency and severity as a consequence of climate change.
- The use of **poor quality construction materials** for both roads and bridges causes early deterioration of the infrastructure. Further to that, the majority of paved roads observed during the study, do not have adequate edge protection.
- **Lack of drainage facilities** also severely impacts the longevity of the asset and constrains access to the road users.
- The **social exclusion** of certain communities, which are often concentrated in rural areas, as a result of poor access to transport services.
- The negative environmental and equity impacts associated with the **increasing ownership and use of private motorised vehicles** and also of the carbon intensive vehicle technologies and fuels being used.

Further details of the road sub-sector are presented in the "Road Sub-Sectoral Plan" report of this Master Plan.

### 2.1.3 Rail

The rail network in Malawi is not comprehensive. The national network covers the central and the southern part of the country as shown in Figure 2.5. There is no network coverage in the northern part of the country. The main features for the network are:

- Single track with loops;
- "Cape" gauge: 1,067mm; and
- Unelectrified.

The majority of the network is being used for freight movement. There are certain sections where a passenger service is being offered. There are four branches of the network within the country namely:

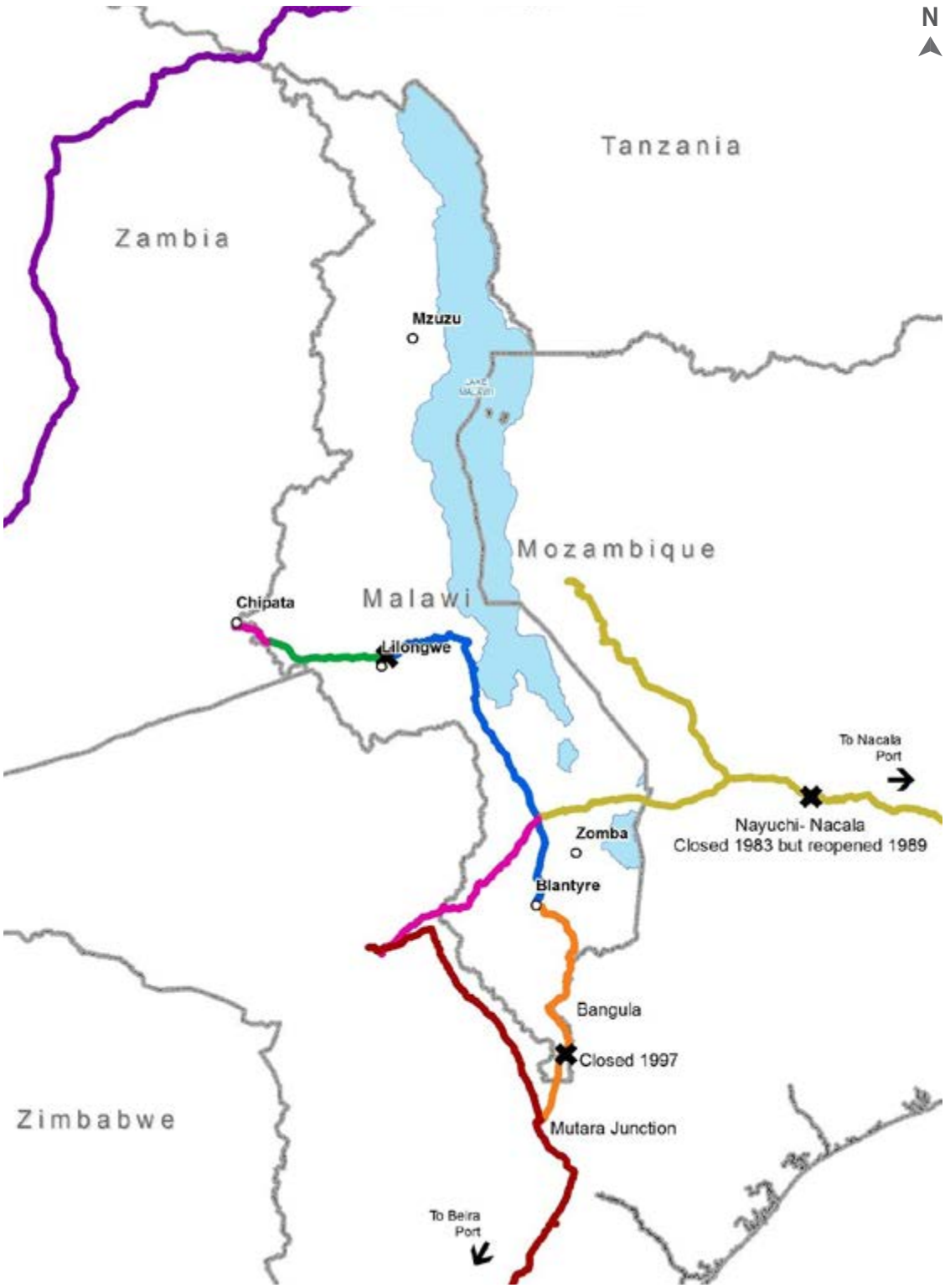
- **Nkaya to Kachaso (west):** This 136.5km long section is a newly built line which became operational from 2015. The line has been built to handle a 20.5 tonne axle load. It consists of a single track with five passing loops. Each loop is long enough to handle two passing 120 wagon trains plus 4 locomotives plus a small amount of extra length as operational spare land. Beyond the national border, the line connects to Moatize in Mozambique. At Nkaya junction work has been undertaken recently to establish a marshalling yard.
- **Nkaya to Nayuchi (east):** This 99km stretch to the east up to the border with Mozambique has recently been rebuilt. The line continues a further 700km into Mozambique to connect with the Nacala Port. It has been rebuilt to handle a 20.5 tonne axle load. The line consists of a single track with six passing loops, including the yard at Liwonde. Each loop is long enough to handle 120 wagon trains with locomotives plus a small amount of extra length as operational spare land. There is no domestic terminal on this route except at Liwonde.
- **Nkaya - Limbe - Makhanga (south):** The entire route section to the border is 297km in length but around 200 km of the route is currently non-operational. The operational section between Nkaya to Limbe has recently been improved from 15 tonnes axle load handle capacity to 18 tonnes. In addition to freight movements, this section offers passenger rail service up to Limbe. The un-operated section of 120km, between Limbe and Makhanga, is expected to be upgraded in 2019. It is expected that Central East African Railways Limited (CEAR) will bring back as far south as Sandama into use for both freight and passenger by 2019.

**Table 2.5 Key features of the rail lines**

| Key Features | Nkaya-Kachaso | Nkaya-Nayuchi | Nkaya-Limbe-Marka | Nkaya-Mchinji/ Chipata |
|---|---|---|---|---|
| **Total length** | 130.5 km | 99 km | 297 km* | 400 km |
| **Maximum line speed** | 70 kmph | 70 kmph | 50 kmph | 50 kmph |
| **Haulage time** | 2-3 hrs | 3-4.5 hrs | 5-7 hrs | 20 hrs |
| **Maximum axle load** | 20.5 tonnes | 20.5 tonnes | 18 tonnes | 15 to 18 tonnes |
| **Track** | Single | Single | Single | Single |
| **Passing loops** | 5 | 6 | | |
| **Concession** | VLL/CLN | CEAR | CEAR | CEAR |
| **Condition** | Good | Good | Nkaya-Limbe: fair, ongoing improvement work<br>Limbe-Makhanga: closed<br>Makhanga-Marka: closed | Speed restrictions, spot improvements ongoing |

* Including 120.6km of the non-operational section

**Figure 2.5 Railway construction dates**




**Legend**

- Built 1909 - 1915
- Built 1922 - 1949
- Completed by 1970
- Built 1982 - 1992
- Built 2012 - 2015
- Opened 1970/2: Occasionally closed
- Tazara Railway 1975

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**Figure 2.6 Railway distances and maximum axle loads**


**Legend**

- 20.5 Tonnens/Axle
- 18 Tonnens/Axle
- 15 Tonnens/Axle
- 15 Tonnens/Axle proposed for rebuild for 2019
- N/A of fully closed

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**Figure 2.7 Map of concession areas**


## Legend

- Mozambique: CDN
- Mozambique: CFM
- North CEAR
- South CEAR Sena line open
- South CEAR Sena line closed
- South CFM Sena Line (closed)
- East CEAR
- Tazara Railway
- West VLL/CLN
- Zambian Railway Ltd.

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- **Nkaya – Mchinji / Chipata (north and north-west):** The entire route is around 400km which comprises of 12km section between Chipata and Mchinji; 110km between Mchinji and Kanengo; 105.5km between Kanengo and Salima; and 172km section between Salima and Nkaya. The route has suffered significantly from the recent washout, particularly between Balaka and Salima. The line terminates around 389km from the Tazara line and around 150 km from the Petauke mine in Zambia. The line loading capacity is 18 tonnes between Chipata and Salima, and 15 tonnes per axle between Salima and Nkaya.

The key features of the four branches of the rail network are set out in Table 2.5. Railway distances and maximum axle loads are shown in Figure 2.6.

Railway operations in Malawi are concessioned to CEAR. Zambia Railways Limited operate on the Nkaya – Mchinji/Chipata and Nkaya – Nayuchi section. Corredor Logistico Integrado de Nacala (CLN) also operates on the Nkaya – Nayuchi section.

A map of railway concessions is shown in Figure 2.7.

The key issues surrounding the Malawi rail network are summarised below:

- There are **skill gaps and a shortage of local expertise** in significant areas of the rail operation and management. It is essential to develop local skilled resources who are capable of managing their own asset.
- The institutional framework in the ministry is not strong. It is supported by only two professional staff, which overstretches the resource and **limits the capability of fulfilling** the roll of the institution, efficient data management and maintaining a working relationship with CEAR.
- Lengthy processes at the border posts and imbalanced trade affects the cost of railway operations.
- The rail network is **not comprehensive** in Malawi. The network only covers the central and the southern region of the country. There is no railway line in the north of the country. It perhaps provides Malawi with a significant opportunity to link with the TAZARA line in Tanzania. There **is a lack of investment** to expand the rail network.
- There is **lack of operational efficiency** in the rail system. Issues include the absence of a published time table for both passenger and freight, excessive dwell time at a station, inefficient passenger counting process and the use of the data.
- There are **gaps in the regulatory framework**. There is no independent safety regulator.
- There is a need for **improving the strategic directives** not only to improve the national rail network, but also to enhance regional **co-ordination** with the neighbouring countries.
- The rail sector is **not fully integrated** with other transport modes. With the right level of investment, rail transport can be well integrated with inland water transport and roads to better link with major economic activities including mining and agriculture.
- In spite of CEAR's social obligations there are **missed opportunities to serve communities that cannot be reached by road-based modes** of transport, for example in areas where there are few minibuses owing to the poor condition of local roads.
- There is unrealised potential for the rail sector to make a larger **contribution to reducing GHG emissions** from the transport sector. This includes promoting a shift from road to rail freight transport, improving motor efficiency, increasing axle loads and exploring the use of alternative fuels.

Further details of the rail sub-sector is presented in the "Rail Sub-Sectoral Plan" report of this Master Plan.

**The entire length of Lake Malawi is navigable and is used for passenger and freight movements.**

**Table 2.6 Summary of port facilities on Lake Malawi**

| Port | Machinery | Storage area | Condition |
|---|---|---|---|
| Monkey Bay | 1 x mobile crane<br>1 x tractor<br>1 x trailer | Dry - 500m2<br>Liquid - N/A | Old and dilapidated.<br>Rehabilitation in 2013. |
| Chipoka | 1 x 35 mt gantry crane<br>4 x 3 mt forklifts | Dry – 800m2<br>Liquid - 923,000 litres | Old and dilapidated.<br>Rehabilitation in 2013. |
| Nkhata Bay | Machine tools<br>Cranes | Warehouses | Jetty is currently not operational. |
| Chilumba | 1 x 35 mt gantry crane<br>1 x 20 mt mobile crane<br>1 x 6 mt forklift<br>5 x 3 mt forklifts<br>1 x tractor<br>1 x trailer | Dry- 800m2<br>Liquid - 583,000 litres | Gantry crane lost.<br>Old and dilapidated. |

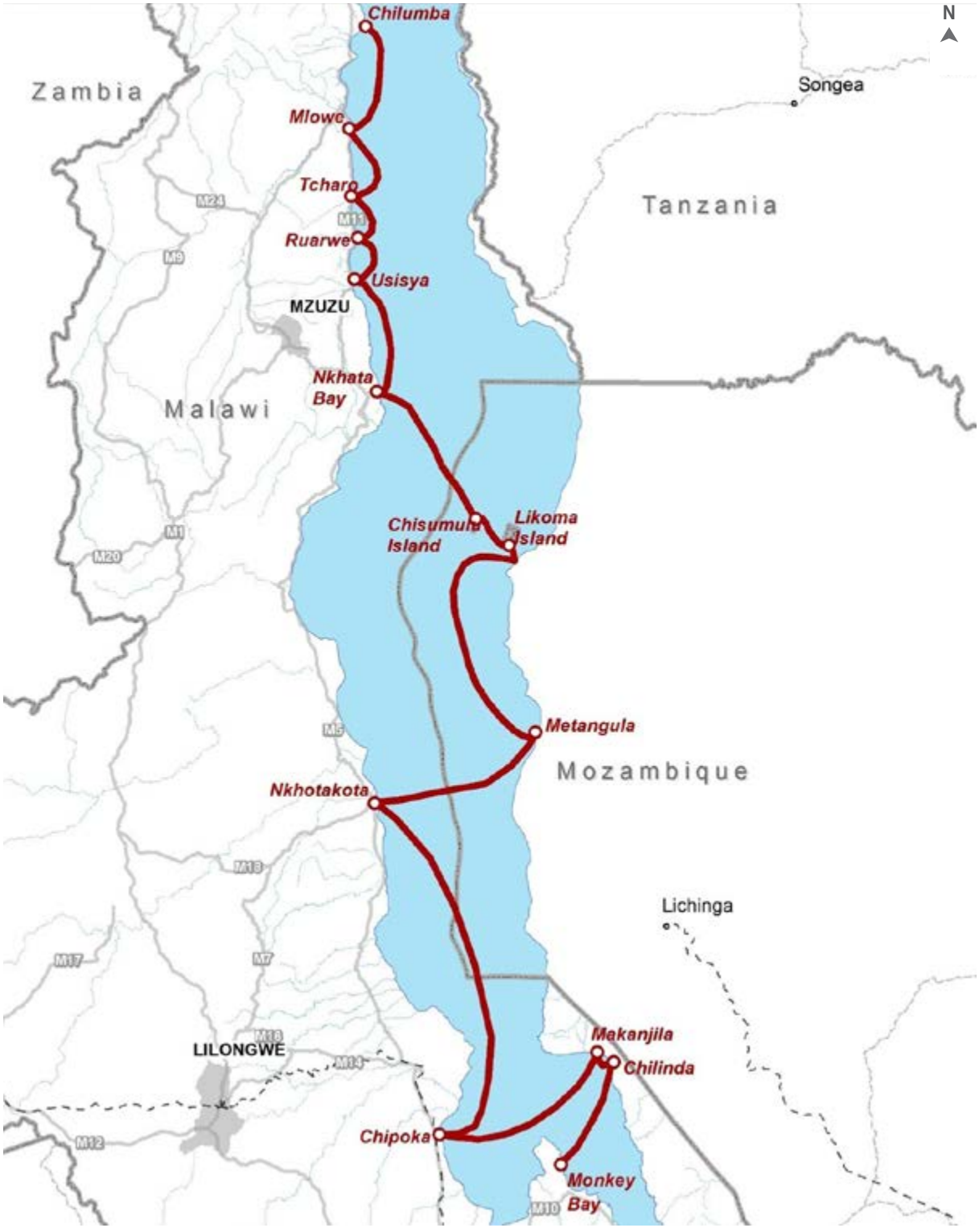
### 2.1.4 Inland water transport

Malawi's inland water transport system largely consists of Lake Malawi and the Upper Shire River, which are connected. The entire length of Lake Malawi is navigable and is used for passenger and freight movements, but while it used to be an essential transport link to the south of the country transport services on Lake Malawi have declined in the last few decades. This is mainly due to road network expansion, which was relatively undeveloped at the peak of demand for inland water transport in the 1980s. Also, while other transport modes have evolved, there have not been any progressive changes to the inland water transport sector, which has contributed towards the loss of modal share. Indeed, as can be seen in Table 2.6, most of the four major ports on the lake (Chipoka, Monkey Bay, Chilumba and Nkhata Bay) are in poor condition. The four ports are managed under a concession to the Malawi Ports Company (MPC), which does not appear to have invested in the ports and in some cases operating conditions have worsened since the agreement was signed. At present, only Chipoka and Chilumba can handle cargo. Attempts to revive inland water transport in Malawi with the development of new concessions bringing private investment to the development and operation of transport services across the lake have proved unsuccessful.

The transport services on the lake have also been affected by changes in economic and political circumstances, which have had an impact on traditional transport corridors. Services are now largely focused on meeting public sector obligations to remote communities, and if the sub-sector is to compete more widely then it will need to be better integrated with the wider transport network. A drop in water levels in recent years has also had a considerable impact on accessibility and maritime infrastructure. At Chipoka, for example, water levels have dropped by more than a metre and it is not possible to dredge the berth further without undermine the existing wall, so vessels with a large draft cannot currently berth at the port.

There are currently no official passenger or freight services on the Shire River, which flows into the Zambezi River in Mozambique and with a length of 400km is the largest river in Malawi. There are localised river crossings and it is used by local fishermen, but the Upper Shire River is navigable from Mangochi to Liwonde and vessels have reached Liwonde in the past. The Middle Shire River is not navigable owing to its steep gradient and the existence of rock bars and while some portions of the Lower Shire River used to be navigable from Nsanje to the Zambezi River large amounts of sedimentation and river week are currently preventing it from being used for navigation, although opportunities to remove this restriction are being explored.

### Figure 2.8 MV Ilala service route




**Legend**

- Lake Malawi ports
- MV Ilala route
- International railways
- Main roads
- External roads network
- Cities
- Major rivers
- Major lakes

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The key issues surrounding the Malawi inland water transport network are summarised below:

- The inland water transport is **not well integrated** with the other modes i.e. road and rail in Malawi. Both road and rail modes provide much better and reliable services compared to the inland waterways. Only Chipoka Port is currently connected to rail, however the port is not operational.
- **The existing navigation system is poor.**
- The **condition of the port infrastructure is poor**. It is further impacted by the drop in water levels of the lake.
- Due to the condition of the existing vessels and poor navigation facilities, vessels suffer **from low operating speeds.**
- There is a **lack of maintenance** of both the vessels and the port facilities. Funding constraints and lack of skilled labour are the key issues affecting the maintenance of the infrastructure.
- There is a **need for institutional strengthening** in this sector. The capacity needs to be improved and adequate training needs to be provided to the operation and management staff in this sector.
- **Private sector participation in the maritime sector has not been successful.** The sector is currently unattractive to private sector investors.
- There is a **lack of a safe and affordable means of accessing services** for communities that rely on waterborne transport services to reach essential functions such as hospitals and markets.

**There are 33 airfields in Malawi, which include two major international airports and five secondary airports with international access.**

- The **impacts of climate change** are increasingly affecting the sub-sector, Increasingly, heavy rainfall, for example, is leading to increased runoff that is causing silt and debris to accumulate and create shallower and less accessible channels for navigation, and persistent drought is contributing towards a decrease in the water levels of lakes and rivers.

Further details of the water transport infrastructure and its condition are presented in the "Inland Water Transport Sub-Sectoral Plan" and in the "Transport condition" report, which is another deliverable produced as part of this study.

### 2.1.5 Civil aviation

There are 33 airfields in Malawi, which include two major international airports and five secondary airports with international access. The remaining 26 airfields are restricted to basic airstrips of grass or low grade material and little or no buildings associated with them. Most airports are operated by the Malawi Government Department of Civil Aviation (DCA), with the exception of Kamuzu International Airport (KIA), operated by Airport Development Limited (ADL). The national parks and industry owners account for others as they are linked to local tourist or produce centres. Table 2.7 presents some of the key features of the main airports in Malawi.

**Table 2.7 Key features of the airports in Malawi**

| Features | Kamuzu International, Lilongwe | Chileka International, Blantyre |
|---|---|---|
| Aircraft parking facility | 14 | 4 |
| Runway length | 3,540m | 2,325m |
| Aircraft handling capacity | Code D & E | Code D & E |
| Passenger capacity | 300,000/year | 200,000/year |
| Cargo handling capacity | 3,000 tonnes/year | 550 tonnes/year |
| Runway condition | Good | Poor |
| Navigation aids | Radar not available.<br>ILS available and functioning | Instrument Landing System (ILS) or radar are not available. |

Malawi Airlines Limited was created in a partnership with Ethiopian Airlines (49%) in 2013. The airline is currently running on two main domestic and six international destinations. They are:

- Lilongwe (administrative base);
- Blantyre (maintenance base);
- Johannesburg;
- Dar es Salaam;
- Nairobi;
- Lusaka;
- Harare; and
- Zanzibar (added in April 2017).

The airline operates one or two flights daily to most of the above key destinations and every alternative day to less busy routes. The international carriers that operate to Malawi are Ethiopian Airlines, South African Airlines and Kenyan Airlines. Low-cost operators have attempted to enter into the Malawi civil aviation market with start-ups like Fast Jet.

The attempts of these low-cost operators have not, however, been successful in the past due to issues surrounding fuel purchase.

International cargo operation by air is limited in Malawi. Emirates operate a cargo service from KIA.

Tourism and feeder services are operated by small, independent companies such as Ulendo Air Link based at Lilongwe KIA. They have access to a range of the smaller airstrips in Malawi and fly to Mfuwe in Zambia as part of a safari package service. The main internal destinations are:

- Lilongwe (base);
- Likoma;
- Club Makokola; and
- Mzuzu.

The Cessna Caravan is one of the main types of aircraft in use and is ideally suited in range and capacity for small groups and charter work as tourist opportunities become available to serve.

The key issues surrounding the Malawi civil aviation sector are summarised below:

- **Lack of funds** to carry out proper maintenance of the infrastructure, which has caused deteriorated infrastructure. This leads to occasional suspension of operation.
- **Lack of world class safety standards**.
- **Navigation aids are not available** in any of the main and secondary airports. There is a need for improved technology to enhance safety and security.
- Malawi Airlines is still **unprofitable** on overall passenger services.
- There are a limited number of carriers to serve the aviation market. Due to the geographic location, long haul flights basing outside of Malawi, **results in the high cost of air transport**. Other factors causing high transport costs are:
  - High fares charged by the few airlines operating within Malawi;
  - High taxes on operators, public and commercial bodies to keep high revenue at a national level; and
  - High aviation fuel costs.
- **Difficulty in monitoring the performance** of individual airports due to the lack of good record keeping and flow of information.

**The four major urban areas of Malawi currently make up 2.5% of the national population.**

**All four urban areas are well connected to the national strategic road network.**

- **Gaps in regulation** especially concerning remotely piloting aircraft systems (commonly known as drones) and air navigation services.
- **Limitation in the existing governance structure** and lack of relevant skill sets to perform operation and management activities including security, and accidents investigation.
- **Lack of fully developed tourism facilities** in the country, and limited marketing, resulting in relatively low tourist numbers.
- **Limited resilience to climate change impacts**, which are contributing towards the risk of compromised performance, including owing to reduced runway capacity because of damage to runways and buildings infrastructure, including power and IT equipment, which is susceptible to flooding and extreme heat.

A detailed account of the aviation sector condition is presented in the "Civil Aviation Sub-Sectoral Plan" and the "Transport condition" report, which is another deliverable produced as part of this study.

### 2.1.6 Urban transport

The Urban Transport Sub-Sectoral Plan of the NTMP is built around four major urban areas of Malawi, which currently make up 2.5% of the national population. These four urban areas are Blantyre, Lilongwe, Mzuzu and Zomba. Whilst the size of the urban population is proportionately low, the combined GDP contribution of Blantyre and Lilongwe is around 31%. This is undoubtedly a significant contribution where the country is still a rural agro-based country. Brief introductions to these four major urban areas are given below.

**Blantyre** is the commercial hub of Malawi situated in 220 sq km in the Shire Highlands. 16% of the land use is commercial development and the rest is residential, of which 42% is planned residential area. It has the largest population density for the country, where the estimated population in 2008 was 661,444[3]. As a commercial and industrial capital, the city has a strong solid economic base for sustained economic growth and a diversified modern economy offering a wide range of employment opportunities. The employment is driven by mainly private sector (42%) and self-employed (36%) people. Amongst other basic infrastructure and facilities, around 85% of the population has access to water.

**Lilongwe** is the capital of Malawi and hosts the majority of the administrative activities. Since becoming the capital the city has rapidly grown into a New Town in the central areas along with the remaining Old Town, which was part of the original fishing village. It is situated over a 456 sq km land area of which more than half is used for agriculture. The city, under 57 defined areas, hosts the national Parliament administrative buildings including the parliament, ministries, government agencies and diplomatic establishments. Several shopping malls have recently been developed.

The city has witnessed rapid population growth since 1975 and about 76% of the population lives in informal settlements that take up about 12.2% of the total city land area. The population is estimated to be over one million by 2017[3]. Due to the transformation to the administrative city, the rate of urbanisation has increased. But the proportion of informal employment is high and the lack of proper regulation in this informal sector causes constrained growth of the economy, resulting in a relatively high proportion (9%) of ultra-poor people.

3 *City population by sex, city and city, United Nations Statistical Division, 2008.*

**Mzuzu** was established as a city in 1985, and the city boundary was gazetted to 143 sq km in 2010. The population is estimated to be around 250,000 in 2017. The city has a large proportion of unplanned areas, with around 60% of the population living in unplanned settlements. The city's economy is transforming rapidly from mainly agricultural, administrative, service and distribution functions to manufacturing and production, high-level services and commercial activities. The employment in the city is well spread across different sectors such as public sector (23%), private sector (16%), self-employment (20%) and agriculture (22%).

**Zomba** was the first capital city of Malawi until it was relocated to Lilongwe. In 1979, Zomba assumed municipal status and was granted city status in March 2008. The city is situated over 39 sq km of land, comprising forest and agricultural farm (85%) and residential (15%). It depends on small-scale activities such as retail trade, manufacturing, transport, marketing and finance.

Employment activities in the city are mainly in public administration, however other employers are from the agriculture, mining and quarrying, manufacturing, construction, marketing, finance and social services. Zomba has also seen a rapid population growth recently, from around 90,000 in 2008 to 155,0003 in 2017.

Zomba's population swells during academic terms owing to the presence of Chancellor College. No minibuses service the route between student quarters and the university campus.

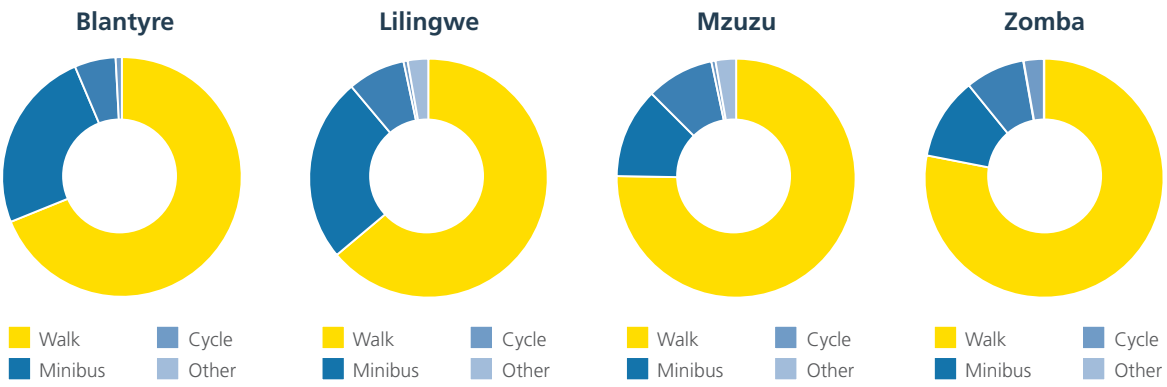
All cities are managed by city councils in accordance with the Local Government Act, 1998. The Act also mandates elected representatives of the various city wards and other ex-officio and non-voting members headed by a Mayor to manage each city.

The cities are managed through departments which vary between cities, but which generally cover the following responsibilities:

- Administration;
- Finance;
- Town Planning;
- Health and Social Services;
- Engineering Services;
- Leisure, Culture and Recreation;
- Commerce;
- Education, Youth, Sport; and
- Environment.

All four urban areas are well connected to the national strategic road network. The M1 provides the major backbone to the national strategic road network connecting Mzuzu, Lilongwe and Blantyre. The M12 and the M14 serve Lilongwe in the East-West direction. The M5 provides access to Mzuzu from the west. Similarly, Blantyre is well connected by the M3, the M2 and the M4. The M3 runs through

**Figure 2.9 Urban transport mode shares**



Zomba, connecting with Blantyre. In all the four cities minibus provides the main mode of public transport. Other supplementary modes are car taxis (both formal and informal), three-wheeler taxis, motorcycle taxis, bicycle taxis and pickup trucks.

Despite non-motorised transport being the major mode in all the urban areas, the cities do not provide effective infrastructure to support this mode. Walking trips per head in the cities are high, ranging from 0.39 to 0.54 trips per head per day. While big buses used to run inside the urban areas in the past, they now serve inter districts routes, along with coaches, mainly due to failed competition with minibuses. The urban transport mode share is predominantly driven by walking (Figure 2.9).

The key issues surrounding the urban transport are summarised below:

- Minibus fares are not regulated in Malawi, and impacted by other factors such as fuel and maintenance costs, the **fare level is very expensive**. Compared to other cities at a standard affordability level, minibus fares are extremely high. This is severely contributing to the overall high **transport cost** in Malawi.
- Minibuses provide the main form of public transport in urban areas. However, due to **poor road conditions**, they **do not fully penetrate** the residential areas. Where they do, they charge premium fares. The minibuses are also **not maintained properly** and often lack road worthiness. Public transport systems in the urban area tend to serve the interest of the operators rather than the passengers.
- High public transport fares are not **affordable or sustainable**. Surveys revealed that up to 40% of some user's gross income was devoted to paying for public transport.
- Both Blantyre and Lilongwe now experience **peak hour traffic congestion.** This has resulted in lower average speeds. The average traffic speed observed in the Central Business District (CBD) area of Blantyre was as low as 19km/hr, with 29km/hr observed in Lilongwe. Such low speeds result in direct disbenefits to road users, and the urban economy.
- The urban areas in Malawi have been grown around the major strategic road network in a way that they **cannot avoid the mix of through and local traffic** in the core of the cities. Such arrangements add to the congestion as well as road safety issues. There are **no good bypass and relief roads** to ease the conditions.
- Only 43% of the urban road network is paved. **Poor maintenance** of the core road network and its' supporting infrastructure such as pedestrian crossings, road markings etc., hinders people movement.

**Malawi is predominantly rural based and in 2016 an estimated 84% of the population lived in rural areas.**

**Walking is by far the most prevalent mode of transport in rural areas of Malawi.**

- Despite walking being a popular mode, the **pedestrian facilities are poor** in all urban areas. **Design standards are also not adequate.** Segregated pedestrian footways are not adequately provided across the cities.
- There is a **lack of pedestrian and access facilities for disabled people**.
- **Car parking provision is limited** to private off-street facilities, in commercial developments, and on-street parking facilities. On-street parking tends to limit road capacity, especially in Blantyre. There are also **no regulations** to determine the appropriate amount of parking relative to the size or type of the development.
- Cycling is growing in importance in urban areas, however, there are **no facilities for cyclists** in the form of lanes or priorities. It forces them to mix with general traffic which causes safety hazards.
- There is a need for an improvement of **road safety facilities** across the urban areas.

- Due to the **poor design standard of junctions**, including roundabouts and signalised junctions, the traffic management is in general inefficient.
- Other strategic issues include:
  - Lack of co-ordination between the city councils and other national bodies, e.g. the Roads Authority (RA), Directorate of Road Traffic and Safety Services (DRTSS), and the Road Traffic Police (RTP);
  - Limited human resources in terms of the number of staff members and their skills;
  - Lack of vehicles and equipment for operation and maintenance;
  - Lack of budget for road improvement and maintenance;
  - Insufficient information systems, including traffic and information signs for traffic safety;
  - Minibuses in all cities acting in a highly unregulated environment; and
  - Lack of clear urban transport policy direction.

Further details of urban transport can be found in the "Urban Transport Sub-Sectoral Plan" report.

### 2.1.7 Rural transport

Mobility in Malawi's rural areas has a direct and substantial impact on the country's economic and social development and performance. However, as a cross-cutting issue, rural transport is not always planned in an integrated manner nor in accordance with a dedicated and holistic vision. Also, related interventions are not always grounded in a detailed and comprehensive understanding of the unique needs and challenges that they need to address, nor a recognition of the breadth of solutions available.

Malawi is predominantly rural based and in 2016 an estimated 84% of the population lived in rural areas. The country's rural population is forecast to continue to grow, although the proportion of Malawian citizens living in rural areas is steadily declining due to recent urbanisation. However, it is without a doubt that in 2037 Malawi will still be a predominantly rural country, both in population and economic terms.

Options of transport mode is limited in the rural areas which severely impacts the choice considering the factors affecting the choice such as distance, cost and comfort. In the rural areas of many districts children as young as five, for example, routinely walk long distances to school.

Walking is by far the most prevalent mode of transport in rural areas of Malawi. Much of freight is transported as headload and the modal share of other forms of transport is relatively low. These other modes, used for both passenger and freight transport, largely comprise of bicycles (personal and kabaza), ox-carts, pick-ups/matolas, motorcycles, minibuses, buses, taxis, boats, trucks and push-carts.

In terms of non-walking modes bicycle use is increasing most rapidly, with bicycle trips having increased three-fold between 2010 and 2015 albeit on the national rather than rural level. There are variations in vehicle ownership and public transport use between districts but there is consensus that both are low in rural areas across the country. The rail mode available to the rural users is very limited. There is currently only one passenger train service that operates between Blantyre and Nayuchi providing intra- as well as inter-district services. It was introduced to serve communities that cannot be readily accessed by bus, largely owing to flooding, and is mainly used by passengers to access local markets. A number of rural communities are dependent on water-based transport, particularly during the wet season when road access can be cut off. There is, however, very limited formal service provision and those that are provided tend to be high cost and more expensive than road based services.

A considerable proportion of the volume of freight transported in rural areas is conducted by subsistence farmers who comprise an estimated 80% of the rural population. Subsistence farmers, by definition, trade a limited amount of produce, which is sold locally.

Rural areas in Malawi are served by a relatively extensive and coherent network of roads. This road network comprises diverse links, which range from paved main roads linking towns and cities to narrow unpaved tracks and trails. Almost 84% of Malawi's road network is unpaved with either an earth or gravel surface.

This includes all 9,478km of undesignated community roads and 74% of its classified road network.

Rural public transport (and freight) services are all operated by the private sector and by small businesses and individuals, with the exception of CEAR, which is responsible for providing all national rail services. The operators are bound by a regulatory framework and many are a member of minibus or kabaza associations. There are, however, considerable gaps in the governance and regulatory framework in which they operate.

The key issues surrounding rural transport are summarised below:

- The relatively **high cost of public transport services** constrains mobility across Malawi's districts. The high cost of fuel is the main contributor to high transport costs[4] but there are other contributory factors, primarily road conditions.
- There are **gaps in public transport regulation** across different districts. It results in an ununiformed regulation system. The fare regulation on the minibuses was removed to promote fair competition.
- There **is a lack of a dedicated rural transport strategy**, which can reduce awareness of, and the incentive to address, the enduring challenges facing the efficient and affordable mobility of people and goods in Malawi's rural areas. It can therefore inhibit the development, prioritisation and implementation of initiatives that target rural transport needs. It can also fail to give rural transport a "sub-sector" form in order to provide a complete shape to Malawi's overall transport strategy.
- Access to health and education is severely impacted by the condition of the rural transport. These can be attributed to **the lack of affordable public transport, lack of better alternative transport mode, and poor road conditions**.

4 *The retail price of petrol in Malawi is the third highest of the 48 countries of Sub-Saharan Africa, exceeded only in South Sudan and Eritrea (GIZ, 2015).*

**The road safety issue is a major concern for Malawi.**

- **Road safety is a major concern in the rural areas.** There are a number of factors affecting road safety. The main factors are given below:
  - Poor road condition, geometry (including inadequate carriageway width) and design;
  - Lack of awareness and education for both drivers and other road users, which causes poor road user behaviour;
  - Lack of adequate driving skillsets, it is further worsening by the ease of access to false documentation;
  - Absence and lack of maintenance of road markings, road signs etc.;
  - Lack of regular road maintenance;
  - Reduced visibility after dark;
  - Lack of wide implementation of traffic calming measures across the network;
  - Unsupervised livestock;
  - Inadequate enforcement of road traffic Act; and
  - Need for greater co-ordination between a large set of stakeholders.

## 2.1.8 Road safety

The road safety issue is a major concern for Malawi as already highlighted in the above transport sub-sector descriptions. Table 2.8 presents road traffic accident data over the last few years.

**Figure 2.10 Accident scene on the M1, 2017**

Crashes like this add to transport costs

It is understood that the actual figures is routinely under reported by the traffic police and DRTSS. Hence it does not give the full picture of the severity.

Figure 2.10 shows the scene of a road traffic accident on the M1 in 2017.

The cost of accidents comprises human cost (compensation), vehicle damage (recovery and repair) cost and public sector cost (police and other public sector agencies attending the accident scene and investigation). The total accident cost, derived from 2012 cost data and 2015 crash figure, is presented in Table 2.9.

Considering the total number of accidents and an estimated unit cost of accident, the total accident cost in 2015 was more than US$47 million (Table 2.9). It was around 0.74% of the country's GDP in 2015. Further details of the accident cost derived from alternative assumptions are presented in the report titled "Financial cost of road accidents", which is another deliverable produced as part of this study.

**Table 2.8 Road traffic accident statistics**

| Accident by severity | Number of accidents | Number of victims | Number of accidents | Number of accidents |
|---|---|---|---|---|
| | 2015 | | 2014 | 2013 |
| Fatal | 888 | 1,068 | 813 | 818 |
| Serious injury | 706 | 982 | 637 | 622 |
| Slight/minor injury | 2,632 | 4,131 | 2,407 | 2,336 |
| Damage only | 3,944 | | 3,470 | 3,580 |
| Animals | 24 | | 28 | 34 |
| **Total** | **8,194** | **17,575** | **7,355** | **7,390** |

Source: 2015 Annual Road Accidents Report, DRTSS

**Table 2.9 Total financial costs of road accidents in Malawi, 2015**

| Cost component | Cost (US$) | Estimated number of incidents | Total cost (US$) |
|---|---|---|---|
| Fatal injuries | 29,704 | 1,068 | 31,724,120 |
| Serious injuries | 1,108 | 3,204 | 3,551,608 |
| Slight injuries | 277 | 5,340 | 1,479,837 |
| Damage only | 868 | 8,880 | 7,705,709 |
| Public sector | 160 | 16,874 | 2,699,904 |
| **Total** | | | **47,161,178** |

## 2.2 **Transport costs**

International freight transport services provide essential connections between Malawi and the international economy. They allow firms to access export markets and the imported raw materials, intermediate inputs, and equipment necessary for Malawi's productive base. If international freight costs can be reduced, and the quality and reliability improved, then exports should be more competitive, and imports cheaper. Equally, if domestic transport costs can be reduced, the costs of goods to the consumer ought to be cheaper.

Malawi's small home market and distant location from key markets pose difficult challenges. The costs of being economically distant from key markets – both in terms of pure transport costs and the opportunity costs of time – impede Malawi's ability to participate effectively in the global economy. Improving Malawi's international freight system will help to reduce the effects of its geographical distance from markets. A more efficient and effective freight system can raise the prosperity of Malawi's businesses and workers and enhance consumers' purchasing power.

There are a number of factors that contribute to the overall transport cost, amongst which fuel, tolls, border fees, and wear and tear to vehicles are the highest.

**International freight transport services provide essential connections between Malawi and the international economy.**

The transport cost has been assessed under two main categories i.e. international and domestic cost.

**International transport cost:** Due to the land-locked geography and the location in the continent, the international transport cost is particularly critical for Malawi. The import-export of the country is heavily reliant on the neighbouring ports including Dar (Tanzania), Nacala (Mozambique), Beira (Mozambique) and Durban (South Africa). The connection to the port and intermediate transfers in and out of the country rely predominantly on the road and rail infrastructure. The choice of mode and the port is also influenced by the commodity that is being transferred. There has been a significant increase of transport cost over the last ten years (Table 2.10).

**Table 2.10 Pure transport cost by commodity, US$/tonne, 2004 and 2016**

| Exports | Mode | Tobacco | | Sugar | | Tea | | Cotton | | Food crops | | Food residues | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2004 | 2016 | 2004 | 2016 | 2004 | 2016 | 2004 | 2016 | 2004 | 2016 | 2004 | 2016 |
| Beira | Road | 62 | 138 | 82 | 71 | 44 | 103 | - | 83 | - | 90 | - | 87 |
| Durban/ Johannesburg | Road | 123 | 233 | 127 | 164 | 67 | - | - | 245 | 45 | 184 | - | - |
| Nacala | Rail | 58 | 61 | 36 | 49 | 22 | 88 | - | 68 | 37 | 73 | - | - |
| Other Africa | Road | - | - | - | - | 65 | - | - | - | 50 | - | 101 | 120 |

| Imports | Mode | Fuel | | Fertiliser | | Cement | | Wheat | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2004 | 2016 | 2004 | 2016 | 2004 | 2016 | 2004 | 2016 |
| Dar es Salaam | Road | 141 | 154 | - | - | 75 | 137 | - | - |
| Beira | Road | 121 | 118 | - | 108 | 60 | 164 | - | 135 |
| Durban | Road | - | - | 179 | 173 | - | - | - | 144 |
| Nacala | Rail | 95 | 116 | 61 | 115 | 40 | 134 | - | 128 |

The pure transport costs are augmented by other additional charges including container charges, port charges, warehousing and demurrage charges that add to the overall cost of transport. The additional charges are variable as they depend on the choice of port and shipping handler etc. Considering the four key ports for Malawi, the pure transport cost can be around 60% of the overall transport cost for international freight movement.

The transport costs of main export commodities as a percentage of the value of the exported commodity are shown in Table 2.11. For both tobacco and tea, the percentage has remained close to constant between 2004 and 2016, and for both these commodities the proportion of transport cost is relatively small.

**Domestic transport cost:** Whilst the domestic transport cost includes part of the international transport cost as it takes into account the domestic leg of the whole movement, it does however also give account of the cost of transporting goods across the national distribution network. It involves the movement of freight from a central warehouse to selling points across the country or from vendors across the country to warehouses for the main local buyers in the major centres of Blantyre or Lilongwe in most cases.

**Table 2.11 Transport cost as a percentage of commodity value**

| Exports | Mode | Tobacco | | Sugar | | Tea | |
|---|---|---|---|---|---|---|---|
| | | 2004 | 2016 | 2004 | 2016 | 2004 | 2016 |
| Beira | Road | 3% | 3% | 17% | 16% | 4% | 5% |
| Durban/ Johannesburg | Road | 5% | 6% | 26% | 36% | 6% | |
| Nacala | Rail | 2% | 2% | 8% | 11% | 2% | 4% |

**Table 2.12 Domestic transport rate, US$/km**

| | Short haul | Mid haul | Long haul |
|---|---|---|---|
| | 0-50 km | 50-200km | 200+km |
| Average | 0.34 | 0.19 | 0.14 |
| High | 1.4 | 0.35 | 0.20 |
| Low | 0.25 | 0.11 | 0.08 |
| Rainy season uplift factor | 25% | 40% | 60% |

Source: RTOA and consultant

Table 2.12 presents the detail of the cost charges quoted for domestic haulage, including highest and lowest quotes given by different operators, schemes and routes. A typical charge for Johannesburg to Lilongwe (about 2,000 km) is US$132 per tonne (7c per t/km), while the charge for Lilongwe to Karonga (550 km) is US$75 per tonne (13.5c per t/km), a 100+ percent difference. Furthermore, while the typical long distance t/km in Malawi was around 8 cents in 2016, charges for shorter trips were much higher. This is demonstrated significantly by prices quoted to the consultant for tobacco transport and those of the World Food Program particularly.

The change in price during rainy season can be very different from the above. The hauliers can increase prices by up to 60% to factor in delays and potential damage to vehicles due to the poor condition of rural roads in the rainy season. This significant price increase is mostly felt by rural communities where affordability is severely constrained.

The cost of transport is also dependant on the types of commodity that are being transported. Table 2.13 presents local haulage rates by different commodities. Clearly, transporting tobacco is more expensive than maize or fertiliser.

Domestic transport charges in Malawi are higher than international charges, regardless if transport is carried out by international transporters (e.g. South African route) or a Malawian transporter (Beira route). Local charges vary highly depending on a range of factors such as commodity, demand, road conditions, weather conditions and client, but are typically anywhere from 30% to 100% higher than international ones.

**Table 2.13 Domestic local road haulage rates, 2015**

| Company | Commodity | Rate (US$/km) |
|---|---|---|
| ADMARC | Maize | 0.072 |
| SFFRFM | Fertiliser | 0.086 |
| Export Trading | Fertiliser | 0.079 |
| Alliance One | Tobacco (0-50km) | 0.12 |
| Tobacco Control Commission | Tobacco (50-200km) | 0.20 |
| Tobacco Control Commission | Tobacco (200+km) | 0.27 |

Source: RTOA and consultant

**Domestic transport charges in Malawi are higher than international charges, regardless if transport is carried out by international transporters (e.g. South African route) or a Malawian transporter (Beira route).**

Most Malawian roads are unpaved, and domestic routes are typically less efficient than international ones, and as such are subject to much higher prices on average. This is because the international routes are on the strategic road network where as domestic routes travel to local roads as well as the strategic network.

**Passenger transport fares:** The ranges of passenger fares are shown in Table 2.14. Lowest fares (per km) are found on rail followed by inter-urban minibuses. At the high end of the range, rail is more expensive than inter-urban minibus due to the fare for the executive class, while the ferry is the highest owing to the fare for a berth.

Table 2.15 compares typical fares and passenger income.

The key issues affecting high freight transport costs are summarised in Table 2.16 on the next page.

**Table 2.14 Passenger transport fares**

| Mode | High (MWK/ US$/km) | Low (MWK/ US$/km) | Sample |
|---|---|---|---|
| Coach | 34.2/ 0.05 | 28.0/ 0.04 | Blantyre-Lilongwe, range dependent on operator |
| Inter urban minibus | 20.6/ 0.03 | 14.7/ 0.021 | Blantyre-Lilongwe and intermediate destinations providing range |
| Urban minibus | 50/0.07 | | Surveys in Lilongwe |
| Ferry | 65.1/ 0.09 | 26.7/ 0.04 | MV Ilala published fares, range dependent on class |
| Rail | 22.7/ 0.03 | 9.1/0.01 | CEAR published fares, range dependent on class |
| Car | 93.8/ 0.13 | 75.0/ 0.11 | Range dependent on fuel consumption |

**Table 2.15 Passenger transport fare and user income**

| Mode | Simple average fare (MWK/ US$) per km) | Average income of user (MWK/ US$ per month) |
|---|---|---|
| Coach | 31/0.44 | 51,605/73.72 |
| Ferry | 46/0.66 | 70,033/100.05 |
| Rail | 16/0.03 | 44,213/63.16 |

Source: RTOA and consultant

**Table 2.16 Issues influencing freight transport costs**

| Condition | Factors | Examples |
|---|---|---|
| Geography | Distance, physiography, accessibility, political | The landlocked nature of Malawi causes constraints, limiting access to world markets, putting Malawi at the mercy of long travel distances, transit times for transhipment and requiring cooperation of neighbouring countries to use international sea ports. Malawi has very little control over most of these factors. |
| Trade imbalance | Trade volume, supply and demand, peaks, empty travel – "back haul rates" | There is a major trade imbalance between import and exports in Malawi causing a lack of back load opportunities for hauliers. This causes higher cost of transport, which then follows through the overall supply chain. |
| Economies of scale | Fuel price, shipment size | Fuel is the biggest single cost component in the transport cost breakdown, with fuel spend accounting for between 35% and 70% of the cost of the trip depending on respondent, route travelled and whether operations are focused on international or domestic market. |
| Mode | Capacity, limitations, operations, conditions | Transit time, transport time, forward clearing efficiency, corridor capacity as well as processing documentation. Inefficiencies in these processes can cause delays hence increase transport cost. |
| Infrastructure | Quality of surface, capacity, limitations, operational conditions | The general quality of transport infrastructure can account for half of the variation in transport costs and as such poor infrastructures imply higher transport costs, delays and negative economic consequences. Whilst the strategic road network in Malawi is in relatively good condition, the rural roads do not provide good all weather access. |
| Competition and regulation | Tariffs, restrictions, safety, ownership, financing | Key issues governing the haulage sector efficiency are:<br>▪ Constrained competition;<br>▪ Limited capacities haulage companies in this sector;<br>▪ Lack of education and training of the personnel causing theft and corruption; and<br>▪ Lack of operators with proper licenses. |
| Financing | Cash flow, cost of importing vehicles and spare parts, interest payments | In addition to fuel price, the high cost of imports of spare parts and tyres, high VAT rates on lorries, and interest rates for accessing financing are relatively high. As supplier/exporters are responsible for providing transport, high transport costs of Malawian transporters make the country's exports more expensive than and not as competitive as they could be. |

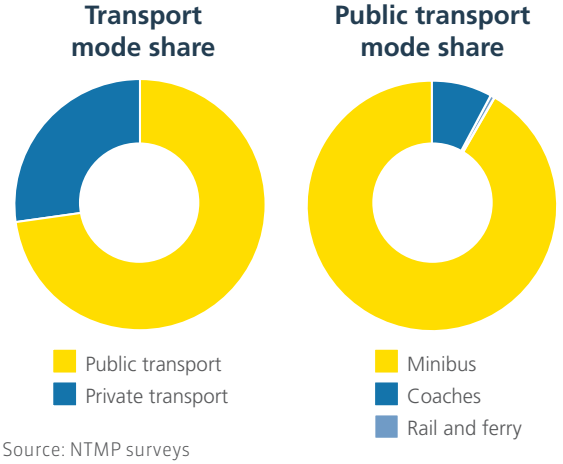
## 2.3 Current transport demand

The demand for transport is a derived demand mainly related to personal or national economy. Users of transport are primarily consuming the service not because of its direct benefits, but because they wish to access other services. Transport supply and demand have a reciprocal but asymmetric relationship. Whilst a realised transport demand cannot take place without a corresponding level of transport supply, a transport supply can exist without a corresponding transport demand. The following two sub sections presents the current transport demand in Malawi by passenger and freight movements.

### 2.3.1 Passenger demand

The passenger transport in Malawi mainly comprises of journeys undertaken by car, notably private cars, taxis, and public transport trips, by minibuses, buses, coaches, rail and ferries. Across the main strategic transport network more than 70% of the motorised passenger trips are made by using public transport. Road transport is the main mode of transport for passenger movements in Malawi. Rail on the other hand has very limited patronage. Such low passenger demand is caused by, amongst various other reasons, limited coverage of passenger service, running between Limbe, Balaka and Nayuchi, and poor reliability are the key ones. Similarly, inland water transport has limited coverage compared to road. It mainly serves Lake Malawi and the navigable sections of the Shire River. Figure 2.11 shows the share of between public and private passenger vehicles and subsequent split between different public transport modes.

**Figure 2.11 National motorised mode shares**




Source: NTMP surveys

**Across the main strategic transport network more than 70% of the motorised passenger trips are made by using public transport.**

**Road transport is the main mode of transport for passenger movements in Malawi.**

Transport trip purposes can be grouped into two broad categories by origin of trip, namely:

- **Non-business** – where at least origin or destination starts from home; and
- **Business** – where neither origin nor destination starts from home.

Table 2.17 presents the estimated share of modes by different demand purposes in Malawi in 2016.

**Table 2.17 Transport demand (12hr weekday) by purpose and mode, 2016**

| Demand segment | Private transport | Public transport | Total |
|---|---|---|---|
| Business | 39,000 | 103,000 | 142,000 |
| Non-business | 77,000 | 158,000 | 235,000 |
| **Total** | **116,000** | **261,000** | **377,000** |

Source: NTMP surveys

The figures presented above represent passenger trip demand over a twelve-hour period on a typical weekday. The proportion of non-business trips (32%) using private transport is slightly higher than business trips (27%). On the other hand, the proportion of non-business trips made by public transport is less than that of business trips.

### 2.3.2 Freight demand

Commercial road freight transport services in Malawi are comprised of:

- Domestic road freight haulage including local and regional movements in addition to movements to the national border points; and
- Cross-border and international road freight haulage.

The Malawi haulage sector is entirely operated by the private sector and dominated by a handful of medium sized companies operating several hundred vehicles, but there are a high number of small operators that act at the local and regional level. Domestic and international freight companies both operate in Malawi and it tends to be the international operators, mostly from Mozambique and South Africa, which capture the majority of international trade logistics. This is hindering the growth and competitiveness of Malawian transporters and there is a perception that the industry is driven by cartels that reduce domestic competitiveness.

Freight in Malawi is predominantly transported by road, which equates to almost 93% share. Other than road, rail is predominantly used for freight with some add on passenger services between Limbe to Nayuchi. Over the last 15 years the proportion of freight transported by road has fluctuated. It has however increased in the recent years (Table 2.18).

**Freight in Malawi is predominantly transported by road, which equates to an almost 93% modal share.**

Figure 2.12 shows the proportions of road freight (light goods and heavy goods) vehicles observed in the traffic surveys. 17% of all truck movements have an international origin or destination. Aside from these, the proportions of trucks travelling between the regions is relatively small at eight percent, whilst most movements are intra-regional.

Inland water transport, on the other hand, carries a very small volume of freight. Based on the data provided by MSC, the current demand for cargo transport using the lake services has declined in recent years from 30,000t in 2012 to around 5,000t in 2016 (Table 2.19). There are a number of factors that have caused such a decline of demand, including increased and tough competition with the road transport sub-sector, poor reliability, and poor condition of the port facilities. Inland water transport freight demand was only 0.07% of the freight transported by roads in 2015.

The aviation sector has even lower share of freight movement, which totalled 3,750 tonnes in 2015 (Table 2.20). Up to four carriers were operating in this market between 2014 and 2015. The tonnage has dropped in 2015, which DCA has linked to the fall in overall air traffic and economic conditions, and it is believed they are unlikely to recover significantly in the immediate future.

**Table 2.18 Freight demand by mode in Malawi (in thousand tonnes)**

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Road | 711 | 806 | 1,876 | 1,342 | 1,448 | 1,470 | 1,365 | 2,574 |
| Rail | 256 | 276 | 280 | 233 | 224 | 171 | 171 | 180 |
| **Total** | **967** | **1,082** | **2,156** | **1,575** | **1,672** | **1,641** | **1,536** | **2,754** |
| % of Road | 74 | 74 | 87 | 85 | 87 | 90 | 89 | 93 |

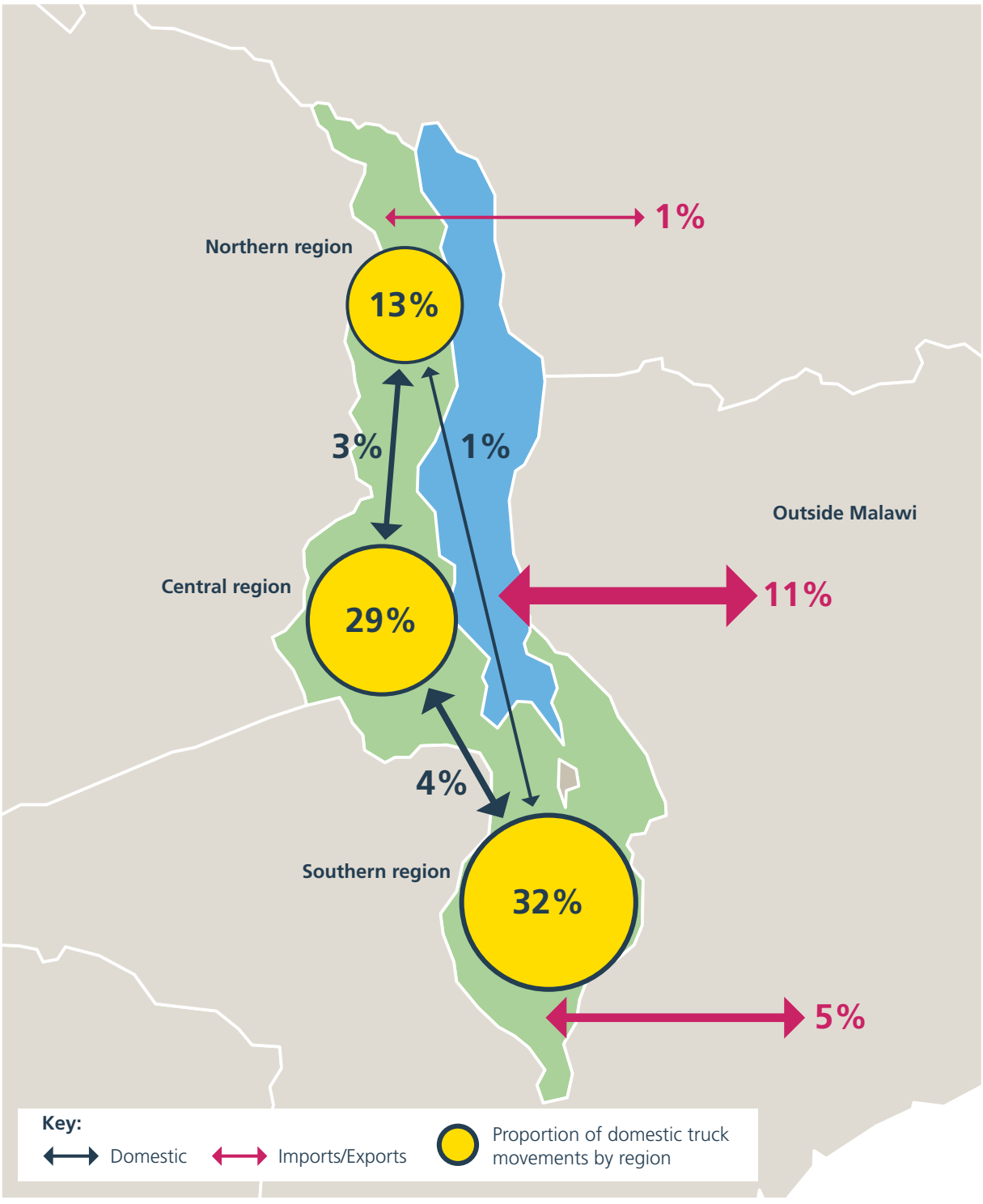
**Table 2.19 Freight movement on Lake Malawi (in thousand tonnes)**

| Year | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|
| Volume | 29.57 | 21.24 | 2.4 | 2.02 | 5.13 |

**Table 2.20 Cargo movements from the two main airports in Malawi (in nearest thousand tonnes)**

| Airport | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2015 |
|---|---|---|---|---|---|---|---|---|
| Chileka | 0.35 | 0.32 | 0.38 | 0.35 | 0.60 | 0.58 | 0.52 | 0.55 |
| Kamuzu | 3.80 | 2.50 | 2.20 | 1.80 | 2.20 | 2.00 | 3.90 | 3.20 |
| **Total** | **4.15** | **2.82** | **2.58** | **2.15** | **2.80** | **2.58** | **4.42** | **3.75** |

**Figure 2.12 Proportions of observed truck movements, 2016**




Source: NTMP surveys

## 2.4 Legal, regulatory and institutional framework

### 2.4.1 Introduction

Figure 2.13 provides a high-level overview of the current institutional structure regarding transport planning and delivery in Malawi. It features key Ministries, other agencies and key stakeholder organisations with a role in Malawi's transport sector. It shows where the transport operators sit within the hierarchy and reporting lines and how the State, donor agencies and regional bodies are positioned in the sector. The organogram is a point of reference for the consideration of reforms to institutional roles, positioning and working relationships.

The various roles and responsibilities within Malawi's transport sector are split across a range of public bodies and private sector organisations at national and local level. Aside from top political leadership and scrutiny provided by the President, Cabinet and Parliament, the key elements of the current institutional framework are as follows:

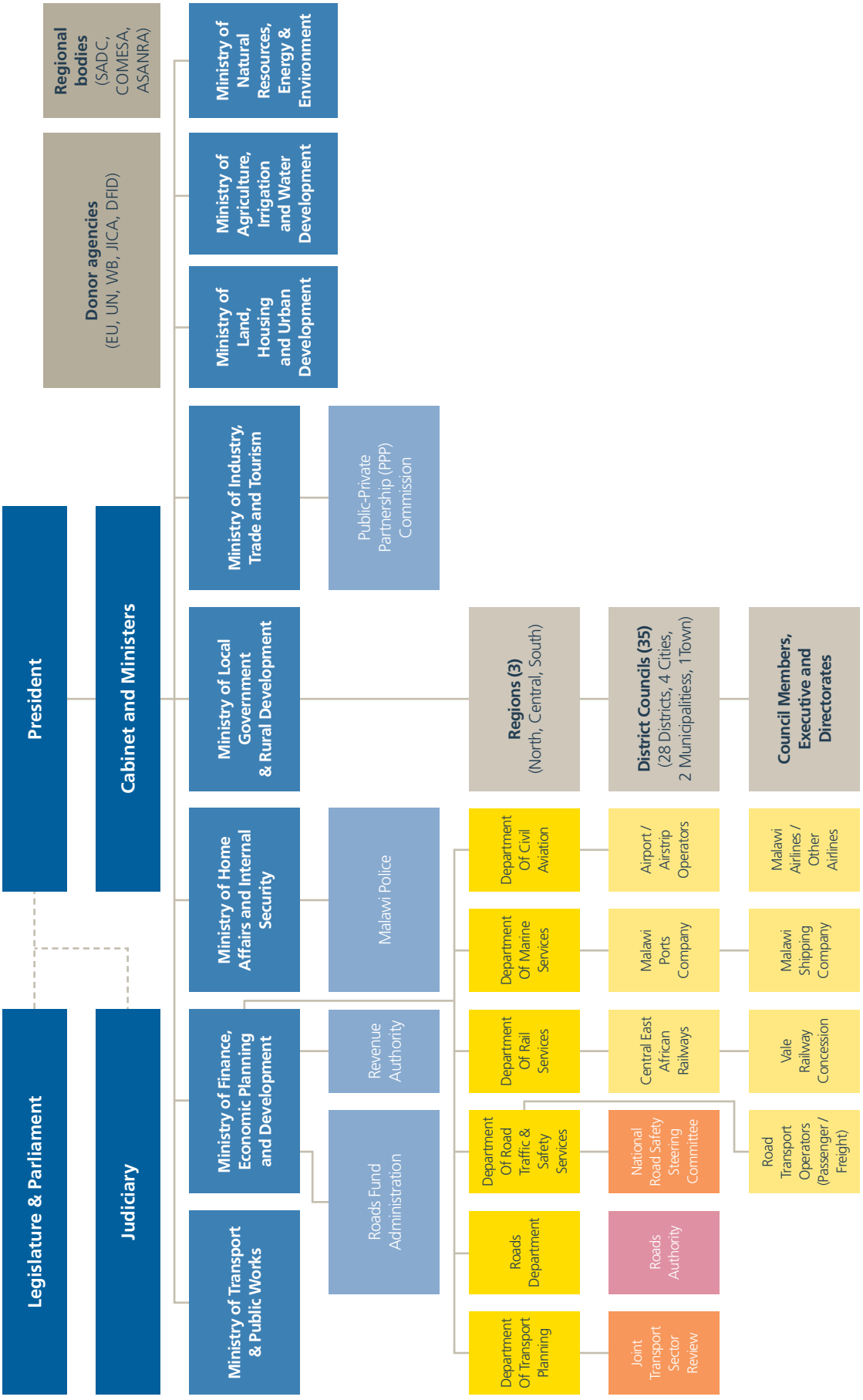
- **Ministry of Transport and Public Works (MoTPW):** the principal steward and public sector policy lead for the transport sector with responsibilities for multi-modal transport planning and regulation, key sub-sector co-ordination and enabling action through a range of other public and private stakeholders;
- **Other government ministries:** whose policies, roles and activities may have important implications for transport, or may be required for the approval, funding or delivery of key initiatives, including the local government, rural and urban development, policing and law enforcement, health, and public and private finance;
- **Public agencies:** with important functions relevant to transport, but outside of ministries and government departments, including the Roads Authority, Road Fund Administration, Public Private Partnership (PPP) Commission and Malawian Revenue Authority;
- **Districts and cities:** local government entities with a range of local planning, service delivery and public representation functions, increasingly emphasised through the National Decentralisation Policy;
- **Private or concessioned operators:** such as CEAR for railways, Malawi Port Company and Malawi Shipping Company, airlines[5] and a large number of commercial road passenger and freight operators and individual service providers;
- **Industry and user representation and wider stakeholder engagement and influence:** both informal and formal, for example through the Joint Transport Strategic Review, Minibus Owners Association of Malawi or the Road Transport Operators Association;
- **Bi-lateral or regional associations:** with Government of Malawi engaging with neighbours such as Mozambique or Tanzania on infrastructure, transport services and trade, including access to sea ports, or as a member of formal bodies such as South African Development Committee (SADC) or Common Market for Eastern and Southern Africa (COMESA); and
- **Donor agencies:** such as the World Bank, African Development Bank, Japan International Cooperation Agency (JICA) or European Union which may provide advice, direct financial aid or loans, or technical assistance to specific transport projects or wider sector and sub-sector capacity building.

With regards to climate change, the Department of Climate Change and Meteorological Services (DCCMS) is responsible for all matters to do with climate change and meteorological services. It aims to meet international obligations through timely dissemination of accurate and up to-date data and information for socio-economic development. It monitors, predicts and provides information on weather, climate and climate change and provides natural disaster early warnings. It provides weather and climate data and information for various socio-economic sectors, without any specific remit to address resilience of transport infrastructure.

Further details of the key institutions and working arrangements are described at length in the NTMP Policy and Governance Review (August 2016) prepared at an early stage of the NTMP work programme as a source of reference and supporting evidence.

5 *The Government of Malawi has a 51% share of the ownership of Malawi Airlines.*

**Figure 2.13 Current institutional map of transport planning and delivery in Malawi**




Source: NTMP Policy and Governance Review (Atkins-EY: August 2016)

## 2.4.2 Current institutional issues

Figure 2.13 confirms that key roles and responsibilities within the transport sector in Malawi are split across a range of public bodies and private sector organisations at a national and local level. Whilst this is not, in itself, unusual and is the case in many countries, the picture in Malawi is characterised by the following features:

- The acute limitation of funding, organisational capacity, technical and managerial skills and strategic planning and programming competencies is seen at almost every level, substantially limiting institutional effectiveness irrespective of configuration;
- Limited joint working within and across public bodies, with limited mechanisms for information sharing and joint policy formulation;
- Until recently, strong centralisation of local decisions within Government of Malawi itself, including line Ministries operating in an environment of limited accountability through elected local councillors within the city and district councils, with speed of decentralisation still to be determined, financing mechanisms are unclear and without a detailed programme of capacity building for local planning and delivery;
- An absence of data, analytical capability and business planning processes to support strategy development, integrated programme management or monitoring of progress;
- An official policy, and plans of varying levels of commitment, to create new transport agencies (as discussed below) semi-autonomous from the government with the potential to increase, rather than reduce, complexity (and add to administrative costs, resource requirements and user charges) unless change is carefully managed;
- An apparent weakness of bilateral and regional actions to secure Malawi's transport goals, but with relatively loose institutional arrangements (e.g. Nacala Development Corridor Joint Ministerial Committee, or broader groupings through SADC and COMESA) to secure delivery and achievement of outcomes; and
- Limited capacity within the MoTPW to address climate change issues within the sector, along with limited co-ordination with relevant government agencies such as the DCCMS.

There are a number of potential overlaps and gaps in jurisdiction which may lead to ambiguity, loosening or abdication of roles and responsibility in planning and delivery:

- Between the Public Private Partnership Commission, MoTPW and various private companies on the strategy, legal basis, rights and obligations of the transport operating concessions awarded to date;
- Between the MoTPW, Cabinet and Ministry of Justice in the process of originating, drafting and implementing new or amended legislation, with the latter seen as delaying required legal decisions;

- Potential gaps in the areas of public transport planning and regulation, rural transport and services, quality of freight haulage or making regional connections effective; and
- Particular weaknesses in urban transport planning, regulation, funding and delivery within an increasingly complex and congested operational environment for Malawi's four main cities of Lilongwe, Blantyre, Mzuzu and Zomba, as well as larger towns such as Kasungu and Mangochi.

There are also some indications of inappropriate political influence in allocating resources and specific transport investment decisions despite efforts to restrict this to the appropriate level, for example:

- Shortages in sub-sector maintenance and development funding due to Government of Malawi imposition of budget ceilings reflecting the wider economic situation, lack of an automatic escalator on Fuel Levy contributions to the Road Fund and delays in allocating/releasing funds even after approved by Parliament;
- Difficulties and delay in recruiting professional staff to MoTPW due to civil service rules and then in retaining them due to rewards being well below those available in the private sector; and
- Cases of public agencies, including the Roads Authority, coming under pressure to commit funds to contracting projects before an election and then to have the funding not materialise, with resulting arrears, claims and litigation.

With the exception of roads (prepared by the Road Authority), none of the MoTPW's Departments have a current or up-to-date strategic or business plan setting out their objectives, priorities and realistic funding requirements. Nor does the Ministry have comprehensive strategic frameworks and associated processes and systems for implementation in rail, marine and civil aviation and has progressed initiatives (including updating legislation and regulations) largely in their absence.

There is some evidence of multi-agency collaboration, but more could be done to make this effective:

- The Joint Transport Sector Review (JTSR) is recognised as an important forum and appears well supported with over 100 stakeholders from the government, development partners and civil society attending the annual meetings, with a set of KPIs and an action plan. However, the JTSR is essentially a voluntary forum and has no formal powers beyond advice. There is no explicit or binding linkage of its action plan to directing or influencing Government of Malawi programmes;
- There are inconsistencies between KPIs, targets and proposals included within JSTR Action Plan, the National Transport Policy and MoTPW Strategic Plan and the priorities actually progressed. Closer adherence to a single process might assist in resolving this;
- Officials within the key MoTPW Departments acknowledge there is limited multi-modal thinking outside of their immediate remit in practice;
- It is unclear how bi-lateral agreements (e.g. Mtwara Development Corridor Agreement) go beyond statements of principle to enable delivery; and
- The National Road Safety Steering Group, a key part of DRTSS's expanded remit, has yet to be established and lead multi-agency action to tackle Malawi's acute road casualty record.

Table 2.21 sets out a SWOT analysis of current transport governance arrangements.

**Table 2.21 SWOT analysis of institutional and funding arrangements**

| Strengths | Weaknesses |
|---|---|
| ▪ Established Ministry of Transport and Public Works with Sector remit represented at Cabinet level.<br>▪ Formal departments established within the government for the key sub-sectors.<br>▪ Recently refreshed National Transport Policy which recognises the importance of legal, regulatory and institutional measures and reforms.<br>▪ Creation of RA/RFA arrangements in roads sub-sector are embedded and have strengthened governance, improved delivery and outcomes.<br>▪ Reasonable understanding of challenges facing key sub-sectors and proposals for improvement.<br>▪ Some committed and capable staff within current arrangements effecting change in their areas.<br>▪ JTSR provides a recognised mechanism for sector engagement, agreement and monitoring of priority actions and is generally seen as beneficial.<br>▪ TSPIMF provides evidence of delivery progress and could be further developed to focus on NTMP outcomes.<br>▪ Malawi signature and commitment to key international, bi-lateral and regional agreements (e.g. IMO, ICAO, SADC) as well as membership of associated institutional structures. | ▪ Despite reasonable high-level policy, lack of an institutionalised hierarchy of planning, support and prioritisation tools and processes linking policy to effective delivery.<br>▪ MoTPW combines a mix of planning, regulatory and operational/delivery functions with lack of focus/clarity of role.<br>▪ Beneath NTP and MoTPW Strategic Plan, limited evidence of development of aligned business plans/annual activity plans by sub-sector/department.<br>▪ Weak/outdated legislation, regulations and standards to support reforms (e.g. Railways Act), constraining the government's ability to specify sector/ sub-sector improvement.<br>▪ Lack of funding, and assured funding mechanisms, to support operation of key institutions and their programmes.<br>▪ Skills gaps, capacity constraints and weaknesses in data/analytical processes at almost every level, with lack of a focused Human Resource and Capacity Development Plan for MoTPW or the sector as a whole.<br>▪ Staffing of some MoTPW Departments (e.g. Roads, Rail) too small to be credible and effective.<br>▪ Staff motivation, incentivisation and attitudes to drive change.<br>▪ Clear sub-sector policy, regulatory and institutional gaps in integrated urban and rural transport.<br>▪ Ambiguity, differing priorities of the government and private sector, and lack of will, capacity and resources to enforce concession agreements (rail, ports and lake services).<br>▪ Constraints in capacity of local private sector (e.g. CEAR, RA contractors, private interest in DTRSS inspection services).<br>▪ Weak linkages between MoTPW Departments and outside JTSR, limited engagement between stakeholders. |

**Table 2.21 SWOT analysis of institutional and funding arrangements (continued)**

| Opportunities | Threats |
|---|---|
| ▪ GoM continued commitment to transport sector reform programme.<br>▪ A number of reforms being progressed or proposed (e.g. Railways Bill, Inland Waterway Authority, establishment of autonomous RTA).<br>▪ Proposals for further reforms supported by previous studies (e.g. TransRA), including those which offer potential to share scarce professional skills and resources in an effective and cost-efficient manner.<br>▪ Revenue streams through a range of current and potential sources, including Fuel Levy, PPP concession payments, local rates, proposed roads. Some revenues may increase (e.g. concession payments) if demand can be stimulated/attracted.<br>▪ Technical Assistance supporting specific initiatives (e.g. review of legislation) or general capacity building with MoTPW/ other agencies.<br>▪ NTMP programme recognises, and offers opportunity to achieve integrated statement of policy and strategic interventions aligned with funding/ financing proposals and legal, regulatory and institutional mechanisms for achievement of outcomes.<br>▪ Decentralisation Policy supports potential for stronger duties and capacity for local transport at district level (subject to multi-modal planning process, funding mechanisms and appropriate local capacity building).<br>▪ Further development and strengthening of JTSR and associated stakeholder engagement processes.<br>▪ Compliance with, and further strengthening of, international, bi-lateral and regional obligations, engagement mechanisms and structures, including SADC provisions for Corridor Planning Committees. | ▪ Macro-economic instability leading to falling of the government resources, investor confidence and consumer purchasing power.<br>▪ Rising the government debt and shortage of funding to pay for reforms and depth/ breadth of new skills and capacity.<br>▪ Sector challenges, and ability to effect change, constantly increasing due to increasing transport costs and limits in funding/financing.<br>▪ Dominance of roads sub-sector, limiting political focus, funding availability and supporting resources to drive other sub-sectors.<br>▪ Limited capacity, skills and integrity of key agencies engaged in compliance and enforcement (e.g. DTRSS Vehicle Inspection, Police Road Traffic Laws or Marine Regulations).<br>▪ Limited ability of the government to attract and compete for talented professionals overall, and in comparison, with the private sector.<br>▪ Limited capacity, competence and ambition of local private sector/ contractors to support public sector maintenance/construction contracts and concessions.<br>▪ Limited scale of some transport operations weakens case for investing in additional stand-alone dedicated institutions (e.g. Marine regulator).<br>▪ Political influence/interference in some investment decisions outside of structured technical processes.<br>▪ Corruption, leading to a loss in funding, weakening productivity and undermining the government credibility with donors.<br>▪ Donor support subject to conditionality, fatigue and changing bi-lateral and multi-lateral priorities. |

Source: NTMP Policy and Governance Review (Atkins-EY: August 2016)

### 2.4.3 Current government proposals for transport sector reform

The Government of Malawi has a long-standing vision for transforming its national transport outlook. Since the 1990s, it has embarked on a series of policy and structural reforms aimed at promoting the development and operation of an efficient and competitive transport sector, with a key theme being the (functional and institutional) separation of public policy and planning, regulation and delivery, combined with the progressive commercialisation and privatisation of existing operations and opening up of the market to new entrants and competition. It has also sought to embed these changes within an updated legal and regulatory environment, with a number or draft laws in preparation or Parliamentary processes.

This rationale lies behind the creation of a separate Road Fund and Road Authority in 2006, concessioning of operations in rail and inland water transport, as well as liberalisation of road freight and passenger transport. Whilst the reforms in the roads sub-sector have been partially successful, concessioning of rail and marine services has delivered far lower investment, operational efficiency or user benefits than was envisaged. Further reforms of policy intent, institutional, legal and regulatory frameworks, and associated funding mechanisms, are required, and have been proposed, to put these sub-sectors on a firmer basis.

In addition, the planned devolution of local roads to district councils, with a refocusing of the Road Authority on a core strategic network under the revision to the Public Roads Act, is in line with the wider Public Sector Reform agenda, provided key skill and capacity shortages and block funding and revenue streams at the local level, can be addressed. The latter is a major challenge, however, for almost all districts, further planning, regulatory, financing and institutional reform may be additionally needed over and above local road maintenance and management to develop integrated, customer-focused local transport networks which are effective in addressing the mobility needs of individuals and communities.

**The Government of Malawi has a long-standing vision for transforming its national transport outlook.**

Government of Malawi has proposed a number of new institutions, including:

- The establishment of a Road Traffic Authority (RTA) to cover vehicle and driver regulation and operator, licensing and inspection;
- The establishment of a new Rail Regulator for infrastructure/service licensing, market access, economic and technical regulation, independent safety regulation, and a separate Rail Infrastructure Manager to take on the network and its assets;
- The establishment of a Civil Aviation Authority for licensing, safety regulation and ensuring compliance with the International Civil Aviation Organisation (ICAO) and other international obligations; and
- In principle, devolution of local road responsibilities to districts subject to capacity building and the results of pilot implementation which is under way.

Whilst similar principles apply to Marine Services, the scale of the sub-sector is small in comparison with other modes and there are no proposals for a stand-alone regulator. Whilst a National Ports Authority was proposed in 2007, linked to Nsanje Inland Port and the proposed Shire-Zambezi Waterway, it has not been taken forward. Nor has a 2014 proposal for an Inland Waterway Authority been progressed and capacitating the Department of Marine Services (DMS) within the Ministry has been conceded as the practical, if not policy complaint, way forward.

Whilst offering improvements on current arrangements, the current reforms are subject to several critical observations. For example, proposals are largely modally-focused and not linked within an overall integrated programme. They may also be proposed on paper or via draft legislation, but with limited consideration of practical implementation, operational process, funding and financing.

Irrespective of precise institutional structures, shortages of human capacity and skills, funding and other resources will need to be addressed. Technical Assistance for ongoing capacity building, skills and enhancement will therefore be required.

The NTMP builds on the proposed reforms, but seeks to go beyond them in securing effective policy delivery, efficient and effective allocation of resources and good governance.

### 2.4.4 Current transport regulation issues in Malawi

The National Transport Policy refers to the need for regulatory, alongside institutional, reform. However, whilst a number of draft laws are in progress (e.g. Inland Water Bill, Civil and Railways Bill), these are not necessarily integrated into an overall regulatory framework, and there is no single legal and regulatory compendium and reference point which is published, available and up to date with clear proposals for implementation.

Evidence of the current situation suggests:

- There are many areas of transport operations, for example public transport operator or vehicle licensing, or marine health and safety, where regulation is currently absent, has gaps or is poorly defined;
- Much of the currently adopted legislation is outdated and no longer matched to modern requirements, standards to be achieved or industry structures;
- There are examples of inappropriate distribution of regulatory requirements between primary legislation, secondary regulations, codes of practice and guidance and contractual agreements. For example, the weakness of the current Railways Act means significant detail is written into the Government of Malawi's contract with CEAR which would be more appropriate in broader rail regulations. By contrast, the draft Inland Water Bill contains a level of detail which may be inappropriate for primary legislation;
- There are consistent weaknesses in monitoring for regulatory compliance and enforcement, for example gaps or ambiguity of the regulatory instruments themselves, lack of an effective compliance checking process, or acute shortages of staffing, systems and other capacity in enforcement agencies;
- There is limited domestic application, within Malawian law, of bilateral and regional obligations;
- Whilst, in the process of developing regulations, there is some consultation and a view of the impact of regulation on operators or users, this has limits and there is no adoption of recognised good practice processes such as Regulatory Impact Assessment;
- There is limited documentation, publicity or information around regulations when they are approved, for example guidelines to assist with compliance, and dissemination of the same to regulated entities;
- There is some evidence in recent reform proposals of adoption of copying regulations from other countries' examples rather than undertaking context-sensitive drafting from first principles;
- There are limited skills, staff capacity, data, process and systems in administration and enforcement;
- These capacity constraints mean it is difficult to form a picture of the extent of non-compliance with regulatory requirements in many areas of key sub-sectors, but it may be high; and
- There is limited communication between different bodies making regulations, for example the MoTPW itself, the Ministry of Justice and the Police, or between different Divisions of the MoTPW, leading to gaps, inefficiencies and unforeseen outcomes.

There are issues for the NTMP to address if it is to secure a legal and regulatory framework which supports, rather than constrains or undermines the delivery of the desired policy goals and outcomes.

## 2.5 Roads Authority arrears

Road sector outstanding payments as at 30th June 2014 amounted to US$37 million/ MWK 25.99 billion (EU, 2014). Subsequent year arrears amounts are shown in Table 2.22. The dramatic increase in the arrears situation in 2013/2014 led the EU to focus on the examination of that year.

The analysis by type of creditor for the 30th June 2014 arrears is: contractors US$37.13 million/ MWK 23.99 billion; consultants US$1.84 million/ MWK 1.29 billion and others US$1 million/ MWK 0.71 billion. Significantly 87% of contractor arrears are owed to only three companies. They are: Mota Engil US$23.6 million/ MWK 16.54 billion; MA Kharafi and Sons US$3.9 million/ MWK 2.73 billion; and Fargo Ltd. US$2.41 million/ MWK 1.69 billion.

The major cause of arrears however was committing to expenditure beyond that provided for by the budget. The team determined that US$45.59 million/ MWK 31.91 billion worth of invoices were payable in 2013/2014. Of this sum invoices totalling US$33.44 million/ MWK 23.41 billion were issued during 2013/2014. This is compared with the budget of US$14.4 million/ MWK 10.08 billion. It can be argued that US$19 million/ MWK 13.33 billion of arrears are due to over commitment.

The report made recommendations on dissolving the level of arrears as detailed in brief below:

- Structure budgets to reduce expenditure allocations to align these with available resources;
- Implement measures to scale down the ongoing projects and limit their scope within the available funds to prevent further accumulation of arrears;
- Use the tool developed during the mission to: continually monitor payments and arrears; ensure that RA and RFA records reconcile; and generate status reports for management;

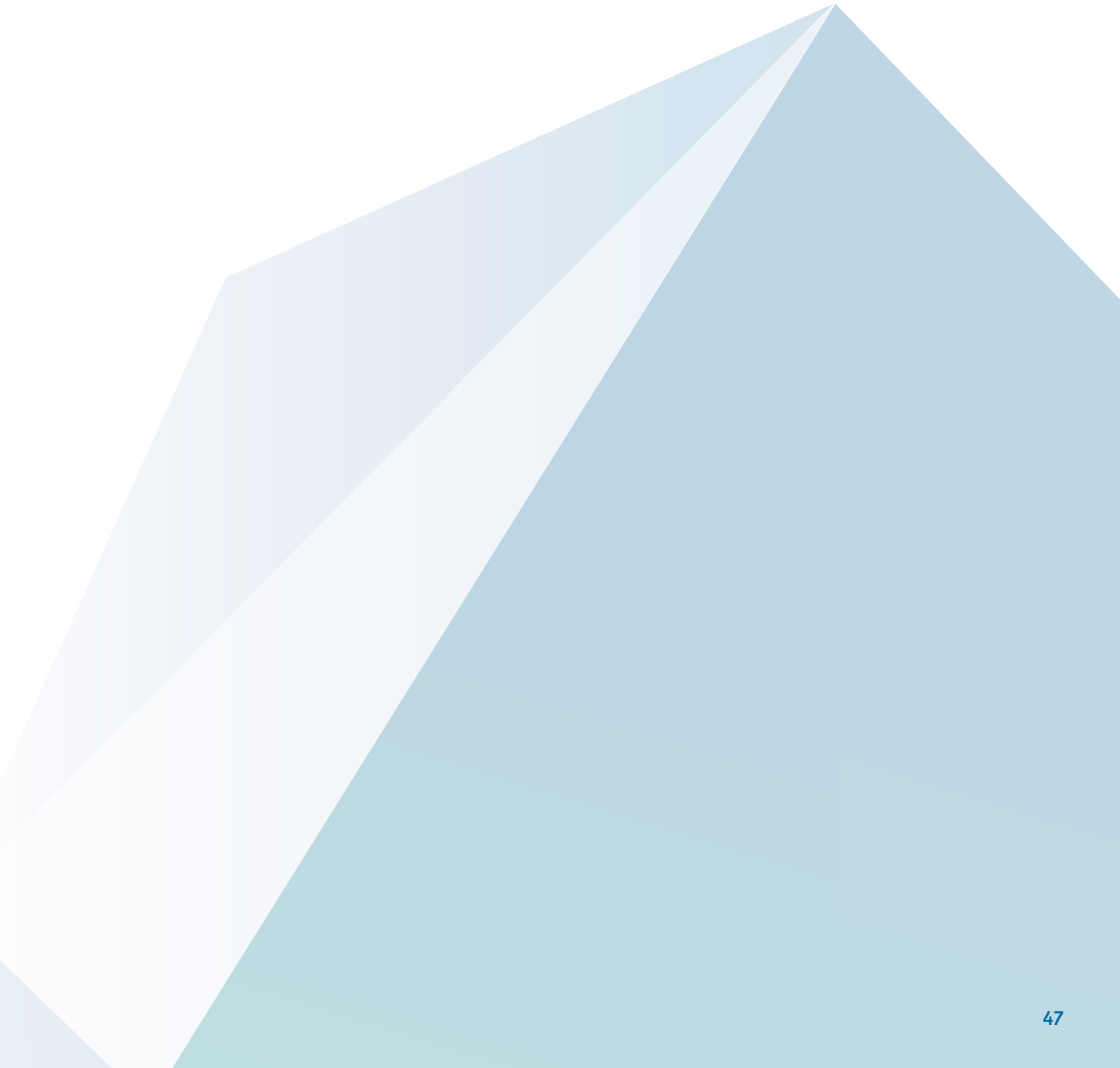
**Table 2.22 Total arrears accrued by the Roads Authority**

| Year | Total arrears amount as at financial year end (US$ millions/ MWK billions) | % percentage increase / decrease from prior year |
|---|---|---|
| **2009/10** | US$7.6 million/ MWK 5.32 billion | - |
| **2010/11** | US$16.38 million/ MWK11.47 billion | 119.31% |
| **2011/12** | US$15.7million/ MWK10.99 billion | -4% |
| **2012/13** | US$12.14 million/ MWK 8.50 billion | -29.2% |
| **2013/14** | US$37.1 million/ MWK25.99 billion | 206% |

- Agree accounting policies for both the RA and the RFA to ensure the consistent recording and reporting in respect of roads capital projects.
- Periodical reporting of projects and contractors' payments and arrears ensuring that: the Public Finance Management Act responsibilities for controlling officers and chief executive officers are discharged; and
- All stakeholders are informed of the latest position in respect of arrears.

Since 2014, it is believed that the arrears have increased although there is no published data.

**Road sector outstanding payments as at 30th June 2014 amounted to US$37 million/MWK 25.99 billion (EU, 2014).**




**On-street parking available in Blantyre, impacting the road capacity.**

# 3 Future growth of Malawi

The future transport demand will be directly driven by national economic and demographic factors. This chapter presents how these drivers are expected to change over the planning horizon of the master plan.

## 3.1 Population and demography

The National Statistics Office (NSO) of Malawi projects the population size of the country. The data presented here in this section has been sourced from NSO. The last census was carried out in 2008. The next one is due in 2019.

Table 3.1 presents the projection of population growth over the next twenty years. The population is expected to double by 2036. This is a significant increase of population which will require a substantial infrastructure support.

Despite the increase of urbanisation, the future population is still expected to be predominantly rural based.

**Table 3.1 Population projection of Malawi**

| Year | Population | Annual % growth |
|---|---|---|
| **2016** | 16,832,910 | - |
| **2021** | 19,718,415 | 3.22 |
| **2026** | 23,067,018 | 3.19 |
| **2031** | 26,895,288 | 3.12 |
| **2036** | 31,191,010 | 3.01 |

**Source:** National Statistics Office

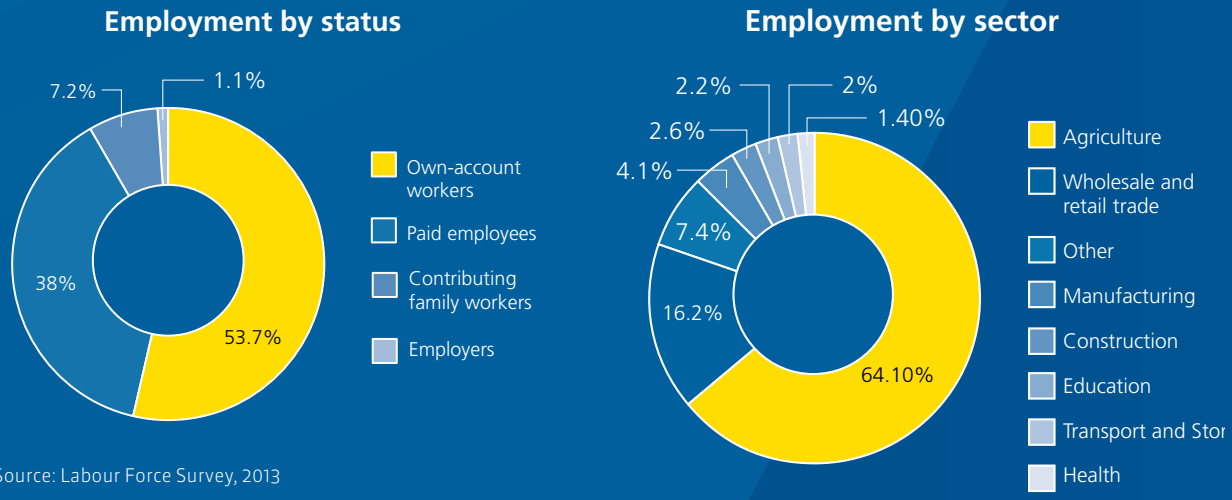
## 3.2 Employment

According to the 2013 labour force survey, around 7 million of the population, aged between 16 and 64 years, were in the labour force. Despite the proportion of males in the labour force being lower than females, the rate of male employment (87%) was higher than the rate of female (76%). The total employed population in Malawi was 5.5 million, which included both urban and rural employment, and is dominated by the agriculture sector.

Amonst other factors, the growth of population and GDP are the main drivers of future growth in employment. Displacement of employment on the other hand is driven by urbanisation and the resulting migration. Table 3.2 presents an estimated employment forecast over the next twenty years.

**According to the 2013 labour force survey, around 7 million of the population, aged between 16 and 64 years, were in the labour force.**

**Figure 3.1 Distribution of employment by sector and status**




Source: Labour Force Survey, 2013

**Table 3.2 Employment forecast**

| Year | Population | Urban employment | Rural employment | Total employment |
|---|---|---|---|---|
| **2016** | 16,832,910 | 627,136 | 4,752,955 | 5,380,091 |
| **2021** | 19,718,415 | 799,533 | 5,488,858 | 6,288,391 |
| **2026** | 23,067,018 | 999,206 | 6,330,050 | 7,329,256 |
| **2031** | 26,895,288 | 1,238,870 | 7,156,810 | 8,395,681 |
| **2036** | 31,191,010 | 1,544,269 | 8,324,369 | 9,868,639 |

Source: NTMP

## 3.3 Key economic sectors

The key economic sectors addressed below are:


### 3.3.1 Tobacco

Tobacco is mainly produced in the Central and Northern regions of Malawi, (depending on definition of regional boundaries - 76% of the production is accounted for in the Central region according to JICA 2012[6]) and is sent to the main auction floors of Lilongwe, Limbe, and Mzuzu and, the majority of which is handled at the auction floor. 96% of all tobacco is exported out of the Dedza border, mainly bound for the Port of Beira.

Domestic transport is the responsibility of the grower and essentially, they can either do it themselves or subcontract to specialist transporters to get it to the auction floor.

Products are physically transported to the floors, which causes major physical constraints during the auction season and can lead to excessive waiting time of vehicles in the vicinity of the auction. Tobacco can wait for up to 10 days at the auction floor with no demurrage payments resulting in loss of revenue earning time for haulers and adding to the inefficiencies of the transport sector. Also, transport practices can be poor, such as inadequately covered trucks arriving at the auction having been rained on.

**Figure 3.2 Tobacco auction floor, Lilongwe**

The tobacco market opens in April and ends in September. Auction Holdings Limited (AHL) acts as both a catalyst and a market for the selling of tobacco by a farmer to a buyer. The process of selling tobacco after preparation can be broken down in six steps: handling and packaging by farmer; offloading at AHL; processing for the sale; market transactions; dispatching to the respective buyers; and payment to farmers.

Soon after the harvest, the farmer cures (dries) the tobacco using different techniques (smoking; heating; and air) depending on the type of tobacco to be produced. The farmer then grades the tobacco in terms of its size, colour, and moisture and packages the tobacco in bales with an ID number attached to the bales (Figure 3.2). Farmers thereafter transport the tobacco through transporters; transport associations or private transporters.

6 *Study on Development of the Sena Corridor (2012).*

**Tobacco is mainly produced in the Central and Northern regions of Malawi.**

Transporters are required to book a day in order to offload their bales at the ware-house. They therefore arrive a day earlier, waiting in line on the offloading bay, in order to have access to the warehouse. Booking is done based on the type of sale of their tobacco: contract basis or auction basis[7]. After offloading is complete, the staff of AHL group the tobacco according to the ID number of the bales, in terms of ownership.

At the auction floor, the bales are weighed and a ticket is attached depicting the weight, floor, date of arrival, and ID number. The bales are therefore grouped in terms of type of sale (contract/auction). After the sorting is complete, the staff transfers the bales to the market for the actual sale. Bales are offered for sale on the floor. Staff open the sorted bales early in the morning; and then Classifiers, from the Tobacco Control Commission (TCC), re-grade the tobacco based on its size, moisture, and colour. This grade determines the price at which the tobacco will be sold. The bales are then grouped in terms of type of sale. The respective buyers then inspect the tobacco and bid a price for the tobacco.

Rejected bales are re-offered on the market after a period of two days. Rejected bales may be 'rehandled' by companies. For example, bales that are rejected as a result of mixed grading are brought to these companies and the tobacco is re-graded, making sure the bales are of a single type.

The major buyers of tobacco are located near to the market place. The tobacco sold is ferried from the dispatching bay to the respective buyers through trucks and conveyors. The cost of transporting to the buyers is borne by the farmers and is deducted from the revenue obtained after tobacco sale.

After the sale is complete, the payment is made to the farmers' bank account. AHL keeps details of all farmers and their bank account details. The payment made to farmers is net after deduction of transport fees.

In 2013 the government installed a maximum rate for the transporters services for transport to the auction floor. Originally this was charged per bale. However unforeseen complications arose due to the non-uniformity of bales. Some can be 10kg, 20kg, 50kg, but transport was charged at a flat rate.

Therefore, growers would bundle all their crop, irrespective of grade, into larger bundles to avoid larger transport fees. This resulted in non-optimal prices for the bales at market, as they were not graded properly, so the quality was not reflected in the price.

TCC are now moving to pricing based on per tonne/km. This will allow growers to pay only for exactly what is transported, and avoid the mixing of grades in bales.

### 3.3.2 Oil

The oil industry could become one of the most important sectors of the Malawian economy. The successful exploitation of oil reserves depends on the successful and timely construction of the infrastructure required to access, process and transfer the oil. This will involve construction on a scale not yet witnessed in Malawi, and the need to bring huge volumes of equipment and materials to the various wells and facilities along the whole length of Lake Malawi, as well as the extreme north and south of the country. These movements will require a significant upgrade of transport infrastructure.

Malawi's oil reserves are not proven. However, there is considerable optimism given the similarities in geological conditions with other areas in the Rift Valley, such as the Albertine Grabben region of Uganda, where reserves of 3.4 billion barrels of oil have been validated.

Malawi has been divided into six blocks for the purposes of exploration and on-shore production, as shown in Figure 3.3. The status of each of the blocks is further shown in Table 3.3.

*7 80% tobacco in Malawi is sold on a contract basis and 20% of an auction basis.*

**Figure 3.3 Oil exploration blocks**

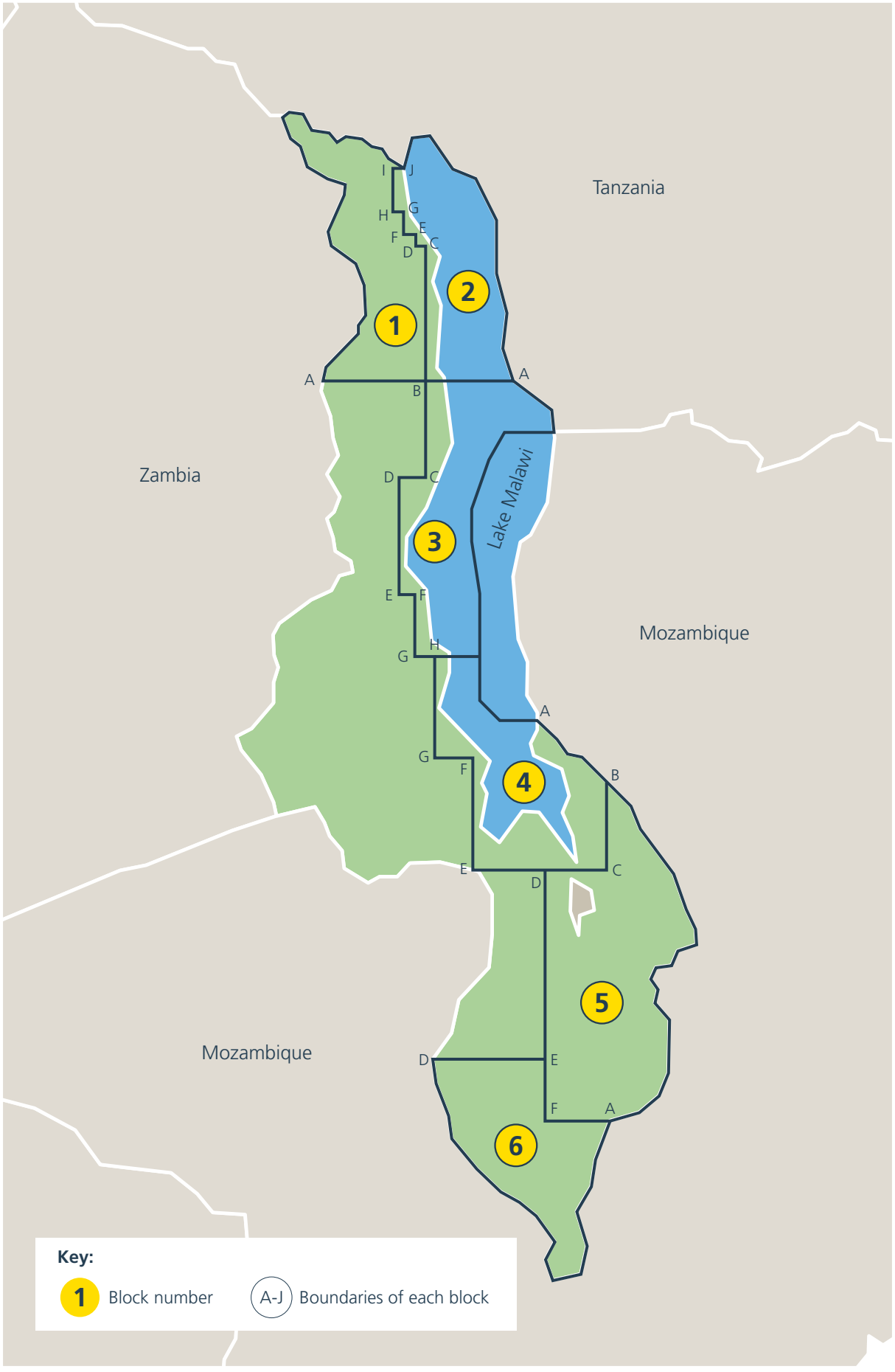


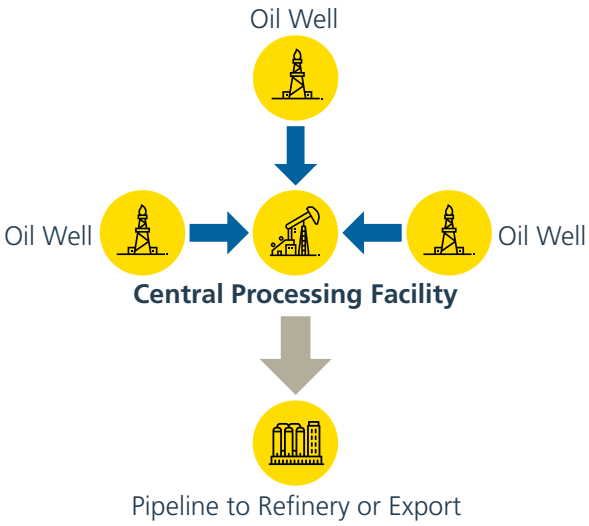
**Table 3.3 Malawi oil blocks status**

| Block No. | Overview | Status |
|---|---|---|
| 1 | Operator: SacOil Limited.<br>Group company holding interest: SacOil – 100%.<br>12,265 km2, block 1 is the second largest block demarcated for oil exploration. | Exploration stage. Exploration licence divided into an initial four year period and two subsequent three year renewal periods.<br>Initial period 2012 to 2016. |
| 2 | Operator: Surestream Petroleum.<br>Holding interesting: 51% stake held by HAMRA Oil. | Presidential order on ban of exploration on blocks lifted. |
| 3 | | |
| 4 | Operator: RAK Gas MB45 Limited.<br>Group company holding interest: Ras al-Khaima – 100%.<br>Block 5 is the largest block demarcated for oil exploration. | Presidential order on ban of exploration on blocks lifted.<br>Production Service Agreement (PSA) signed in 2014 is being re-negotiated to address several anomalies noted by GoM.<br>Exploration license has expired and is to be renewed. |
| 5 | | |
| 6 | Operator: Pacific Oil Limited.<br>Group company holding interest unknown. | Presidential order on ban of exploration on blocks 2 to 6 lifted.<br>Exploration work to continue following lifting of the government suspension, though exploration license has expired and is to be renewed.<br>PSA signed in 2014 is being re-negotiated to address several anomalies noted by GoM. |

The development of transport infrastructure to support early exploration and production activities will largely be determined by the location of the Central Processing Facilities (CPF).

Oil is pumped from the wells and then transported to the CPF for processing and then to the refinery before being moved out to the market.

**The role of Central Processing Facilities in Malawi's oil industry**



### 3.3.3 Mining

The mining sector in Malawi is underdeveloped which is a result of years of very little investment and lack of mineral data. Significant steps have been made by the country to develop the sector which led to the opening of the Kayelekera Uranium Mine by Paladin (Africa) Limited in 2009. From the start of production through to mid-2014 when the mine was in operation, the mining sector's contribution to GDP increased dramatically, rising from 1% to 10%. However, with the collapse of the spot price in uranium, the sector's growth came to a halt.

The government's development strategies have recognised the sector as a priority in both the Malawi Growth and Development Strategy (MGDS) and Economic Recovery Programme (ERP), with emphasis being placed on the promotion of a conducive, transparent and accountable mining regime in the country. The long-term goal is "to increase production and value addition of mineral resources" of the sector. Government of Malawi identified seven key strategies aimed at growing the maximum potential of the sector and these are:

- Producing a detailed geological map of Malawi;
- Strengthening institutional capacity of the sector;
- Developing an integrated data management system;
- Strengthening seismic monitoring;
- Promoting both local and foreign investment;
- Enforcing environmental, occupational health and safety in the sector; and
- Enforcing legislation on sustainable use and management of mineral resources.

Following the recognition of the sector's potential and identified key strategies, the mining sector has achieved the following:

- Launched the Mines and Minerals Policy of Malawi in 2013, whose goal is to "enhance the contribution of mineral resources to the economy so as to move from being an agro-based to mineral based economy".

**The mining sector's contribution to GDP increased dramatically, between 2009 and mid-2014 rising from 1% to 10%.**

- Review of the Mines and Minerals Act (1981) with the aim to align it to the mining policy and among others, creating a good platform that enables an enhancement of good investor/community relationships.
- Completed the Airborne Geophysical Survey in 2015 which aims at helping Malawi overcome some of the challenges faced in the mining sector by improving efficiency, transparency and sustainability. The results of the survey have yet to be released, though it is expected that some interesting geological features have been identified that were not previously known. Features of scale that could be indicative of a number of minerals, but this would need to be further understood through detailed interpretation of the existing data and follow up geophysical and drilling campaigns.
- Malawi has signed up to the Extractive Industries Transparency Initiative (EITI) and was accepted as a candidate country to the EITI global transparency standard which requires extensive disclosure and measures to improve accountability in how oil, gas and minerals are governed. This means that the country will publish accounts showing all payments the government received from its extractives sector. Under the standard, the country will also be required to make public information about license holders, the licensing process, production data and the allocation of revenues from its natural resources.

It is important to note that the country needs to manage expectations as it takes a long time for an exploration target to become a mine and demand is strongly influenced by the global mining industry's performance, as seen with the Kayelekera Uranium Mine. The standard lead time from identification of a prospect to production can be 10 to 15 years. In this regard the availability of geophysical data and reforms in the sector should be considered as exceptionally important initial steps in a long process.

### 3.3.4 Potential for mining sector growth

Mining sector growth is expected to stem from the current portfolio of mineral prospects in the country, some of which have been partly or fully evaluated. Based on the existing pipeline of mineral prospects and assuming that there will be a steady improvement in the provision of infrastructure, if the world prices for the minerals that Malawi is endowed with improve, and the government managed to create a transparent and conducive environment for investors, there is huge potential for the sector to grow. Table 3.4 shows the potential pipeline projects in the sector.

**Table 3.4 Mining sector project pipeline**

| Region | District | Deposit | Project description | Status |
|---|---|---|---|---|
| Northern | Karonga | Uranium | ▪ Kayelekera Uranium Mine.<br>▪ Open cast mine with proven reserves of 3,943Mt of contained uranium oxide as of 2008.<br>▪ Owned 100% by Australia's Paladin Energy Limited. | ▪ Care and Maintenance.<br>▪ Re-opening of this mine depends on wider global uranium prices.<br>▪ Upon re-opening it will generate 1220 tonnes per day for six years. |
| Northern | Chitipa | Niobium | ▪ One of Malawi's largest Niobium deposits.<br>▪ Estimate resource of 100,000 tonnes.<br>▪ Uranium can be recovered as a by-product.<br>▪ 90% of the tenement is owned by Resource Star Limited. | ▪ Application to extend existing tenement area was made in 2010.<br>▪ Unknown. |
| Northern | Karonga and Chitipa | Oil | ▪ Block 1 which is 12,265m$^2$ and is the second. largest petroleum exploration licence demarcated.<br>▪ 100% owned by South Africa's SAC Oil Holdings. | ▪ Exploration stage.<br>▪ Exploration licence divided into an initial four year period and two subsequent three year renewal periods. |
| Northern | Karonga and Nkhata Bay | Oil | ▪ Owned by Hamra Oil and entails the exploration in blocks 2 and 3 onshore.<br>▪ Completed fuel tensor gravity survey. | ▪ Presidential order for ban of exploration on blocks two to six has been lifted in 2017 and some feasibility studies are underway. Several companies to start importing exploration equipment. |
| Southern | - | Oil | ▪ RAK GAS MB45 is owned by UAE Oil and entails the exploration in blocks 4 and 5. | ▪ Presidential order on ban of exploration on blocks lifted.<br>▪ PSA signed in 2014 is being re-negotiated to address several anomalies noted by GoM.<br>▪ Exploration license has expired and is to be renewed. |

**Table 3.4 Mining sector project pipeline (continued)**

| Region | District | Deposit | Project description | Status |
|---|---|---|---|---|
| Southern | - | Oil | ▪ Owned by Pacific Oil Limited entails exploration in block 6. | ▪ Presidential order on ban of exploration on blocks 2 to 6 lifted.<br>▪ Exploration work to continue following lifting of the government suspension, though exploration<br>▪ license has expired and is to be renewed.<br>▪ PSA signed in 2014 is being re-negotiated to address several anomalies noted by GoM |
| Central | Kasungu | Cement | ▪ Owned by Shayona Cement.<br>▪ Livwezi and Chikowa deposits.<br>▪ Expansion project aimed at increasing mined quantities to 650 tonnes in phase1 and 1200 tonnes in phase 2. | ▪ Operational. |
| Central | Lilongwe | Graphite | ▪ One of the largest, high-grade, flake graphite deposits in the world based on the JORC Mineral Resource estimate.<br>▪ 100% owned by Australia's Sovereign Metals Limited.<br>▪ Can support a base case scenario with graphite concentrate production of over 110,000tpa over an initial mine life on 20 years. | ▪ Pre-feasibility and feasibility studies yet to be undertaken.<br>▪ Scoping study to examine production scenario of 30,000tpa and expanded scenario of 65,000tpa. |
| Northern | Mzimba | Niobium | ▪ 100% owned by Australia's Globe Metals and Mining Limited.<br>▪ Field exploration and bulk sampling completed successfully.<br>▪ Estimated 60 million tonnes of ore grading 0.29% niobium metal.<br>▪ The largest niobium mineral resource in Malawi.<br>▪ By-products include uranium and tantalum. | ▪ Mining licence granted.<br>▪ Development agreements negotiations ongoing.<br>▪ Some inhabitants in the area have started to receive their replacement compensation. |
| Southern | Phalombe | Rare Earth Elements | ▪ Annual processing capacity assumed at 500,000 tpa of ore.<br>▪ Mine life of 18 years.<br>▪ Average annual production REO in concentrate of 2,841 tonnes.<br>▪ Average "magnet" REO production in concentrate of 1,026 tonnes. | ▪ Exploration licence.<br>▪ Pre-feasibility study completed in November 2014. |

**Table 3.4 Mining sector project pipeline (continued)**

| Region | District | Deposit | Project description | Status |
|---|---|---|---|---|
| Southern | Nsanje | Titanium | ▪ Owned by Crown Minerals Limited.<br>▪ Deposit is located between Ndiola and Chimbwimbwi Rivers.<br>▪ Indication of rutile, ilmenite, apatite and zircon deposits. | ▪ Metallurgical test work continues. |
| Northern | Karonga | Coal | ▪ Nkachira Coal mining project owned by Malcoal Mining which is a joint venture between Australia's Intra Energy Corporation and Malawi's Consolidated Mining Limited.<br>▪ Total core resources reported are 38.4 million tonnes based on the JORC Mineral Estimate.<br>▪ Mine was intended to feed into Intra Energy's Pamodzi Coal Fired Power Project at Chipoka in Salima, aimed at producing 120MW. | ▪ Mining licence granted.<br>▪ Five Exclusive Prospecting Licences (EPLs).<br>▪ Discussions commenced in early 2016 in relation to the sale of the Malawian subsidiaries with a view to the long-term supply of coal to the 120MW power station from its Tancoal Mine (Tanzania). |
| Northern | Rumphi | Coal | ▪ Owned by Mchenga Coal Mines.<br>▪ Mines 3,000 tonnes per year and has a production capacity of 6,000mt/mth.<br>▪ Coal is sold locally to tobacco, textiles, cement, food and beverage manufacturers. | ▪ Raising investment to expand coal output and develop an 80MW coal fired power plant. |
| Southern | Mulanje | Rare Earth Elements | ▪ 100% owned by Canada's Springstone Limited. | ▪ Exploration licence granted. |
| Central | Ntcheu | Limestone | ▪ Bwanje Cement Company Limited owns the project.<br>▪ 28MT indicated cement grade limestone deposit.<br>▪ Planned plant capacity of 500,000MT per annum. | ▪ Mining licence awarded in 2010.<br>▪ Environmental approval obtained from Department of Environmental Affairs.<br>▪ In discussions with various potential partners for the right mix of financing and technical expertise to take the project forward. |
| Southern | Balaka | Rare Earth Elements | ▪ 100% owned by Australia's Lynas Corporation Limited.<br>▪ Mining Licence granted in 2010.<br>▪ Inferred Resource of 107,000 tonnes of REO.<br>▪ Deposit also contains strontianite and phosphate minerals.<br>▪ Environmental Licence granted in 2013. | Care and maintenance. |

In order for the country to transform its significant resource endowment into a global competitive advantage, an enabling environment needs to be created to attract significant investment in the sector:

- Ensure that mining companies have the ability to find, extract and remove ores at a competitive cost by providing dependable and cost effective energy and transport infrastructure as these two inputs are an integral part of the sector; and
- There needs to be a platform for dialogue created to build trust among the various players in the sector, starting from a common knowledge about how the industry works, including sources, uses of mining revenues and operational facts. The initial knowledge sharing could include:
  - The mining life cycle, from exploration through development and construction, to operations, closure and post closure;
  - Financial flows within the sector including how a mining company finances its activities, cost and revenues associated with operations, and financial reporting requirements within the company and to and the government agencies;
  - Environmental and social issues and opportunities to mitigate any potential negative impacts and to capitalise upon any opportunities to realise related improvements, as well as to identify and define related roles and responsibilities of mining companies, the government and civil society; and
  - Process issues and techniques related to how potentially contentious issues can be discussed in inclusive, participatory and non-confrontational ways.

## 3.4 **Tourism**

The travel, hospitality and leisure industry is a key driver of the global economy[8]. The industry encompasses a variety of services, including accommodation (such as hotels, casinos, cruises and resorts), food and beverages and other value-added services.

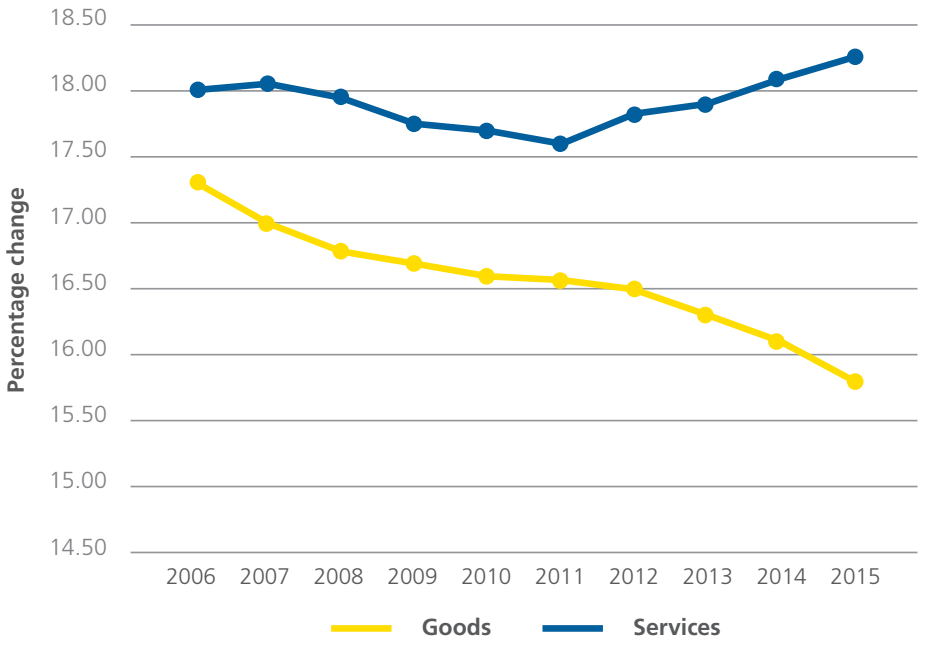
- The total contribution of travel and tourism to global GDP on an international level was US$7,170.3 billion (9.8% of GDP) in 2015, and is forecast to rise by 3.5% in 2016, and to rise by 4.0% pa to US$10,985 billion (10.8% of GDP) in 2026.
- In 2015, the world-wide contribution of travel and tourism to employment, including jobs indirectly supported by the industry, was 9.5% of total employment (283 million jobs). This was expected to rise by 2.2% in 2016 to 290 million jobs and by 2.5% per annum to 370 million jobs in 2026 (11% of total).
- Visitor exports generated US$ 1.308 billion (6.1% of total exports) in 2016. This is forecast to grow by 3% in 2017, and grow by 4.3% per annum, from 2016 to 2026, to US$2,052 billion in 2027 (6.2% of total).
- Travel and tourism investment in 2016 was US$774.6 billion, or 4.3% of total investment. It should rise by 4.7% in 2017, and rise by 4.5% pa over the next ten years to US$1,259 billion in 2027 (4.7% of total).
- Globally renewed consumer confidence, along with a shift in household spending from goods to services and experiences helped leisure travel sustain a growth rate well ahead of GDP.

Figure 3.4 shows world consumer expenditure, as a percentage of total household expenditure from 2006 to 2015. Travel and tourisms contribution to GDP in 2016 in shown in Figure 3.5.

**The travel, hospitality and leisure industry is a key driver of the global economy.**

8 *World Travel and Tourism Council, 2016.*

**Figure 3.4 World consumer expenditure, percentage of total household expenditure**




Source: Bureau of Labour Statistics, 2016. Note: Goods include food and drinks, tobacco, clothing and footwear, and household goods. Services include communications, leisure and recreation, and hotels and catering.

The global travel and tourism sector is forecast to grow, in terms of GDP contribution, by four percent on average per year over the next ten years, continuing to outperform the global economy throughout the forecast period. The divergence in growth between economy-wide GDP and direct travel and tourism GDP is expected to widen relative to the last few years to 1.4 percentage points, as the components of travel and tourism GDP continue to grow more quickly than their macro economy counterparts and other sectors. By 2026, travel and tourism is expected to support 370 million jobs in total globally, which will equate to one in nine of all jobs in the world.

In 2017 Malawi is expected to attract 969,000 international tourist arrivals. By 2027, international tourist arrivals are forecast to total 1,898,000, generating expenditure of US$44k (MWK 32.246 million), an increase of 2.8% per annum (Figure 3.6).

Travel and tourism investment in 2016 was MWK20,423 million, four percent of total investment (US$28.8 million). It should rise by 3.7% in 2017, and rise by four percent per annum over the next ten years to MWK31,306 million (US$44.2 million) in 2027, 3.6% of total.

**Figure 3.5 Travel and tourism sector contribution to GDP**

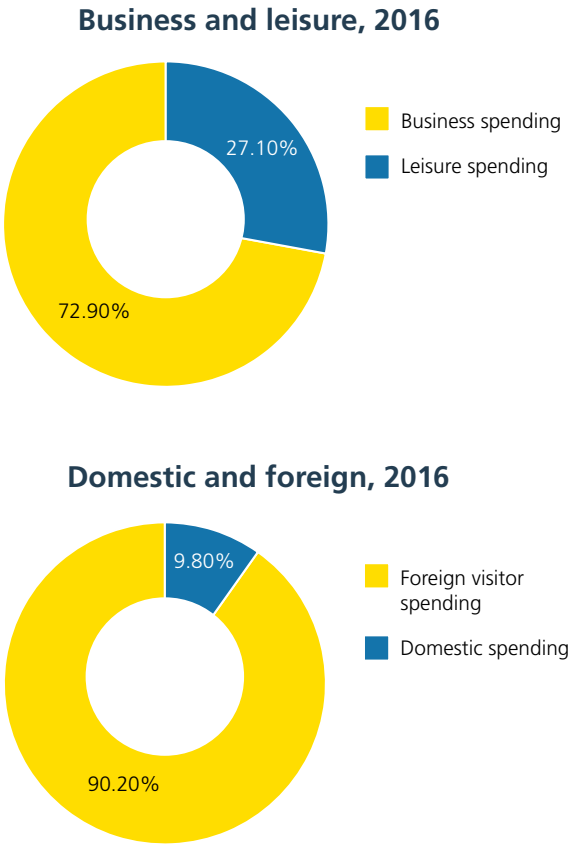
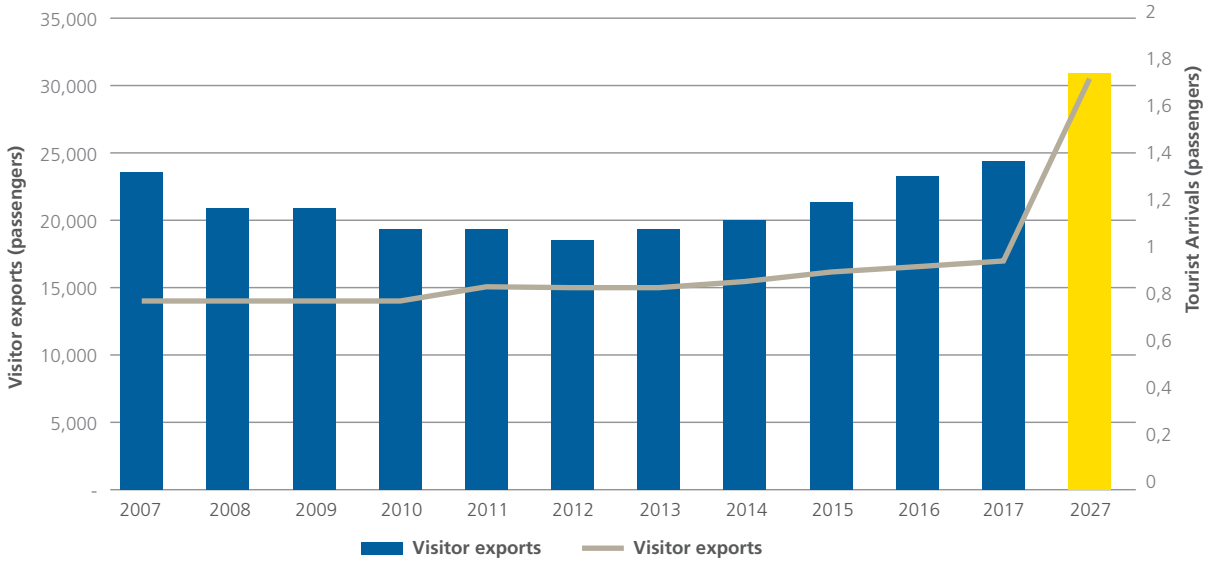


**Figure 3.6 Visitor exports and international tourist arrivals**




**International visitors demand** – international visitors represent 17% of the tourism demand in Malawi and the number of international visitors in 2009 totalled 755,000 and the related numbers using a particular type of accommodation is shown in Table 3.5.

Tourism's positive contributions to economic growth include:

- Producing foreign exchange earnings that are essential to import both consumer and capital goods;
- Facilitates the use of resources that are in line with the factor endowment of the country;
- Creates job opportunities;
- Promotes improvements in the infrastructure, benefitting not only tourists but also residents;
- Is a conduit for transferring new technological and managerial skills into the economy; and
- Potential to create a positive linkage with other sectors of the economy.

The contribution forecast for the sector is detailed in Table 3.6. Between 2016 and 2036 the sector is expected to grow at 6.5% per annum, and by 8.5% pa thereafter.

Despite its potential and priority status, the country's tourism sector continues to face a lot of challenges, such as limited air access for visitors and high air fares.

**Table 3.5 Tourist accommodation used, 2009**

| Type of Accommodation Used | Number | % |
|---|---|---|
| Hotel / Inn / Lodge | 202,000 | 27% |
| Rest House | 174,300 | 23% |
| Private House | 308,400 | 41% |
| Other/No Accommodation | 70,000 | 9% |
| **Total** | **754,700** | **100%** |

**Table 3.6 Tourism direct and indirect contributions**

| Indicator | 2015 Income | 2016 forecast growth rate (%) | 2026 Forecast Income | Annual Forecast growth rate (%) |
|---|---|---|---|---|
| Direct contribution | US$22.6k / MWK 105,029m | 2.9 | US$279k / MWK 202.83m | 6.5 |
| Total contribution | US$304.5k / MWK 221.1m | 4.2 | US$596k / MWK 443,181m | 6.5 |

Source: World Travel and Tourism Council: Travel and Tourism Economic Impact 2016 Malawi

There are considerable cross-sector linkages between the transport and tourism sectors. The improvement of transport infrastructure and services, for example, can have a positive impact on tourism and increases in tourism can in turn benefit transport sector performance. This includes in the Civil Aviation sub-sector where airlines are heavily dependent on passenger numbers, even on services where there is freight capacity for exports. .

The majority of hospitality and accommodation providers that were consulted have an average occupancy rate of less than 40% in a given year, suggesting that facilities are not being used to their full potential.

**International visitors represent 17% of the tourism demand in Malawi and the number of international visitors in 2009 totalled 755,000.**

## 3.5 Economic growth

The GDP growth projections, published by different organisations over the last five years, are not the same. Table 3.7 shows GDP projection between 2015 and 2018 from different sources.

For the purpose of this study the government's projection has been used. It is the most optimistic projection amongst other sources. Following the same principle, the missing 2018 projection is assumed to be 5.8%, which is the highest amongst other sources. The assumptions set out in Table 3.8 have been taken in order to develop GDP forecasts for the next twenty years.

On the basis of the above assumptions the GDP growth has been derived and it is presented in Table 3.8. All the underlying assumptions in the estimations process are presented in Table 3.9.

**Table 3.7 GDP growth projection comparison**

| Source | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Economic Intelligence Unit | 3.1 | 2.7 | 3.8 | 5.0 |
| International Monetary Fund | 2.9 | 3.0 | 4.0 | 5.5 |
| World Bank | 2.8 | 5.0 | 5.8 | 5.8 |
| Government of Malawi | 3.1 | 5.1 | 7.0 | - |
| Consultant's assumption | 3.1 | 5.1 | 7.0 | 5.8 |

**Table 3.8 Assumptions for sectoral growth**

| Sector | Assumptions | % of GDP in 2017 | Annual average growth (%) 2017-2036 |
|---|---|---|---|
| Agriculture | Reasonably strong growth in first ten years reflecting a move towards more valuable export crops, with lower growth rates in the second ten years as a result of lack of significant growth in worldwide demand for tobacco. | 28 | 5.2 |
| Electricity, gas and water | Large growth in the electricity sector starting in 2019 reflecting investment in new hydro power schemes needed to cut the power deficit and required to service mining and manufacturing sectors. | 1.2 | 11.4 |
| Mining and quarrying | Massive growth in the period 2019 to 2023 reflecting the availability of power and up-turn in world-wide demand for minerals. This is to be followed by lower but sustained growth. | -0.8 | 17.6 |
| Manufacturing | Slightly increased and sustained growth reflecting the growth in the primary sectors. | 9.3 | 6.0 |
| Construction | Slightly increased and sustained growth reflecting the growth in the primary sectors. | 2.6 | 4.7 |
| Wholesale and retail trade | Significant growth over the period 2021 to 2027 following growth in primary sectors. | 16.2 | 6.7 |
| Transport and storage | Sustained growth at current levels. | 2.7 | 4.5 |
| Accommodation and food | Increased and sustained growth reflecting growth in tourism. | 2.0 | 7.9 |
| Information and communication | Significant growth to 2021 reflecting improvements in IT needs, followed by lower but sustained growth. | 4.3 | 5.8 |
| Financial and insurance | Continued growth at current relatively high levels to 2025, followed by slightly lower growth. | 5.1 | 5.8 |
| Real estate | Average but sustained growth. | 7.3 | 2.5 |
| Professional and support services | Average but sustained growth. | 0.3 | 3.0 |
| Public administration and defence | Average but sustained growth. | 2.0 | 6.0 |
| Education | Average but sustained growth. | 2.6 | 5.2 |
| Health and social work activities | Average but sustained growth. | 2.7 | 5.2 |
| Other services | Average but sustained growth. | 4.8 | 4.0 |

Source: NTMP

**Table 3.9 GDP growth estimate**

| Year | Annual average GDP growth (%) |
|---|---|
| 2016 to 2021 | 6.5 |
| 2021 to 2026 | 6.7 |
| 2026 to 2031 | 5.2 |
| 2031 to 2036 | 5.1 |

Source: NTMP

## 3.6 Growth in transport demand

The growth in transport demand is driven by economic and socio-economic factors. As the economic activities of the country will continue to increase the demand for transport will follow. The key drivers of transport demand growth for Malawi are:

- Growth of population and its demography;
- Growth of employment;
- Growth of the economy; and
- Future infrastructure development, unlocking growth potential for Malawi.

Future demands have been estimated using the derived elasticity, representing how trip making would react to the changes of those driving factors.

### 3.6.1 Passenger transport growth

Each of the above factors are expected to grow at various rates as discussed in the sections above. Table 3.10 presents the estimated growth of transport demand for the next twenty years, under do-minimum conditions without any major interventions. The demands presented include all the strategic trips within Malawi as well as those to and from the country.

The total demand is expected to double by 2036. The average annual growth rate of the demand over next twenty years is expected to be around 3.4% compared to population growth (3.1%) and GDP growth (5.9%) over that period[9].

**Table 3.10 Estimated transport demand (12-hour day), 2016 to 2036**

| Year | Demand (trips) | % annual growth |
|---|---|---|
| **2016** | 378,000 | |
| **2021** | 451,000 | 3.6 |
| **2026** | 528,000 | 3.2 |
| **2031** | 610,000 | 2.94 |
| **2036** | 722,000 | 3.44 |

9 *The growth rate presented here is the compound growth rate between 2016 and 2036.*

**Table 3.11 Growth in transport demand (12hr day) by purpose and mode, 2016 to 2036**

| Demand segment | Private transport | | | Public transport | | |
|---|---|---|---|---|---|---|
| | 2016 | 2036 | Annual change, 2016 to 2036 | 2016 | 2036 | Annual change, 2016 to 2036 |
| Business | 39,000 | 81,000 | 3.7% | 103,000 | 192,000 | 3.1% |
| Non-business | 77,000 | 151,000 | 3.4% | 158,000 | 298,000 | 3.2% |
| **Total** | **116,000** | **232,000** | **3.5%** | **261,000** | **490,000** | **3.2%** |

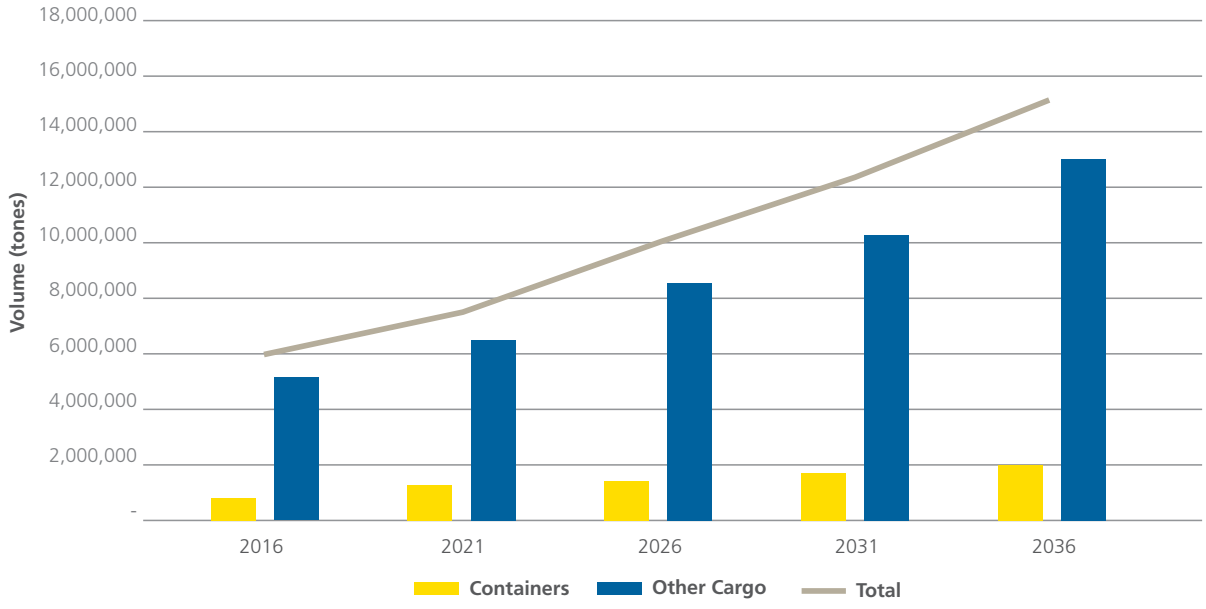
Table 3.11 presents both public transport and private trip demands, disaggregated by business and non-business. Public transport passenger demand is expected to grow at a similar rate of 3.1% over the 20-year period, with private transport growth being higher at 3.5% per annum, reflecting a growth in car ownership.

## 3.6.2 Freight demand growth

Freight demand is expected to growth at steady rate of 4.8% annually. The proportion of containerised and other cargo is assumed to remain the same as the base year, without interventions, as shown in Figure 3.7.

The share of rail for containerised traffic (38%) and other cargo (seven percent) will continue to be the same in the future. Hence the growth of overall freight movements would mean a reasonable growth of the goods vehicles on the road. Both Light Goods Vehicles (LGV) and Heavy Goods Vehicles (HGV) are expected to grow at around 4.8% per year rate, which is in line with the average freight demand growth.

**Figure 3.7 Freight demand growth**



## 3.7 **Strategic network constraints**

The current transport network is not well suited to meeting transport demands in ways that can reduce transport costs. Of particular concern are:

- The most used port by importers and exporters is Beira, which is only connected by road to Malawi;
- Nacala Port, which is connected by rail suffers from limited shipping line calls, restricting its attractiveness to transporters;
- Quelimane Port, which is nearer to Malawi than Beira, is also only connected by road;
- The above mentioned ports are all in Mozambique, which suffers from frequent civil unrest that affects connectivity and transport costs;
- Mtwara Port is not formally connected to Malawi, despite the designation of the Mtwara Corridor;
- Lake Malawi is currently presenting a constraint to east-west movement, rather than a solution;
- Dar es Salaam Port is not connected by rail to Malawi;
- Domestic road transport costs are high, with a large proportion of this being ascribed to poor rural road conditions;
- The strategic road network, particularly the north-south corridor, needs a comprehensive maintenance regime, above the current level of interventions; and
- The existing network, of road, rail and inland water transport links is susceptible to climate change.

**Minibus pick up point right next to pedestrian crossing in Lilongwe.**

# 4 Key strategic goals

## 4.1 Strategic considerations

There are numerous factors that are impacting on Malawi's transport sector.

The primary strategic considerations are identified in Chapter 2 and summarised below:

- High transport costs, due to:
  - An infrastructure deficit, and with a sizeable proportion of existing infrastructure insufficiently maintained;
  - Insufficiently developed rail and waterborne transport infrastructure and services, which have declined owing to a focus on improving the road network;
  - Inadequate and poorly regulated passenger and freight systems;
  - Rapid growth in urban areas and associated congestion;
  - Limited diversification of the economy and a heavy reliance on the agricultural sector, with numerous and dispersed production sites located across the country; and
  - Vulnerability to extreme weather conditions, such as drought and flooding.
- Human and financial resource limitations, including capacity deficits in transport sector institutions, leading to:
  - Impaired competitiveness of Malawi's exports and the mobility of the population;
  - Poor safety and security across all modes of transport, and the associated human, social and economic impacts;
  - Opportunities to develop an environmentally sustainable and resilient transport network being missed;
  - Widespread social exclusion, which is concentrated in rural areas often characterised by poor connectivity and access, and a population with one of the lowest levels of per capita income in the world; and
  - Relatively poor regional integration in terms of transport infrastructure and trade.
- Key considerations regarding future demand for transport in Malawi, as summarised in Chapter 3, include the following:
  - Forecast growth in population, employment and GDP, as well as the development of transport infrastructure, is likely to see transport demand double by 2036 and the need for substantial transport infrastructure to support;
  - There will be increased urbanisation but the population will remain predominantly rural based, which will necessitate a strategic approach to rural (as well as urban) transport provision, as will the fact that the agriculture sector is expected to experience more growth than any other sector of the economy;
  - The oil industry could become one of the most important sectors of the Malawian economy but it will require the timely construction of large-scale infrastructure projects to access, process and transfer the oil;
  - The government's drive to develop Malawi's mining sector will require considerable investment in supporting transport infrastructure, as will the forecast growth of the tourism industry;
  - Passenger transport demand is expected to grow at an average of 3.4% per year over the next twenty years, and to be accompanied by a 3.1% growth rate for passenger public transport and 3.5% growth in private transport;
  - Freight demand is expected to growth at a steady rate of 4.8% annually, and;
  - The need for safe, sustainable and resilient transport infrastructure and services, as well as the negative consequences of failing to provide the same, will increase.

## 4.2 **Vision**

The vision of the National Transport Policy is:

***'The development of a co-ordinated and efficient transport infrastructure that fosters the safe and competitive operation of viable, affordable, equitable and sustainable transport services'.***

This NTMP aims to support the achievement of this vision by providing a guide for the development of the transport sector over the next 20 years, by addressing the strategic considerations above.

## 4.3 **Objectives**

Three strategic objectives have been developed to support the vision and guide the development of the NTMP:

- Reduce transport costs and prices across all modes;
- Improve the safety of transport infrastructure and services; and
- Enhanced and sustainable passenger and freight transport systems.

The achievement of these long-term goals will be guided by the pursuit of the following operational objectives, listed below:

- To facilitate a modal shift from road to rail and inland water transport;
- To mainstream safety and security considerations into transport projects, policies and related processes;
- To increase citizens' access to all-weather roads;
- To improve intermodal integration;
- To enhance the connectivity of rural areas, including to support continued growth of the agricultural sector;
- To foster transport systems to support the development of oil and mining sectors;
- To improve the resilience of transport infrastructure and services;
- To develop the domestic freight industry; and
- To reduce dependence on Mozambique for access to international markets.

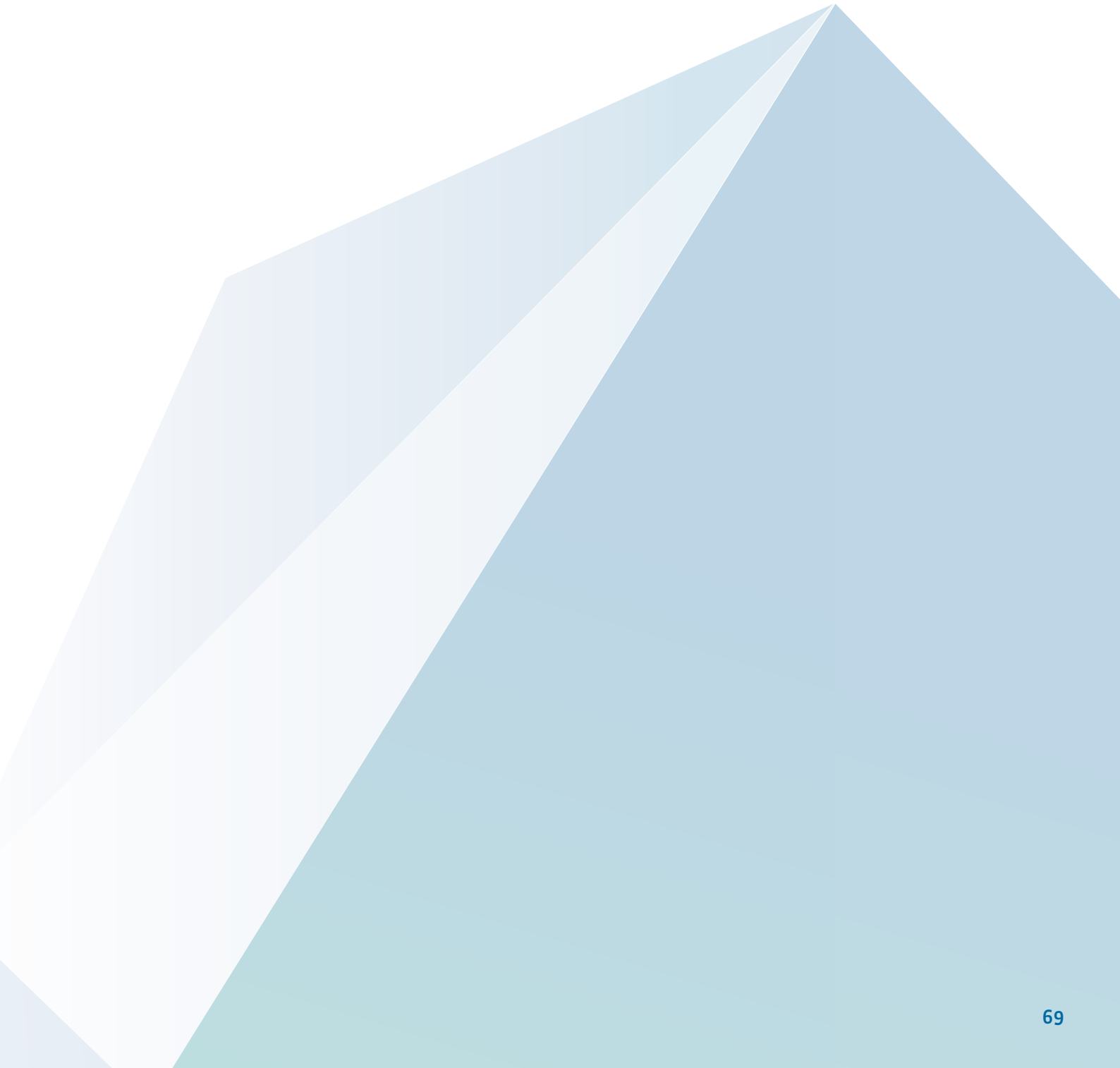
The Key Performance Indicators (KPIs) that have been developed to monitor progress towards these objectives and the implementation of the NTMP are listed in Chapter 12.

## 4.4 **Strategies**

The strategies outlined in the NTMP for achieving the objectives are in line with those of the Malawi Growth and Development Strategy III (MDGS III), being finalised in August 2017. The MDGS III strategies are:

- Undertaking systematic maintenance and rehabilitation of infrastructure;
- Ensuring that there is an integrated, well-managed, viable and sustainable transport infrastructure;
- Providing a framework for the development of an efficient transport system;
- Providing safe, reliable, effective and efficient transport operations;
- Promoting inter-modal competition or complementarity, where feasible;
- Developing an efficient and productive maritime transport infrastructure;
- Developing transport corridors in order to improve the competitiveness of Malawian goods and services on the regional and international markets;
- Developing the Nsanje World Inland Port;
- Promoting an environmentally sustainable and climate resilient transport system;
- Providing access to safe, affordable and sustainable transport system with special attention to the needs of those in vulnerable situations including persons with disability, pedestrians and cyclists;
- Enforcing transport regulations;
- Mobilising private businesses to engage in the transportation sector to improve competition; and
- Promoting PPP in the operation and management of transport infrastructure.

**The strategies outlined in the NTMP for achieving the objectives are in line with those of the Malawi Growth and Development Strategy III (MDGS III), being finalised in August 2017.**



Segregated pedestrian facilities in Zomba.

# 5 Improvements to the transport system

## 5.1 Strategies for reducing transport costs

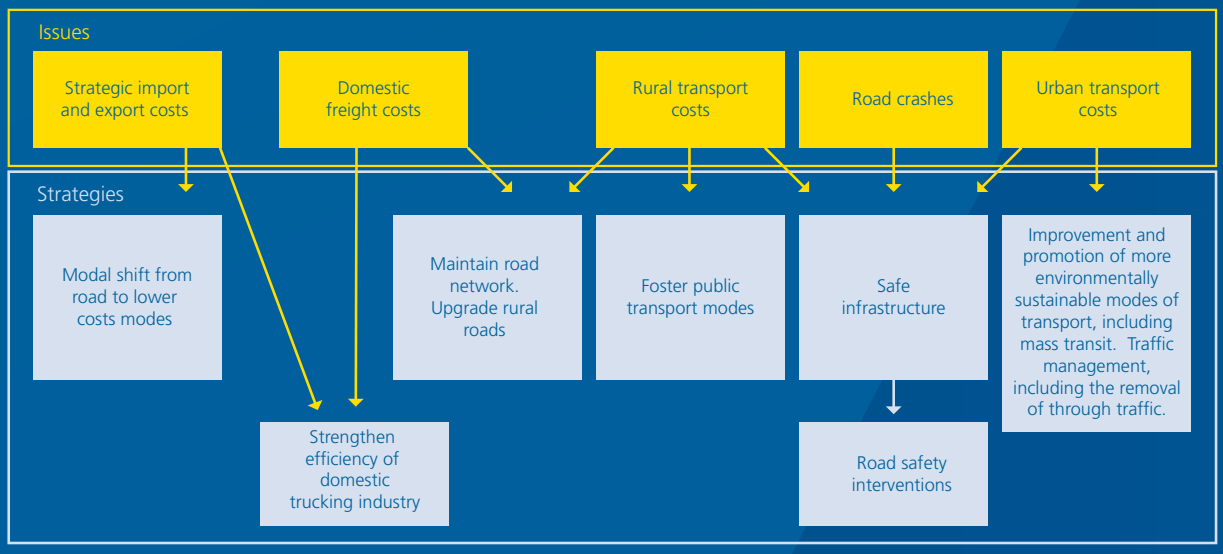
In Chapter 2 the issues affecting high transport costs were articulated, as were key considerations regarding future demand for transport in Malawi in Chapter 3. The main objective of this NTMP, with the goal of improving GDP growth through a sustainable long-term investment plan, is to reduce direct transport costs and the socio-economic costs inherent in inadequate and unsustainable transport systems.

High transport costs are an inhibitor to both international trade and domestic freight and as a landlocked county, Malawi places major reliance on road transport, a fact which attributes to keeping transport costs high. Interventions involving a strategic modal shift to rail and inland water transport where larger quantities of cargo can be moved at lower cost are proposed. Establishing a haulage industry council to represent, promote, register and regulate Malawian operators of freight transport services will assist in strengthening the governance of the domestic trucking industry for better efficiency.

Urban and rural residents suffer from the effects of high transport costs in their respective areas. Key strategies to curb these costs in rural areas include upgrading roads and ensuring regular maintenance of the network to improve overall accessibility (i.e., improve farmer's ability to access and transport inputs and produce, and people's ability to access education, employment and services). Fostering public transport modes, better traffic management and the reduction of through traffic in urban roads and introducing environmentally sustainable modes are key strategies for controlling transport costs in urban areas. Improvement in these areas will allow for reduced transport costs (including travel time, vehicle operating costs, and accident and pollution costs).

Road crashes in Malawi cost the nation 0.78% of GDP in 2016 in the form of medical care and indirectly from productivity losses. Increasing safe infrastructure and road safely interventions in urban and rural transport systems are intended to reduce this cost. The strategies for addressing costs are summarised in Figure 5.1.

**Figure 5.1 Strategies for reducing transport costs**



## 5.2 **Accessibility and mobility**

Strategies for improving accessibility and mobility build on those developed for addressing transport costs. If implemented effectively they will collectively result in the improvement of infrastructure and the establishment of a more appropriate and modern institutional framework, and ultimately an improvement in accessibility and mobility for all transport users. The impacts will include improved safety, social inclusion, efficiency, integration and enhanced social and economic opportunities. They are consistent with the strategic direction set by the 2015 National Transport Policy , this NTMP's objectives, and have also been guided by the following plans and policies:

- Vision 2020;
- Malawi Growth and Development Strategy (MGDS) II;
- Transport Sector Investment Programme (TSIP);
- Road Authority's 5-Year Business Plan; and
- Road Sector Programme (RSP).

The key intervention areas are summarised below.

### 1. Improve road safety

This NTMP will complement, and seek to increase momentum for the implementation of, the initiative of the National Road Safety Strategy (NRRS) (DRTSS, 2015) to address the high social and economic costs associated with Malawi's roads being amongst the most dangerous in the world. Its measures will improve access to financial and technical support to improve infrastructure and traffic management as well as associated guidelines, education and public awareness, data collection, management and application, and legislation and enforcement. In doing so it seeks to both design improved safety and foster a related cultural change, an example of this is included in aspects of Universal Design.

### 2. Consider transport in terms of its impact on accessibility and mobility

Interventions are considered from the perspective of their impact on accessibility and mobility for both people and freight. They will not be considered ends in themselves, rather as links within a network that in turn must be viewed as a component of a wider system.

**Strategies for improving accessibility and mobility build on those developed for addressing transport costs.**

The plan's actions will mainstream and institutionalise, in relation to rural areas in particular, a planning approach that considers sub-sectoral interventions in the wider context of their impact on accessibility.

### 3. Improve public transport

In both urban and rural areas, the proportion of the population with access to a motorised vehicle will remain very low during the NTMP period. By necessity this segment of the population can only have improved accessibility through better public transport.

### 4. Enhance social inclusion

The actions have been considered in the context of impacts on social dimensions including gender, income, mobility and age. They collectively meet the needs of diverse social groups, and infrastructural. Institutional and regulatory measures are proposed to design these considerations into the transport sector planning and operation in the long-term.

### 5. Ensure that provisions are applied and allocated to non-motorised as much as motorised modes of transport

Most journeys on the road network are made by a non-motorised mode of transport and the measures outlined in this NTMP address the currently limited consideration of, and provision for, walkers and cyclists that characterises the road network.

### 6. Improve resilience to climate change impacts

The plan's measures recognise that Malawi is experiencing climate change impacts, such as more frequent and severe flooding and drought, and that transport infrastructure is deteriorating more rapidly as a result. It proposes measures, including in relation to design standards, materials and maintenance regimes, to 'design in' climate change resilience for efficiency and effectiveness savings.

**7. Build capacity to sustain and continuously improve the effectiveness of interventions to support the guiding principles**

The value of the financial and technical support accessed to implement this NTMP will be maintained by a programme of capacity building that will be designed to create domestic capacity to effectively implement the plan and optimise its impacts.

## 5.3 Choice and strategic options

The National Transport Policy calls for greater modal choice as a means of fostering competition towards lower transport costs. This is entirely consistent with a liberal market in the transport sector. However, in order to allow greater modal choice, and indeed to affect any strategy towards modal shift, it is necessary for the Government to intervene. Up to now, the Government interventions have prioritised the road sub-sector for very good reasons.

## 5.4 Strategies for the economic growth sectors

The enhancement of passenger and freight transport systems, including by improving intermodal integration, will facilitate economic growth, as reflected in the NTMP objectives. This sub-section contains proposals for fostering transport systems that support the development of the following growth sectors of the economy: oil, mining, tourism and agriculture.

### 5.4.1 Oil

#### 5.4.1.1 Transport for oil production

The most efficient and environmentally sustainable means of moving crude or refined oil is by pipeline. However, a pipeline would only be viable for volumes of 25,000 to 40,000 barrels per day. Any given block with a lower production rate than the threshold for a pipeline would use other forms of transport, an in such a case, rail and inland water transport should be prioritised.

**A production rate of 5,000 barrels per day would be the equivalent of around 255,000 tonnes per year.**

The situation is complicated by the option of a potential refinery in Malawi that could meet domestic needs, and possibly some regional (primarily Zambian) needs too. A refinery would be viable at a minimum processing of 25,000 barrels per day, somewhat less than Malawi's equivalent current fuel consumption. Modular refineries are possible under which capacity can be increased by 2 or 3 times as need arises. A decision on a location for a potential refinery would need to take into account the production rates (if any) of the various blocks, and sub-blocks within them. However, at this early stage we recommend that any refinery is located as close as possible to the railway, in order that domestic distribution can be done by rail and not road, particularly to the main centres of demand in Blantyre and Lilongwe. In the absence of a refinery, crude oil should be exported via pipeline to an appropriate port.

In the absence of a pipeline, or perhaps before a pipeline is constructed, crude oil should be exported by rail to Nacala. A production rate of 5,000 barrels per day would be the equivalent of around 255,000 tonnes per year, a viable load for rail transport.

Consideration would need to be given to the options of any rail extensions versus local pipelines to find the most economic means of transport to the trunk rail line.

There is some scope for inland water transport to play a role in transporting crude oil, since the most likely oil deposits are on the coastal strip or in Lake Malawi. The current tanker vessel MV Ufulu has been out of service for 15 years, and has a carrying capacity of 310 tonnes, well below what will be required to service all 5,000 barrels per day. Significant investment in port infrastructure and vessels would be required.

**Table 5.1 Proposed logistics for oil equipment import**

| Block no. | Main districts | Logistics plan |
|---|---|---|
| 1 | Chitipa, Karonga | Option 1: Rail from Nacala, transship at Liwonde using inland water transport to Chilumba |
| | | Option 2: Dar es Salaam, via Mbeya and new rail link to Karonga |
| 2 | Lake Malawi | Option 1: Rail from Nacala, transship at Liwonde using inland water transport to Chilumba |
| | | Option 2: Dar es Salaam, via Mbeya and new rail link to Karonga |
| 3 | Lake Malawi | Option 1: Rail from Nacala, transship at Liwonde using inland water transport to Nkhata Bay |
| | | Option 2: Dar es Salaam, via Mbeya and new rail link to Chilumba, transship using inland water transport to Nkhata Bay |
| 4 | Lake Malawi | Option 1: Rail from Nacala, transship at Liwonde using inland water transport to Chipoka |
| | | Option 2: Rail from Nacala, transship at Liwonde to road |
| 5 | Phalombe, Mulanje, Machinga, Chiradzulu | Option 1: Rail from Nacala, transship at Liwonde to road |
| | | Option 2: Rail from Nacala, transship at Limbe to road |
| 6 | Nsanje, Chikwakwa | Option 1: Rail from Nacala, transship at Limbe to road |
| | | Option 2: Rail from Beira, new line to Nsanje/Bangula, transfer to road |

#### 5.4.1.2 Transport for oil industry development

Even at an exploration stage, heavy plant and equipment will need to be imported into Malawi to the coastal areas, and possibly on the lake. Modes of transport determined for this could set the tone for the future import of the much larger volumes required for production.

During the construction of CPFs required to develop Malawi's oil industry, transport will be needed to bring materials in and also for the construction of warehouses and camps that will be based at some distance from the CPF area. Truck volumes will correspond to the size of the CPF, which is determined by the size of the separators used to process the hydrocarbons. The construction of the CPF will require out of gauge transport (a form of transport that accommodates cargo that exceeds the dimensions of standard 20 foot or 40 foot freight containers with fixed sides and so cannot be carried using standard methods of transport), specifically a container of flat rack, which can be handled by a rigid ISO over-height spreader attached to standard Quay Crane spreader and requiring no manual intervention at the point of stow.

Alongside the movement of materials, a large number of workers will be required on site. The peak period of high traffic volumes could last for four to five years and decline significantly thereafter.

Table 5.1 indicates recommended options for the import of rigs and other specialised equipment.

In addition, consideration should be given to the construction of an international airport, primarily for key oil workers and management in the area of the oilfields. At this stage, it is not possible to recommend a specific location. Karonga airport could service Blocks 1 and 2. Rather than construct a new airport at Mzuzu, a more strategic location would be Nkhata Bay.

Drilling exploration is not expected to occur before 2020, and it is possible that production could start some years after that, but all within the timeframe of the NTMP.

**Figure 5.2 Inland water oil tanker**

**Figure 5.3 Offshore supply vessel**

The initial volumes noted above appear quite small to justify the required investment. Nevertheless, if inland water transport and rail is to be used regardless of the volumes there are several transport segments to consider:

- Transport from 'offshore' production to the shore for storage/transhipment (Blocks 2,3 and 4 as shown in Figure 3.3 in Chapter 3). This will be typically done by ships or submarine pipelines.
- Transport link using inland water transport/ rail or pipelines for distribution or export.

In avoiding the use of trucks, production from the north part of the country will require consequent investment for transport connections. Offshore production from Block 4 can be linked directly to the rail network at Chipoka. One of the key issues with transporting the crude oil using the lake is the availability of vessels. Several tankers and a new shipyard to assemble the vessels would be required.

An example of a tanker for inland water transport is shown in Figure 5.2. This has a capacity of 800m3 as it may be difficult to get larger ships in due to draft limitations (the draft here referring to the minimum depth of water in which a ship or boat can safely navigate, which has, for example, been affected by recent drop in Lake Malawi's water levels) around the lake.

Depending of the distance to travel, it might take four days for a ship to load, travel, unload and return so there would be a need three or four of these kinds of vessels to accommodate the 255,000 tonnes of crude oil that would need to be transported per year in the absence of a pipeline.

There is also a need for offshore supply vessels (Figure 5.3) and terminals. Because of the limited offshore storage capacity, fuel, supplies, materials and equipment needing to be shipped frequently in relatively small quantities to the offshore sites. On return journeys, waste materials, equipment no longer needed and equipment in need of repair and maintenance is shipped back to shore. Crews will also be moved by vessels. There is also a large requirement for supporting activities/industries which would typically be located at the offshore supply terminals.

### 5.4.2 Mining

Table 5.2 lists the transport needs identified for the mining sector and Table 5.3 sets out the key mining projects within the NTMP period. Figure 5.4 presents the location of all the major mining projects in Malawi.

**Table 5.2 Transport projects for the mining industry**

| District | Mineral locality | Mineral | Current infrastructure | Transport need |
|---|---|---|---|---|
| Chitipa | Illomba | Graphite | D2 and M9 roads | Upgrading of district road to tertiary road as a minimum |
| | Kaseye Mission | | D7, D6, D4 and M9 roads | Upgrading of district roads to tertiary as a minimum |
| | Misuku Hills | Heavy sands | D10, D11, D15 and M26 roads | Upgrading of district roads to tertiary as a minimum |
| | Ngana | | | |
| Karonga | Lufira and Kibwe | Coal | D19 road | Upgrading of district roads to tertiary as a minimum |
| Rumphi | Kaziwiziwi | Coal | T305 road Construction of Njakwa-Livingstonia-Chitima road | Upgrading of road to tertiary as a minimum |
| Mzimba | Mzimba | Precious and Semiprecious stones | M9 and M22 roads | N/A |
| Mzimba | Majiasawa | Precious and Semiprecious stones | M5 and D52 roads | Upgrading of district road |
| Nkhotakota | Dwangwa | Alluvial Gold and Aluminium | M5 road | N/A |
| Kasungu | Chikoa Livwezi | Limestone | No identifiable infrastructure | N/A |
| Dowa | Chisepo | Iron Sulphide | S117 road | N/A |
| Nkhotakota | Katengeza | Graphite | M18 and M5 roads | N/A |
| Lilongwe | Lilongwe | Graphite, Iron Sulphide, Crystalline Gypsum | No identifiable infrastructure | N/A |
| Dedza | Linthipe Mouth | Kaolinitic Clays | M1, S126, T372, D220 roads | N/A |
| Lilongwe | Malingunde | Gold and Zinc | T364 and S124 roads | Upgrading of roads |
| Ntcheu | Golomoti – Malowa Hill | Red and Orange Garnet | M5 and S127 roads | N/A |
| Ntcheu | Nkhande, Rivirivi, Dzonze, Kapiridima and Chimwazulu | Kaolinitic clays, Corundum and Limestone | M1, M5 and M8 roads close to Liwonde train station | N/A |

**Table 5.2 Transport projects for the mining industry (continued)**

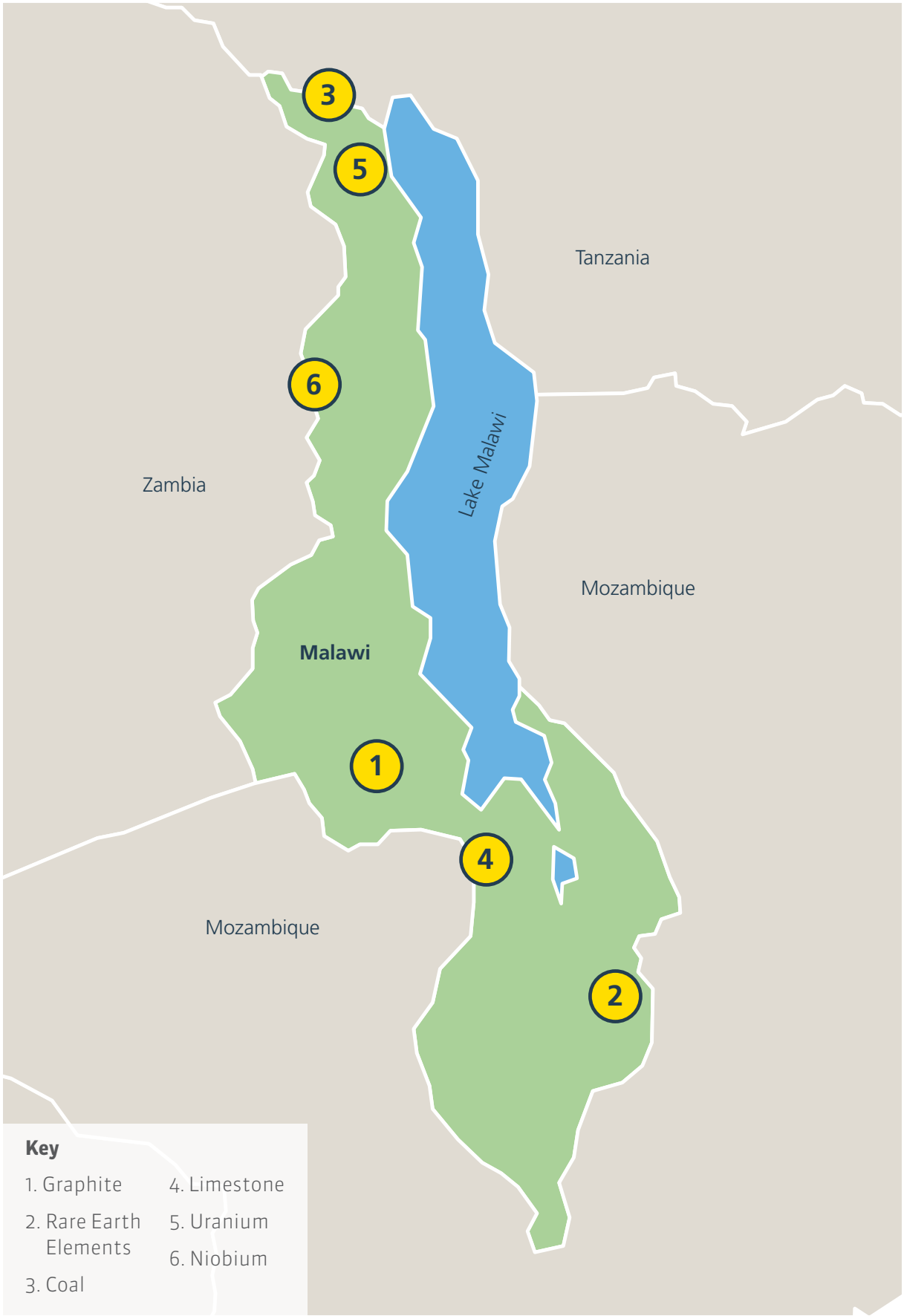
| District | Mineral locality | Mineral | Current infrastructure | Transport need |
|---|---|---|---|---|
| Ntcheu | Likudzi | Gold, copper, nickel and Graphite | M1 road<br>Liwonde train station | N/A |
| Ntcheu | Senzani | Kaolinitic Clays | M1 road<br>Liwonde train station | N/A |
| Balaka | Kangankunde | Rare Earth Elements and Strontianite | M1 road<br>Liwonde train station | N/A |
| Balaka | Chenkumbi | Limestone | M8 road<br>Liwonde train station | N/A |
| Mangochi | Lake Malombe | Natural Cement and Hydraulic Lime | M3 road<br>Liwonde train station | N/A |
| Zomba | Junguni Hill | Sodalite Syenite and Nepheline Syenite | No identifiable infrastructure | N/A |
| Zomba | Mongolowe Hills | Nepheline Synenite | M3 and S131 roads | N/A |
| Zomba | Lake Chirwa | Heavy Mineral Sands | S143 and T404 roads<br>M3 to Liwonde and Limbe | N/A |
| Zomba | Changalume | Limestone | | N/A |
| Zomba | Chingale | Phosphate | | N/A |
| Neno | Matope | Marble | M1 and T416 roads | N/A |
| Neno | Lisungwe | Platinum Group Metals | D313 and M6 roads | N/A |
| Mwanza | Nsengwa | Rare Earth Elements | S136 road | N/A |
| Blantyre | Lirangwe | Marble | M1 road | N/A |
| Blantyre | Mindale Hill | Iron ore | M1 road | N/A |
| Phalombe | Tundulu | Rare Earth Elements, Pyrochlone – carbonatite, Phosphate, Soevite | S147 road | Upgrading of roads |
| Phalombe | Nkalonje | Rare Earth Elements | S147 road | Upgrading of roads |
| Phalombe | Songwe Hill | Rare Earth Elements | S147 road | Upgrading of roads |
| Mulanje | Chambe Basin | Rare Earth Elements | No identifiable infrastructure | N/A |
| Mwanza | Thambani | Niobium and Uranium | No identifiable infrastructure | N/A |
| Nsanje | Tengani | Titanium | M1 road | N/A |

### Table 5.3 Key mining projects in NTMP period

| No on Figure 5.4 | Deposit | Location and distribution | Infrastructure requirement | Assumed start date |
|---|---|---|---|---|
| 1 | Graphite | ▪ 15kms south of Lilongwe<br>▪ Export to China<br>▪ Rail via Nacala Port | ▪ 12km rail siding from Duwi to Lilongwe Salima railway line connecting at Balan'gombe rail siding<br>▪ Upgrade road D191 and unnamed road | ▪ 2024 earliest<br>▪ Pre-feasibility and feasibility studies yet undertaken |
| 2 | Rare Earth Elements | ▪ Tundulu, Nkalonje and Songwe Hills<br>▪ S147 and M2 roads in Malawi, exit at Muloza Border and utilise Mozambique | ▪ Continued maintenance and rehabilitation of S147 and M2 roads | ▪ 2020 earliest<br>▪ Pre-feasibility study completed in November 2014 |
| 3 | Coal | ▪ Karonga<br>▪ M1 to Chilumba Bay to Chipoka and Salima | ▪ Adequate port facilities in at Chilumba and Chipoka to handle coal | ▪ 2025 earliest<br>▪ Mining licence granted<br>▪ 5 Exclusive Prospecting Licences (EPLs) |
| 4 | Limestone | ▪ Ntcheu, Malowe Hills, 500 kMT annual<br>▪ Access road M5 to rail station at Golomoti than rail to Lilongwe or Blantyre | ▪ M5 road to be rehabilitated<br>▪ Station facilities at Golomoti to be upgraded to allow for transhipment of limestone | ▪ 2020 earliest<br>▪ Mining licence awarded in 2010 (15-year mining licence)<br>▪ Environmental approval obtained from Department of Environmental Affairs<br>▪ Further discussions with technical and financial investors |
| 5 | Uranium | ▪ Karonga, northern Malawi<br>▪ Road via Songwe Border, through Tanzania and Zambia to Walvis Bay* Port in Namibia | ▪ Continued maintenance of M1 road to Songwe Border | ▪ Dependent on increase world trends in 2020 |
| 6 | Niobium | ▪ Mzimba, northern Malawi<br>▪ Export to China<br>▪ Road to Kanengo rail station, then rail via Nacala Port | ▪ Continued maintenance of M1 and niobium handling facilities at Kanengo station | ▪ 2020 earliest<br>▪ Mining licence granted<br>▪ Development agreements negotiations ongoing<br>▪ Some inhabitants in the area have started to receive a related relocation compensation. |

* Walvis Bay port is the only Port in Africa certified to handle radioactive materials

**Figure 5.4 Location of major mining projects in Malawi**



### 5.4.3 Tourism

Table 5.4 shows the country's main tourist attractions and the current transport options to reach the various destinations.

Additional roads that require interventions are:

- Nthalire to Chitipa: banks on either side of the road significantly high;
- Rumphi - Nyika – Chitipa – Misuku road;
- Nkhata Bay-Mzuzu; excessive deforestation in the area leads to heavy rains always washing the road away;
- Nkhata Bay-Salima: sections of the road in poor condition (along Nkhotakota road), especially with frequent passing of overloaded trucks; and
- Upgrading of access roads:
  - Salima – Senga- Maganga roads 40 km;
  - Cape Maclear and Kasankha Bay road 26km to bitumen;
  - Liwonde Mnsanama to Mvuu Camp Road (3km bitumen and 30km all weather);
  - Rumphi -Nyika – Chitipa Road to Chelinda Camp (20km all weather);
  - Chitimba – Livingstonia road (17km Bitumen);
  - Bunda turn-off - Nkhotakota Wildlife Reserve (100km all-weather);
  - Kasungu – Lifupa (70km all weather);
  - Dedza to Chongoni Art Site (15km Bitumen);
  - Bunda turn-off to Tsang'oma Rain shrine (10km grading);
  - Namwera –Fort Mangochi (15km all weather);
  - Grading of all earth roads within strategic protected areas of Nyika, Vwaza, Kasungu, Nkhotakota and Liwonde (1000km);
  - Old Bandawe Missions in Nkhata Bay (10Km all-weather to M5 Lakeshore);
  - Fort Lister Slave Trade from Phalombe(15Km all weather);
  - Chitipa- Nakonde (Nakonde Corridor);
  - Senga Bay-MAFCO through Maganga to Salima; and
  - Likuni - Dzalanyama or Mchinji Road – Dzalanyama Forest Reserve.

**Table 5.4 Malawi's main tourist attractions**

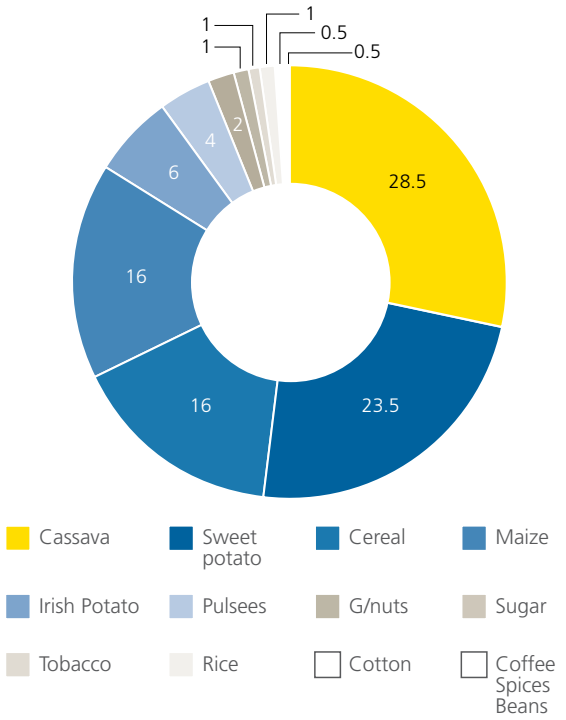
| Attraction | Major access points | Transport |
|---|---|---|
| Lake Malawi | Nkhata Bay | Road (M5), lake services |
| | Salima | Road (M14, S122) |
| | Mangochi | Air, road (M10) |
| | Monkey Bay | Road (M10, S128), lake services |
| | Nkhotakota | Road (M5), lake services |
| Nyika National Park | Rumphi – Thazima Gate | Road (unpaved) |
| Nkhotakota National Park | | Air, road (M18) |
| Kasungu National Park | Kasungu | M1, S118, potholed road, and gravel road in park |
| Liwonde National Park | Liwonde | M3, 14km unpaved road, M8, 30km unpaved road |
| Majete Game Reserve | Chikwawa | S136, paved |
| Mulanje Mountain Reserve | Mulanje | M2 |
| Lengwe National Park | Chikwawa | M1, paved roads |
| Likoma Island | KIA, Lake ports | Air, lake services |
| Mwabvi Wildlife Reserve | Bangula | M1 |
| Namizimu Forest Reserve | East of Mangochi | Road, 3km unpaved |
| Vwaza Marsh Reserve | | M8 |

## 5.4.4 Agriculture

### 5.4.4.1 Growth areas

Malawi produces 18 million tonnes of a variety of crops. Cassava, sweet potato, cereal and maize are the most grown with 29%, 24%, 16% and 16% respectively (Figure 5.5).

**Figure 5.5 Crop production shares by tonnage**




Short-term growth of the agriculture sector is based on the assumption that the weather conditions will continue to normalise in the coming years. Reasonably strong growth is expected in the sector over the next ten years reflecting a move towards more valuable export crops by virtue of Government of Malawi interventions in agro-processing and value addition in the country. Lower growth rates from 2025 till the end of the NTMP period will be as a result of lack of significant growth in world-wide demand for tobacco. By 2036, however, agriculture will still be the dominant sector in the economy, with a slightly reduced importance.

**Malawi produces**
**18 million tonnes**
**of a variety of crops.**

While maize has been the major food crop in terms of both the policy agenda and area planted, tobacco has been, and continues to be, the dominant cash crop in the economy accounting for approximately 63% of the country's total export earnings. Tea and sugar are other important cash crops accounting for eight percent and seven percent of export earnings, respectively. It is envisaged that the major export crops, excluding tobacco, will continue to increase in production per hectare.

Livestock production, which contributes about one-fifth of the value of total agricultural production, consists mainly of subsistence grazing of sheep, cattle, goats, poultry and pigs (WTO, 2002). This agricultural sub sector is also expected to grow at a slower pace than crop production.

### 5.4.4.2 **Food security**

Increasing food security is one of the main objectives of Malawi's Agricultural Sector Wide Approach (ASWAp 2010 and MoAIWD, 2011). This has a strong focus on increasing maize production and since the mid-2000's, this has resulted in rapidly increasing production. Food consumption expressed in kilocalories (kcal) per capita per day is a key variable used for measuring and evaluating the global and regional food situation (FAO, 2003). Malawi's current kcal/capita is 3560 for maize. Utilising similar principles of MOAIWD's food balance sheet, Table 5.5 shows an increasing deficit of maize, Malawi' staple food crops, in the forecast years.

In 20 years, Malawi will require a further 54% of the maize currently produced today to ensure that the country remains food secure. While the short-term results of improving food security in Malawi can be seen through the national fertiliser subsidy programmes, other farm input assistance initiatives and, enhanced water management systems, the long-term outlook needs to be supported by a comprehensive food security policy.

Improved transport and transport services are a critical element in pre- and post- harvest activities and infrequent, expensive or poor quality transport and storage services increase product costs, damage goods, increase crop deterioration, resulting in high instances of food insecurity.

**Table 5.5 Forecast food balance sheet**

| | 2016 | 2021 | 2026 | 2031 | 2036 |
|---|---|---|---|---|---|
| Maize production (MT) | 2,829,947 | 3,013,894 | 3,215,825 | 3,383,048 | 3,555,583 |
| Production in kCal (in mn) | 21,836,378 | 23,255,746 | 24,813,881 | 26,104,204 | 27,435,515 |
| Population | 16,832,910 | 19,718,415 | 23,067,018 | 26,895,288 | 31,191,010 |
| Calorie requirement (in mn) | 21,872,683 | 25,622,108 | 29,973,283 | 34,947,737 | 40,529,598 |
| Surplus / Deficit (in mn) | (36,305) | (2,366,362) | (5,159,401) | (8,843,532) | (13,094,082) |
| **Surplus / Deficit in MTs** | **(4,705)** | **(306,675)** | **(668,647)** | **(1,146,103)** | **(1,696,965)** |

Source: Consultant's calculations

### 5.4.4.3 **Export potential**

The National Export Strategy's (NES) strategy imperative and goal for Malawi is for exports to match imports in the long-term. In 2016, Malawi imported US$2.3 billion worth of goods and services (43% of GDP) but only exported US$1.2 billion.

Tobacco, sugar, tea, pulses and cotton are Malawi's most important export crops by value and the largest by volume. Other crops being encouraged for export include pigeon peas, soya beans, groundnuts, sunflower, red kidney beans, sugar beans, white haricot beans, cow peas, sorghum, popcorn maize and rice. Export promotion companies like AHCX, facilitate export orders for informal farmers, aggregators, processors for value added products such as dhal, spices and paprika.

Growth in agriculture exports can be cultivated by sustainable and reliable transport logistics, accessible road networks and adequate trans-shipping/loading facilities for public use. Most tobacco companies, for example, own their own facilities, enabling packaging, storage and ultimately efficient transportation of the product to the final destination.

#### 5.4.4.4 Diversification

The main food crop, maize, is heavily reliant on rain. With recent trends of changing weather patterns and slowing demand for tobacco on the world markets, the Government of Malawi has set diversification as an explicit goal (MOAFS, 2011) for ensuring continued food security and increased revenues from export. In addition, poorly diversified diets characterised by an overreliance on starchy staples are a red flag for malnutrition. Conversely, diets which include a variety of foods are considered important for positive health. Diets which include nutrient-rich legumes as well as vitamin-rich fruits and vegetables are associated with micronutrient adequacy and reductions in chronic under nutrition (Arimond and Ruel 2004; Thompson and Amoroso 2011).

Key crops seen as potential candidates for mass diversification are root tubers, namely sweet potatoes, cassava and soya beans as specific varieties are drought resistant and can be grown throughout the year. Other crops include:

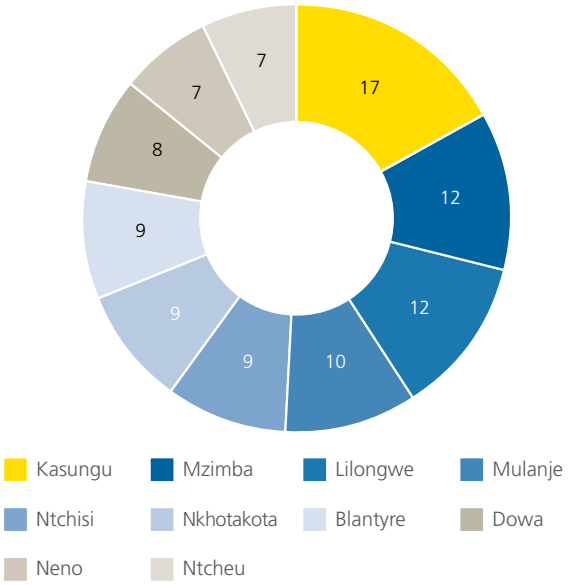
- **Cotton** – the market for cotton is well established with the main marketing opportunities being offered by Chinese firms. These firms have helped in increasing the competition on the market thereby helping in offering better prices for the farmers.
- **Pigeon peas** – Malawi is the third largest producer of pigeon peas in Africa. Pigeon peas are less capital intensive as they do not require fertiliser, which may reduce the farmer's production costs.
- **Groundnuts** – Malawi grows numerous varieties of groundnuts, including highly demanded brands such as Chalimbana and SG7.
- **Finger millet** – there is a ready market in South Africa and India.
- **Beans, cow peas, Irish potatoes** – beans and cowpeas are also potential crops such that they can also be grown under irrigation. Cassava and sweet potatoes are also on the promotion side especially as far as value addition is concerned.

A clear policy framework and implementation strategies for encouraging farmers to grow diversified crops not only for subsistence but on a cash basis will contribution positively to the economy to which improved transport and transport services are a critical success factor.

In-country road networks need to be developed and maintain to ensure that they are enabling for production in rural areas as well as transportation to other regions of the country. The ten districts depicted in Figure 5.6 make up a cumulative 61% of total national crop production and the NTMP provides for a specific focus on roads from these to other in-country and external destinations.

The proposed rural roads programme to address this is set out in Section 5.7.3.

**Figure 5.6 District crop production as a percentage of total national production**



#### 5.4.4.5 Reducing transport costs for tobacco

The tobacco auction system places costs and delays on small holder farmers and the product. The large tobacco companies would by and large be happier to move away from the auction system to direct contracting with farmers.

This has a number of advantages for farmers:

**Guaranteed prices;**

**Lower transport costs, as only one haul from farm to processing plant is needed;**

**Technical assistance with quality of inputs, to the extent of assistance with the provision of inputs; and**

**Sensitisation on type of tobacco and growing techniques.**

The disadvantage for farmers is that they feel that they can obtain a higher price for their product at auction. However, this is not guaranteed.

It is recommended that the TCC investigate a proposal to abolish the auction system, and move to direct contracting.

## 5.5 Railways

### 5.5.1 Strategy

The railway system in Malawi provides the greatest potential for reducing transport costs, one of the three strategic objectives that have guided the development of this NTMP. Even under CEAR's market pricing policy, transport costs per tonne-km by rail are lower than by road. However, the railway's strategic cost advantage is limited by the fact that it only serves Nacala Port. Despite investments in port infrastructure for non-coal traffic, the number of shipping lines that call at Nacala are fewer than at other major Indian Ocean ports. The most attractive port to Malawian shippers and transporters is Beira, which is currently served only by road from Malawi.

In order to take advantage of railway's inherent cost advantage, and to promote a shift in cargo transport from road to rail as well as to improve multi-modal integration, both key NTMP operational objectives, a dual strategy is proposed:

- Maximising CEAR's advantages through better operational techniques and improving the state of the existing network; and
- Extending the railway network into Malawi from ports other than Nacala, in order to offer choice and increased competition.

### 5.5.2 Improving performance

Table 5.6 lists 20 recommendations for improving the performance of the freight railway on the existing network.

### Table 5.6 Recommendations for improving freight railway performance

| No | Area | Description | Lead owner |
|---|---|---|---|
| 1 | Capacity building | Consider approach to IRO/Transnet or development of similar distance learning programme. | GoM/CEAR |
| 2 | Financial | Scrutinise in detail the level of track (and other) maintenance and renewals by CEAR including any underspend. | GoM |
| 3 | Financial | Wagon element of haulage fee be disaggregated so that customers are incentivised to use wagons more productively. Charge for use of wagons separately from rest of haulage fee. The disaggregated element for the wagons should reflect actual usage as far as possible so that if customers become more efficient their fees will fall and should they employ their own wagons their fees will fall. CEAR need something to stop customers using wagons as mobile storage. This is common practice globally. | CEAR |
| 4 | Financial | Shunting element of haulage fee to be disaggregated so that customers are incentivised to manage this cost. As above, CEAR need to separate the shunting cost from the general haulage charge so that customers have an incentive to reduce their shunting requirement. | CEAR |
| 5 | Freight marketing | Work with the Zambian Railways Limited (ZRL) to understand and agree what can be done to improve the railway service short of increasing the axle load. Additionally, they should agree on a list of target customers to approach to sell this new service, in particular, whether it is worth approaching any of the mining operations in Zambia. | CEAR |
| 6 | Marketing freight | Establish a formal rail freight users group. Include both Malawi and international rail users. | GoM |
| 7 | Operations | Conduct further trials to test the maximum trailing load west and east between Nkaya and Kanengo and Chipata with different locomotive types – partly for publicity and partly to understand optimal operational efficiency. | CEAR |
| 8 | Operations | Consider optimum operating methodology should Chipata line be extended. | CEAR |
| 9 | Operations | Publication of the CEAR freight timetable - at least to staff and potential customers. | CEAR |
| 10 | Operations investment | Examine the cost and consider the case to extend (the east-west route) train control system to include Limbe branch. Consider donor funding given safety concerns. | CEAR |
| 11 | Operations investment | Review potential extension of the east-west route train control system to include the north branch. | CEAR |
| 12 | Operations investment | Consider whether renewal and maintenance standard should be uplifted to 18 or 20.5 tonnes – and also consider incremental case for each and every renewal if higher standard is not adopted. | GoM /CEAR |
| 13 | Operations investment | Undertake an audit of the operational methodology at all private sidings including an estimate of the cost to CEAR and the investment options for reducing this. | CEAR |
| 14 | Operations investment | Evaluate the cost of extending radio train control system to the south and to the north lines. | CEAR |
| 15 | Regulation | Continue with the move of customs clearance from Liwonde to Nkaya. | GoM |
| 16 | Regulation | Secure license for Type GT26 locomotives to operate on the southern branch (at least as far as Limbe) to improve operational flexibility. | CEAR |
| 17 | Regulation | Extend customs pre-clearance to Zambia – Mozambique transit traffic. | GoM |
| 18 | Regulation | Create an independent regulator for the rail sub-sector, either as a stand-alone agency or in combination with the regulation of other sub-sectors to secure stronger technical, economic, environmental and safety co-ordination in line with national and regional goals. | GoM |
| 19 | Regulation | Following separation of the regulatory function from MoTPW, restructure the residual functions of the Department of Railway Services to focus on effective policy making, monitoring and oversight. | GoM |
| 20 | Regulation | Seek parliamentary approval for a new Railways Act (or equivalent legislation) to determine the future sub-sector structure, with provisions for the Minister and rail regulator to make regulations and guidelines as may be required to achieve a safe, efficient, integrated and financially sustainable rail sub-sector over the duration of the NTMP. | GoM |

### 5.5.3 Strategic freight rail options

The key potential investments are listed below. They are:

- Moatize avoiding line;
- Restoration of Sena (Beira) line north and south options;
- Upgrade of axle load (and line speed) of Nkaya – Chipata;
- Upgrade of axle load (and line speed) of Nkaya – Limbe/Sandama;
- New line from Kanengo/Salima to north of Malawi;
- Provision of intermodal facility at Liwonde;
- Investment in freight facilities (sidings and loading/discharge equipment);
- Train control technology extension;
- Capacity building: operational and management training; and
- Heritage rolling stock restoration.

These are mapped on Figure 5.7.

Excluded from this list is an extension of the line from Chipata to the Tazara line at Serenje as this is thought to be outside of the scope of this study and reported to be being examined by Zambian Railways currently. It is understood that CEAR and the Government of Malawi understand what is proposed. Even though this project is far from certain it is worth the Government of Malawi keeping in regular contact with the Government of Zambia and the sponsors of the scheme and asking if there is anything that the Government of Malawi can do to support the scheme in terms of lobbying funding or other bodies.

Table 5.7 provides a summary of the key infrastructure proposals. Note that only civil engineering schemes that require significant investment or financial support are mentioned here. Schemes that do not require investment or are relatively low cost, or more operationally focussed are not listed. For example, one of the recommendations of this report is that the charges for wagon usage and for shunting should be disaggregated. This, though, does not require significant investment by CEAR and hence is not included in this list.

### Table 5.7 Summary of key infrastructure proposals

| Title | Investment requirement | Purpose | Comment | High cost estimate (US$ million) |
|---|---|---|---|---|
| Moatize avoiding line | 11 km new line | Access to Beira | Long route for Nkaya – Limbe/ Makhanga traffic | 56 |
| Sena Line | 72 km of new line | Beira – Nsanje: proposed intermodal border location | 20.5 tonnes/axle | 298 |
| | 116 km of new line | Beira – Bangula: proposed intermodal location | 20.5 tonnes/axle | 480 |
| | 125 km of new line and 121 km restored line 237 km of restored line | Beira – Limbe | 20.5/18 tonnes/axle | 765 |
| Axle load upgrade Nkaya - Chipata | Part rebuild to deliver 18 tonne axle for 389 km | Enhance operational efficiency | 18 tonne/axle | 116 – 362 |
| | Part rebuild to 20.5 tonne for 389 km | Enhance operational efficiency | 20.5 tonne/axle | 362 plus risk factor of 100 |
| Axle load upgrade Nkaya – Limbe | Part rebuild to 20.5 tonne/ axle for 121 km | Enhance operational efficiency | 20.5 tonnes/axle | 80 |
| New line: Kanengo/Salima to north of Malawi | 260-500 km of new line | Enhance rail network coverage across Malawi | 20.5 tonne/axle to Mzuzu or Tazara line with Tanzania | 1,600 – 3,000 |
| New line Mbeya-Chilumba | 234 km of new line | Connect with port on Lake Malawi | 20.5 tonnes/axle to connect with Tazara line | 968 |
| Intermodal facility at Liwonde | 2 km of new line + intermodal sidings | Increase rail and maritime network reach and interoperability | Excludes maritime infrastructure costs | 5 |
| Dry port at Salima | 2 km of new line + intermodal sidings | Increase rail and road network reach and interoperability | | 10 |

## Figure 5.7 Rail civil infrastructure enhancement options


**Legend**

- South SENA line open (potential axle upgrade: 18 or 20.5 t/a)
- Nkaya to Mutara Junction via Moatize Avoiding line
- Recent upgrade of axle load completed
- Spot upgrade
- New line: Salima-Mzuzu
- Chilumba to Mbeya
- Chipata – Patauke – Serenjer potential extension
- Tazara Railway
- Other lines

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#### 5.5.3.1 Moatize avoiding line

One lower cost Option to rebuilding the Sena line between Limbe/Sandama and Mutarara – or prior to any rebuilding of the Sena line as part of a phased approach to help encourage traffic to grow – is to connect the Nkaya – Moatize line with the Moatize – Beira/Macuse line.

Currently both lines go into the mine complex at Tete/Moatize so it is not operationally feasible to run a regular freight service without some means of avoiding the operational congestion that will be caused. Exceptional traffic, including new wagons imported via Durban has been run this way, but this arrangement was too indirect, complicated and operationally problematic in terms of having to run through the mine sidings and its use of line capacity to be commercially viable for most traffic. A connecting, mine avoiding line, could therefore be needed between the Nkaya – Moatize line and the Moatize – Beira line east of Moatize.

It is important to note that such a link line will still be relatively direct. The line from Nkaya – Moatize runs roughly south-east. It covers 60 km (as the crow flies in Mozambique). It is relatively straight. The Moatize – Beira line is less direct running north-east-east from Moatize for around 45 km before turning south at Caldas Xavier to run more directly to Beira. It would therefore be possible to build an 11 km connection near Caldas Xavier. Critically, because it is direct this new connection will allow trains to/from Nkaya to avoid Moatize and around 90km of wasted running.

Such an avoiding line should be relatively simple to build. There is a parallel road and has no obvious large geographical obstacles (river crossings or mountains). It could therefore be constructed more cheaply and more quickly than any complete reconstruction of the Limbe/Sandama – Mutara route, and might help grow the traffic and develop markets for a later reconstruction of Limbe/Sandama reducing the traffic forecasting risk for funders/financiers/donors.

This option requires the Beira trains to operate on part of the west branch of the Malawi network. That line is used exclusively by coal traffic currently and is operated by Vale (not CEAR). Extra loops and other operating provisions would be required to persuade Vale that any Beira traffic would not risk the primary coal traffic. New access agreements would be required to regulate any arrangement. Because the coal traffic accounts for the clear majority of all traffic and underpins the CEAR's finances, Vale may not initially welcome any such option and may need considerable effort to be persuaded of its merit. This is probably the biggest single obstacle to this option being developed.

One of the other historic obstacles to developing the Moatize avoiding line option may be that the line from Moatize to Beira is operated by CFM and is not managed by Vale owned entities. Any traffic that runs to Beira via Caldas Xavier might be viewed as traffic that could have run to/from Nacala or via Bangula/Limbe if the Chiromo River crossing is rebuilt. This is made additionally complicated by the fact the Sena line is used for coal traffic and these exporters have an existing commercial relationship with CFM and it was this traffic that paid for the construction line upgrade works undertaken by RITES Ltd and IRCON International. However, whilst the Government of Malawi needs to be sympathetic to the commercial sensitivities of CEAR the opportunity to connect Beira by rail, the traffic that this will generate for CEAR and the competition this will bring to the existing Beira road operations probably outweighs any short-term dis-benefit to CEAR.

The common complaint of road users to Beira is that CEAR rail haulage prices to Nacala are insufficiently competitive to make them switch because Beira is nearer. Having rail direct to Beira gives a greater chance of rail offering a more competitive product. More importantly, it is probably worth noting that CFM operate the existing railway between Mutara and Beira, and that any restoration of the Sena route via Chiromo will require their cooperation anyhow. Engaging them via this early option will certainly be helpful.

It is recognised that this route is less direct than Nkaya – Beira via Limbe, Chiromo, Marka, Mutara and Vila Nova de Frontiera, and may not pose a very long-term solution. In the long run, any operation from/to Nkaya via Limbe and the Chiromo crossing will be around 100 km more direct (around 30%) than using this avoiding line and therefore less expensive to operate in terms of fuel, staffing, locomotive and wagon provision and track wear. In the short to medium-term this is likely to be acceptable for some traffic – excepting traffic that uses the southern branch.

However, currently, most non-coal traffic to/from Malawi runs to/from terminals between Nkaya and Limbe on the southern branch. For this traffic using rail to reach Beira would involve a more circuitous journey. Some of the traffic on the Limbe branch originates further south – for example, much of the sugar traffic from Illovo originates from near Bangula and is trucked to Limbe for loading to rail – and for this traffic the rail route is likely to be too circuitous to be competitive. The road haulage already costs Illovo around US$20 per tonne but the rate varies. It would be hard therefore for rail to compete for this traffic to Beira against direct trucking.

Such an avoiding line might help opening up the option for rail to become the preferred mode for traffic between Durban and Malawi. Over the long distance involved rail should be priced competitive with road haulage although transit times are unlikely to be much better because of the quality of the roads (in South Africa in particular) even allowing for the vulnerability of road hauliers over such an extended and multi-national route through complex jurisdictions and with different policing experiences. Any regular rail operation though would require the cooperation of the four railways in South Africa, Zimbabwe, Mozambique and Malawi – however commercial arrangements are already in place between South Africa and Zimbabwe and between Zimbabwe and Mozambique, so it should be possible to extend these to Malawi. However, the volume of traffic that passes through Durban is relatively small when compared with Beira or Nacala. If the Sena line was rebuilt this would also allow the establishment of a regular rail operation between Malawi and Durban and this would be marginally more competitive than for a Moatize avoiding but the journey time differential between a Moatize avoiding line and a reopened Sena is unlikely to be the key factor given the total relative length of the rail route between Nkaya and Durban.

No cost has been produced previously for this option. The route is 11 km and there are no major obstacles (such as river crossings) the total cost could be approximately US$76 million[10]. This includes a provision for US$10 million for extra loops on the west branch between the new junction and Nkaya to ensure that any new trains to/from Beira do not use capacity reserved for the core coal traffic.

*10 Calculated by using the Vale cost of west line US$800-870 million for 130.5 km on a per mile basis.*

#### 5.5.3.2 **Rebuilding the Sena line**

There are two options for rebuilding the Sena line:

- **The first** and simplest is to build the entire route or build extensions further and further south from Limbe until the whole route is refurbished. This is the known as the "northern approach" option in this report because it effectively extends the railway from the north.
- **The second** is to extend the line from the Sena end towards Mozambique. This is the known as the "southern approach" option in this report because it effectively extends the railway from the south.

#### 5.5.3.3 **Northern approach: extending from Limbe/Makhanga**

This option involves rebuilding the line from Lime/Makhanga to Marka, on the Mozambique border, ultimately to Mutara to connect with the Sena line. It provides the most direct route to/from Beira which is the preferred port for most Malawi imports and exports, and significant volumes of Zambian imports and exports. CEAR is currently restoring the line to Makhanga albeit at the existing 15 tonne axle load. The restored line is expected to be used by passenger trains in the main as there are few historic freight users on the route. For this line to attract significant volumes of freight traffic the line would need to connect with Beira.

For this the Shire River crossing at Chiromo near Bangula would need to be rebuilt, the 114 km section within Malawi and Mozambique to Mutara Junction will also need to be rebuilt and the line section between Makhanga and Limbe further upgraded to at least 18 tonne/axle and probably 20.5 tonnes/axle.

The existing freight line between Nkaya and Limbe is 18 tonnes/axle. CEAR is expected to restore the line between Limbe and Makhanga to 15 tonnes/axle. The marginal cost of rebuilding the 114 km section completely to 20.5 tonnes axle (rather than 15 or 18 tonnes) is relatively low. It is recommended that the whole line between Nkaya/Limbe and Mutara be restored to 20.5 tonnes axle, which is consistent with the axle load provided to this study for the Moatize/ Mutara – Beira section of the Sena line.

This option is designed principally to provide access to Beira Port. It could, however, attract passengers to the rail network as they could travel by rail to Nacala and for the domestic freight traffic (i.e. rail freight not imported or exported out of Malawi), and/or to/from Zambia. The impact is most simply illustrated through what would happen to Illovo – historically one of the most important customers in Malawi. Illovo only use rail for a minority of their traffic.

This is mainly because of the high cost because Illovo are not connected to the rail network since the Chiromo washaway. Illovo must load all their rail traffic from near Bangula to Blantyre at a cost of around US$20 per tonne and then pay for the material to be transhipped to rail. This extra cost effectively means that rail is only competitive for their highest quality (lower volume) product for export through Nacala. Most of their local traffic is road hauled – both within Malawi to Kanengo and other destinations or for export including via Beira. If the railway were extended to Bangula then it would be possible to load Illovo's products direct to rail. This might make it more economical to carry more of the 80% volume by rail that goes by road currently. Other Malawi customers located between Limbe and Marka would also benefit.

Reopening the Sena line from the north has historically been the preferred default option. It is a logical progression of the existing network rehabilitations. One key advantage – and a reason why it has been favoured by CEAR – is that it effectively and progressively extends their area of operation. Until the railway reaches Mozambique CEAR will not have to deal with CFM – the Mozambique operator of the Sena line. However, the northern option has three significant issues.

**The first** and most significant issue is the cost. Two feasibility studies have been undertaken on the route – one initial but comprehensive report funded by JICA and a second engineering feasibility report funded by DFID which has not been shared with this study team[11]. They are understood to differ significantly over estimated the cost of restoring the route. The JICA study estimated that the civil engineering element of the rehabilitation and reconstruction of the railway between Limbe and Marka (the Mozambique border) would cost US$152 million for 201 km, although in total this was increased with signal equipment and new rolling stock and 10% contingency to US$234 million[12].

It is understood that this reconstruction estimate included uplifting the axle load to 20 tonnes, however, no cost was included for raising the axle load between Limbe and Nkaya[13].

This study has produced a very high level estimate of US$380 million for reconstructing this route and at the same time upgrading to 20.5 tonnes/axle. This was done by reviewing and updating the costs in the JICA report and then comparing these against the reported expenditure by Vale on the east and the west lines (which had not been built when the JICA report was published) and against the estimates in for the Nkaya – Mchinji (June 2012 feasibility report) for similar work on a different line in Malawi, and against the fact that no work has been undertaken to protect the existing route infrastructure from further damage, in particular the Shire Rover crossing, since the Chiromo washaway[14]. Although calculated on a whole route basis the US$380 million high level estimate can be roughly disaggregated as US$80 to 100 million for upgrading the axle load between Makhanga and Limbe, US$180 to 200 million for the 114 km between Mutara and Bangula via Marka, and US$100 million to restoring the Shire River crossing. It should be noted that this cost does not include any provision for increasing the axle load between Limbe and Nkaya.

11 *The DFID report is still in draft form by the Government of Malawi and cannot be released. It is important to note that the cost estimates for the rehabilitation of the line are very significantly higher than the JICA report*

12 *JICA project for the Study of the Development of the Sena Corridor in the Republic of Malawi January 2012 for The Ministry of Transport and Public Infrastructure (MOTPI) Republic of Malawi, page S-35-36 tables 23+24 and page S-37 table 25. Summary with contingency on page S-52.*

13 *The JICA reports states (page 3-50) that "Two design axle loads of 15 tonnes/axle and 18 tonnes/axle are currently applied. It is intended to upgrade this to 20 tonnes/axle".*

14 *The average rate per km in the JICA report (US$1.16/km) albeit including rolling stock is not significantly different to the Nkaya – Mchinji June 2012 Feasibility Report (US$1.3/km) allowing for inflation. This is significantly less expensive than building a new alignment for whilst the track and track bed will need replacing the alignment is assumed to be still usable and large scale earth works will not be needed. Updating this cost to allowing for further inflation and the uncosted 37 km to Mutara within Mozambique required to connect to the Sena line, but considering the work committed by CEAR, gives a cost of around US$300 million. Some of the line is currently being refurbished by CEAR at this expenses so this cost may fall, however, the JICA report only included US$20 million for the 9 km section between Bangula and Makhanga that included the Chiromo Bridge over the Shire River. This seems optimistic given the time that has now passed since the washaway and we recommend that a very high level estimated provision of US$100 million should be added for the cost of rebuilding this bridge so that the risk of future washaways is reduced.*

The key infrastructure cost and area of cost risk is in the new bridge required to cross the Shire River and associated waterways. The Shire River floods and it was one such flood that caused the washaway that destroyed the existing Chiromo crossing. Unfortunately, no work seems to have been undertaken since to maintain what was left of the bridge after that washaway. It has, therefore, been assumed that the bridge will need to be completely rebuilt.

**The second** issue is that restoring this route to the Mozambique border will not in itself be sufficient to operate trains to Beira (or Macuze). The extension to Bangula will only be worthwhile when it reaches the Mutara Junction on the Sena because most forecast traffic will want to operate to/from Beira. From the new Shire River crossing the line would need to extend 77 km to the Mozambique border and a further 37.5 km within Mozambique to the rail junction at Mutara. Whilst the cost for this has been included in the US$380 million estimate above, this has not always been the case in previous reports. It is important to note that CFM enjoy the right to operate trains over the Beira corridor.

Agreement will be needed between CEAR and CFM as to how they will divide the haulage of traffic. That agreement is likely to give CEAR the opportunity to market price any incoming traffic. The key danger with this is that CEAR use their position, either immediately or over time, to reinforce Nacala (from which they get more revenue) at the cost and loss of competitive pressure of the Malawian economy. One of the reasons that most Malawi traffic still uses Beira is that it is cheaper than Nacala.

**The third** issue is that because most the traffic will be to/from Beira and that requires the entire line to be built there is no worthwhile opportunity to phase the construction and the cost. Whilst a north facing connection to Bangula should attract some Illovo traffic to Nacala and other points within Malawi and Zambia it will struggle to win Illovo traffic to rail that uses Beira or further south. If construction of the line from the north were phased, the next significant phase of work, the Shire River crossing, would be most expensive and most risky per km.

### 5.5.3.4 South approach: extending from Mutarara junction

The proposed alternative is to extend the Sena line from the south. Construction could then be divided into at least three phases. The first from Mutara to an inland port (ideally with customs clearance) on the Mozambique/ Malawi border, the second to Bangula and the third across the Shire River and connected with the CEAR network. It should be noted that this suggestion of examining the option of a southern link and a phased approach to rebuilding the Beira corridor is not new. A similar idea was raised in the EU and the World Bank (2010) Malawi Transport Sector Multi-Modal Development & Potential Public Private Partnership Study (section 2.1.2 page 88 and 89) where it states "the consultant suggests studying the possibility to link the two networks between Bangula (Malawi) and Gundano (Mozambique). Guardano is on the Beira corridor almost due west of Bangula and is proposed rather than Mutara because at this point it was not certain that that the coal route between Moatize and Nkaya would be built so it would have to carry both coal traffic and general goods traffic"[15]. It would mean Malawi having to support a railway being built in Mozambique and the railway may initially at least have to be operated by CFM rather than CEAR.

The first and primary benefit of having an extension from Mutara in the south towards Malawi is one of cost, and in particular the potential for phasing the cost to allow the market to be tested and develop. For phase 1 it would be relatively inexpensive to build the 33.7 km to the Malawi border – around US$63 million[16]. If an inland port with customs pre-clearance was established just within Malawi (or at least a location where the trains can be customs cleared), it would be possible to attract new traffic to rail – in particular traffic that prefers to use Beira over Nacala.

*15 EU and World Bank (2010) Malawi Transport Sector Multi-Modal Development & Potential Public Private Partnership Study: section 2.1.2 – 2 pages 88 and 89.*

*16 This figure was calculated by taking the very high level estimate for Mutarara – Bangula (US$180-US$200 million) and pro-rata-ing by distance.*

That new traffic would not be restricted merely to the area west of the Shire River (noting that the Chiromo washaway destroyed both rail and road access) but from customers much further north along the Chikwawa corridor up to Blantyre and north – particularly customers who prefer or must use Beira Port.

CEAR may worry that the new link to the Beira railway might undermine rail traffic to Nacala – but that can only be the case if CEAR are in some way currently able to exploit their position as the monopoly rail operator within Malawi. At the margin, there may be some general traffic that could run to Beira by rail and truck that is currently running to Nacala but this is likely to be small. Because all traffic to Beira with this option will need to be trucked to the inland port, nearly all the traffic will in fact be competing directly and in the main with direct road haulage. What the new route would do is offer the Malawian economy another choice from the current binary rail to Nacala or road to Beira or more distant ports offer that they currently enjoy. In the long run this may cap the opportunity of CEAR to exploit their monopoly rail provision but only for users who are rail and are port ambivalent.

It might be seen as a disadvantage for Malawi to support development of a neighbouring country's railways but this is unlikely to reduce the pool of available funding for Malawi's own railways. Malawi will be the main beneficiary from such a railway in terms of modal competition for traffic and will gain support which will be needed for when the line is extended further north.

In phase 2 the line could be extended to Bangula. Phases 1 and 2 combined of any south option are still expected to be significantly cheaper than any northern option and would connect Illovo at Bangula directly to rail. Together they are likely to cost around only half of the total cost of restoring the whole line between Mutara and Limbe/Nkaya – around US$180 to 200 million. Intermediate options – perhaps to Nsanje are also possible. Currently the concession agreement with CEAR gives them monopoly rights within Malawi so unless an agreement can be reached CEAR, CFM may have to reach a cooperation agreement with CEAR for haulage over the small section in Malawi. It may be hard for CEAR to operate this service economically as any locomotive will be isolated from the rest of the fleet and the maintenance facility so CEAR may have to "buy in" services from CFM.

Phase 3 of a south option would involve rebuilding the crossing across the Shire River at Chiromo near Bangula, connecting with the proposed extension from Limbe to Sandama/ Makhanga and upgrading the axle load and the capacity of the route between Sandama/ Makhanga and Limbe/Nkaya. The total cost of phases 1, 2 and 3 would be the same as any final north option, although traffic levels should be greater on the first day of operation as some passengers would already being using rail from the investment in phases 1 and 2.

The south option works better jointly with the Moatize avoiding line. It offers customers using Beira three alternatives: road as now, rail and road to inland rail port and direct rail. This is better than the north alternative for until a full connection is built, any line extension from the north would require trains from Beira to use a very roundabout route that would be close on being twice the more direct truck route.

Whilst the south option is isolated and only provides a connection to/from Beira Port (and Durba) it will promote competition between routes and prevent Nacala Port exploiting its monopoly rail access.

Because both the Moatize avoiding line and any investment in Mutara Junction to Marka are in Mozambique it will be difficult to justify funding them with any of the financial surplus expected to be generated by CEAR. Although they will benefit the railways in Mozambique so funders in Mozambique may help, international donor support or funding will be required. However, both the options above can be linked with other schemes within Malawi. The Moatize avoiding line can be linked with extra loops on the west line and with higher axle loads on the northern line. Any rebuild of Mutara – Marka line can be linked with Marka – Bangula, or even Marka - Limbe. As a result, as part of any funding package, it should be able to negotiate with CEAR that they will fund associated investment.

### 5.5.3.5 Upgrade of axle load (and line speed) of Nkaya – Salima/Chipata

The route between Nkaya and Chipata has an axle load of 15 tonnes /axle because of the limiting section between Salima and Nkaya which is 15 tonnes only. This is lower than on the core east –west route and on the Nkaya – Limbe/Sandama route. Having a lower axle load reduces the payload of each train.

However, increasing the axle load effectively requires the replacement of all the existing bridges and culverts on the section between Salima and Nkaya as the clear majority are incapable of supporting the higher axle load. The ongoing restoration of the route which involves work on key locations only does not include an upgrade of the axle load because of the cost of doing so. To upgrade the line in its entirety will cost between US$344 million and US$361 million approximately, although there is a risk that this could be around US$100 million more; that is the difference between a rehabilitation of the line as currently constructed or with extra/longer loops and a rebuild to 20.5 tonnes axle load, with the risk factor added for items that are renewed and will need rebuilding. This option was costed, studied and rejected by the June 2016 Feasibility Study for the Rehabilitation of the Mchinji to Nkaya Railway Line in Malawi by Team Engineering with D'Appolonia for the EU. To restore the line to a 18 tonnes axle load will cost between US$116 million and US$344 million[17].

17 *The cost of calculating the upgrade to 20.5 tonnes/axle from the current 15 tonnes/axle, less the cost of restoring the line as currently designed which CEAR is expected to be undertake as part of the 2017 concession negotiations. It is possible that the cost will be more than this because structures renewed as part of the line restoration will need to be rebuilt to accommodate 20.5 for which a risk factor of US$100 million has been added. A higher risk factor (of US$228 million) has been factored into the upgrade cost range of the 18 tonnes/ axle Option as there is a higher chance that extra work will be required for this Option. These figures should be clearer towards the end of the current refurbishment work when the asset condition is known better.*

However, should Chipata grow significantly as a hub for mining traffic or be likely to grow following a change to the existing logistical arrangements or mining operations, it may be worth upgrading the route to match the Nacala line (20.5 tonnes). Similarly, should the line be extended to connect with the Tazara Railway the line should be considered for an upgrade as otherwise this section will be the largest constraint in terms of operational efficiency measured as tonnage per train or per wagon, or even in terms of the total capacity of the line. At this moment CEAR have yet to decide how to handle the potential traffic from Zambia most efficiently. Should a connection to Serenje be built owing to forecast traffic from Lusaka, the Copper Belt and other parts of Zambia, then the case for upgrading the route between Nkaya and Mchinji will be much easier to make as this section will then become the constraint on the wider route.

It is also worth considering the standards that should be used for renewing and maintaining the line. The cost of rebuilding an asset with a higher axle load varies but is generally not very significantly more. Any such structure is likely to be typically more robust, at least for as long as the axle load of the train is not raised for current levels. It is worth considering whether it is worth establishing a formal policy that as and when assets are renewed that they are renewed to 20.5 tonnes axle load, so that the cost of upgrading the line in future is reduced.

#### 5.5.3.6 Upgrade of axle load (and line speed) of Nkaya – Limbe/Sandama

The routes between Nkaya and Limbe and between Limbe and Sandama have axle loads of 18 and 15 tonnes respectively. This is lower than the axle loads on the core east –west route. Having a lower axle load reduces the payload of each freight train. However, as currently no trains run south of Limbe and no significant freight is forecast to do so unless the line is extended beyond the Shire River, this is really only currently an issue between Limbe and Nkaya.

Other options have examined the cost of extending the Sena line to Mutara and have included the cost of increasing the axle load of the Limbe – Makhanga/Sandama section. In this section of the report it is considered as a separate and stand-alone scheme only.

At the moment, the wagon fleet and the locomotive fleet would be unable to take advantage of having a higher axle load on this route. Over time that will change, particularly if CEAR can persuade customers to invest in their own wagons. Therefore, until the rest of the Sena line is built, this option is not recommended given the cost below. Unlike with the north line there is unlikely to be significant volumes of international traffic or mining traffic, unless the line is extended in which case this upgrade becomes part of that wider option.

The cost of increasing the axle load has been estimated by examining the JICA report and the difference between estimates produced for raising the axle load between Nkaya and Mchinji to 18 and 20.5 tonnes. A very high level estimate of around US$80 million has been produced on that basis.

#### 5.5.3.7 New line from Kanengo/Salima to north of Malawi

Extending the railway to the north from either Kanengo or Salima is an option considered. However, there are a number of factors that militate against this.

The first is cost. Given that the new coal line cost Vale over US$800-870 million and is 130.5 km long, it is unlikely that any line to Mzuzu would be anything less than US$1.6 billion[18]. If the line were extended to the Tanzanian border and any potential connection through to the Tazara railway the cost would be closer to US$3.0 billion[19].

The second issue is that until the rest of the CEAR network is brought fully up to standard then any branch to the north would be isolated from the rest of the network operationally. To take full advantage of any line to the north would probably require some form of investment in the rest of the network first.

The third issue is that, currently there is no significant and local customer demand for rail – or at least from any customers willing to commit to use rail haulage for significant volumes of traffic. This is because the products that are carried currently are also often carried by truck in that part of Malawi served by rail. Should a large mining operation or other industry , for example relating to the oil industry, emerge the dynamics of a new line to the north could change significantly, but it should be borne in mind that Vale's operation at Moatize is world class in terms of the volumes of coal that it produces that require transport and it would probably require something of a similar scale to transform the economics.

*18 The rail distance is not known exactly as an alignment has not been designed but it is unlikely to be less than 260 km.*

*19 The rail distance is not known exactly as an alignment has not been designed but is unlikely to be less than 500 km.*

There are few opportunities for customers to communicate with CEAR (and the Government of Malawi) on a collective basis. When freight customers meet, they find that they have common issues and potentially common views on the strategy that should be adopted by the railway and the government. In those nations where rail freight is most developed such customers often form formal organisations to ensure that their concerns are understood appropriately. If there were the case for a line from the north such customers would be important supporters.

As an alternative, the option of an intermodal terminal at Salima to serve the north of Malawi is considered.

#### 5.5.3.8 Extending the railway from Mbeya into Malawi

As an alternative to extending the railway north from the existing network, it is proposed to construct a line from Mbeya into Malawi, currently recommended to be at Chilumba, a distance of 234 km. The construction of an intermodal facility at Chilumba would allow transporters to use road transport within a 100 km to 150 km radius, and rail the remaining 1,068 km to Dar Port. This is still a considerable distance compared to Nacala, and the line would not be likely to attract existing traffic from Nacala. It would however:

- Be attractive to potential rail users in the north of the country, albeit the market is limited;
- Guarantee that the road portion of strategic journeys was done by Malawian trucking companies; and
- More importantly act a strategic alternative should Mozambiquan ports be inaccessible.

#### 5.5.3.9 Provision of an intermodal facility at Liwonde and an inland port

When the railway was first built one of the key locations it sought to first connect to was Lake Malawi. At Chipoka an intermodal facility was built on the lake (Figure 5.8). The size, and in particular the length of Lake Malawi, means that it can connect parts of Malawi that otherwise might be too difficult to do so by rail given the high cost of extending the railway north of the Mchinji – Kanengo – Salima axis.

Unfortunately, the Chipoka facility is currently non-operational. The crane needs refurbishing. Most importantly the draft is now insufficient to accommodate vessels of sufficient size.

Chipoka Port is not currently operational due to the low water levels which prevent the vessels from accessing the port facilities. The drop in water levels in recent years has been attributed by some to the change in rainfall patterns caused by climate change, the impacts of which have seen rainfall decrease, evaporation losses increase, and drought become more frequent and severe. Dredging alone is not feasible, as it could undermine the existing quay which has not been constructed to face the extreme low water levels that the Lake Malawi is presently experiencing. Chipoka Port could be rehabilitated by extending the existing quay into deeper waters.

At upstream Liwonde the depth of the Shire River is constant due the hydroelectric station dam. It should be possible, to build sidings, a crane and a new quay at this point. It is not yet clear exactly what the draft would be but it is thought to be significantly deeper than at Chipoka taking into account the road bridge at Mangochi can be navigated. With an appropriate vessel, it should be possible for containers to make a weekly circuit from Liwonde to points towards the north of Lake Malawi and back to Liwonde in time for the next arrival from Nacala (and potentially Beira).

At the moment, there is no regular service – especially from Liwonde. However, with a new rail connection to Beira it is possible that with a rail connection at Liwonde a regular vessel might be commercially viable. However, the lack of any customer demand for intermodal (rail to / from water) services and the lack of any obvious industrial freight users currently suggests that the rail connection to Nacala is not sufficient in itself. However, it is recommended that once a Beira connection looks likely that establishing a potential rail and water port at Liwonde is considered as an option and a client consultation exercise is undertaken.

**Figure 5.8 Chipoka terminal**


It is further recommended that an integrated CRVA be carried out for the potential rail and water port (strategic action 1) once a go ahead to establish this is given. This will help inform the identification of any key climate risks and vulnerabilities associated with the port, including the requisite climate change adaptation responses for these.

#### 5.5.3.10 Investment in freight facilities (sidings and loading/discharge equipment)

Whilst the development and improvement of the railway is typically described in terms of the network for customers the capacity of their sidings and (un)loading equipment can be more important. In some instances, restrictions on the size of customers' sidings and their (un)loading equipment can cause operational complexity and cost for CEAR. In some cases, customers are effectively using a CEAR asset because they have not got adequate facilitates, particularly where CEAR locomotives have to shunt wagons using the mainline for (un)loading.

In addition to the proposal to disaggregate the cost of shunting and wagons CEAR should consider whether there is an investment case that would avoid the need. It is recommended that CEAR undertake an audit of all customers' sidings and the method of working, which will be required anyhow to determine any disaggregated shunting cost, to determine if any modest investment in facilities might save operational costs. Whilst funders are unlikely to consider supporting a single customer but one or more investment, such as the building of a separate shunting or siding access line, for a group of customers may be received better.

## 5.5.4 Strategic passenger rail options

### 5.5.4.1 Operational

Table 5.8 lists the proposals for immediate and continual implementation to assist passenger operations and make services more attractive to passengers.

**Table 5.8 Operational recommendations for passenger services**

| No | Area | Description | Lead owner – note that others may lead activity |
|---|---|---|---|
| 1 | Operations | Factor reduction in speed restrictions into a new calculation of the passenger journey time between stations. This process should be repeated – and a new public timetable produced – no less than once per year. | CEAR |
| 2 | Operations | Maximise the use of the existing passenger fleet to create two sets and operate a more ambitious 12 trains/week schedule. | CEAR |
| 3 | Operations investment | Review potential extension of the east-west route train control system to include the north branch. | CEAR |
| 4 | Operations retail | Production of passenger timetable with days and times of departure for every station with date of the publication of the next proposed timetable, no more than 12 months ahead. | CEAR |
| 5 | Operations retail | Publication of passenger timetable on website – revised whenever there are amendments e.g. because of line closures. | CEAR |
| 6 | Operations retail | Publication of timetable by poster at all stations (even halts). | CEAR |
| 7 | Operations retail | Develop media plan and liaise with National Public Radio and other media over publicity regarding scheduled and unscheduled changes to the timetable or its operation. | CEAR |
| 8 | Operations retail | Formalise a reduction in the dwell time at each station to no more than 3 minutes at the smaller halts and 5 minutes at larger stations – less where practical. | CEAR |
| 9 | Operations retail | Include at least one premium coach per scheduled train. If this recommendation is rejected then the existing premium coaches should be declassified at a minimum and potentially reconfigured as standard coaches, and all reference to premium fares be removed from CEAR publications. | CEAR |
| 10 | Operations retail | Display station opening times where information can be seen by public ideally near "next train" display. | CEAR |
| 11 | Operations retail | Introduction of "next train" signs at all manned stations (showing time and day and direction). Consider at unstaffed stations also using on board staff. | CEAR |
| 12 | Passenger marketing | Merge the two premium fares – "Premium" and "Business". | CEAR |
| 13 | Passenger marketing | Review the level of fare differentiation between premium and standard and what other services might be offered to premium passengers – perhaps a coffee, tea or soft drink service. Conduct regular usage level surveys – if the premium coach is empty then reduce fare differential and increase level of service. If premium coach is full then increase fare differential. | CEAR |
| 14 | Passenger marketing | Review all fares in the light of current operating conditions, bearing in mind the corporate and social responsibility element of the service, and the need to enhance revenue to help reduce CEAR's operating loss. Once determined, the new fares should be published and displayed at each of the stations on the station notice boards. The fares should also be displayed on the company website. | CEAR |
| 15 | Passenger marketing | Simplify and unify the way that the fares are shown at stations. | CEAR |

### 5.5.4.2 New passenger services

Passenger services are provided as part of CEAR's corporate social responsibility. This is limited to services laid out in the Concession Agreement and unlikely to be unilaterally extended by CEAR, since these operations do not meet operating costs. Equally the government could specify and pay for extended passenger services, but with a monopoly provider, it is unlikely to get value for money for these.

However, when calculating the costs of providing passenger services in the future, there should be no inclusion of track access or maintenance costs. This is because it can be argued, strongly, that the track is provided for and maintenance paid by the freight side, and the much lighter axle loads of passenger trains barely affect maintenance needs.

Under this arrangement, it is quite likely that a well patronised passenger operation would meet operating costs, restricted to fuel and manpower. The marginal cost of operating any enhanced services should initially be low given that the rolling stock is already paid for and the wear on the track is likely to be minimal because of the light axle load of the trains. The only significant costs are fuel, staffing and the mechanical wear on the locomotive and the passenger carriages. If there is a significant uplift in passenger numbers in response to the uplift in frequency and speeds then consideration should be made of reintroducing premium fares and, finally, uplifting fares so that there is no significant crowding. This will raise extra revenue that will pay some of the extra operational costs.

The competitive position of rail in the different markets have been reviewed and suggests that there is unlikely to be sufficient demand to build a positive business case for an intercity product. The costs and operational complexity of introducing a metro operation are also likely to be prohibitive. However, the is an opportunity to maximise use of the existing rolling stock and upgrade in line speeds to operate faster and more frequent rural services and, over the long-term, potential for a small-scale tourist train operation.

It should be possible to operate up to 12 services per week using the existing rolling stock and significantly enhance the passenger benefit from the railway, taking advantage of the faster times made possible by recent investments.

**Table 5.9 Proposed passenger route and schedule**

| Set | Route – with calls at local halts also |
|---|---|
| Set 1: | |
| Monday + Wednesday + Friday | Blantyre via Limbe – Sandama/Makhanga |
| Tuesday + Thursday + Saturday | Makhanga/Sandama – Blantyre via Limbe |
| Set 2: | |
| Monday + Friday | Limbe + Blantyre - Balaka - Nayuchi |
| Wednesday | Limbe + Blantyre – Balaka – Bilira (and potentially Liwonde) |
| Tuesday + Saturday | Nayuchi – Balaka – Limbe via Blantyre |
| Thursday | Bilira (potentially Liwonde) – Balaka - Blantyre + Limbe |

The exact pattern of the service will need to be agreed by CEAR and the Government of Malawi but one option is shown in Table 5.9.

Each set could consist of six passenger coaches (and goods as required), which would still leave sufficient spare for operations and maintenance. It is recognised that this is a considerable improvement on the service offered currently by CEAR but given the recent line improvements it is likely to be possible.

With a further two sets of passenger vehicles and continued improvements to line speeds it would be worth planning for:

- a return service three times per week between Salima and Blantyre/Limbe (which would allow the Bilira train to serve Liwonde/Nayuchi instead); and
- a Mchinji – Salima service via a new station in Kanengo.

All the train sets, and particularly this last set, would need to be rotated regularly to ensure that they could be maintained at Limbe. These services proposed are similar in character to the existing service, that is rural and with frequent stops. A through service that does not stop and, therefore, that might catch freight trains and use up significant capacity is not proposed.

The use of current rolling stock is proposed at first. Later these may be replaced by Diesel Multiple Units (DMU's), which would be more operationally efficient.

## 5.6 Inland water transport

In order for inland water transport to play its full role in a multi-modal transport system the key policy areas and issues summarised in Table 5.10 are addressed. The options proposed to address these areas have been developed via extensive stakeholder consultation and in line with the NTMP objectives outlined in Chapter 4. They have the potential to contribute towards realising all three of the strategic objectives, including by facilitating a modal shift from road to inland water transport, improving safety and security, improving multi-modal integration, and improving the resilience of transport infrastructure and services, including in the context of threats such as climate change.

### 5.6.1 Reducing inland water transport costs

The main issue with freight transport lies with the operational inefficiencies at the ports and low reliability of the service. This has created delays with moving cargo and resulted in standing time costs. Poor integration of the ports with the rail network and a low level of training have also created some operational inefficiencies and have led to increased costs. Vessels need to be adequate for the type of commodities that they transport and be of various sizes and types to allow efficient loading and unloading operations and to travel full.

Inland water transport is usually well suited for the transport of dry bulk, general cargo and heavy loads on long distances and the strategy should focus on this market. Small volumes and short distances cannot compete with road transport as they require transhipment at ports and transport at each end by road and/or rail.

It has also been observed that MSC has not managed to operate a regular freight service (even seasonal) and relies on an ad hoc service.

The strategy for reducing inland water transport costs consists of the following:

- Passenger transport to focus on popular route segments. Less popular segments should be covered by a reduced service and smaller vessels;
- Fleet of passenger vessels to be adequate for required service (i.e. low fuel consumption, low draft or ro-ro type vessels that can berth directly on the beach as berthing facilities are not available at all locations);
- Improvement of operation at ports with better suited equipment, trained staff and better connection to rail network;
- Strategy to focus on large volumes and long distances;
- Establish a regular service and route for freight; and
- Adequate freight vessels and various type and size to cover various markets.

**Table 5.10 Inland water transport policies, associated issues and proposals**

| Policy area | Current Issue | Proposal |
|---|---|---|
| International Maritime Conventions and national regulations including environmental regulations. | Vessel and operation do not fully comply with regulations which are not currently properly enforced. | Government department to enforce regulations with increased local presence, increase cooperation with private sector and adequate funding. |
| Marine safety. | Lake navigability and maritime safety have not been sufficiently addressed. | Update navigation charts, maintain and upgrade aids to navigation, improve vessel safety and provide search and rescue facilities. |
| Port productivity, operational efficiency and commercial viability of lake services. | Adequate infrastructure or equipment is not available. Only 2 ports are operational. Lack of proper training to operatives and management. | Invest in equipment and vessels fit for the required service. Provide adequate training. |
| Free market and setting of price structures. | The current concessionaire has a virtual monopoly on operation over the lake services. | Revise the concession to introduce competition and drive price down. |
| International shipping and promotion of foreign trade. | Insufficient participation in international trade. | Inland water transport to be linked to regional transport corridor. |
| Rail and road links. | Poor connection to rail and road networks. Only one port (not operational) directly accessible by rail. | Target key ports for multi-modal integration. Co-ordinate all sub-sectors plans. |


## 5.6.2 Physical interventions

Specific interventions are proposed on the major transport corridors where inland water transport can be integrated with the overall transport chain summarised in Figure 5.9. The criteria to establish a good modal interchange port location are:

- The markets to be served by inland water transport are located close to the waterway;
- Large sites that can accommodate a logistic centre for dispatching of freight;
- Good access to rail and highway networks;
- Access to an appropriate labour supply (i.e. close to an important city or settlement); and
- Impacts on the local environment minimised.

### 5.6.2.1 Nkhata Bay Port development

Due to its geographical position (proximity to the northern shore lake communities, Likoma islands and Tanzania), Nkhata Bay has the potential to become a transport hub on the lake. There is an immediate need to restore the sunken jetty.

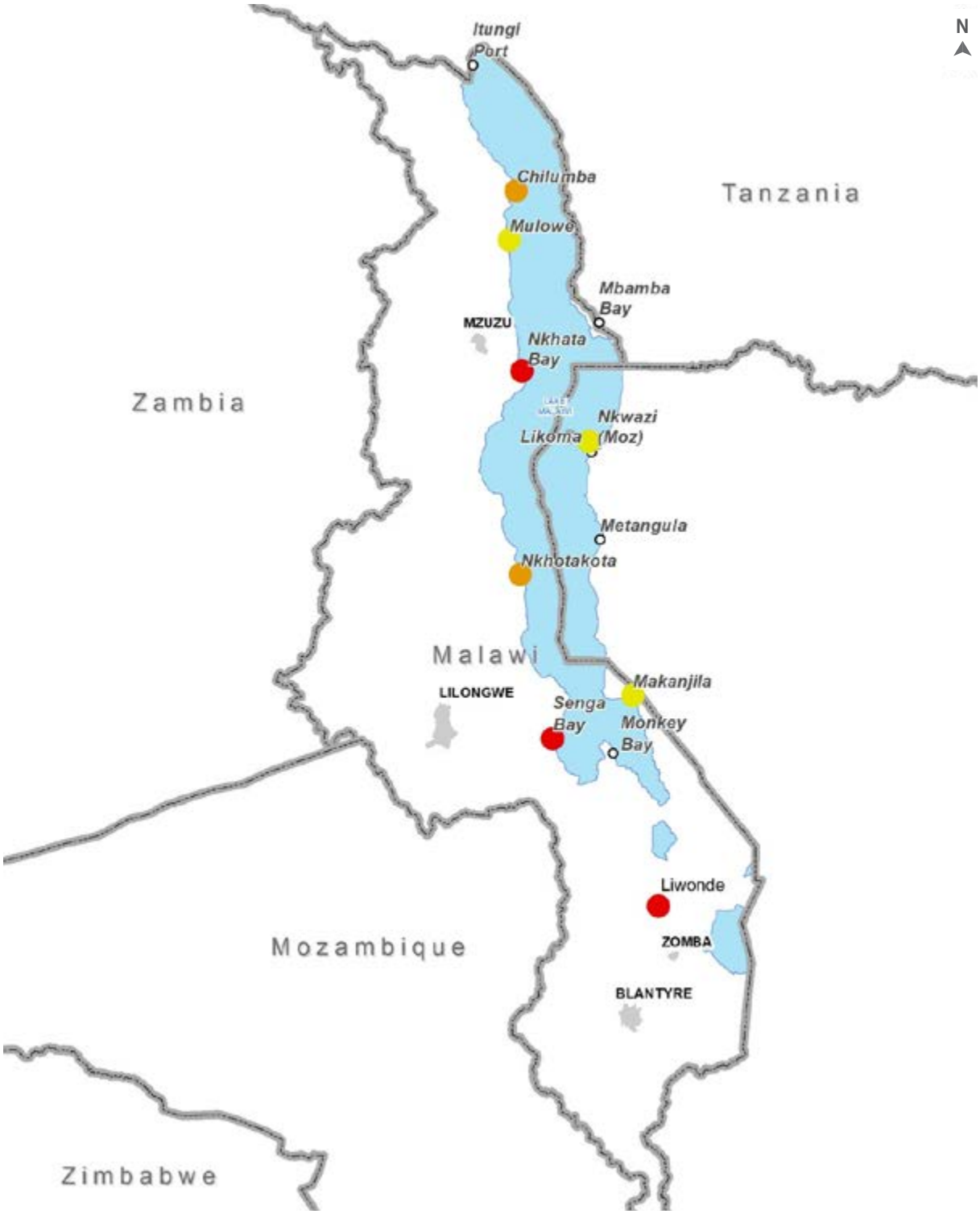
Additional proposed interventions have an estimated cost of US$20 to 25 million, and would consist of the following:

**Nkhata Bay has the potential to become a maritime transport hub on the lake.**

- A new ro-ro berth to accommodate ro-ro traffic to/from Mbamba Bay (Tanzania), which will be linked to Mtwara Port. Nkhata Bay would also be linked to the road network to Zambia. The size of the terminal and ro-ro vessels will be dependent on the demand forecast for ro-ro traffic across the lake and maximum size the dry dock can handle for vessel construction;
- Customs offices and warehouses;
- Parking space for lorries using the ro-ro terminal;
- A general cargo berth (either lo-lo or ro-ro) for freight service to other ports across the lake;
- New cargo handling equipment;
- Storage area;
- Maintenance workshop; and
- A dedicated passenger terminal for Likoma Island and Tanzania.

There are plans to develop new shipbuilding and ship repair facilities at Dindano in Nkhata Bay District at an estimated cost of US$75 million. Private sector investors are being sought, but there is little expectation of investment in the short-term.

## Figure 5.9 Proposed inland water transport interventions




**Legend**

- Major intervention
- Medium intervention
- Small intervention

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Government of Malawi

**Project:**

National Transport Master Plan

### 5.6.2.2 Chipoka Port development

Chipoka Port is the only port currently connected to the main rail network. However, as previously mentioned, the port is currently not operational due to the low water levels, which prevent vessels from accessing the facilities. As dredging alone is not feasible, as it could undermine the existing quay, alternative solutions need to be looked at.

The proposed interventions are estimated to cost US$10million to US$15 million and would consist of the following:

- Extension of the existing quay. This could be in the form of building a new and deeper sheet pile wall in front of the existing quay. Alternatively, the existing quay wall could be extended to deeper waters but this has the disadvantages of having a section of the berthing facilities made redundant;
- Dredging of a new access channel and at the berth (Figure 5.10);
- Siltation management; and
- New equipment , such as cargo handling equipment.

### 5.6.2.3 Liwonde Port development

The only other port on the lake where the rail network passes next to inland waterways is at Liwonde on the Upper Shire River. There is scope to develop a new river port that will integrate to the railway network and link directly to the Nacala corridor. The proposed interventions are estimated to cost US$15 million to US$20 million, and would consist of the following:

- New general cargo berth;
- New storage yard, warehouses and handling equipment;
- New railway connection; and
- New navigation channel (potential dredging).

The new river port at Liwonde (Figure 5.11) should provide an interchange facility with rail. A dry port at this location would not be beneficial. It is recommended that dry ports be established at Blantyre and Lilongwe instead.

**Figure 5.10 Potential interventions at Chipoka Port**


Source: the satellite image is from Google Earth.

**Figure 5.11 Liwonde site**


Source: the satellite image is from Google Earth.

#### 5.6.2.4 Fleet of vessels

In addition to the proposed interventions to the port infrastructure, construction of more efficient vessels to support passenger and freight transport is essential. The current vessels are not well fit for purpose and often too large for the operations that they are used for.

The passenger vessels should have a low fuel consumption, be flexible/navigable and be capable of landing on a beach in a similar way to the MV Chambo, which has a shallow draft and a drop down ramp but is only operating in Mozambique.

Ro-ro vessels which are equipped with an aft ramp or a front ramp for loading and off loading vehicles, and lo-lo barges which require lifting equipment for loading and offloading cargo, are the most appropriate for freight transport. Depending on the size and type, the cost per vessel would be in the order of US$1 to US$5 million.

#### 5.6.2.5 Shire-Zambezi Waterway

This project would entail re-opening the Shire and Zambezi Rivers to navigation in order to provide a direct waterway transport system between Nsanje in Malawi and the port of Chinde, a distance of approximately 340 km. A pre-feasibility study was conducted in 2006 and the results of the study again indicated that the rivers are navigable but require further studies.

A Memorandum of Understanding (MOU) was signed by Malawi, Mozambique and Zambia in 2007 to develop and implement the waterway as a trans-boundary facility. The MOU provides for cooperation among the countries during the various stages of the development of the waterway and establishes appropriate consultative mechanisms.

SADC commissioned Hydroplan[20] to undertake a full feasibility study, and this reported in 2015. The study proposed two options for vessels to carry cargo on the river:

1. The use of barges and pushers to create a pushed convoy. The convoy would navigate from Nsanje to Chinde. At Chinde a platform would need to be installed and used as storage and a transfer area between the barges and the coasters which would transport the containers from Chinde to Beira Port; and

**The annual savings in transport costs between using the Shire-Zambezi compared to road would be in the range US$8.5 million to US$14.4 million.**

2. The use of special coasters which are able to move the containers from Nsanje to Beira Port avoiding the transfer of Cargo at Chinde.

The preferred option provided for a 1.5m water depth in the river, in the use of a pushed convoy, with a price per container carried of US$2,968. This was estimated to be around 11% cheaper than the comparative road option, but more expensive than rail. The costs of dredging to maintain a 1.5m depth were estimated to be US$17.7 million (capital), and US$30 million per year (maintenance).

It has been forecasted that 1,060,000 tonnes of cargo would use the river in 2025, at an average cost of US$0.06 per tonne-km. This would give a gross annual revenue of US$21.6 million. The annual savings in transport costs between using the Shire-Zambezi compared to road would be in the range US$8.5 million to US$14.4 million. On this basis, the project's profitability would be marginal at best, and would require a subsidy.

20 *Southern African Development Community Secretariat – Multinational Malawi / Mozambique / Zambia – Feasibility Study for the Navigability of Shire-Zambezi Waterways – Consultancy Services: Executive summary, Hydroplan, 2015.*

### 5.6.3 Safety and security

The recommended safety measures are:

- Training of seafarers is paramount to safety and they must understand operating procedures on-board ships;
- The Malawi Communications Regulatory Authority (MACRA) should not assign distress frequencies to other radio stations;
- A co-ordinating centre to co-ordinate maritime search and rescue;
- Marine Police to be improved and equipped to respond quickly to emergencies;
- Establish search and rescue teams in all strategic places along the lake to respond to emergencies;
- Registration of vessels to ensure they abide by rules of safety;
- Continued sensitisation of canoe users regarding safety;
- Lighthouses to be replaced where not functioning;
- Sensitisation against vandalism;
- Lake to be re-charted;
- Ship operators to use electronic data navigation in future; and
- Decentralisation of DMS to lake-shore districts.

### 5.6.4 Capacity building

#### The Government

Malawi has one marine college located in Monkey Bay. It belongs to the Government and it used to be under the rail department when rail and maritime were together. The college has the capacity for 30 students and 12 teachers. It is currently operating under capacity with 5 teachers for 19 students. It provides an advanced diploma in marine engineering and marine navigation. At the end of the courses, most of the students join the shipping company or the fishing company. In addition, the college trains the police and army. The college also provides training for the local community, notably for a tourism boat to allow skippers of the boats from resorts to get a certification for navigation/operation. Previous funding sources have included: JICA for navigation simulation and trainers; the Government of Iceland for a new library and buildings in 2002 , and IMO, which sent an engineer/navigator for training.

A lack of funding for capacity building has been a key issue for many years and funding from the Government has been cut by half in recent years. The following consequences have been observed:

- Upgrading the facilities is unaffordable and keeping up with newest technology is difficult, particularly as there is no internet connection;
- Teachers are not being replaced as the Government is cutting funding to the college;
- Students have to pay for their own tuition fee or have a sponsor;
- As part of the concession agreement (41.1.3.), MSC is to invest 1% of all gross revenue towards new equipment, rehabilitation and operation of the marine college but this has rarely been the case over the last few years; and
- Lack of training for stevedores. Several unfortunate events took place in recent years at Chilumba and Nkhata Bay making facilities not operational due to human error.

There is a constant need to provide appropriate staffing, training, buildings and other facilities to undertake operation, maintenance and management of the lake services. The marine college provides a good base to enhance capacity building across the maritime sector. However, it needs regular and sustainable funding to provide the much needed training in the sector. There are 3 key areas that need to be addressed:

- Navigation and vessel operation;
- Port operation; and
- Maintenance of vessels and port infrastructure.

#### Under the concession

It is desirable for a port to build a pool of maritime expertise in the operational and technical aspects of its business activities. This includes recruitment of new talent, and upgrading of skills and knowledge of the existing staff.

In addition to initial training, it is desirable for a manpower development plan to be developed and to consider productivity training for established employees. The port should put a priority on improving productivity, re-defining the business model to enhance efficiency and re-designing jobs as growth in technology occurs. Training on equipment, including that which is proprietary, is useful and should be stipulated in any contract for the purchase of equipment. Training throughout the warranty period is helpful in order to have a strong base of skilled staff.

Maintenance of vessels and port infrastructure is an issue. There is a lack of appropriate training. The tendency is to wait for vessels and infrastructure to break down before maintenance (reactive) rather than take a preventive approach. An asset maintenance plan is to be established.

There are shipyard facilities at Monkey Bay. Monkey Bay has the only floating docks for Lake Malawi and neighbouring countries (Tanzania and Mozambique) use it for maintaining their fleet. The dry dock was part of the concession and is operated by MSC (Motta - Engil). Monkey Bay is the main base for all vessels but it is not the best geographical location for a central operation.

### 5.6.5 Freight services

The historical freight operation route in the 1980s and 1990s was the Chilumba/Chipoka route on the Dar es Salam corridor. Now that most of the freight transits via Mozambique or South Africa ports, there are no longer any established freight routes. The focus should be to establish two 'main' ports in the north and south, connected to the Mtwara corridor and Nacala corridor. Nkhata Bay in the north, is ideally located on the Mtwara corridor for ro-ro service and connection to road networks between Tanzania and Zambia. Chipoka Port is connected to the rail network and its existing infrastructure would make

it a suitable candidate. However, the low lake water levels have made the port non-operational and important capital investment would be required for the revival of the port. As an alternative, a more centrally located port could be developed on the Shire River at Liwonde as it is directly connected to the railway network and Nacala corridor. This would also require important capital investment. It would be preferable to establish one of these two locations as the preferred main port in the southern lake region. However, both ports can be developed simultaneously should the future freight demand support it. Those main ports should be supported by a network of smaller ports or landing facilities for freight movement and distribution across the lake.

It is recommended that the freight operation is developed as listed below and shown in Figure 5.12:

- **Main freight routes:**
  - Nkhata Bay and Mbamba Bay as part of the Mtwara corridor (ro-ro service); and
  - Nkhata Bay and Chipoka or/and Liwonde as part of the Nacala corridor. These two options require a detailed feasibility study.
- **Secondary freight routes:**
  - Nkhata Bay to Chilumba;
  - Nkhata Bay to Likoma;
  - Chilumba to Chipoka or/and Liwonde;
  - Itunga Port to Chipoka for dedicated movement of cement/clinker; and
  - Nkhotakota to Chipoka or/and Liwonde for dedicated movement of sugar.

**The historical freight operation route in the 1980s and 1990s was the Chilumba/Chipoka route on the Dar es Salam corridor.**

### 5.6.6 Passenger services

The only established routes are for the passenger operation as described in Chapter 2. These routes are not always economically viable due to low passenger demand and lack of suitable berthing facilities at the stopping points. The passenger service needs to be split between the north and south of the lake to meet passenger needs efficiently. A passenger demand analysis with pricing strategy should be developed to establish the preferred routes and required size of vessels. The current fleet of passenger vessels should then be gradually replaced.

It is recommended that the ferry operation is developed as follows and shown in Figure 5.3:

- **Central route** with a regular service between Nkhata Bay, Likoma Islands and Nkhotakota Bay - ferry capacity to be 100 to 200 passengers. With a business plan to determine if a smaller vessel with daily trip would be more appropriate;
- **South route** with a regular service between Monkey Bay, Makanjila and Senga Bay - ferry capacity to be 50 passengers;
- **North route** with a service between Nkhata Bay and Mulowe – capacity of 50 passengers; and
- **International route** to Mbamba Bay (Tanzania) with ro-ro traffic.

**Figure 5.12 Inland water transport freight potential**


**Legend**

- Main freight route
- Secondary freight route
- Land-based freight route

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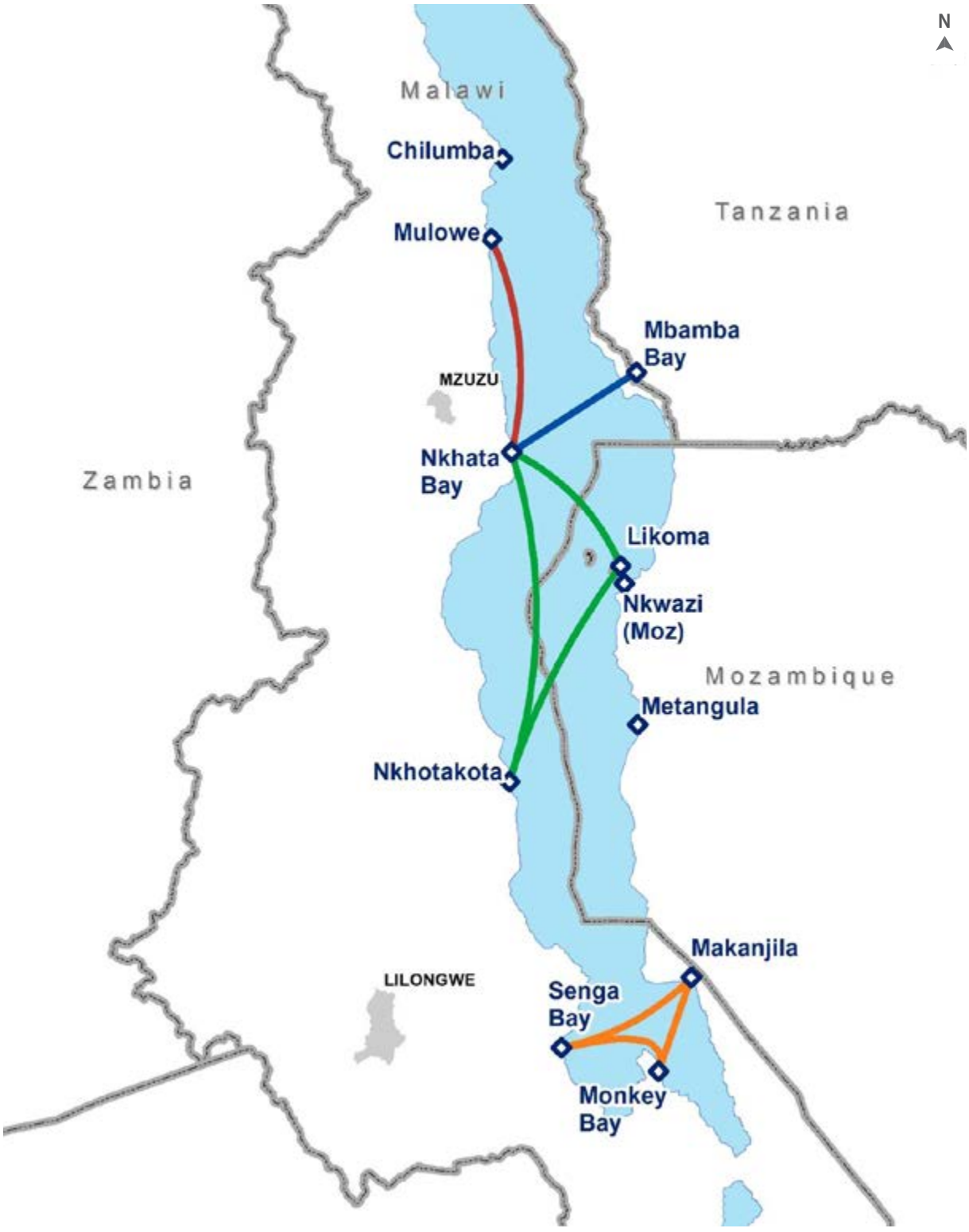
Government of Malawi

**Project:**

National Transport Master Plan

**Figure 5.13 Proposed inland water transport passenger services**




**Legend**

- Regular Central Service
- Regular link to Tanzania (Ro-Ro)
- Regular Northern Service
- Regular Southern Service

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### 5.6.7 Required amendments to the concession agreements

The Governments and port authorities around the world have withdrawn from port operations, knowing that the private sector will allow for greater flexibility, efficiency and better services to port customers. This was the case in Malawi when the concessions for the shipping and port operations were granted to MSC in 2010 and the Malawi Ports Company in 2012, both of which are subsidiaries of Mota Engil. The objective of the port concession was to increase the efficiency in port operations, decrease the cost of port services to stakeholders, decrease cost to the Government and attract private sector participation to invest. The results of our findings indicate that the objectives have not been met. It shows that either the Government or the concessionaire or both may not be working in line with the terms of the concession:

- There has been no significant improvement to the port infrastructure;
- The cost of port services to users has not reduced;
- The reliability and efficiency of ports and shipping have not improved; and
- The connection to the rail network is not currently available.

All the above have had a negative impact on the inland water transport's reputation. The ports and inland water transport are not appealing to shipping companies at present.

The concessionaires are currently losing money and have not been paying the concession fee. The short-term plan should allow for a review of the concessions with some immediate actions to improve the financial viability of inland water transport operations. A clear and viable business plan for freight operation should be developed and the passenger operation should be improved.

There is merit in having a single concession for a better integrated service. Inland waterway services, inland terminals/ports and end-leg road/rail services depend on the individual operations of the barge carriers, terminal operators and road/rail hauliers. They usually act separately and this tends to be the major obstacle to the development of competitive barge transport. An essential condition for the development of inland waterway services is the integration of combined transport operators who manage inland water transport services, ports and terminal haulage.

### 5.6.8 **Vessel management system**

It is recommended that the Department of Marine Services draft regulations to require all vessels of a certain size and type to be fitted with an operating Vessel Management System (VMS). A VMS is designed to allow real-time tracking of a vessel's location, heading and speed. A VMS would offer the following advantages:

- Improved safety through knowledge of the location of a vessel in distress; and
- The ability to enforce measures against illegal and over-fishing.

The primary function of a VMS program is to track vessel locations, identify possible fishing activity and provide a means of communication. For the effective application of VMS to a fisheries management objective, it is essential that management rules to achieve the set goals must relate to VMS capabilities. Specifically, management rules where VMS could be effective will probably include restrictions related to geographic areas.

These include but not limited to areas of Lake Malawi which are:

- Closed for fishing;
- Closed at certain times;
- Restricted for fishing or other activity, to certain vessels based on type, size, and licence status;
- The amount of access is to be timed or counted; and
- Not allowed for vessels to land.

The above restrictions are quite common in fisheries management practice and VMS may be applied quite simply and effectively in most of these situations.

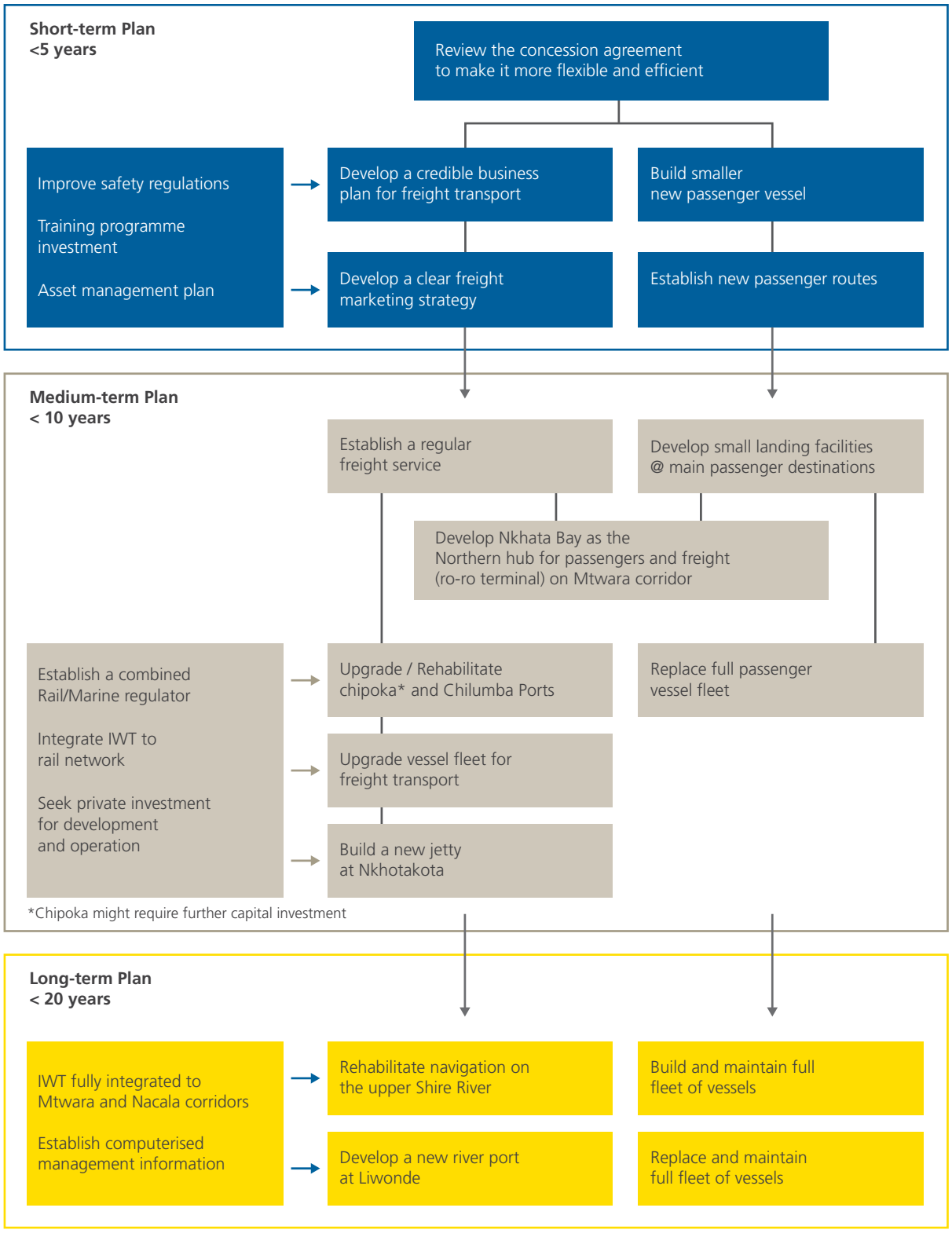
A vessel monitoring system pilot study has been conducted on the R.V. Ndunduma, a 17-metre stern trawler equipped with a 380 HP engine, on Lake Malawi. The trial recommended the installation of a system with a cost of around US$380, and an annual subscription of US$150[21].

*21 Application, Efficiency and Effectiveness of Fishing Vessel Monitoring System (VMS) on Lake Malawi, Fisheries Integration of Societies and Habitats, Pact and USAid, January 2017.*

## 5.6.9 Implementation plan

The implementation plan for inland water transport is shown in 5.14.

**Figure 5.14 Proposed implementation plan for inland water transport**



## 5.7 Roads

The vast majority of passenger and freight transport demand is, and will continue to be, borne by roads. The options generated to improve the sub-sector, which are introduced in this sub-section, will therefore play a crucial role in realising the NTMP's objectives. All have been developed using a consultative and highly participatory approach that has involved all of the key stakeholders.

### 5.7.1 Roads as an asset

The value of the road asset to Malawi can be calculated by assessing the cost to re-build the network, or to build it today starting from scratch. The value of the road asset is shown in Table 5.11.

Approximately 50% of the asset value is provided by the main roads. The total asset value is around US $6.2 billion. This means that roads, taken together are one of the Government's most valuable assets, and worth more than a number of key private sector assets, as shown in Table 5.12.

In the road sub-sector, the main source of recurrent funding is from the Road Fund. The 2016/17 budget provides for an allocation for road maintenance of US$29 million.

**Table 5.11 Road asset value (US$ million)**

| Asset | Paved | Unpaved | Total |
|---|---|---|---|
| Main | 2,669 | 164 | 2,833 |
| Secondary | 332 | 671 | 1,003 |
| Tertiary | 29 | 815 | 844 |
| District | 4 | 524 | 528 |
| Urban | 385 | 116 | 501 |
| Total | 3,419 | 2,290 | 5,709 |
| Community | - | 474 | 474 |
| **Grand Total** | **3,419** | **2,764** | **6,183** |

Source: Consultant

**Table 5.12 Asset values: Malawi roads and selected private companies**

| Company | Asset Value (US$ million) |
|---|---|
| Malawi roads | 6,183 |
| Press Corporation | 614 |
| Illovo Sugar (Malawi) | 149 |
| Sunbird | 24 |
| Telekom Networks Malawi (TNM) | 58 |

Source: Consultant

This is intended to be split between national roads (US$18 million) and urban roads (US$11 million). This skewed distribution in favour of urban roads reflects the lack of recent attention to urban road maintenance, and although the allocation is not based on a formal needs assessment, it is intended to address rehabilitation as well as pressing periodic maintenance needs.

The fuel levy, collected by MERA, is routed directly to the RFA's account. The overall allocation for road maintenance is therefore non-discretionary with funding being legally ring-fenced. Thus, the funding source for road maintenance is sustainable.

The fuel levy is forecast to raise US$33 million in 2016/17. The levy provides a reasonably predictable source of funds, and is sustainable to the extent that it should continue to contribute an increasing source of funds for road maintenance over the next 20 years.

However, since this source, set as a percentage of the pump price of fuel does not fully cover road maintenance needs it is not wholly sustainable. Current annual maintenance needs for the national and urban road network can be calculated grossly using:

1% **of GDP; or**

2.5% **of the asset value.**

The first gives an annual need of US$64 million (MWK46 billion), and the second a value of US$158 million (MWK113 billion). Therefore, the current levy provides between 24% and 64% of present needs. A more detailed analysis will provide a clearer figure of long-run road maintenance needs. In the meantime, in order for the funding mechanism to provide a sustainable source of funds, our preliminary conclusion is that the fuel levy will need to be increased.

Table 5.13 lists the overall network in statistics for the paved Main, Secondary and Tertiary (MST) network 2007 and 2014 to 2015, when the last condition survey was carried out. Traffic has grown on average by 8.5% annually over the same period.. Whilst the average IRI has dropped only 0.5% over seven years, the proportion of roads in 'good' condition (IRI<3.5) fell from 58% to 31%.

The paved network was divided into three traffic and three conditions bands, and the percentages of the network in each band are shown in Table 5.14. Over 50km of the highest traffic band is on poor condition, and hence a major cause for concern.

**Table 5.13 Paved network overview**

| Year | Total km | AADT | Average IRI | IRI | | | |
|---|---|---|---|---|---|---|---|
| | | | | <3.5 | 3.5-5.0 | 5.0-7.0 | >7.0 |
| 2014-15 | 2,931 | 1,268 | 4.0 | 31% | 57% | 9% | 3% |
| 2007 | 2,924 | 660 | 3.5 | 58% | 28% | 13% | 1% |

Source: Roads Authority and TRL HDM-4 Database, AADT and IRI weighted by section lengths, Incomplete data

**Table 5.14 Paved network condition and traffic levels, 2014**

| Traffic | Good, IRI< 3,5 | Fair, 3.5<IRI<5.0 | Poor, IRI>5.0 | Total km |
|---|---|---|---|---|
| >1,000 vehicles/ day | 14.5 | 17.8 | 5.1 | 1,094 |
| 250-1,000 vehicles/ day | 12.6 | 31.5 | 4.9 | 1,434 |
| <250 vehicles/ day | 6.2 | 4.3 | 3.2 | 403 |
| **Total km** | **976** | **1,569** | **386** | **2,931** |

Note: Total MST paved roads km in RA database less than actual total

The Highway Development and Management System (HDM4) was run in Strategy Mode for the paved MST network with an unconstrained budget, over the period 2016 to 2035, with major works programmed to start (realistically) in 2018. The following are the findings:

1. The recommended investment in capital maintenance averaged US$64 million per year, with an additional requirement of US$90 million for recurrent activities over the whole period.
2. This resulted in a long run average IRI across the network between 4.1 and 5.5, representing the most efficient use of the resources.
3. Of the required total expenditure of US$1,280 billion[22] over the analysis period, around US$167 million is recommended for the reconstruction of 334 km of roads. If the cost of reconstruction is removed from the long run maintenance need, the total average annual requirement becomes US$59.7 million.
4. When applied to the whole MST paved network of 3,533 km, this gives a total cost of US$72.0 million annually.

The Unconstrained Strategy provides the best long-term outcome for the paved network. The annual cost is equivalent to around 2.2% of the value of the paved MST network. **This is the recommended annual level of funding needed to maintain the asset.**

There is insufficient data for HDM4 to be run on the remaining, mainly unpaved, network. As a result, we have taken 2.2% of the asset value of the remaining network to represent the average annual maintenance need. This equates to US$68.5 million. The total road maintenance need for the paved and unpaved networks is US$140.5 million (equivalent to MWK 101.2 billion). The net present value (NPV)/Cost for this is 13.9.

*22 Expended over less than 20 years, as any recommended works could not start until 2018.*

### 5.7.2 Road rehabilitation

The Unconstrained HDM4 strategy run recommended 334 km of road rehabilitation. Ongoing road rehabilitation/reconstruction projects are listed in Table 5.15.

**Table 5.15 Ongoing rehabilitation projects**

| Name | Funding agency | Length (km) | Completion |
|---|---|---|---|
| Mzuzu-Nkhata Bay | AfDB | 47 | 2017 to 2022 |
| Liwonde-Mangochi | AfDB | 75 | 2017 to 2022 |
| Blantyre-Zomba endpoints | AfDB | 60 | 2017 to 2022 |
| Karonga-Songwe | WB | 45 | 2017 to 2022 |
| **Total** | | **227** | |

*Source: RA, 2017*

**Table 5.16 Ongoing upgrading projects**

| Name | Funding agency | Length (km) | Completion |
|---|---|---|---|
| Chiringa-Chiradzulu* | GoM | 80 | 2017 to 2022 |
| Lilongwe old airport – Kasiya Santhe (S117) | GoM | 95 | 2017 to 2022 |
| Jenda-Edingeni | GoM and Abu-Dhabi Fund for Development | 38 | 2017 to 2022 |
| Zomba-Jali-Phalombe-Chitakale (S144, S147, S148) | Kuwait Fund, BADEA and OFID | 51 | 2017 to 2022 |
| Thyolo – Thekerani – Makhanga (S151) | Kuwait Fund, BADEA and OFID | 82 | 2017 to 2022 |
| Chikwawa – Chapananga (S136) | GoM | 76 | 2022 to 2027 |
| Lirangwe-Chingale-Machinga (S139) | Kuwait Fund, BADEA and OFID | 62 | 2022 to 2027 |
| Lumbadzi-Dowa-Chezi (M7/M16) | GoM | 18 | 2017 to 2022 |
| Mzimba-Mzalangwe | GoM | 62 | 2022 to 2027 |
| Ntcheu-Tsangano-Neno-Mwanza turn-off (S118) | Government of China | 140 | 2022 to 2027 |
| Njakwa Livingstonia – Chitimba (S103) | GoM | 75 | 2022 to 2027 |
| Msulira – Nkhotakota (M5) | GoM | 32 | 2027 to 2032 |

** Completed 2017*

Ongoing and proposed road improvement projects are shown in Table 5.17.

**Table 5.17 Road improvement projects**

| Name | Funding agency | Length (km) | Completion |
|---|---|---|---|
| Illovo roundabout to Midima roundabout (M2) – dualling | GoM | 0.5 | 2017 to 2022 |
| Area18 roundabout - Area 49 at Kaunda Road Junction -widening | GoM | 3 | 2017 to 2022 |
| Area18 roundabout - Parliament roundabout - KCH - Amina House – dualling | GoM | 4.2 | 2017 to 2022 |
| Kaunda - Chendawa and Area 25 - Nzenza – M1 Junction - widening | GoM | 20 | 2017 to 2022 |
| KIA turn off to Bunda turn off (M1):<br>(i) KIA turn off to Kanengo<br>(ii) Kanengo to Mchinji Road roundabout<br>(iii) Mchinji Road roundabout to BIWI<br>(iv) BIWI to Bunda turn off | GoM/JICA/ Government of People's Republic of China | 14 | 2017 to 2022 |

Proposed rehabilitation projects are listed in Table 5.18. These reflect priorities on the main road network.

### 5.7.3 Rural road upgrades

From the analysis of agricultural production, district consultations, and future demands, the programme of rural road upgrades listed in Table 5.19 was prepared. The location of these rural roads in the context of 2015 agricultural production are presented in Figure 5.15. The figure shows the spatial relevance of the proposed upgrades to the Malawi's main rural economic acitivity.

**Table 5.18 Potential rehabilitation projects**

| Road name | Potential funding agency | Length (km) | Completion |
|---|---|---|---|
| Nsanje-Marka (M1) | GoM | 30 | 2022 to 2027 |
| Ntcheu-Kasinje (M5) | GoM | 50 | 2022 to 2027 |
| KIA Junction-Kasungu-Jenda-Mzimba turn-off (M1) | COMESA | 234 | 2022 to 2027 |
| Mangochi-Chiponde (M3) | AfDB | 138 | 2022 to 2027 |
| Mzimba turn-off -Mzuzu-Kacheche (M1) | WB | 138 | 2022 to 2027 |
| Nsipe-Liwonde (M8) | GoM | 55 | 2022 to 2027 |
| Balaka-Salima (M5) | GoM | 200 | 2022 to 2027 |
| Kapatenga-Nkhotokota-Dwangwa (M5) | Chinese Government and GoM | 150 | 2022 to 2027 |
| Chiweta-Bwengu-Kacheche | World Bank and European Investment Bank | 63 | 2022 to 2027 |
| Rumphi-Hewe-Zambia Border (M24) | AfDB | 65 | 2022 to 2027 |
| Mangochi-Makanjira (S256) | Chinese Government and GoM | 138 | 2022 to 2027 |

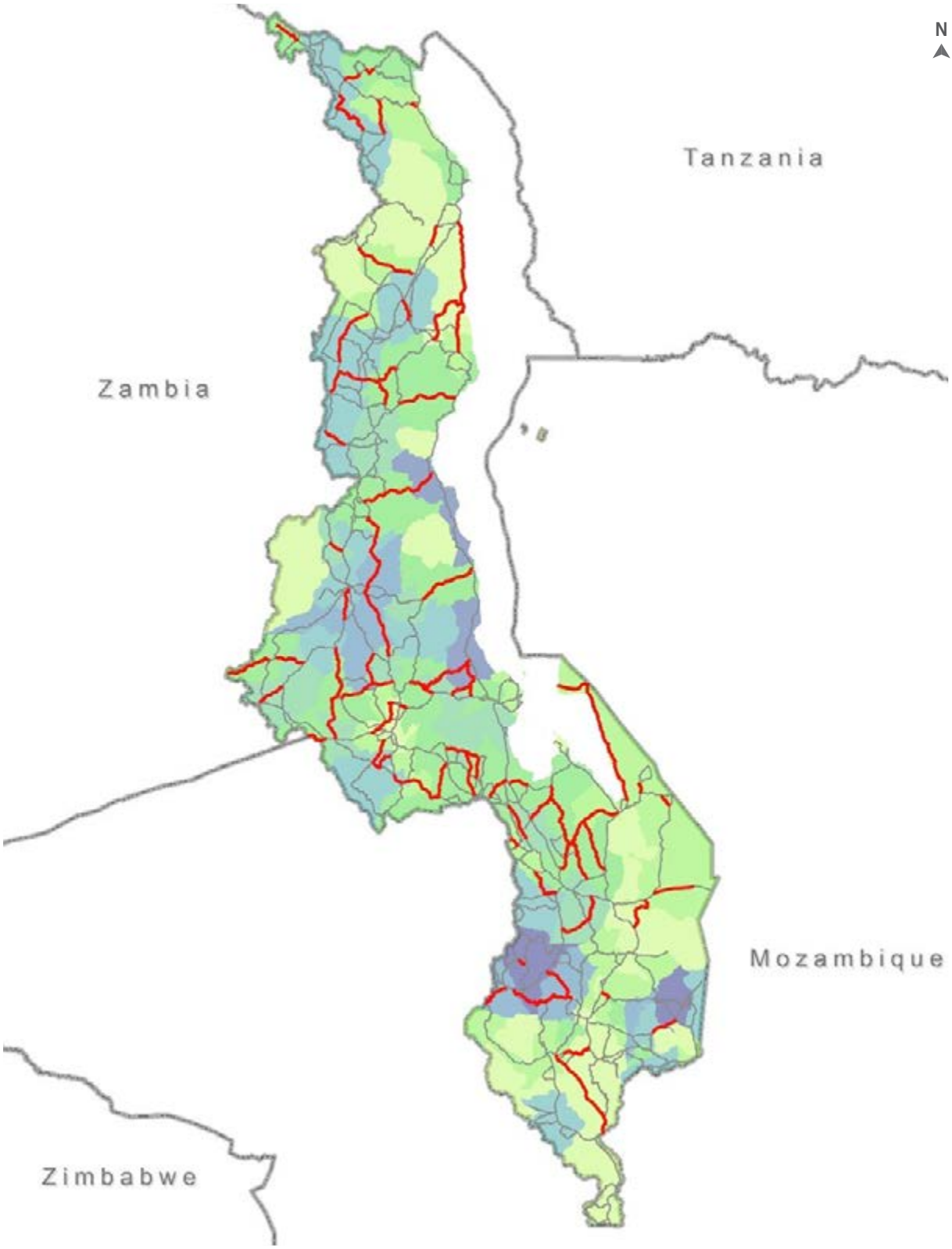
Source: RA – Schemes under design or feasibility, 2017.

### Table 5.19 Proposed rural road upgrading programme

| Road No | Start name | End Name | Length (km) | Forecast Motorised vehicles 2036 |
|---|---|---|---|---|
| S100 | M26 turnoff | T301 junction | 12.68 | 378 |
| U | Karonga airport road | | 5.12 | 940 |
| T305 | T306 junction | D30 junction | 15.86 | 318 |
| M24* | Rumphi | M9 junction | 39.29 | 352 |
| M11 | Chiweta | M5 | 103.52 | 260 |
| S108 | Luwazi road | | 27.45 | 718 |
| T309 | Ekwendeni | T308 | 17.12 | 857 |
| S106 | Euthini | S107 | 30.92 | 423 |
| D61 | | | 20.90 | 570 |
| S112 | Embagweni | Endegeni | 48.03 | 403 |
| M9 | S111 | Euthini | 17.22 | 451 |
| S101 | M26 turnoff | Kopakopa | 26.85 | 344 |
| S113 | M1 through Viphya | M5, Dwanga | 64.90 | 183 |
| S231 | M18 | T389 | 50.24 | 371 |
| S125 | M1 turnoff | S124 | 24.42 | 648 |
| M18 | Malomo | Nkhotakota | 47.81 | 551 |
| T333 | Mkanda | Chikoto | 34.18 | 909 |
| S116 | Mchinji | Mponda | 21.21 | 461 |
| D119 | Kasiya | Nambuma | 24.81 | 481 |
| S115 | S117 | M1 | 17.88 | 390 |
| M16 | M7 | M14 | 21.72 | 922 |
| T361 | M1 at Lumbadzi | M14 | 5.88 | 372 |
| D189 | Kabwabwa | M1 at Lumbadzi | 12.29 | 1,356 |
| S122 | Chitedze | T347 | 17.59 | 1,018 |
| U | Namitete | Zambia border | 15.95 | 932 |
| S124 | Likuni | T346 | 23.20 | 2,757 |
| S126 | Loti | Linthepe | 26.73 | 483 |
| T371 | Dedza pottery | Chipasi | 15.62 | 965 |
| T372 | Chipasi | Kapula | 3.41 | 907 |
| D220 | T374 | T372 | 11.8 | 224 |
| T375 | - | - | 7.26 | 579 |
| T376 | Mlanda | Mua Mission | 18.98 | 794 |
| T373 | Kapula | T374 | 15.37 | 667 |
| T386 | Namwera | | 8.17 | 1,978 |
| U | M3 | S151 | 11.47 | 644 |
| T382 | M10 - Nankumba | T371 | 8.52 | 967 |
| T381 | M5 | S133 | 95.80 | 510 |
| S280 | M5 | Mangochi | 75.54 | 753 |
| T383 | S127 | S134 | 1.74 | 791 |
| D240 | Unnamed | M1 | 9.53 | 685 |
| S299 | M3 | S131 | 32.27 | 509 |
| S136 | Mwanza | Mozambique border | 22.80 | 1,452 |
| S137 | Chileka | Tedzani | 58.14 | 1,170 |
| S146 | S145 | M3 | 8.37 | 1,158 |
| T418 | Michiru | M2 | 17.09 | 1,617 |
| T418 | S152 | Michiru | 9.83 | 620 |
| S152 | Kanjedza | Bangula | 79.91 | 747 |
| T393 | Nsanama | Nyuchi | 43.47 | 1,395 |
| S117 | Kasiye | Santhe | 39.04 | 1,055 |
| T346 | Kasiye | Namitete | 38.46 | 630 |
| | | | **1,407** | |

*Currently being designed as Low Volume Seal.

**Figure 5.15 Proposed rural road upgrades and agricultural production, 2015**




**Legend**

Total agricultural production (tonnes per year)

- 0 - 50000
- 50001 - 100000
- 100001 - 150000
- 150001 - 200000
- 200001 - 300000
- 300001 - 400000
- 400001 - 500000
- 500001 - 1000000
- Proposed rural roads for upgrading
- Other road network

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## 5.8 **Road safety**

### 5.8.1 **Physical schemes**

Improving road safety is a high priority in this NTMP. This is reflected in its strategic objectives, which include improving the safety of transport infrastructure and services, and operational objectives including the mainstreaming of safety and security considerations into transport projects, policies and related processes.

Specific road infrastructure projects were developed from a review of overall road crashes, along with the existing and future demand for motorised and non-motorised transport on these roads, all designed to improve safety. The schemes propose the introduction of segregated non-motorised transport lanes, primarily to protect cyclists and pedestrians from motorised traffic on the following roads:

- M12 from Lilongwe to Mchinji (90 km);
- M1 Mponela to Dedza (120 km);
- M1 Dedza to Blantyre (198 km);
- M6 Blantyre to Mwanza (95 km);
- S143 (10 km); and
- S108 (10 km).

### 5.8.2 Safe level crossings

Safety at road and rail crossings needs to be improved. A risk assessment needs to be conducted at level crossings to ensure that road authorities and network operators identify technical and operational hazards to users and manage any identified risks to people, property and the environment, including with a clear understanding of stakeholder roles and responsibilities. The standard criteria for grade separated crossings is where Average Daily Traffic (ADT) of motorised vehicles multiplied by the trains per day is greater than 50,000 within the space of a few years. Very few, if any, crossings meet this criterion in Malawi, but grade separation is nevertheless recommended in the following cases:

- New railways;
- New roads; and
- Road rehabilitation projects, upon review of a road safety audit.

**Improving road safety is a high priority in this NTMP.**

In the context of at grade railway crossings the criteria for safety interventions is calculated as follows: Train Vehicle Units (TVU) = daily traffic (motorised and non-motorised) x trains per day. Where the TVU is less than 6,000 an unmanned level crossing with warning signs is required.

Where TVU is more than 6,000 but less than 10,000 an unmanned crossing can be erected and manned on a priority basis, and where the TVU is greater than 10,000 a manned level crossing is ideal.

### 5.8.3 **Other interventions**

The following measures are proposed:

- Comprehensive education and awareness campaign that targets all categories of road users;
- Improve the speed and standard of accident response;
- Link Malawi's Road Traffic Accident (RTA) system with the Malawi Traffic Information System (MalTIS);
- Review the institutional setting for achieving road safety objectives;
- Improve road signing and marking;
- Assign regional road safety coordinators;
- Introduce a theory test for all drivers;
- Prepare design guidelines for roads in urban areas;
- Enhanced enforcement of regulations;
- Introduce safe level crossings at road rail crossings; and
- Implement a capacity building programme to support delivery of the strategy.

As with all strategies the phasing of the measures proposed to improve road safety needs to be carefully considered. A capacity performance review activity for all agencies involved in road safety, for example, should be conducted before measures are implemented. Short- and long-term issues need to be differentiated both owing to practical issues of resource and the benefit of being able to adapt the approach adopted based on learnings from implementing priority measures.

### 5.8.3.1 Comprehensive education and awareness campaign that targets all categories of road user

**Aim:** Promote safe behaviours on the road network amongst all road users.

**Description:** Educating road users is one of the three pillars of strategy to improve road safety. The DRTSS currently provides road safety education in schools, which includes a programme of road safety clubs and scholar patrols to ensure that children learn about the principles of road safety and practice them from a young age, but this type of education and awareness campaign does not reach many of the users of Malawi's roads. A number of related efforts have been made. Road safety awareness campaigns have, for example, included the purchase of an interactive mobile screen, radio broadcasts, outdoor advertisements, television and print media campaigns, and a number of road safety functions are commemorated annually including:

- Joint Easter awareness and enforcement;
- Independence period awareness and enforcement;
- Africa Road Safety Day on the third Sunday of November; and
- Road Safety Month in December.

In addition, the Directorate is directly involved in the following training programs: defensive driving courses; in-vehicle assessment programmes and cyclist training. The Directorate also inspects driving schools at least once a year to check compliance. It is proposed that these measures are more clearly packaged and critically reviewed in terms of their engagement with all road users. In spite of the activities referred to above there is, however, still inadequate awareness and understanding about risks associated with travelling on Malawi's road network. Hazard perception, road safety and traffic regulation awareness, and driving standards tend to be poor. International experience has shown that targeted programmes of road safety education and training, preferably comprising both national and regional level activities, can have a positive impact on road user behaviour.

There is a wide literature regarding good practices that can be drawn upon to help to increase the effectiveness of the campaign. These extend to training trainers and a programme monitoring its impact.

### 5.8.3.2 Improve the speed and standard of accident response

**Aim:** To reduce the likelihood of victims of collisions on the road network to be killed or seriously injured.

**Description:** DRTSS has acknowledged that Malawi has inadequate capacity for the post-crash response and care. There is an acute shortage of ambulances, well trained paramedics, firefighting equipment and personnel. Often the people first to the scene following a road traffic accident do not have basic first aid training to assist people who are injured and are rarely able to communicate with trauma units. The Directorate in collaboration with relevant stakeholders such as Ministry of Health and World Bank will initiate the establishment of emergency centres staffed with trauma trained personnel along the M1 road and procurement of trauma response vehicles. It is also considered that first responder trainings will be conducted. Furthermore, the Directorate intends to introduce a toll-free number in its quest to improve accident reporting. This has not yet been implemented.

#### 5.8.3.3 Link Malawi's Road Traffic Accident (RTA) system with the Malawi Traffic Information System (MalTIS)

**Aim:** Improve the Road Traffic Accident (RTA) system.

**Description:** When the DRTSS introduced MalTIS in 2001 the system was considered state-of-the art. It has since been upgraded and currently has many interfaces, including with the Malawi Revenue Authority and Malawi Police Service. It is proposed that its utility could be improved by creating an interface with the RTA system. The beneficiaries would include the police, DRTSS, Ministry of Health and insurance companies.

#### 5.8.3.4 Review the institutional setting for achieving road safety objectives

**Aim:** To clarify, and where necessary simplify and streamline, roles and responsibilities relating to the realisation of road safety objectives.

**Description:** Numerous stakeholders and agencies are involved in the delivery of road safety objectives and there is merit in conducting an independent review of the institutional framework to ensure that the optimal arrangement is in place. This should extend to a critical review of each agency. In the DRTSS, for example, eight of its currently 268 staff work within Management, Policy and Planning functions, and the impacts of the internal distribution of resources, roles and responsibilities should be reviewed.

#### 5.8.3.5 Improve road signing and marking

**Aim:** Introduce more warning and instructional road signage and demarcation of space on carriageways to improve awareness of risk and encourage safe behaviours.

**Description:** Signs that provide warnings and give orders (mainly prohibitive) inform road users and in doing so improve compliance and reduce risk. Road markings can have a similar impact by guiding vehicles and segregating road-users, thereby decreasing the potential for conflict.

#### 5.8.3.6 Reinstate road safety in primary school curriculum

**Aim:** Increase awareness about the risks associated with using the road network and contribute towards the development of a national road safety culture.

**Description:** A wealth of road safety teaching materials are available to educate children from a young age about how to be more aware of risks posed by the road network and about the behaviours that they can adopt to reduce this risk. A programme of related resources, including both materials and activities suited to the Malawian context, are readily available for delivery in classrooms. Standard teaching materials should be prepared and teachers trained to deliver them effectively.

#### 5.8.3.7 Assign regional road safety coordinators

**Aim:** To introduce dedicated experts and a related communication channel where local road safety concerns can be raised and related initiatives conceived and communicated.

**Description:** The Government of Malawi and stakeholders in all of Malawi's districts are aware of both the need and scope to improve rural road safety. The same factors are responsible for collisions across the country but there are some variations by district and the assignment of regional safety coordinators could help to ensure that opportunities to increase the safety of local road networks are identified and their implementation supervised. Related district level initiatives can be challenging to sustain and so this is a more cost-effective approach. The functional sections of the DRTSS are decentralised into four regional operations, and these could be enhanced by having road safety coordinators assigned to act as a point of communication and engagement with the districts in their region.

#### 5.8.3.8 Prepare design guidelines for roads in urban areas

**Aim:** To enhance road user safety of the urban road network.

**Description:** Appropriate road design can contribute towards the effectiveness of numerous transport policies and the achievement of multiple social, economic and environmental objectives. Road design in Malawi's urban areas needs to better accommodate NMT users and prioritise safety. It can have an impact on traffic speeds, road user behaviour, and modal split. There are an extensive number of urban road design manuals that detail good practices and that can be readily tailored to the Malawian context.

#### 5.8.3.9 Introduce a theory course for all drivers

**Aim:** To improve the competence of drivers with a focus on enhancing their ability to drive safely.

**Description:** Drivers should be required to take a theory test before obtaining a provisional driving license. The theory course would cover regulations (for example related to road signs and traffic laws) and road safety best practices regarding both vehicle operation and maintenance. A theory course, as has been demonstrated in countries such as Zambia, can have a direct positive impact on road safety.

#### 5.8.3.10 Issue based enforcement for road user behaviour change through policing

**Aim:** To increase awareness of regulations relating to discrete motoring offences and road safety, and ensuring parallel enforcement.

**Description:** Almost all road crashes are caused by, or involve, human error. It is therefore necessary to influence the way drivers, cyclists and walkers behave when using the road network. Measures with the potential to deter drivers from offending include improved and more stringent driving tests, better road signing, and road safety campaigns designed to increase awareness of the consequences of offending. There are also various ways of influencing behaviour and it is recognised that the most effective approach is a co-ordinated strategy of education and awareness, engineering and enforcement. This proposed measure focuses on enforcement to support and complement education and engineering measures, to specifically target irresponsible, dangerous and unlawful behaviour.

**Given the high level of costs of road crashes, investment in autonomous vehicles could bring significant economic benefits.**

The Road Traffic Act sets out powers and duties of examiners to stop and inspect vehicles and drivers to ensure they are in keeping with the laws, particularly to ensure that vehicles meet the requirements for a certificate of fitness and that drivers have the correct licences and permits to drive. These personnel are in addition to traffic police officers, but despite the dedicated resource enforcement of regulations remains inadequate. We propose a campaign of high-profile policing, road-checks and intelligence-led operational patrols to target offenders and act as a deterrent. Examples of issue based enforcement include the following:

1. **Drink driving** – police can carry out discretionary road stops and require a person to take a breath test, if they have reasonable cause to suspect that they have been driving or attempting to drive with alcohol in their body. This activity can be specific prior to festive periods (more collisions occur during the festive period in Malawi than at any other time of year) and month ends, with discretionary police stops at or near drinking premises. A person failing to provide a breath test is guilty of an offence.
2. **Vehicle fitness checks at depots especially for passenger carrying vehicles** – traffic police are to carry out specific checks campaigns prior to vehicles getting on to the roads, this will ensure that minibus drivers are given the responsibility for their vehicle fitness before carrying any passengers. If a vehicle is checked and does not meet the safety standards required, they are disallowed by revoking of driving licence and or vehicle registration paper. This way the offender will be not be able to continue to carry passengers until the issue is fixed.

3. **Vehicle lights** – closely related to the general vehicle checks, lighting checks ensure that motorists are made aware of the importance of being seen and their ability to see other road users timely. Low visibility on Malawi's roads is the cause of a significant number of crashes that occur. The traffic police will carry out discretionary stops and check that all lights inherent on a vehicle design are working, these include headlights, tail lights, fog lights, signal lights, brake lights and hazard lights. Where a set of lights are found to be not working, the choice of a fixed fine or attending course to raise awareness of hazards that can be caused by faulty vehicle lights.
4. **Special education campaigns** – police in conjunction with the Department of Safety Services within DRTSS should organise and promote catchy road safety awareness campaigns like Speedwatch in April, Summer Safety in August and Festive Safety over the Christmas and New Year period. The campaigns would ensure that police are work more intensively during the campaign period, and are support by media campaigns sponsored by private sector or donor patterns.
5. **A speed watch campaign** – which aims to reduce the number of deaths and injuries on Malawi's roads caused by excessive and inappropriate speed. Each year, over a four week period, traffic officers across Malawi use the technical equipment and high profile patrols to crackdown on speeding drivers. This is coupled with a publicity campaign on the Government owned media to increase public awareness of the dangers associated with this behaviour. Enforcement is increased at locations where speed has been identified as a major causation factor in crashes. The M1 corridor would be a good pilot for this project; and
6. **Seat belt campaigns** – safety publicity campaign focuses on education and awareness about seat belt wearing about 3 or 4 times each year. Police enforcers are to give offenders when stopped at a discretionary stop the choice of a monetary fixed penalty or spending time watching an in-car safety video of a car crash and talking to a road safety officer.

**Within the NTMP period autonomous vehicles are likely to become commonplace in many developed cities.**

#### 5.8.3.11 Blackspot identification

Blackspots, or road sections with very high crash rates, are currently being identified by DRTSS with the World Bank support. A comprehensive set of interventions at blackspots should be implemented to include:

- Forgiving infrastructure improvements, reduced radii, and junction safety measures;
- Lighting;
- Sightline improvements;
- Improve signs and markings;
- Local sensitisation; and
- Enforcement.

### 5.8.4 Autonomous vehicles

Within the NTMP period autonomous vehicles are likely to be commonplace in many developed cities. In addition, autonomous trucks in convoys are currently being trialled. The primary benefit of such vehicles for Malawi is road safety. Given the high level of costs of road crashes, investment in autonomous vehicles could bring significant economic benefits.

The DRTSS should establish a programme to monitor developments in this field and assess the infrastructure requirements against potential benefits.

## 5.9 Air transport

This sub-section outlines the options that have been developed, in close consultation with stakeholders, to improve Malawi's civil aviation sub-sector. They will collectively contribute towards the attainment of all three of the NTMPs strategic objectives.

### 5.9.1 Chileka Airport

The main interventions are introduced below.

#### 5.9.1.1 Runway rehabilitation

The current runway has poor surface conditions and requires resurfacing to improve stability and braking action (which is affected by a large rubber deposit build up). This resurfacing would offer an opportunity to increase the length of the western approach to increase its length from 2325m to 3500m and the width to 45m to allow Code E aircraft to land comfortably. The taxiway to the south of the runway could also be extended to facilitate the full length and link the south-eastern end of the cross-wind runway as well.

#### 5.9.1.2 ATC tower and fire station

The ATC visual room is sited on the roof line of the current terminal and lacks a clear view to the runway ends. A new standalone tower could be sited to the south of the existing maintenance apron at a central point to the runway. The new structure would allow compliance with the ICAO for siting the tower and improve visibility for controllers of approaches and visual circuit enhancing safety.

The size of the fire station is adequate. However, the current location is not suitable. Relocating the station to the west of the maintenance apron would provide a central position to both the thresholds and facilitate expansion of the existing aircraft apron. It would also benefit from the close location to the ATC tower for communication links and could be more efficiently tailored to the fire appliances in use.

#### 5.9.1.3 Navaid strategy

Chileka neither has a radar nor an operational ILS. The surveillance and its coverage is critical at Chileka due to the high ground terrain surrounding the airport and the need to create a flexible operation for larger aircraft with less manoeuvrability.

It should be noted that installing Automatic Dependent Surveillance – Broadcast (ADS-B) has already been planned for Chileka.

Performance Based Navigation (PBN) is being promoted by ICAO and Malawi must align its strategies with this new concept.

Airfield Ground Lighting (AGL) at Chileka should include approach, runway, taxi and apron, and obstruction lights. Not all AGL components are currently serviceable and they urgently need attention. It was found through field inspection that only 50% of the runway lighting is working, which is just one operational circuit. The second circuit has been out of service for some time. Whilst the problem may be anywhere in the circuitry, it is recommended that the whole AGL system needs rehabilitation and the control system upgrade. The cost of the upgrade and rehabilitation would be in the of US$0.9 million to US$1.8 million. It is recommended that there should be two digital signals interleaved where 50% of the runway is on each. The interleaving allows control of crossover from one to another if one fails. It also allows switching of runway direction as a part of normal operations.

#### 5.9.1.4 Cross-wind runway cargo facility

The cross-wind runway at Chileka is not being used. It is a large paved area that could ease the demand for apron parking space with the increase of operation. The space can further benefit the existing small cargo facility, which is currently situated adjacent to the terminal.

A new phased cargo facility based on the north side of the airport utilising the cross-wind runway as access and for apron would be a catalyst for an important revenue stream.

Blantyre as the business centre could provide a major market and take advantage of short distances to border communities with other countries; having a cargo facility with potential global reach using the improved runway and cargo facility in combination would give the airport a regional significance. The operation would attract new employment potentials and opportunities for hauliers and transport providers locally as well as possibilities as a goods regional distribution hub. Construction could be phased to allow a build-up of the business and capacity to meet operations and market demands.

#### 5.9.1.5 **Terminal development**

Chileka is expected to complete departure terminal departures improvements, but whilst much of this will address current and short-term capacity issues, the increase in schedule and aircraft size would require a much larger facility capable of handling flights of 250 to 300 passengers. Forecasts and market predictions suggest that Malawi may not provide the indigenous numbers for growth, but external originating traffic is on the increase. The ability to operate larger aircraft would also create demand for larger space for check-in, security, lounge, immigration and baggage hall facilities. The proposed government plan to expand the terminal would need to be phased for the development already underway, but the continuity of funding will be required.

In the absence of a bankable project in the short-term, it is necessary to expand arrival and check in concourse areas to address the problem of arriving passengers queuing on the apron, departing passengers congesting at security areas and passenger dropping areas requiring users to stand in the rain or hot weather conditions.

### 5.9.2 Lilongwe/ Kamuzu International Airport

#### 5.9.2.1 **Runway development**

KIA has the ability to operate Code E aircraft currently, although as part of aspirations to establish the airport as truly international in standing, the runway could utilise space to the east to improve stopway and runway end safety area provision. The work would also seek to lengthen the taxiway to make this full length and allow runway capacity in busy periods to be managed effectively, as well as add flexibility should an aircraft blockage occur due to an incident. The runway extension would not affect the perimeter road.

Due to the restrictive positioning of the apron, the airfield package should include a new apron built parallel to the runway and west of the existing apron to allow parking of more, larger Code D and E aircraft. This would also permit access to the cargo shed facilities and allow direct aircraft loading for types such as the Boeing 747F.

In the medium-term the runway width should be expanded to accommodate wide bodied jets, such as the Airbus A380, in line with the vision of direct inter-continental flights. ICAO Annex 14 Volume 1 on airport design specifies a runway width of 60m for Code F aircraft. However, both the European Aviation Safety Agency and the US Federal Aviation Administration have now approved A380 operations on 45m (150ft)-wide runways, which at present is the standard width for major airports.

Major airports operating such aircraft are providing 60m width (75m including the shoulders). An interim measure would be a 45 metre wide runway with 7.5 metre shoulders on both sides, which can be used for Airbus A380 operations if the runway is also provided with these additional "outer" shoulders. Outer shoulders[23] should be prepared for jet blast protection, engine ingestion protection, and to accommodate run-off by an aircraft, with use by supporting ground vehicles as a minor benefit.

The bearing strength has to match as well though, including aprons and taxiway, as long as the market supports this (i.e. operators with route connections). Since Code F also covers the B747-800 the freight variant in that instance (as well as pax or pax/cargo combinations) should also be considered. The other consideration is that for aircraft of that size, the operators would expect the ILS to be serviceable and available, but this could be part of an overall airport upgrade package that includes the ADS-B surveillance as well.

The taxiways at KIA will need to be 45m width for Code F and bearing strength needs to match A380 PCN (bearing), and work will be needed to achieve this.

*23 ICAO Doc 9157 Aerodrome Design Manual Part 1, Chap 5.2 Runway Shoulders.*

#### 5.9.2.2 **Navaid strategy**

The Japanese investment package for KIA currently includes the proposed installation of an ADS-B system, which would then address the lack of surveillance at KIA. The ILS is unserviceable and may be a drain on finances over the short- to medium-term. The adoption of ADS-B would align with airline use of Global Navigation Satellite Surveillance (GNSS) and improve future proofing of air navigation at a local and regional level in line with SADC aspirations. No modification to radio beacons are proposed as these will dovetail with satellite based aids, however a replacement programme would need to be set out with the DCA/CAA for the medium-term. This needs to be placed within the whole framework of Communications, Navigation and Surveillance (CNS)/Air Traffic Management (ATM), taking into context performance based navigation. Later the principle of Aviation Systems Block Upgrade (ASBU) may be considered as an alternative.

#### 5.9.2.3 **Terminal development**

The Japanese investment plan is based on recreating the terminal to create two new wings, one each for arrivals and departures. This is combined with rehabilitation of the departure lounge and arrival hall areas to allow current flights to be handled at immigration without excessive queuing. It would also relieve pressure on the baggage collection facilities in the occasion of multiple flight arrivals. The addition of a new apron as described above would facilitate further expansion to the west of the terminal and possible departure gate development. The plans set out to increase passenger numbers using the terminal simultaneously by over 500 people and this could be realised in a combination of one or two small aircraft up to a Code D arrival at approximately 300.

#### 5.9.2.4 **Cargo expansion**

KIA has sufficient building space for an upgraded cargo warehouse and despatch area. This may encourage local enterprise to use the airport site and haulage businesses. It would also compliment the facility at Chileka and enable a degree of competition.

### 5.9.3 **Other airports**

The existing Mzuzu airport is deemed to be operational but attracts no flights. A new airport at Mzuzu would be a costly addition, without any formal traffic numbers. A better alternative would be to locate a new airport for the north of the country at Nkhata Bay. This would tie in with proposals for a Special Economic Zone (SEZ) at Chincheche, and the proposed development of Nkhata Bay Port on the Mtwara corridor. The development of the oil and gas industry could generate additional justification for an international airport in this location.

The DCA currently has a grass strip airport at Mangochi, but this does not attract flights either. The drive from Lilongwe to Mangochi (three hours) via the S127 takes in some of southern Africa's most stunning scenery, and is likely to be competitive in terms of both time and cost with air for journeys from Lilongwe to lakeside resorts. As a potential international entry/exit point Mangochi has a larger customer base than Likoma, although this is still relatively small in terms of direct international flights.

### 5.9.4 Malawi Airlines

The Government's 51% shareholding is the most tangible cost in terms of operation. Following the acceptance of Yamoussoukro, the Government should plan to sell this stake and realise the possible US$6 million value of this for re-investment in the sector. The airport developments and commitment to improving the sector governance and liberalisation would make this attractive to external investors including regional airline players.

The aircraft types operated are efficient and commonly used in the region so little to no saving would be gained from re-equipping at this stage, however a fleet procurement plan should be negotiated with Ethiopian Airlines to ensure that they are competitive and compliant environmentally in the future short-term. The airline should examine the potential for smaller capacity equipment on domestic routes. Although Ulendo has explored this market with little success, the market will expand in the future.

Given that the market in Africa is set to grow at over four percent per year over the NTMP period, Malawi Airlines should investigate the acquisition of more equipment and assess the market potential of routes to Maputo, Kigali, Cape Town, Ndola and Durban.

### 5.9.5 Open Skies and Yamoussoukro Agreement

Implementation of the 1988 Yamoussoukro Agreement in Malawi and other states in southern Africa is intended to reduce fares and increase consumer choice. Malawi has little to gain from embracing Yamoussoukro in the short-term. The current market is very small and potentially fragile to shocks that might occur from a unilateral open sky in Malawi. It is recommended that in the short-term the status quo is maintained, and that Malawi continues to pursue new carriers into the country and increased accessibility through bi-lateral arrangements.

**The airport developments and commitment to improving the sector governance and liberalisation would make Malawi Airlines attractive to external investors including regional airline players.**

### 5.9.6 Ground handling

Since there is a single ground handling company at KIA, its monopoly position may contribute to high costs. The introduction of a second handling company is contingent on passenger volumes reaching a level that provide sufficient business for two companies.

A licence to a second ground handling company was awarded at Entebbe International Airport to DAS Handling in 2002, when passenger numbers were around 500,000 annually. This figure is expected to be reached at KIA in 2028, and has already been reached if Chileka is included.

It is recommended that the concession to Lilongwe Handling Company (LIHACO) is re-negotiated under a tender arrangement, and a license to a second handling company is also awarded under a competitive tender process. This is also in line with the Airports Council International Policy and Recommended Practices for Ground Handling concessions which stipulates for open tendering, fair, competitive, transparent and accountability in the selection of the ground handler with clear defined criteria to be met. This will reduce handling costs, which should be passed onto the passenger.

### 5.9.7 Unmanned Aircraft Systems (UAS)

Unmanned aircraft systems (UAS) are already being used in Malawi. Currently there are three main applications:

- **Imagery** – generating and analysing aerial images for development and during humanitarian crises, including for situation monitoring in floods, and also used by the mining and extractives industries;
- **Connectivity** – UAS may be able to extend Wi-Fi or cellphone signals across difficult terrain, particularly in emergency settings; and

- **Transport** – delivery of small low weight supplies such as emergency medical supplies, vaccines and samples for laboratory diagnosis, including for HIV testing.

In the medium-term, with a favourable regulatory and operating environment, UAS could be used in Malawi's commercial sectors for transporting:

- Fish from Likoma to the mainland;
- Tobacco samples from farms to processing companies and buyers;
- Materials used in road construction to central materials laboratories for testing;
- Mineral samples for testing;
- Medical supplies from a central store to rural areas, to avoid unnecessary stocks in many rural locations; and
- Larger-scale humanitarian aid, food and similar in emergencies.

Commercial applications for UAS will be facilitated by Unmanned Traffic Management (UTM) Systems which allow drones to go beyond the visual line of sight. It is recommended that a UTM system is adopted in Malawi. In the short-term, Malawi needs to adopt regulations for licensing pilots and registering craft.

### 5.9.8 Regional safety oversight

Among the southern African states, there are varying degrees of adoption of the Yamoussoukro principles and co-ordination on safety in civil aviation is required among these states. This will ensure that compliance with international standards is promoted and that national standards complement those in neighbouring states to remove or minimise disparities.

The Malawian CAA should set up a national dedicated team of indigenous negotiators, regulatory experts, airport, air traffic and airworthiness specialists, which as a concept should be mirrored in neighbouring states. The national teams would set the scope of the co-ordination body and standards based on the African continental initiatives such as Yamoussoukro to create terms of reference. The regional co-ordinating bodies should also seek to join with other African regions, ideally under the African Civil Aviation Commission, and lead liaison with the ICAO and IATA safety councils to plan and implement safety actions, with safety council representatives as participants. Regular meetings of teams and regional bodies would encourage prioritisation of safety initiatives and attach importance at a national leadership level.

### 5.9.9 Civil Aviation Bill

Following an audit of Malawi civil aviation sector by ICAO in 2013 and the recent European Aviation Safety Agency study, a series of recommendations were made to enable the Country to align with International best recommended practices and standards in the aviation sector and the region aviation strategies in response to the 2012 Abuja Conference on safety. A key recommendation was that to provide regulatory and oversight function for the aviation sector, there was need to separate the function of regulatory and oversight functions from the ownership, management and operations of the airports where the regulatory and oversight functions should be undertaken by the Civil Aviation Authority (CAA) while the management and operations of airports is left in the hands of an Airports Company.

The Ministry of Transport and Public Works, and also through the Public Service Reforms under the Ministry responded to this in 2015 by proposing a Bill to create the new CAA on the basis that it would add credibility to Malawi's aviation governance and encourage overseas operators to add Malawi as a destination while the Public Service Reforms extended the Airport Developments Limited (ADL) mandate to manage and operate the key airports in Malawi.

The Bill sets out to create a CAA to provide the regulatory and oversight functions for the service providers in the aviation sector while ADL operates in similar manner of the British Airports Authority or Airports Company of South Africa(ACSA), to own, manage and operate key airports in Malawi. This would pave the way towards creating a commercial body as evolved in the UK with British Airports and then privatized airport companies, so that the regulatory role is independent. The Bill was passed by Parliament in June 2017, and was assented to by His Excellency The President in August 2017.

### 5.9.10 Overall institutional and regulatory reforms

The key future institutional and regulatory development for the sector is the Civil Aviation Bill and the creation of a new autonomous Civil Aviation Authority and an extended mandate for ADL as an Airports Company. The latter is part of a wider Government reform agenda that should see policy, regulatory and operational roles functionally and organisationally separated across the Civil Aviation sub-sector.

The separation of the DCA and CAA has yet to be finalised and constitutions determined, as well as organisational development and capacity building for both organisations.

The items below are summarised from strategies described above and should form the foundations of action in this area.

- Legal and practical creation of the Civil Aviation Authority and extended mandate of ADL, according to an agreed implementation plan and timetable;
- Identification of a dedicated civil aviation budget managed by CAA, with sufficient income to achieve financial sustainability;
- Creation of oversight by CAA of airport and aviation security – and jointly managed with the Police;
- Airports have revenue generating areas and non-revenue making areas. When concessioning out operations it is best to segregate these areas to foster commercial development and to promote transparency, and avoid cross-subsidies;
- Assessment of residual functions of DCA to cover policy, standards, drafting regulations, either as a stand-alone functional review or a wider restructuring of MoTPW;
- Sale of the remaining Government stake in Malawi Airlines; and
- Allowance of more private ownership and management of smaller regional airfields. Provide planning and tax incentives for development/competition.

### 5.9.11 Other activities

A number of other activities are recommended. These are listed below:

- Aviation school and apprenticeships in a variety of aviation trades to foster the next generations and provide career path opportunities for Malawians.
  With the relocation of a CAA headquarters to KIA, it would be opportune to collocate this with the aviation school to create a centre of excellence and provide courses and training that would draw people into the sector as well as aid retention through development;
- Incentives to operators to broaden the schedule range so that more of the operating day is utilised at KIA and Chileka;
- Mzuzu airport relocating;
- Exploring and capitalising upon opportunities to use airports and airfields for as wide a range of uses as practical and safe, for example regarding tourism including hot air balloon trips;
- Greater priority on embracing natural power generation technology, with investment at Chileka in solar power as a priority for back-up; and
- Cargo is a growth area and Malawian cargo has experienced profitability. This area should be expanded at Chileka to develop ground transport businesses and opportunities. The airport could act as a cargo distribution hub for local hauliers and transport.

### 5.9.12 Cross-cutting issues

The future development of air transport will need to take account of key cross-cutting issues. All stakeholders will need to ensure that they fully meet their obligations in reducing climate change and environmental harm. In particular:

- Airlines should be encouraged to use fuel-efficient and less noisy aircraft types and will be expected to meet any future requirements under the Kyoto Agreement or under current and future Emissions Trading Schemes;
- ATM routing distances should be minimised to reduce aircraft fuel burn;
- Noise preferential arrivals and departure routings should be established at all of Malawi's African airports to minimise aircraft noise exposure for local residents;

## Figure 5.16 Summary of recommendations for airports


**Legend**

- Develop
- Dispose
- Dispose to Military
- Dispose to Police
- Foster Use
- None
- Promote for Mining
- Relocate
- Secure

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**Client:**

Government Of Malawi

**Project:**

National Transport Master Plan

- The development of public transport in preference to road surface access to the major airport hubs should be encouraged where financially feasible; and
- In terms of gender equality, the air transport industry will need to provide equal employment and training opportunities in line with best global practice.

Figure 5.16 shows a summary of the recommendations for airports and airfields in Malawi

## 5.10 Urban transport

### 5.10.1 Principles

The objective for urban transport in Malawi is to develop a sustainable transport system with a strong mass transit network supplemented by other modes (pedestrian, cycling, bus) based on the following principles:

- Giving preference to, and right of way to, sustainable transport modes in terms of allocating time, space and facilities, guided by a proposed new road user hierarchy;
- Integrating walking, cycling and public transport routes that are efficient, direct, attractive and competitive to other modes of transport;
- Providing conditions which allow people of all abilities to feel safer using their streets and sustainable transport options;
- Raising the profile of walking, bike riding and public transport and the benefits of these transport modes through the provision of information, facilities and active promotion;
- Improving air quality and reducing noxious emissions from transport; and
- Improving public transport regulation.

These principles align with the NTMP's objectives and also with the views of stakeholders, who were engaged extensively in the development of the options outlined below.

### 5.10.2 Mass public transport

#### 5.10.2.1 Bigger buses

Road based mass transit vehicles (conventional buses, guided buses, bus rapid transit) are a more efficient user of scarce road space than private vehicles. Their cost per passenger kilometre is lower than the cost of private transport and of minibuses, which can translate into personal and societal cost savings.

**Figure 5.17 Bus lane, Liverpool, UK**


Mass transit vehicles have more efficient engines than smaller vehicles leading to reduced fuel consumption.

A bus with a carrying capacity of 108 passengers could replace around seven minibuses. The minibuses would use around 23 to 25 litres of diesel for a 20 km journey, whereas the bus would consume eight to ten litres. In terms of both fuel consumption and $CO_2$ emissions a bus could replace the equivalent of 14 private vehicles.

Recommended actions are:

- Phase out minibuses on high demand urban corridors;
- Licence only vehicles with more than 38 seats;
- Sensitise existing owners and operators on the financial benefits of big bus operations;
- Franchise routes for big buses, where minibuses shall not operate;
- Establish priority measures (bus lanes and priority traffic signals) on high ridership corridors; and
- Develop a feeder service plan for minibuses.

Bus services will operate more efficiently, both financially and in passenger interests, if provided with priority measures such as bus lanes (Figure 5.17). Bus lanes should only be provided for high capacity buses. They should be introduced under specific legislation (usually a roads Act) that empowers city councils or other authorities to designate a part of the highway (or all of a highway) for the use of only certain classes of vehicle. Regulations should then be drafted to cover issues such as the hours of operation, and signage that is legally enforceable.

#### 5.10.2.2 **Bus Rapid Transit (BRT)**

The Lilongwe Master Plan contains a proposal for mass transit, broadly focussed on a north-south corridor, possibly along the alignment of the M1. We recommend modifying this proposal slightly so that it is moved away from the main highway, in order to avoid conflicts over road space allocation. We propose a BRT scheme somewhat on the western side of the city to capitalise on existing development and demand and to foster growth along that corridor, in line with the development plan proposals. Currently 25% of all minibuses operating in Lilongwe have an origin or destination in Area 25.

The 20 km BRT mass transit scheme (Figure 5.18) is designed to revolutionise public transport in the capital city through a dedicated system of fast, reliable, comfortable and affordable buses. The system will link the employment centres of Kanengo and Old Town to the large and growing residential areas of Area 25, Area 47, and Area 49 as well as serving the National Stadium and the retail areas of CrossRoads and City Mall.

All BRT stops (stations) should incorporate Universal Design for easy pedestrian access and provide adequate bicycle parking facilities. In addition, integral to BRT planning and implementation will be the development of suitable medium-distance pedestrian and bicycle routes, with appropriate infrastructure to allow easy NMT access to BRT stops and terminals.

Key features would be:

- Buses with a capacity of 150 passengers operating at a frequency of 60 buses per hour along the line, giving a capacity of 9,000 passengers per hour, the equivalent of over 520 existing minibuses;
- Secure bus stations providing shelter from both sun and rain;
- Electronic stored value ticketing would be used to minimise passenger boarding times and to protect revenue;
- All ticketing would be done off-bus to facilitate speedy bus operations;
- The scheme will be built on new infrastructure where possible to maximise penetration and accessibility, and to avoid having to convert and widen existing roads;
- The scheme would require a new bridge across the Lilongwe River in order to access Old Town; and
- The scheme will cost around US$110 million, and could be financed through development partner support for the infrastructure with operations concessionned to an experienced public transport operator.

### 5.10.3 **Fuel efficiency and air pollution**

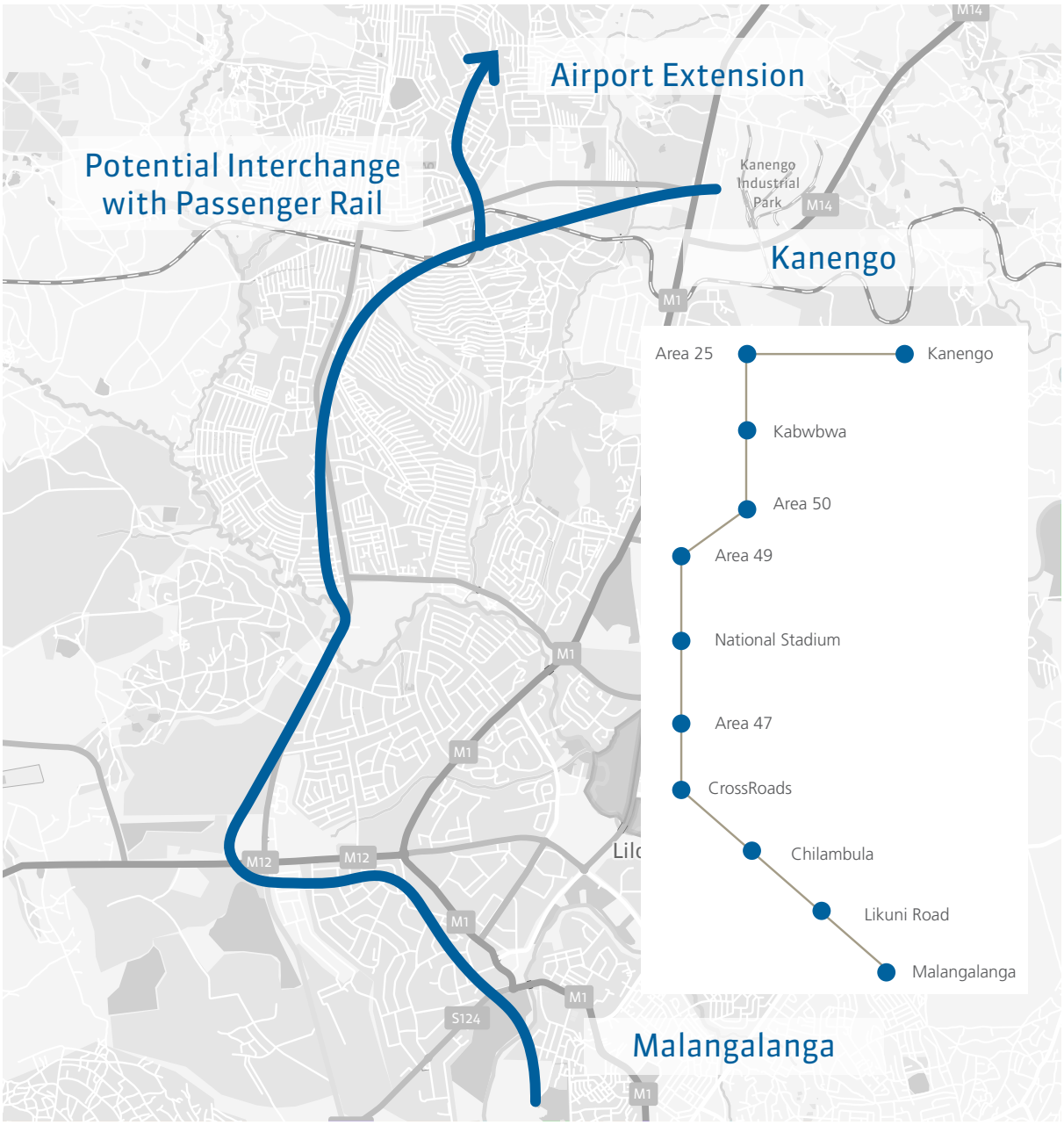
The fuel efficiency of vehicles in all the urban areas is low due to the relatively old age of vehicles, poor maintenance regimes, and increasing congestion. The adoption of minimum emission standards for all vehicles would ensure a significant reduction in fuel consumption and $CO_2$ emissions. Such standards have been adopted in most developed countries, and are increasingly being adopted in developing countries such as India, Brazil, South Africa and Mauritius. Fuel efficiency and emission standards tend to be directly linked as cleaner and more efficient vehicles are promoted in the market. Gains accrue to vehicle owners and users, as well as the state through improved fuel security and health benefits.

Most vehicles in Malawi are imported second-hand from Japan. There are no age limits on vehicle imports. A baseline study on emissions is required in advance of setting emission standards.

Adoption of standards can be incremental, reflecting the current state of the vehicle fleet immediately, and moving to more rigorous standards over time. Benefits on fuel efficiency can be gained through greater use of bio-fuels, dual-fuels and hybrid vehicles, with the potential for import duty variations to encourage this.

The MoTPW should be responsible for the adoption of standards with DRTSS implementing and enforcing them. Capacity increases are required for the measurement and monitoring of vehicle emissions.

**Figure 5.18 Lilongwe bus rapid transit route and stations**



The use of diesel fuel is becoming of increasing public importance. Although the $CO_2$ emissions from diesel are less than those of petrol (gasoline), the air pollution impacts are much greater. In particular, diesel engines contribute to air pollution in two key ways – through the production of Particulate Matter (PM) and Nitrogen Oxides (NOx). Very fine soot PM can penetrate the lungs and can contribute to cardiovascular illness and death. Nitrogen oxides can help form ground level ozone and this can exacerbate breathing difficulties, even for people without a history of respiratory problems.

To combat this, the mayors of Paris, Mexico City, Madrid and Athens have stated that they will ban the use of diesel cars and trucks in their respective cities by 2025. They have committed to providing incentives for alternative vehicle use and to promote walking and cycling. London has pledged to stop procuring double-decker buses that run purely on diesel from 2018, and in future all new single-deck buses will be zero-emission. New York, Amsterdam and Cape Town, have also committed to phase out the procurement of diesel buses by 2020. Possible substitute fuels include the world's first double-deck hydrogen-fuelled bus, which will be trialled on London's roads in 2017.

Single decker electric (battery powered) buses are already in service in multiple countries. Electric motors have very high torque and can deliver that torque at low speeds typical of bus use. Batteries can recover energy from braking with the overall result that an electric transit bus uses 20% of the raw energy a diesel bus would require to go the same distance. In addition, emissions from electric buses are effectively zero, which can be compared with conventional buses. Potential savings from conversion of half the minibus fleet to bigger buses.

The cost of a cycle lane is of the order of US$128,500 (MWK90 million) per kilometre. The above roads (total 55 km) could be improved with cycle lanes at a cost of US$7 million (MWK5 billion), or US$1.4 (MWK 1 billion) per year in a 5-year programme. The introduction of cycle lanes will add to the effective capacity of the roads above because cycles are removed from the main carriageway where they reduce the theoretical capacity of the road.

Implementation of cycle lanes will defer possible expenditure on capacity increases to the road itself. Cycle lanes can be dedicated for cycles only (Figure 5.19) or shared with buses (Figures 5.20).

#### 5.10.4.2 **Cycle paths**

In addition, the creation of cycle paths, dedicated routes for cycles not attached to a road will be useful in providing links within and between the developing areas of the cities. At first these can be unpaved – what is important is to create and protect a right of way. In Lilongwe cycle paths can enhance accessibility to/from and within the proposed Government development zones in Area 35 and Area 44, as well providing linkages between Areas 25, 50 and 49.

#### 5.10.4.3 **Kabazas**

Kabazas, or public transport cycles should be encouraged, particularly where they can play a long-term role as part of the overall transport network. This can include making public infrastructure provision for them at important bus stopping points and BRT stations in the form of shelters and fare tables for nearby destinations. Any regulation of kabazas should be extremely 'light touch', designed to improve safety. This can include road safety awareness, safe bicycle conversion practice, and wearing high visibility vests. These can be implemented through sponsorship by local companies.

#### 5.10.4.4 **Bike sharing**

Bike share programmes are now common in European cities, and schemes are now being developed for Johannesburg, Nairobi and Kampala. Under such a scheme a traveller can pick a bike at one location and cycle it to another for a small fee. Programmes usually need a sponsor to start off the scheme, such as UN-Habitat in Nairobi. Issues critical to the success of a scheme are charge rates and payment methods, the design of bikes and docking stations, and measure to prevent theft. Such schemes are most successful in conjunction with priority measures such as cycle lanes.

**Figure 5.19 Cycle lanes**

*Cycle Lanes (top to bottom): UN Avenue, Nairobi; T4 Chipata, Zambia*

**Figure 5.20 Bus and cycle lanes**

*Top: London; bottom: Liverpool*

#### 5.10.4.5 **Bicycle commuting**

Public authorities can take a lead in promoting Bicycle Commuting Campaigns. Typically, the biggest obstacles to increased cycling are concerns over road safety, and the lack of secure facilities for cycles at the workplace. Public authorities can encourage cycle facilities at the workplace through awareness campaigns, and by providing such facilities for their employees and visitors at the National and Local Government offices. Later, the provision of cycle facilities, such as secure parking, could be required to secure planning permissions for new developments, through development control legislation. City councils should work with large employers in their areas to promote cycling to work, particularly through assisting with the identification of safe routes for cyclists.

### 5.10.5 **Pedestrian facilities**

In Chapter 3 it was noted that within all cities walking will be the dominant main mode of transport in 20 years' time. Furthermore, walking is the sub-mode of transport for virtually all travellers – to and from public transport, and often at the beginning and end of car journeys in urban areas. The ability to walk safely within urban areas is a basic human right, but one that is not fully catered for yet. Since for many urban dwellers, walking is the only mode choice, investment in pedestrian facilities is a priority in terms of both meeting transport needs and social equity.

#### 5.10.5.1 **Footways**

Sidewalks or footways are "pedestrian lanes" that provide people with space to travel within the public right-of-way that is separated from roadway vehicles. Footways reduce pedestrian collisions with motor vehicles. Such facilities also improve mobility for pedestrians and provide access for all types of pedestrian travel. Footways should be part of every new and renovated facility and every effort should be made to retrofit streets that currently do not have footways.

Footways can be constructed from concrete, asphalt, crushed stone, or other materials if they are properly maintained and accessible (firm, stable, and slip-resistant).

A minimum width of 1.5 m for an urban footway is recommended, which allows two people to pass comfortably or to walk side-by-side. Wider footways should be installed near schools, at public transport stops, in CBD's, or anywhere high concentrations of pedestrians exist. Footways should be continuous along both sides of a street and should be fully accessible to all pedestrians, including those in wheelchairs.

The cost for concrete kerbs and footways is approximately US$25/linear metre for kerbing and US$60/square metre for footways. Asphalt curbs and walkways are less costly, but require more maintenance, and are somewhat more difficult to walk on for pedestrians with mobility impairments.

All urban streets should have footways, with the possible exceptions of roads with very low levels of motorised traffic (usually a cul-de-sac), or where a shared surface is preferred. Where footways are protected by a raised kerb they should be visually demarcated through high-visibility markings, and a textural and/or colour change.

Where a raised footway is interrupted by a vehicular access to premises, the general principle should be that that the pedestrian facility stays at the same level and the motorised access should change level. This is not possible at road junctions (except with speed tables), and hence kerb ramps are needed.

#### 5.10.5.2 Kerb ramps

Kerb ramps provide the access between the sidewalk and roadway for people using wheelchairs, push chairs, walkers, crutches, handcarts, bicycles, and also for pedestrians with mobility impairments who have trouble stepping up and down high kerbs. Kerb ramps should be installed at all intersections and locations where pedestrian crossings exist. Wheelchair ramps must have a slope of no more than 1:12 (must not exceed with a maximum side slope of 1:10). Where feasible, separate curb ramps for each crossing movement at an intersection should be provided rather than having a single ramp at a corner for both movements. This also provides improved orientation for visually impaired pedestrians. Tactile warnings should be used to alert pedestrians to the footway/street edge. All newly constructed and improved road projects should include kerb ramps. In addition, all agencies should upgrade existing facilities. They can begin by conducting audits of their pedestrian facilities to make sure that public transport services, schools, public buildings, and parks, etc. are accessible to pedestrians who use wheelchairs.

#### 5.10.5.3 Crossings

Marked pedestrian crossings indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. Pedestrian crossings should be installed at signalised intersections and other selected locations.

Pedestrian crossings should be installed at all locations where pedestrian flows warrant them for example: near to schools, major public transport stops, hospitals, and in shopping areas. These can be unprotected – in the form of black and white markings parallel to the footway, or signal protected either at intersection traffic signals, or stand-alone protected crossings (e.g. on Paul Kagame Road, Lilongwe). The general criterion for crossing design are set out in Table 5.20.

In some cases, pedestrian crossings can be raised and should often be installed in conjunction with other enhancements that physically reinforce pedestrian crossings and reduce vehicle speeds. Advance warning signs should be placed well before crossings. Driver awareness on the priority of pedestrians on crossings needs to be raised.

Protected pedestrian stages should be designed as part of all new signalled intersections, and retro-fitted to existing ones. This can be done through 'all red' phases, or careful design that allows pedestrians to cross safely while vehicles move through other parts of the junction.

**Table 5.20 Criteria for pedestrian crossings**

| Type of crossing | Criteria for implementation |
|---|---|
| Unprotected | Vehicle speeds less than 50kph<br>P less than 1,000 per hour<br>V less than 500 per hour<br>P at least 2 x V<br>$PV^2$ greater than $0.6 \times 10^8$ |
| Signal protected | $PV^2$ greater than $0.9 \times 10^8$ |
| Refuge | $PV^2$ greater than $0.4 \times 10^8$<br><br>Road width greater than 7.8m |

It is important to ensure that crossing markings are visible to motorists, particularly at night. Pedestrian crossings should not be slippery or create tripping hazards. One of the best materials for marking pedestrian crossings is inlay tape, which is installed on new or repaved streets. It is highly reflective, long-lasting, and slip-resistant, and does not require a high level of maintenance. Although initially more costly than paint, both inlay tape and thermoplastic are more cost-effective in the long run. Inlay tape is recommended for new and resurfaced pavement, while thermoplastic may be a better option on rougher pavement surfaces. Both inlay tape and thermoplastic are more visible and less slippery than paint when wet. Estimated costs per average crossing are in the range US$50 to US$150.

**Figure 5.21 Pedestrian crossings**

Top to bottom: Staggered signal protected crossing (UK Design); Pedestrian Crossing with refuge (USA); Unprotected crossing with refuge (UK).

#### 5.10.5.4 Bus and transit stops

Bus stops should be located at intervals that are convenient for passengers. The stops should be designed to provide safe and convenient access and should be comfortable places for people to wait. Adequate bus stop signing, lighting, a bus shelter with seating, are desirable features. At major BRT stops, the provision of secure cycle parking should also be considered. Bus stops should be at highly visible locations where pedestrians can reach them easily by means of accessible travel routes. Therefore, a complete footway system is essential to support a public transport system. Convenient crossings are also important.

Proper placement of bus stops is key to user safety. For example, placing the bus stops on the near side of an intersections or pedestrian crossing may block the pedestrians' view of approaching traffic, and the approaching drivers' view of pedestrians. Approaching motorists may be unable to stop in time when a pedestrian steps from in front of a stopped bus into the traffic lanes at the intersection.

Far-side bus stops generally encourage pedestrians to cross behind the bus. Relocating the bus stop to the far side of the intersection can improve pedestrian safety since it eliminates the sight-distance restriction caused by the bus. Placing bus stops at the far side of intersections can also improve general traffic flow.

Ideally, in the future, bus stop locations should be fully accessible to pedestrians in wheelchairs, should have paved connections to footways where landscape buffers exist, and should not block pedestrian travel on the footway.

#### 5.10.5.5 Pedestrian priority

Pedestrianisation of existing streets can be done to enhance the urban ambience, and promote activities such as retailing, culture and leisure in city centres. Removing motorised vehicles not only adds to safety but it can act as a deterrent to car use, particularly where alternative high quality public transport is in place.

Shared surfaces can be used to give pedestrians priority over the whole carriageway, most usually using a distinguishing textured material. This is best implemented on low traffic volume roads, or where private vehicles are banned and pedestrians share the road with public transport.

#### 5.10.5.6 Footbridges

Urban footbridges are designed to permit traffic flows and reduce accidents by providing a safe means to cross main roads. Some existing footbridges were not constructed to Universal Design principles and they do not have ramps that permit their use by a wide range of people, including those with bicycles, wheelchairs and pushchairs. Pedestrians prefer not to use footbridges (which require time and energy to climb) and they risk accidents by crossing the traffic lanes. On roads where it is appropriate to stop the traffic, level pedestrian crossings with islands and traffic control are more convenient for pedestrians.

The provision of adequate safe crossing facilities for pedestrians and NMT users on busy or dangerous national and urban roads should be a priority. The benefits to pedestrians of at-grade crossings are maximised where there is adequate safety, compliance and enforcement. Where traffic and pedestrian consideration require the provision of footbridges, these should, as far as practicable, incorporate Universal Design principles.

## 5.10.6 Highways

Both the share and the absolute number of motorised trips in the urban areas will rise dramatically in the next 20 years. Of particular concern is the expected growth in the unrestrained demand for private transport trips, largely by private car (Figure 5.23). This in itself will place a huge strain on the existing road infrastructure.

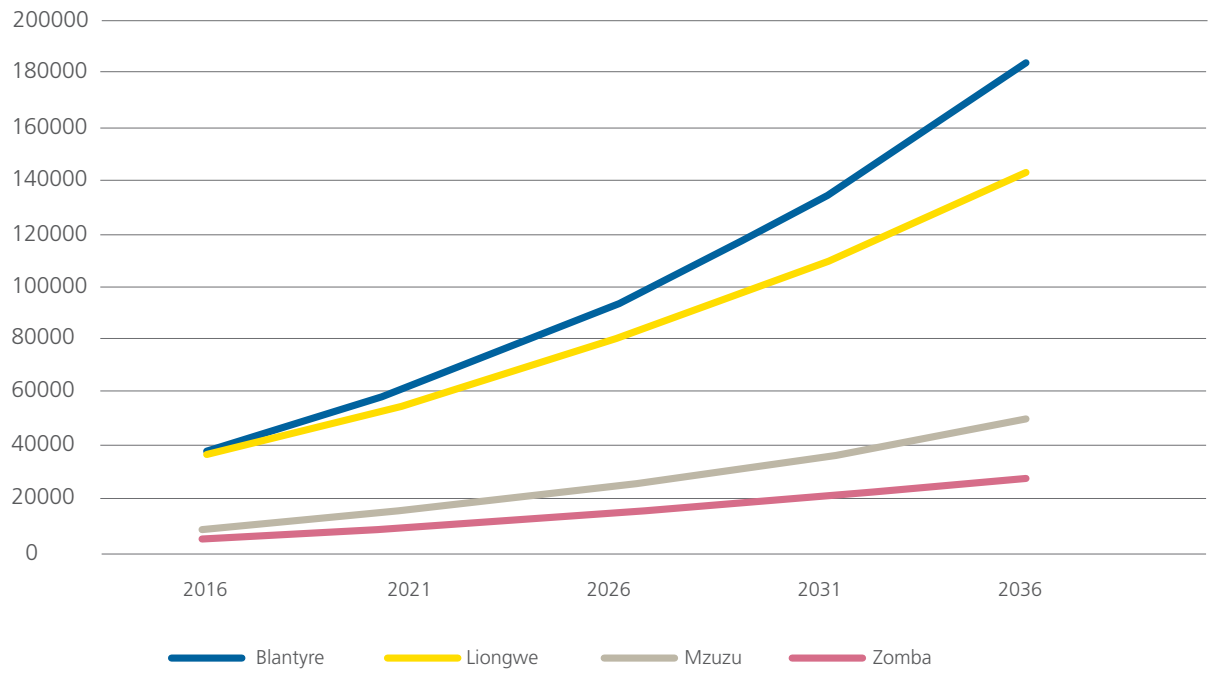
The approach of 'predict and provide' for increasing private transport use has largely been discredited in European cities, with the accent on public and non-motorised forms of transport. However, it is necessary to ensure that there is sufficient highway capacity to ensure that public transport vehicles can move easily. Therefore, there is merit in an additional highway provision to meet this end, as well as providing a reasonable level of service for private vehicles.

The major cities like Blantyre and Lilongwe are sufficiently complex in terms of the road network and traffic patterns that more sophisticated tools are required to analyse the impacts of interventions on traffic congestion and speed. These city councils need to have capacity in urban transport modelling.

**Figure 5.21 Footbridges in Blantyre**

Left, pedestrians prefer to cross at grade. Right, no safety measures on the handrails on a footbridge near a school.

**Figure 5.23 Forecast daily car trips in urban areas**



### 5.10.6.1 New roads

There is a case for additional highway capacity in the cities to remove through traffic from the main centres of activity. This generally calls for the provision of bypasses. These need to be carefully planned, so as to cater for through traffic whilst not being attractive to local (short-distance) movements which might erode the benefits. However, as the cities develop, it is hard not to see land use intensification taking place close to bypasses in the future, as they will offer improved accessibility compared to the more congested city centres.

Proposed priorities for the construction of bypasses are:

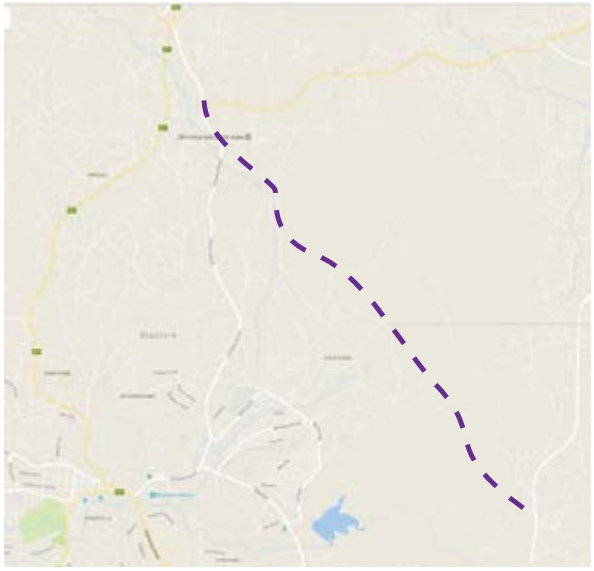
1. Lilongwe Western Pass (Figure 5.24) – linking the M12 and existing Western Bypass at Gateway Mall to the M1 north of Kanengo, with an airport spur to KIA. The road should be limited access with junctions with the S122 Mzumanzi, access to Area 25, and access to Area 55 (25 km);
2. Mthandizi- Mpingwe (Limbe Bypass), linking the M2 and M3 (3.6 km);
3. Ndirande-Nkolokoti linking Makata to Nkolokoti Road in Blantyre (3 km);
4. Misesa-Soche Hill–Manja in south Blantyre (4 km); and
5. Mzuzu Western Bypass, following the alignment of existing unpaved roads which widening and upgrading. The first 4km has been constructed by NOCMA as part of access to its strategic fuel reserve.

Future proposed candidates are:

1. Lilongwe Eastern By pass (35 km);
2. Blantyre Elevated Expressway (8 km), (Figure 5.25); and
3. Blantyre Inner Relief Road (14 km).

**Figure 5.24 Lilongwe bypasses**


**Figure 5.25 Blantyre inner relief road**



The proposed Blantyre-Limbe Elevated Expressway (Figure 5.26) is an eight kilometre elevated road that would run above the Chipembere Highway in Blantyre between Limbe at the M2/M3 junction to Mbayani on the M1. It would provide a seamless connection between these two points as well as having free-flowing on/off ramps at Chichiri, College of Medicine, and Blantyre CBD. The expressway would offer a fast flowing alternative to the congested Chipembere Highway, and provide relief to it at the same time which would allow for the provision of dedicated lanes for fast urban public transport.

The US$168 million project could be financed under a PPP arrangement with a concessionaire appointed to design, construct, manage, operate and maintain the highway which will include installation of computerised chip reading system, provision of high visibility lighting, safety feature and a control centre.

Tolls are expected to be around US$0.5 (MWK 375) per km. There will be no toll gates; instead payment will be made by through pre-paid re-chargeable windscreen mounted chips, debited by local sensors. Payment can be made manually or through a Smartphone App. Enforcement will be through close circuit TV, and optical character recognition of registration plates, linked to the MalTIS system.

#### 5.10.6.2 **Road widening**

Road widening proposals for general traffic, public transport and cyclists for all cities should be carefully appraised. As noted earlier, it is junctions that limit the capacity of the road system, and where possible these should be improved first.

#### 5.10.6.3 **Truck routes**

Authorities should consider measures to remove heavy goods vehicles from roads in urban areas which are inappropriate. There are two potentially complimentary options:

**Figure 5.26 Impression of elevated expressway, Blantyre**

**Advisory routes:** signed routes for vehicles above any designated weight along roads which have sufficient width, capacity and appropriate adjacent land uses; and

**Truck bans:** on specific roads or into and within specific areas designed to protect urban areas from large and heavy vehicles.

## 5.10.7 Congestion and traffic management

### 5.10.7.1 Costs of congestion

If no significant interventions are made in the urban transport system, traffic congestion will rise inexorably, more so in peak times of demand. Congestion has two major impacts: increased fuel consumption due to lower average speeds, and a loss of productive time. Significant congestion is currently evident at peak times in both Blantyre and Lilongwe. It is now, however, being experienced in off-peak periods as well.

In order to assess the potential future impacts of congestion, the forecast private vehicle trips for Blantyre and Lilongwe have been used. Fuel consumption increases with average speed, and the relationship for a typical saloon vehicle with an engine size of around 1,000cc is shown in Figure 5.27.

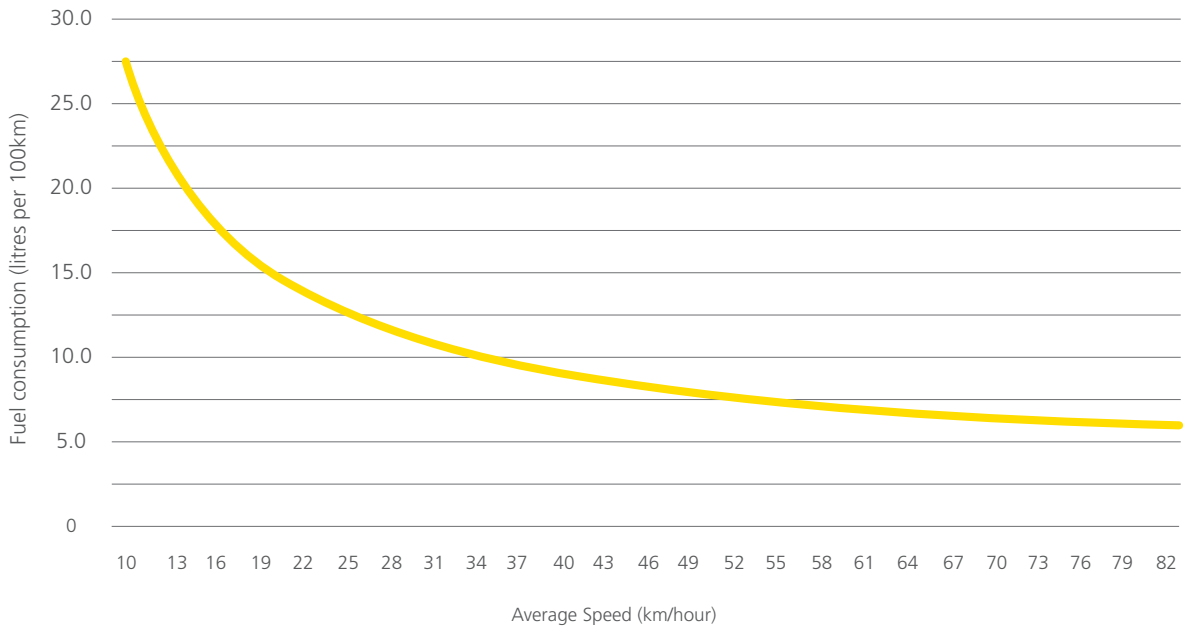
A single current average speed of 29 kph for peak periods was taken for both Lilongwe and Blantyre (Table 5.21). Whilst this speed is higher than observed in Blantyre, the observations in Blantyre were of roads known to be relatively congested. Hence the average speed in the city ought to be higher than those observed. An off-peak average speed of 35 kph was assumed.

Congestion will force average speeds down, and with unrestrained demand it is not unreasonable to suppose that average speeds in Blantyre and Lilongwe in 15 years' time could be similar to current speeds in Nairobi.

An average (diesel and petrol) fuel price of US$1.14 (MWK825) per litre is assumed, along with an average tips length of 5 km. The value of time for car users was estimated from the Stated Preference Surveys. In these surveys a variety of travellers were interviewed and given hypothetical choices between modes of transport of varying costs and trip times. Interviewees revealed the way in which they would trade off time and cost, and their collective responses were used to derive a value of time. This is estimated to be US$1.66 (MWK 1,203) per hour for car users. 51% of private vehicle trips take place in the peak four hours. The estimates for congestion costs presented in Table 5.22 and Figure 5.28 are relative to 2016, i.e. the incremental cost of congestion with no significant intervention in either city. These costs are only for private vehicles, and exclude public transport and goods vehicles.

By 2036, the costs of traffic congestion in the two major cities could be over US$320 million. Even in 5 years' time, the costs could exceed US$50 million. This emphasises the value of interventions to reduce congestion.

**Figure 5.27 Fuel consumption and average speed**



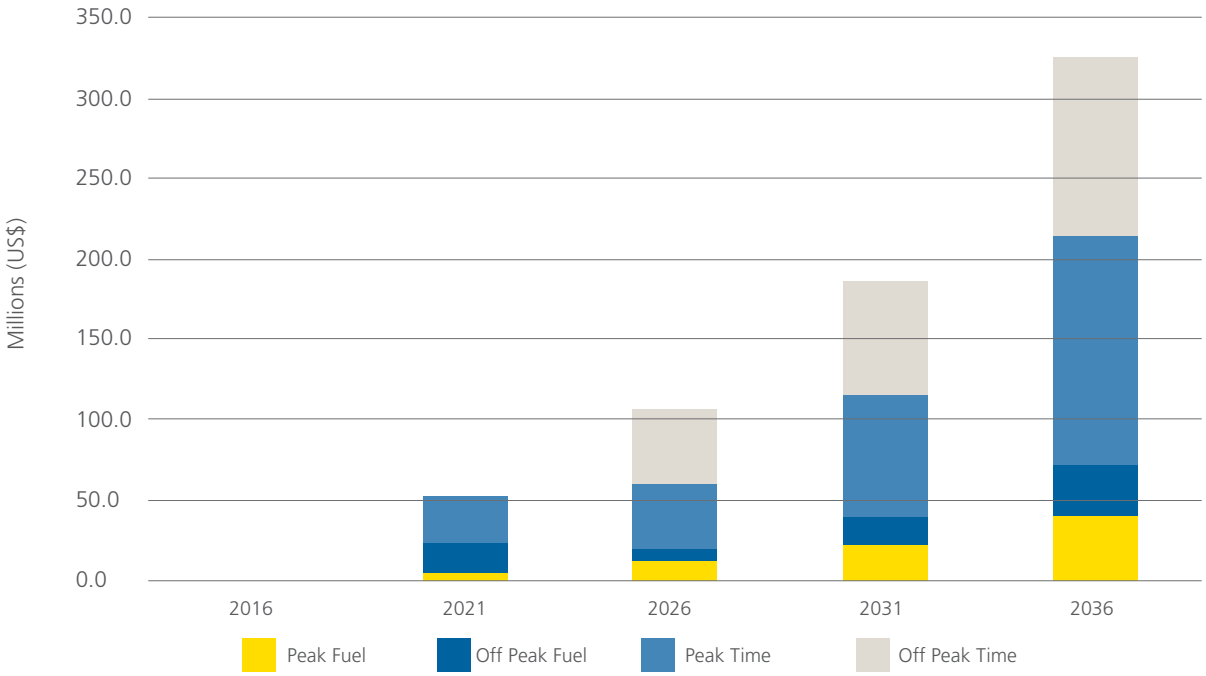
### Table 5.21 Assumed average speeds in Lilongwe and Blantyre

| Year | Peak (kph) | Off peak (kph) |
|---|---|---|
| 2016 | 29 | 35 |
| 2021 | 27 | 33 |
| 2026 | 24 | 30 |
| 2031 | 20 | 26 |
| 2036 | 16 | 22 |

### Table 5.22 Incremental costs of traffic congestion in Lilongwe and Blantyre, relative to 2016, US$ million

| Year | Peak fuel | Off peak fuel | Peak time | Off peak time |
|---|---|---|---|---|
| 2021 | 4.2 | 4.1 | 14.3 | 28.4 |
| 2026 | 10.8 | 10.2 | 37.8 | 45.6 |
| 2031 | 20.9 | 18.9 | 76.0 | 70.9 |
| 2036 | 38.1 | 32.6 | 143.5 | 110.4 |

### Figure 5.28 Incremental costs of traffic congestion



#### 5.10.7.2 **Traffic management**

Traffic management is designed to ease congestion and improve road safety. The key factors affecting congestion are junctions, not the scale of road links between junctions. In urban areas, where a junction becomes congested it can create a queue of traffic that 'blocks back' to an upstream junction and reduces its effective capacity. This regularly occurs in Lilongwe – the Kamuzu Central Hospital roundabout becomes blocked due to queuing traffic on the Mzimba Road (east) exit, and this reduces entry capacities on all the junction arms. Then, the Mzimba Road (west) queue blocks back to the Amina House roundabout, causing additional congestion there. Similar effects are regularly observed in Blantyre on the Chipembere Highway roundabouts, both in the evening peak and at lunch-time.

Roundabouts are prone to being blocked and that affects all entry traffic, whereas signals, can allow traffic flow to exits which are not blocked. Blocking of roundabouts is currently the subject of police over-ride (Area 18 roundabout, morning peak hours) who control entry flows.

For the key reasons of capacity and pedestrian safety, traffic signals are preferred in urban areas to roundabouts.

Traffic can also be managed through controlling directional traffic through one-way systems. These systems can allow parking on links and reduce the number of conflicting movements at junctions. The planned one-way system for Blantyre CBD needs to be implemented urgently. One-way systems use existing infrastructure efficiently, with minimal costs associated with signing and road markings. Before implementation, consultation should be held with local businesses, and before and after surveys carried out to monitor effectiveness. These should focus on journey times, as opposed to average speeds.

#### 5.10.7.3 **Traffic signals**

At a junction, there are demands for movements which conflict with each other, for example turning traffic, minor road traffic, pedestrians etc. Traffic signals are designed to minimise the various conflicting manoeuvres at a junction by allocating time and road space to vehicle and pedestrian movements in a sequence. They should provide good facilities for all road users including cyclists, pedestrians and mobility-impaired users. Traffic signal design aims to give adequate time to each traffic stream and road user while keeping the overall cycle time as short as possible.

Signal design needs to be improved to increase throughput at junctions and reduce the potential for accidents. Key issues are addressed below.

Cycle times should generally be between 40 seconds and 120 seconds. Cycle times in excess of 120 seconds are not recommended as drivers and pedestrians can get frustrated with delays and can be tempted to take risks. Shorter cycle times (90 seconds or less) should be provided where pedestrian flows are relatively high. However, cycle times in excess of 120 seconds are acceptable in the context of restricting side road access onto a main road so long as drivers are informed by signage.

There must be at least one primary signal at each stop line. The primary signal is normally sited on the nearside (footway side), between one metre and five metres beyond the stop line. Additional primary signals should be sited on the offside on dual carriageways and at locations with a splitter/pedestrian crossing island in the centre of the road. On faster roads or roads with four or more approach lanes, high mounted or overhead additional signals should be considered. Similarly, if visibility of the signal heads is restricted by a crest in the alignment, then high mounted or overhead additional signals (six metres) should be considered. Signals should be visible within the stopping sight distance of the junction. Neither parking/loading nor street furniture should block the approach view of the signals, within 40m of the signals.

Generally, there should be at least one secondary signal associated with every stop line. The secondary signals are normally sited on the opposite side of the junction where they can be seen easily by drivers waiting at the stop line. Where a vehicle is waiting to turn right at a junction and there is an opposing right turn movement with an early cut-off facility, drivers could be confused when the secondary signal for their movement turns to red. The driver would normally expect oncoming traffic to stop and would use the inter-green period to complete their turn. However, when an early cut-off phase operates then the opposing traffic continues to run.

The list of priority conversions of roundabouts to traffic signals is:

- Amina House, Lilongwe;
- Kamuzu Central Hospital, Lilongwe;
- Parliament roundabout, Lilongwe;
- Golf Club roundabout, Lilongwe;
- Chipembere Highway/Mahatma Gandhi Road, Blantyre;
- Chipembere Highway/Chileka Road, Blantyre; and
- Chipembere Highway/Makata Road, Blantyre.

Traffic signals need a constant power supply. This can be achieved through solar, but these must be protected from theft. Road user discipline is important and education and awareness programmes need to be stepped-up. Other road safety initiatives are more national and covered in the Roads Sub-sectoral Plan.

**Demand for parking will grow, and where is there is a shortage of on-street spaces, these need to managed to reduce impacts on congestion, and to maximise revenue to city authorities.**

## 5.10.8 Parking

### 5.10.8.1 On street parking

The removal of on-street parking can assist in reducing traffic congestion. However, in the short to medium-term there could be pressure for this to be replaced by off-street facilities. Demand for parking will grow, and where there is a shortage of on-street spaces, these need to be managed to reduce impacts on congestion, and to maximise revenue to city authorities.

Each city needs to make a formal inventory of all existing and potential on-street parking spaces, along with usage. Such a survey has been carried out in Blantyre and shows that demand is well in excess of supply.

Differential pricing of parking spaces should be introduced to reflect demand in the various areas of the cities. Pricing should be graduated (per hour) in order to dissuade long-term parking by commuters that contributes to peak hour congestion. Time limits (e.g. 4 hours) can be considered.

Management and revenue collection from parking should be contracted out to private companies, and city authorities should establish parking accounts so that income is transparent and reported upon. Contracts can be fixed price, or set at a percentage of revenues. Zones can be established so that contracts can be let to more than one company, in order to promote competition.

Reserved on-street spaces for adjacent business owners could be considered. This would remove the practice of informal reservation on public roads, and premium fees could be charged.

City authorities should use physical design solutions to reduce footway parking, through installing bollards and planting trees to create physical barriers to parking on footways.

#### 5.10.8.2 **Off-street parking**

#### 5.10.8.3 **Public parking**

It will be desirable to eliminate on-street parking on many streets in city centres, in order to free up space for pedestrians and other activities and improve urban design. The supply should be shifted to peripheral lots, which can be accessed from major arterials and avoid directing traffic through the narrower roads in city centres. Off-street parking should be developed and managed by the private sector, but since a loss of on-street parking will result in a revenue loss to authorities, consents for off-street facilities should include a revenue contribution clause to city authorities.

Off street parking operated by the private sector should be licensed by city authorities so that they can impose tariff regimes that meet transport objectives. For example, tariffs should be progressive against length of stay to dissuade long-term parking, largely by commuters, who would have an alternative mode of transport under an improved bus system.

#### 5.10.8.4 **Private parking**

Parking provided by developments for their own use should be regulated through car parking standards for development control. Authorities will need to take a view on whether standards should be maximum or minimum.

Minimum standards would require a developer to provide at least a certain amount of parking within the curtilage of the proposed building. This is designed to ensure that supply matches demand and that vehicles are not forced to park on-street.

Maximum standards require developers to provide no more than a set level of parking. This is designed to prevent developments from encouraging private car use, and hence reducing congestion.

In either case, city authorities should differentiate between operational parking – that which is necessary for the operation of the building – and would normally provide for service vehicles and visitors, and non-operational or discretionary parking, which could be provided for non-essential journeys and commuters.

Where developers are not able to meet a minimum requirement, they could contribute to the cost of public off-street parking through commuted sums. This would require legislation, most usually as an amendment to the planning Acts.

#### 5.10.8.5 **Park and ride**

Park and ride is a mixed mode system in which a private vehicle is used in the first part of the trip from less dense areas to reach a car park located close to a main road. At this point the driver transfers to a dedicated bus service operating in the denser urban area, usually to the CBD or another centre.

**Figure 5.29 Park and ride**


Top to bottom: Park and Ride bus (Bristol, UK); Park and Ride car park (Salisbury, UK); UK road sign, under traffic regulations

The key features of a successful park-and-ride operation are:

- The car park is located in a place which can be reached by private car without encountering traffic congestion;
- The car park is safe and secure, guarded and lit;
- Good waiting facilities are provided;
- The bus service has a fixed timetable that makes wait times tolerable for passengers; and
- The bus operates on a route with bus priority measures.

Candidate projects for park and ride are:

1. Lilongwe: car park sited at the junction of M12 and Lilongwe bypass, with bus priority measures starting 1km west of Crossroads roundabout, running east and south east to Old Town;
2. Blantyre: car park sited in Bangwe with priority measures running through Chipembere Highway to Blantyre CBD; and
3. Zomba and Mzuzu on M-roads in medium- to long-term.

### 5.10.9 Travel demand management

Many of the proposals listed above are concerned with managing traffic (both motorised and non-motorised) safely and efficiently. Ultimately the demand for motorised travel within the cities may prove too great for traffic management measures to address successfully. Before that occurs, authorities may wish to consider interventions that restrain the use of private cars within cities, in order to make the best use of existing assets, particularly the road infrastructure. Any such interventions can and should be wholly consistent with a sustainable urban transport strategy that seeks to prioritise public and non-motorised transport.

Any measures to restrain the use of private cars within cities should be preceded by the implementation of a decent public transport system.

Prior to the introduction of any restraint mechanisms, interventions which promote efficiency should be considered such as:

- Staggering working and school opening hours to reduce peak period impacts;
- Restrict parking supply, and/or increase charges for long-term parking; and
- Promote car-pooling and car-sharing.

### 5.10.10 Coach terminals

Inter-city coaches are not considered part of the urban transport system, but their terminating points ought to be linked to the urban public transport system at a small number of designated areas with appropriate supporting infrastructure.

Currently inter-city coach terminals in Lilongwe and Blantyre are disparate. Currently, in Lilongwe coaches use terminal points at City Mall, Game complex car park, Pacific Hotel and Mbowe. In Blantyre Axa and National Bus have their own (separate) terminals whilst other coaches use Shoprite, Chichiri and Petroda filling station.

## 5.11 Rural transport

### 5.11.1 Infrastructure

All rural communities should have a minimum basic access allowing year round linkage to social and economic services. After that, the level of service provided by rural transport infrastructure should be steadily improved to promote rural economic development.

This is reflected in the NTMP's operational objectives, in which the pressing need to enhance the connectivity of rural areas to support social and economic development is explicit.

Basic access is defined as the minimum level of rural transport infrastructure required to sustain socio-economic activity. A basic access intervention, in this context, can be defined as the least-cost (in terms of total life-cycle cost) intervention for ensuring reliable, all-season passability for the locally prevailing means of transport. This level of service allows for brief interruptions in the infrastructure connection in periods of heavy rains.

However, the provision of basic access alone is unlikely to be sufficient for accelerated rural development in agriculture and other economic sectors. For this reason, the steady improvement of transport infrastructure beyond basic access will be necessary to reduce transport costs, increase reliability of access and facilitate an increased rate of development. Because resources are scarce, investments in the improvement and upgrading of rural transport infrastructure will be targeted to maximise their contribution to rural social and economic development as laid out in district development and agricultural development plans.

The prioritisation of rural transport improvements should take into account equity and economic development as well as the particular needs and priorities of women, children, the elderly, the disabled and other disadvantaged and minority groups. The design of all rural transport infrastructure improvements should provide for the safety of road users and those living on the roadside.

### 5.11.2 Services

All communities should have safe and affordable means of transport available to access social and economic services. Rural mobility is constrained not only by the quality of transport infrastructure but also by a lack of choice and availability of the types of transport (motorised and non-motorised) available. Moreover, in many rural areas there are no transport services available due to poor infrastructure and the low level of demand. Even in areas where there are transport services, these are sometimes unaffordable by the rural poor.

However, Intermediate Means of Transport (IMT) and Non-Motorised Transport (NMT) can operate profitably at lower levels of demand than conventional transport services and are, therefore, well suited to many rural areas.

The development of NMT for transport in rural communities can be promoted by further research on suitable types of non-motorised and intermediate means of transport; exploring the possibility of credit facilities for means of transport and/or lowering taxes on bicycles; popularising NMT among the rural population including translation of suitable guidelines and examples into local languages.

**All rural communities should have a minimum level of basic access allowing year round linkage to social and economic services.**

### 5.11.3 Interventions

The following measures are proposed:

- Establish local transport committees;
- Adopt regular and sustainable maintenance programme for rural roads;
- Develop local programmes of road infrastructure improvements;
- Develop means of segregating and/ or safeguarding NMT in rural areas;
- Implement traffic calming measures;
- Improve public transport infrastructure;
- Foster safe kabaza use;
- Implement rural transport cost SMS centres; and
- Develop a Rural Transport Master Plan.

These are introduced in turn below.

### 5.11.4 Establish local transport committees

Road users and roadside residents are as much concerned with the state of local roads and transport as those who are responsible for maintaining the roads. Road authorities, either national or district, may not have the local knowledge on specific sections of roads, the accident spots, drainage problems and usage. This knowledge is usually held by the road users and local communities living along the roads.

Roads maintained by national or even local agencies are viewed as the property of that agency, and not the property of the community. This leads to the theft of road furniture, signs, and other materials, as well the misuse of roads, such as blocking side of drains, by the local community.

The response to this is the establishment of local transport committees. These should comprise some (locally) elected officials and local people with interest in passenger transport and the movement of goods, including farmers, and transporters, with an accent on women and youth participation, along with representatives of road authorities and concerned ministries[25].

The role of the transport committees would be to:

- Sensitise the community on the benefits of good roads and safeguarded drainage;
- Inform roadside residents of proposed road works;
- Inform roadside residents on the road reserve and the Government's rights on road reserve;
- Provide advice to road authority staff on road safety issues near schools and markets, at accident spots and water crossing locations on roads;
- Facilitate road safety training at schools and other venues;
- Help to conduct sensitisation amongst the community to encourage people, particularly women, to come forward for work on road maintenance;
- Identify transport service gaps and encourage local transporters to fill such gaps; and
- Identify transport infrastructure needs, such as depots and shelters and inform concerned agencies.

25 *Not all representatives of all Government agencies need attend all meetings, so long as there is improved inter-ministerial co-ordination (proposed elsewhere).*

### 5.11.5 Adopt a regular and sustainable maintenance programme for rural roads

**Aim:** To contribute towards the provision of timely and adequate road maintenance.

**Description:** Maintenance is key to the longevity of any road network. It is proposed that a maintenance programme, comprising routine and periodic maintenance, should as a minimum accommodate the following:

- Timely patching of potholes to prevent major loss of pavement (monthly);
- Regular cleaning of drainage systems to prevent any blockage leading to overtopping and washout of the highway infrastructure (annually prior to the start of the rainy season and inspection to remove trees and large debris during the rainy season);
- Re-gravelling of shoulders on sealed roads to prevent the sealed surface being undermined (8 to 12 year as periodic maintenance); and
- Re-grading and re-compaction of unsealed roads to restore camber to shed water and maintain 'ride' (annual).

### 5.11.6 Develop local programmes of road infrastructure improvements

**Aim:** To improve road infrastructure across Malawi.

**Description:** This programme should be developed with the participation of both national and district level officials. It should first prioritise improving infrastructure to ensure reliable all-season basic access to areas of social and economic activity with priority given to areas of agricultural production. It should then support a programme of gradual improvements to infrastructure for all modes beyond basic access that:

- Maximises contribution to district level rural social and economic development, rural development and agricultural development plans;
- Is equitable and reflects the needs and priorities of vulnerable groups including women, mobility impaired citizens, and children; and
- Has sufficient capacity and resilience including with regards to climate change, to cater for forecast demand.

### 5.11.7 Develop means of segregating and/or safeguarding NMT in rural areas

**Aim:** To increase road safety and contribute towards maintaining high levels of walking and in some districts cycling.

**Description:** Dedicated walking and cycling infrastructure should be provided as well as related instruments designed to guide the mobility of these users and improve their safety. Improvements to the condition of routes and their maintenance, segregation of NMT users from motorised traffic (by physical barriers or demarcation on a shared carriageway), traffic calming measures for motorised road users, formal pedestrian crossing facilities and the provision of bicycle stands can all contribute towards the development of more favourable environments for walking and cycling. The regulatory and policy framework need to support their introduction, and design guidelines be provided to maximise their impact where implemented.

### 5.11.8 Implement traffic calming measures

**Aim:** To reduce congestion at capacity bottlenecks and improve road safety.

**Description:** A wide range of high- and low-tech traffic calming measures should be introduced in Malawi to make better use of existing infrastructure, improve safety and enhance the environment. Traffic calming measures such as route and right-of-way restrictions, for example, can be applied to alter the direction and movement of traffic, and parking measures designed to improve traffic flow in areas where a lack of restrictions hinder movement. Speed limits and measures to enforce them, such as speed humps, build outs and rumble devices can also be applied to greater effect on Malawi's road network to create smoother driving conditions.

### 5.11.9 Improve public transport infrastructure

**Aim:** To improve the accessibility, security and journey experience of public transport.

**Description:** Public transport infrastructure in Malawi is currently limited in urban but particularly rural areas. There is therefore considerable potential to introduce new infrastructure, and optimise the infrastructure that already exists, to improve public transport. As a minimum bus stops should be provided, traffic calming introduced to improve service reliability, and service information provided at hubs.

### 5.11.10 Encourage kabaza associations that provide training and road safety equipment

**Aim:** Foster safe kabaza service provision.

**Description:** The organisation of public transport operators varies between districts. In some, such as Ntchisi, kabazas are not registered or licensed whereas in others kabaza associations regulate where services are provided and assign drivers to serve specific routes. Associations tend to levy chargers and in return operators are said to receive occasional training, basic safety equipment such as reflective jackets and reflectors, and transport to hospital in the event of a collision. The extent to which these benefits are realised are, however, said to be limited and kabaza operators have expressed demand for more support post registration. It is recommended that all associations are encouraged to provide their members with training and equipment to increase the safety of the services that they provide and therefore to safeguard both the drivers and their passengers.

### 5.11.11 Implement rural transport cost SMS centres

**Aim:** To provide efficient access to details of transport costs associated with the production and distribution of agricultural produce.

**Description:** A transport unit, controlled by a central server, could be strategically placed within districts to provide real-time information regarding the transport costs associated with the inputs and outputs of agricultural production, as well as contact details of related transporters in the area. Real-time information could also be provided regarding costs in other regions of Malawi. This could support planning and encourage competition between transport suppliers thereby driving down costs.

### 5.11.12 Develop a rural transport master plan

**Aim:** To develop a dedicated and holistic vision and strategy for rural transport in Malawi.

**Description:** A comprehensive and standalone multi-modal rural transport master plan should be prepared to complement the NTMP, which has a very limited scope in terms of rural transport. The activities that have informed the development of this the Roads Sub-Sectoral Plan reveal the clear need for a more in-depth targeted review and action plan for the rural transport sub-sector. This would be a sizeable task that would require a detailed profile of rural transport demand, infrastructure and services to be developed, including via a coherent survey and in-depth interviews. Qualitative and quantitative analysis would also need to be undertaken to understand the economic, socio-economic, environmental and social impacts and constraints of the status quo in rural transport and the gains and losses associated with do nothing, do minimum and ambitious levels of intervention. A thorough review would need to be undertaken to determine the adequacy of existing policy, legislation and institutional arrangements to contribute towards addressing rural transport challenges, related international rural transport best practices would need to be reviewed, and planned and proposed rural transport investments identified and developed. These should be conceived in the context of rural accessibility strategies, and transport investment programming and financing proposals should be developed.

## 5.12 Non-motorised transport

### 5.12.1 Introduction

Walking and cycling are healthy, sustainable, economical and non-polluting means of transport. The modal share of walking is already very high and this needs to be sustained. The citizens of Malawi have the right to walk and cycle in safety, while conforming to appropriate regulations, in their pursuit of work and family tasks and in accessing social and economic activities and services.

This NTMP contains very specific proposals for improving infrastructure for cyclists and pedestrians. These are expected to be implemented in the first years of the NTMP. Thereafter, this plan provides the guidance, below, for safe and secure non-motorised transport that is both sustainable, and will lead to lower transport costs.

### 5.12.2 Universal design

Appropriate 'Universal Design' principles should be included in all new and refurbished NMT transport infrastructure. Universal Design principles ensure that there is appropriate pedestrian access everyone, including the elderly, men and women in wheelchairs, people with small children and those with various disabilities, including mobility problems and visual impairment. Universal Design infrastructure includes ramp alternatives to steps, hand-rails where falls would be dangerous, lack of obstructions and clear signs. These features benefit pedestrians of all abilities and have a negligible effect on overall costs when included at the design stage.

### 5.12.3 Safety

Cyclists and pedestrians are the most vulnerable of road users, with no physical protection. Dangerous driving and inadequate infrastructure contribute to safety risks, but so does the unreasonable behaviour of bicyclists and pedestrians. These safety issues will be improved by better enforcement and resource management as well as by education and publicity. Cycling proficiency courses and bicycle riding codes will be encouraged and publicised.

Since many bicycles lack basic safety equipment including reflectors, bells, lights and functioning brakes, the private sector (including bicycle suppliers and commercial enterprises that advertise and sponsor) will be encouraged to develop innovative and imaginative ways of increasing the safety features on bicycles.

### 5.12.4 Roads and road maintenance

The needs of pedestrians and cyclists will be adequately addressed in the planning, implementation, regulation and enforcement of roads and other rural and urban infrastructure.

There is a need to maintain footways and cycleways as well as the roads. This will not only include physical repair and maintenance, but also regular operational maintenance, involving clearing away obstructions, debris and any encroachment.

### 5.12.5 Environment

Walking and cycling cause little environmental pollution. NMT can contribute to healthy lifestyles, and assist in, making reliable and sustainable transport systems.

### 5.12.6 Design

The MoTPW and Roads Authority will review existing standards and prepare relevant codes and manuals that encompass the infrastructure requirements of pedestrians and bicyclists and the best practices to be followed from design to implementation.

All national road designs, and related infrastructure such as bridges, should include a non-motorised transport statement explaining how the needs of pedestrians and cyclists have been incorporated into the designs. This should include a statement as to the adequacy of the hard shoulder width close to trading centres.

All relevant construction and maintenance contracts should require a non-motorised transport statement explaining how the needs of pedestrians and cyclists should be incorporated into the works. The Government will require the relevant bodies to verify that there is compliance with these requirements.

### 5.12.7 Pedestrian crossings

In future, pedestrian crossings will be clearly marked with standard zebra stripes and stop lines. In general, they will be on platforms to emphasise the pedestrian priority of the crossing and to calm traffic speeds. Zebra stripes must be maintained to ensure the markings remain clearly visible. On main roads, appropriate traffic calming infrastructure and rumble strips will precede the crossings. When traffic is heavy, there will be pedestrian islands between traffic lanes. Crossings will be placed in safe and appropriate locations using information derived from local community participation and/or surveys of local behaviour relating to crossing roads.

In order to assist road authorities, the Government will develop and issue guidelines on the standards for pedestrian crossings and incorporate thee in Universal Design principles.

### 5.12.8 Cycleways

All new and upgraded urban and main roads will include consideration of the needs of cyclists and include dedicated cycle lanes when the existing and predicted demand justify this. The relevant city authorities will plan for through cycle routes between high density residential areas and major places of employment / education.

## 5.13 Alternative fuels

### 5.13.1 Fuel and energy security for transport

Malawi's fuel import dependency will increase in the short- to medium-term as demand continues to grow. Currently, Malawi imports 97% of its refined petroleum products and obtains the remaining 3% from locally produced ethanol fuel (National Commission for Science and Technology (NCST), 2011). Malawi is also a price taker in the global oil market, so any international price hike has a direct impact on Malawi's current account and, as seen in the past, a depreciation of Malawi's currency will increase the import bill.

A reduction in Malawi's fuel dependency will have a positive impact on transport costs and prices, a strategic objective of this NTMP.

The costs of transport of the petroleum products from sea ports (Beira, Nacala, Dar es Salaam and Durban), for example, are high. There is limited storage capacity for petroleum products compared to national requirements, and there has been no major expansion in capacity since 1964. There is an over reliance on road freight for fuel haulage, and there has been an increase in the number of road freight tankers, which are often used as storage. There is often a low turn-around of road tankers leading to repossessions by bankers. This puts pressure on high freight rates for fuel, which in turn affects the transport costs of other goods.

NOCMA's strategic fuel reserve initiative which plans to have an additional 60 million litres capacity (around two months demand), with 25 million litres each at Lilongwe and Blantyre, and 10 million litres at Mzuzu. The major consumer of the liquid fuel is the transport sector (89.99%), followed by domestic (5.25%), industry (2.87%), and agriculture (1.9%).

The demand for petrol and diesel is dependent on the growth of vehicle ownership and use, road infrastructure, the price of oil, the future efficiency of vehicles, the growth of alternate modes of transport and the emergence of substitutes like biofuels. Due to the rapid growth of the number of vehicles, the demand for petroleum products will witness a growth in demand and it is expected to rise to approximately 560 million litres by 2030 considering a high output growth (NCST, 2011).

The following strategies need to be considered to secure Malawi's energy supply for transport:

1. Reduce fuel dependency by introducing plug-in hybrid engines;
2. Increase percentage of ethanol petrol blend from 20% to higher levels;
3. Introduce biofuels (as biodiesel or 100% ethanol) and other technologies;
4. Introduction of electric vehicles;
5. Fiscal incentives such as duty free importation of hybrid vehicles;
6. The Government procurement of hybrid vehicles for its fleet; and
7. Legislation on compulsory blending of fuel.

Parallel strategies to be explored include enlarging the use of domestic energy resources through promotion of renewable energy projects such as increased use of solar to generate electricity; continuing with the development of Malawi's power sector by the optimal way, minimising the environmental impacts and expected investment and operational costs; and accelerate energy conservation and efficiency including development of technical personnel and energy efficient technologies.

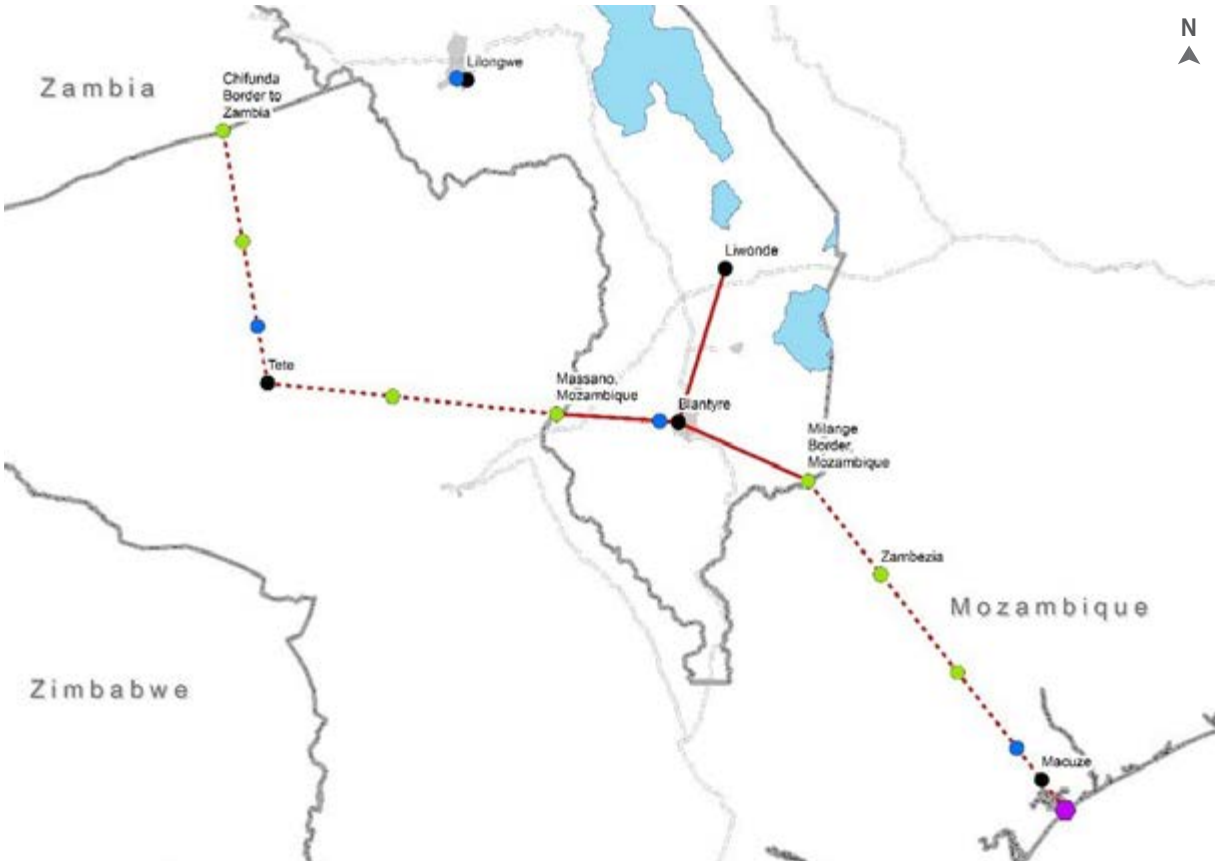
### 5.13.2 Pipeline exploration

Transport of alternative fuels for transport such a liquid petroleum gas (LPG) is most efficiently done via a pipeline. In 2013, Sub-Saharan Regional Pipeline Corporation (SSRPC) proposed a pipeline project to import fuel from the Macuze Port in Mozambique to hinterland countries including Malawi[26]. The first segment of the project, shown in Figure 5.30, includes the construction of an 812 km fuel pipeline from Macuze Port in Mozambique to Blantyre, across to Tete and on to Chifundu, Zambia. The 500 cubic metre per month capacity pipeline is estimated to cost US$1.9 billion, including the cost of pump stations and storage tanks. The second segment is to extend the pipeline to Serenje in Zambia, Mokambo and Tshinsenda in the Democratic Republic of the Congo (DRC), to Fitwaole in Zambia and finally to Lubumbashi and Tenke-Fungurume in the DRC at a cost of US$2.3 billion.

SSRPC proposes developing the project on a Build-Operate-Transfer model, and for the Government of each country to hold a 51% stake in the pipeline segment running through their territory.

*26 http://zitamar.com/mystery-firm-promotes-moz-malawi-zambia-congo-fuel-pipeline/.*

### Figure 5.30 Layout of phase one of the SSRPC pipeline




**Legend**

- Malawi
- Mozambique
- Onshore connection at Macuze
- Intermediate station pumps
- Main station pumps
- Terminals
- Railway network

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Government of Malawi

**Project:**

National Transport Master Plan

**Figure 5.31 Typical LPG supply chain**

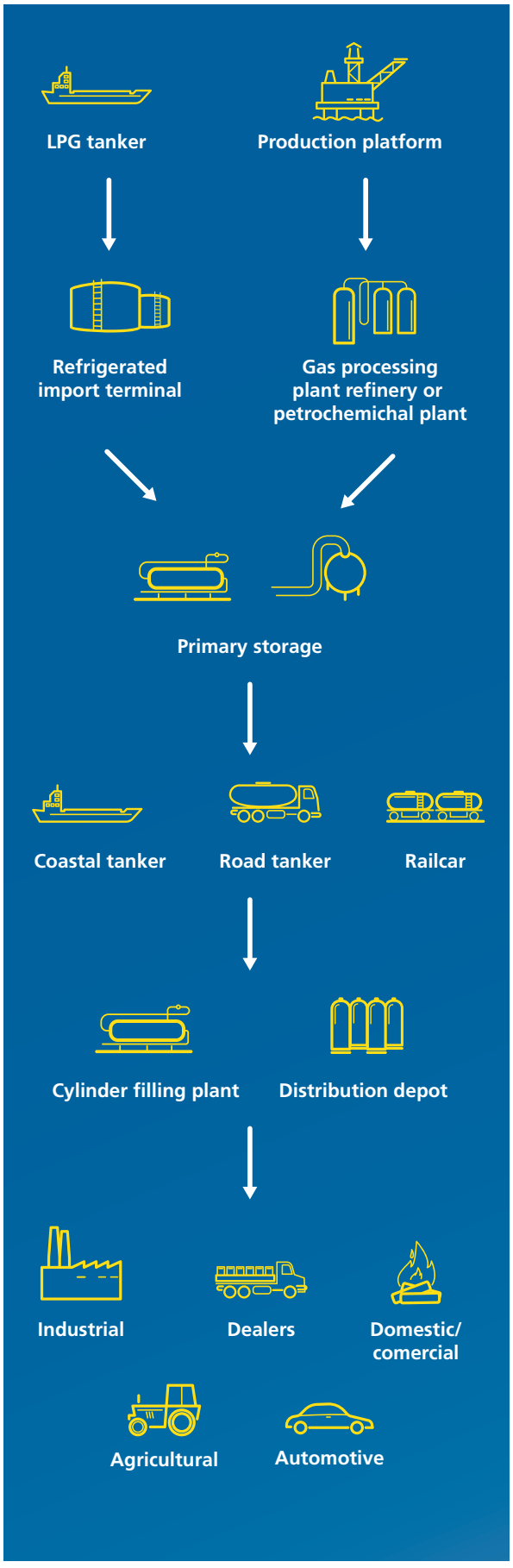



Figure 5.31 depicts a typical oil / gas supply chain. The Government of Malawi should consider the further development of existing pipeline projects like the SSRPC initiative. And in regard to this particular proposal, the Government of Malawi may see feasibility in prolonging transportation of the fuel or gas via existing railway from the Blantyre terminal to Lilongwe.

Generally, pipeline networks are composed of several pieces of equipment that operate together to move products from location to location. The main elements of a pipeline system are:

- **Initial injection station:** Known also as "supply" or "inlet" station, is the beginning of the system, where the product is injected into the line. Storage facilities, pumps or compressors are usually located at these locations.
- **Compressor/pump stations:** Pumps for liquid pipelines and compressors for gas pipelines, are located along the line to move the product through the pipeline.
- **Partial delivery station:** Known also as "intermediate stations", these facilities allow the pipeline operator to deliver part of the product being transported.
- **Block valve station:** These are the first line of protection for pipelines. With these valves the operator can isolate any segment of the line for maintenance work or isolate a rupture or leak. Block valve stations are usually located every 20 to 30 miles (48 km), depending on the type of pipeline. Even though it is not a design rule, it is a very usual practice in liquid pipelines. The location of these stations depends exclusively on the nature of the product being transported, the trajectory of the pipeline and/or the operational conditions of the line.
- **Regulator station:** This is a special type of valve station, where the operator can release some of the pressure from the line. Regulators are usually located at the downhill side of a peak.
- **Final delivery station:** Known also as "outlet" stations or terminals, this is where the product will be distributed to the consumer. It could be a tank terminal for liquid pipelines or a connection to a distribution network for gas pipelines.

### 5.13.3 Electric vehicles

A number of major vehicle manufacturers are moving to mass production of electric vehicles. It is likely that by 2025, 50% of all new vehicles being produced will have electric motors. Hence within the NTMP period, a high proportion of second hand vehicles will be electric. Malawi needs to take advantage of this change and realise the benefits that will result. Apart from being lower polluting, electric motive force is cheaper than petroleum, and does not incur the transport cost that liquid fuel requires.

Electricity demand forecasts need to take account of the change to and growth in electric vehicles. The Ministry of Transport and Public Works should take the lead in assessing future demand, and determine the need for charging stations, or whether electric batteries will be able to be charged domestically in ten years' time. Fiscal measures should be introduced at the right time to foster the import of elective vehicles as opposed to petroleum driven cars.

## 5.14 Regional transport corridors

As a landlocked country, Malawi is heavily dependent on regional transport corridors across southern and eastern Africa for the movement of imports and exports. These corridors are central to improving physical connectivity between Malawi and its neighbours, and boosting trade across Africa. They act not just as conduits to movement and integration, but also as engines of regional and local economic development[27].

In order to meaningfully achieve the NTMP's strategic objective of enhancing passenger and freight transport systems explicit consideration must therefore be given to regional transport corridors.

In this context the development of this NTMP was informed by meetings with stakeholders in all neighbouring countries.

Many International Finance Institutions (IFIs) now consider transport corridors as the core strategy for supporting regional integration processes across Africa.

A functional corridor in this context requires:

- A collection of routes, some of them with more than one mode of transport, linking several economic centres, countries and ports;
- A strategy which integrates investment in infrastructure and services;
- Trade potential, and the ability to exploit this, between key nodes; and
- Policy and regulatory frameworks which have the objective of overcoming impediments to the efficient movement of traffic and which minimising hurdles to such movements.

The Establishment of Corridor Management Institutions (CMIs), such as SADC's concept of Regional Corridor Committees, are being increasingly supported by Government's, public agencies and various economic operators in the constituent states to promote efficiency, integrity and inclusiveness of movement.

There are three main regional corridors which serve and pass through in Malawi, as set out in Table 5.23 and described below.

*27 Discussion on the role of "economic corridors" has intensified over the recent years. The economic corridor approach looks at regional transport routes not only as a means of transporting goods and services or as a gateway for landlocked countries but also as a tool for stimulating social and economic development in the areas surrounding the corridor.*

**Table 5.23 Regional transport corridors in Malawi**

| Corridor | Participating States | Corridor Management Institution |
|---|---|---|
| Mtwara Corridor | Tanzania, Mozambique, Malawi and Zambia | No |
| Nacala Corridor | Mozambique, Malawi and Zambia | Tripartite Agreement signed by Malawi, Zambia and Mozambique in 2010. |
| North – South Corridor<br><br>Split into Dar-es-Salaam Corridor and Durban Corridor | South Africa, Botswana, Zimbabwe, Zambia, Malawi, Tanzania and Democratic Republic of Congo | Dar es Salaam Corridor Committee Agreement signed by Zambia, Malawi, and Tanzania |

### 5.14.1 Mtwara Corridor

The Mtwara Transport Corridor comprises Mtwara Port on the Indian Ocean and runs westwards through Masasi, Tunduru, Namtumbo, Songea and Mbinga to Mbamba Bay on the shores of Lake Malawi. The corridor crosses Lake Malawi to Nkhata Bay in Malawi and continues through Mzuzu and southwards on the Great North-South Corridor to the border with Zambia, linking with the Nacala Corridor at Chipata. A section of the corridor runs southwards from Mangaka to the border with Mozambique over the Unity Bridge to Mueda and links with the Pemba-Montepuez-Lichinga Corridor in northern Mozambique. The zone of influence of the Mtwara Port therefore covers large areas of southern Tanzania, northern Mozambique, northern Malawi and eastern Zambia.

Major mining projects to be developed in the Mtwara Development Zone include coal, iron ore, titanium and vanadium mining, hydro-electric generation, development of gas reserves. Deposits of gold, graphite, limestone, marble and uranium have been reported. Prospecting for these depends on a transport system that can support delivery of the required equipment in remote areas, as well as extraction of the prospected resources.

There is currently cross-border trade between Mozambique, Tanzania, Malawi and Zambia amounting to over US$60 million dominated by agricultural products like maize, sugar, fish and vegetables. Other goods include clothing, soft drinks, beer, vehicle spare parts, cosmetics and electrical and kitchenware.

The economic benefits expected through the development of the corridor are increased trading activity in the Mtwara Development Zone following improvements of the road system and border processes in the zone of influence. It is also anticipated that improvements to the road network shall enable increased prospecting in this mineral rich region and potential for export through the Mtwara Port which is also undergoing upgrading by the Tanzania Ports Authority. Improved trade facilitation measures shall result in reduced time and costs for transit traffic, thereby boosting trading activities across the border.

**Figure 5.32 Mtwara Corridor**

## 5.14.2 Nacala Corridor

The Nacala Road Corridor is one of the important trade corridors in southern Africa and its development is critical to enhancing regional and international trade competitiveness particularly for landlocked countries such as Malawi and Zambia. In recognition of the above, the SADC Secretariat has included the development of the Nacala Road Corridor in its Regional Master Plan (2012 to 2027).

The road and rail transport infrastructure along the corridor is considered as "anchor infrastructure" along which spatial development in other economic sub-sectors can develop, such as energy, mining, agriculture, agro-forestry, fisheries, and tourism. To operationalise this concept, Malawi, Mozambique and Zambia, with support from SADC, have signed a tripartite Spatial Development Initiative (SDI) agreement for the Nacala Transport Corridor with the aim of working jointly to package and develop economic projects to enhance national and regional economic integration and growth.

The corridor benefits from on-going trade and transport facilitation projects being implemented in Malawi and Mozambique, namely: the current on-going expansion and improvement of the Nacala Port to improve efficiency and cargo dwell-time; and the "Doing Business" reform programmes in Malawi and Zambia, which involve improvements in the trading process and upgrading of the customs information system and implementation of a National Single Window.

In addition to the above mentioned projects, AfDB, EU and EIB are financing road improvements from Luangwa Bridge to the border between Malawi and Zambia at Mwami. Similarly, in Mozambique, the AfDB, JICA, and Korea Exim Bank are co-financing sections of the road from Nampula to Lichinga through Chiponde, the border between Malawi and Mozambique.

**Figure 5.33 Nacala Corridor**

## 5.14.3 North – South (Dar es Salaam) Corridor

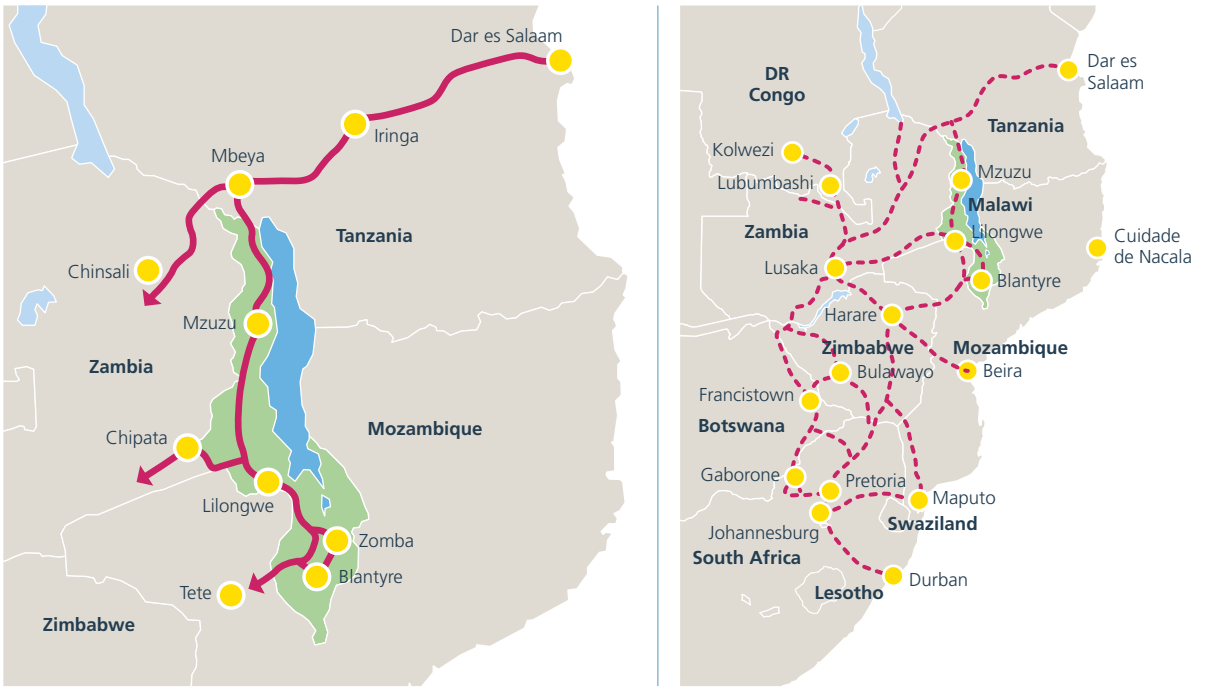
The North-South Corridor links the port of Durban to DR Congo and Zambia and has spurs linking the Port of Dar es Salaam and the Copperbelt and Durban to Malawi (Figure 5.34). The countries covered are Botswana, Democratic Republic of Congo, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe, with a road network of 8,599 km in these seven countries.

The COMESA-EAC-SADC Tripartite is leading this programme with the intention of speeding up the flow of traded goods, thereby reducing the transactions costs of cross-border trade. The programme represents an innovative approach to supporting and developing physical infrastructure, while also addressing trade facilitation and regulatory needs and deficiencies along the corridor in a coherent and holistic manner.

Mechanisms have been put in place to improve donor co-ordination and cooperation through the establishment of the Tripartite Trust Account and the Friends of the Tripartite - a forum of donors and international cooperating partners, which meets regularly, under the leadership of DFID. A pipeline of priority projects has been developed and resources, including technical assistance, have been made available to accelerate project preparation. The Tripartite has also established a dedicated Project Preparation and Implementation Unit to oversee this work.

The M1 road is a backbone of Malawi road network and provides an important link in the regional North-South Corridor, connecting the Port of Dar es Salaam with the Malawi economic centers of Lilongwe and Blantyre as well as Mzuzu on the border with Mozambique. It supports regional trade and tourism with Mozambique in the south, Tanzania and Zambia to the west and north, and with the wider SADC region.

**Figure 5.34 North South Corridor**




Left within Malawi; Right whole corridor

### 5.14.4 Proposed corridor projects

Table 5.24 lists the projects proposed for the main corridors.

**Table 5.24 Corridor projects**

| Mode | From/To | Corridor | Intervention | Status |
|---|---|---|---|---|
| Road, M1 | Karonga-Songwe | North-South | Rehabilitation and safety initiatives | Ongoing |
| Road, M5 | Mzuzu-Nkhata Bay | Mtwara | Rehabilitation | Ongoing |
| Road, M12 | Lilongwe-Mchinji | Nacala, Mtwara, North-South | Provision of cycle lanes and capacity increase | Proposed |
| Road, M6 | Blantyre-Mwanza | North-South | Provision of cycle lanes and capacity increase | Proposed |
| Road, M1 | Mponela-Lilongwe | North-South, Mtwara | Provision of cycle lanes and capacity increase | Proposed |
| Road, M1 | Lilongwe-Blantyre | North-South | Provision of cycle lanes and capacity increase | Proposed |
| Road | Lilongwe bypasses | North-South, Mtwara | New roads | Proposed |
| Road, M1 | Songwe-Blantyre | North-South, Nacala, Mtwara | Dualling | Proposed |
| Inland Water | Nkhata Bay-Mbamba Bay | Mtwara | Provision of roll-on roll-off ferry service | Proposed |
| Inland Water | Liwonde | Nacala | Wet port and freight services | Proposed |
| Inland Water | Chilumba-Chipoka | North-South | Freight Service | Proposed |
| Rail | Mbeya-Chilumba | North-South | New rail line | Proposed |
| Rail | Nacala | Nacala | Rail Freight User Group | Proposed |
| Rail | Beira to Malawi | North-South | New rail options | Proposed |

### 5.14.5 Corridor Management Institutions

Transport corridors require an appropriate management system and framework to ensure that the corridor expectations are being achieved across borders. To this end, corridor Management Institutions (CMIs) have been established for the North-South Corridor, but are not yet established for the Mtwara and Nacala corridors. The NTMP proposes that trans-national institutional arrangements should now be established for all three corridors.

The establishment of an autonomous CMI is designed to improve corridor infrastructure management, performance and contribute to reducing transport costs and delays. CMIs can play a co-ordination, as well as an advisory, role to both to the Regional Economic Communities (RECs) such as SADC and COMESA, as well as individual corridor member states with regards to the implementation of strategic transport objectives, including trans-national infrastructure investment, regional integration and harmonisation of standards.

In terms of efficiency, CMIs are generally more technical and focused than transport units within the RECs which generally lack staffing and mandate, and, with dedicated resourcing, tend to be stronger on skills and capacity. They also have less bureaucratic and more autonomous structures, geared to outcomes.

When establishing a CMI, it is important to prescribe its coverage, infrastructure facilities, and broad challenges and to ensure stakeholder support. The following provides an additional checklist of activities to be undertaken:

- Mapping of the corridor over its entire geographical coverage showing its infrastructure facilities;
- Surveys and forecasts of the traffic, and conditions, passing through the Corridor;
- Determination of the mandate of the CMI given by the scope of services and a clear definition of issues and challenges to be addressed; and
- Advocacy and consultation with policy makers at the Government level, and non-government stakeholders, in participating states to obtain ownership, willingness and active support.

**The establishment of an autonomous CMI is designed to improve corridor infrastructure management, performance and contribute towards reducing transport costs and delays.**

Transport corridor management systems deployed by CMIs should focus on trade and transport facilitation by carrying out the following functions:

- Monitoring the state of physical infrastructure covering ports, roads, railways, inland terminals, and border posts, identifying gaps, weaknesses and bottlenecks;
- Monitoring the compliance with the implementation of corridor agreed trade and transport facilitation instruments;
- Establishing appropriate databases (transport observatories) and preparing and disseminating information based on agreed Key Performance Indicators;
- Trans-national resource mobilisation for corridor programmes;
- Facilitating capacity building for both policy makers, oversight agencies, service providers, economic operators and corridor neighboring communities;
- Promotion and support to research and studies on issues relevant to improving corridor performance, based on clear evidence and structured decision making; and
- Undertaking advocacy functions for the Corridor to promote its use and supporting investment.

Appendix B provides further details on establishing CMI's.

## 5.14.6 Border crossings

### 5.14.6.1 General

Border crossings are a major obstacle to trade and transport as they involve the repetition of controls, of procedures and documentary requirements. Organising border posts in such a way that processes which currently required twice (exit of one country and entry of the other) can be accommodated in one set of procedures. The One Stop Border Post (OSBP) concept is now a common feature on agendas of regional communities and countries aiming to facilitate trade and regional integration.

The implementation of OSBP requires a combination of actions to achieve the expected results. There is a range of interventions of various control authorities with a different mandate and focus, namely:

- Customs;
- Police;
- Immigration;
- Transport;
- Sanitary, veterinary; and
- Quality and technical.

### 5.14.6.2 OSBP models

In general, OSBP are represented under mainly three different types, all aimed at allowing persons and goods to stop only once at a given border.

Under a common facility on one territory:

- The OSBP is located on the territory of only one of the two countries; and
- Control procedures for both countries are carried out at only one place in each direction.

The model can provide a simplified system for users, whilst authorities of both countries still carry out all their respective checks and controls.

In a juxtaposed border post a customer will stop only once and controls will be performed only once by the authorities of only one country which will act on behalf of the other country's authorities.

A juxtaposed border post is the most efficient model, but requires careful negotiation to operationalise such a model.

A Straddle Border Post facility is established exactly on the border, with each country's control authorities operating the part of the facilities located on their territory. This model can contribute to facilitating border processing activities but requires efforts in terms of co-ordination of controls between authorities of both countries in order to realise decreases in processing times.

### 5.14.6.3 Conditions for establishing OSBPs

The Governments of neighbouring countries concerned must be committed to the OSBP concept. The level of commitment tends to vary with the type of OSBP to be implemented. Such a commitment is required in terms of:

- Design and implementation of a OSBP; and
- Joint or co-ordinated operations.

The two Governments have therefore to commit to:

- Enforcing the original decision to proceed;
- Arranging for the land acquisition and connected legal status;
- Sourcing financing;
- Organising the various national authorities to cooperate and exchange information, and, if not, delegate to one leading agency some power and responsibilities; and
- Ensuring that these national authorities on both sides cooperate and co-ordinate their efforts and activities together.

### 5.14.6.4 Enabling legal framework

An enabling legal environment should aim to cover:

- The location, ownership of the land and sovereignty recognition;
- The establishment of a joint management committee;
- The freedoms of respective control authorities to access and act on respective territories (in the limits of the facilities);
- Security arrangements;
- Access arrangements of both countries to the facilities;
- Co-ordination mechanisms to be put in place;
- Mutual recognition of controls;
- Sharing of data and notification of special situations; and
- Criteria and conditions for private service providers to be located within the facilities.


#### 5.14.6.5 **Improving procedures**

The UN International Convention on Harmonization of Frontier control of goods (1982) can contribute to facilitating trade and transport through the promotion of key best practices to ease border crossings through the following principles:

- Limit as much as possible the number and extend of controls at borders and rely on controls at departure and destination;
- Use internationally recognised certification to avoid duplication of controls such as:
  - International Weighing certificate that is issued at the first weighing station and is recognised en-route avoiding new weighing of vehicles unless an irregularity is suspected. This can be implemented through RECs' instruments without difficulty; and
  - International Technical inspection certificate of vehicles that can reduce technical controls of vehicle at borders; and
- Organise priority treatment at borders of certain transport such as live animals, perishable food stuffs, and hazardous goods, based on harmonised practices.

Border crossing procedures can also be facilitated through:

- Mutual recognition of transport documents (consignment notes) to ensure that the international consignment note established at departure is valid for the entire journey until the destination thus avoiding recourse at borders for any national transport document;
- Mutual recognition of regional transit documents and guarantees to avoid the carrying out at borders of unnecessary customs formalities; and
- Development of interconnection of customs systems and exchange of data which contributes through advanced cargo information for example to accelerate the border processing time while enhancing security of trade through advanced risk assessment and analysis.

#### 5.14.6.6 **Proposed OSBP's**

Malawi and Tanzania are at an advanced stage in establishing an OSBP at Songwe/Kasumulu. An MoU was signed in 2016 and consultants have been engaged to carry out a feasibility study and detailed engineering design, with financial support from the World Bank.

Five further crossings are priorities for OSBP's at: Muloza, Mchinji, Dedza, Chiponde and Mwanza. MoU's have been drafted for these, and support is scheduled from the AfDB and World Bank.

In order to assist the transport of goods by rail an OSBP should be established at the Nayuchi-Entre-Lagos border. Alternatively, import cargo should be cleared at Nkaya only.

A further OSBP should then be constructed at Marka.

### 5.14.7 Malawi Cargo Centres Limited

Malawi Cargo Centres Limited (MCCL) is a dry port located in Tanzania with branches in Mbeya and Dar es Salaam. It was commissioned by the Government of Malawi in 1987 under a lease agreement. It was established as a result of civil war in Mozambique with a goal to fully utilise the Port of Dar es Salaam. It was an important part of the northern corridor linking Lake Malawi traffic via Chilumba and Mbeya to Dar, with the specific objective of emphasising mass transport by catalysing the use of rail and minimising the use of road.

Malawian fuel imports through MCCL was halted in 2012, when importers were set free to import using any route. More recently the NOCMA has set a quota of 30% of all fuel imports to be via Dar.

MCCL has a number of fixed assets. At Dar es Salaam: 22 tank wagons with 11 Petrol tank wagons; 11 Diesel tank wagons; a petrol tank of 8 million litres, a diesel tank of 12 million litres, warehouse, crane, forklifts and conveyors. At Mbeya: a petrol tank of 1.4 million litres; and a diesel tank of 2.5 million litres (inclusive of diesel-converted paraffin tank of 400,000 litres), warehouse and crane.

To some extent the original purpose of MCCL has been lost, as transporters now have much more choice regarding ports, with Beira and Durban being favoured over Dar. The response to this by MCCL has had little impact, largely attributed to port charges at Dar and inefficiencies on the TAZARA railway. It is proposed to move to making MCCL a Government of Malawi concession, as opposed to the current lease arrangement. This will mean that MCCL will be required to sustain itself against targets, with an expectation that the Government will increase its revenue. However, such an arrangement goes against the Government policy of being involved in service provision. The only reason for continuing MCCL's operations under a Government of Malawi umbrella is to allow for a strategic alternative port should civil unrest erupt again in Mozambique.

Traffic from Malawi using the port of Walvis Bay has increased by 50% in the last year. The Government of Namibia may offer land for a dry port, and this should be further explored.

## 5.15 Responding to climate change

### 5.15.1 Overview

Reliable, efficient and safe transport infrastructure underpins sustainable economic and social development. Climate change can have significant implications for transport infrastructure as transport assets typically have long operational lifetimes that can span decades. At the same time investments and planning for low carbon transport and resilient infrastructure and services are vital to successfully manage the growth of greenhouse gas (GHG) emissions from the transport sector and to adapt to climate change. The growth of GHG emissions can be managed by adopting a strategic approach, as incorporated in this NTMP, that supports the maintenance of sustainable travel behaviours, such as walking and cycling, and reduces the need to travel using motorised transport, and particularly via private motorised modes. It should also support a shift of demand from relatively high carbon intensive modes, such as road to rail and inland water transport, and facilitate a reduction in GHG emissions by improving the energy efficiency of vehicles used on all modes. Resilience can be achieved by considering the location, design, build and operation of the asset with respect to a changing climate. As outlined in this NTMP, this can be achieved by taking a concerted approach to climate change mitigation and adaptation as part of normal planning, design and appraisal and operation and maintenance regimes. Ideally this is undertaken at an early stage in the project process to avoid, as far as possible 'end of pipe' climate change mitigation and adaptation measures that are added at a late stage, as these are often costlier and less effective.

The NTMP projects and programmes have been fully costed and resourced. The development of climate resilience infrastructure is expected to increase the total capital cost of these projects by between 5% and 20%[28]. The benefit of such investment in adaptation are however expected to significantly outweigh the level of investment. Modelling of the benefits of undertaking adaptation at a global level identifies cost benefit ratios of 1.7 to 2.7 depending on the discount rate and scenario[29].

*28 IIED (2009) Assessing the costs of adaptation to climate change A review of the UNFCCC and other recent estimates.*

*29 AfDB (2011) The Cost of Adaptation to Climate Change in Africa.*

In some cases, the required investment in climate change adaptation measures (structural or non-structural) will be cost neutral or even negative, representing CAPEX and OPEX savings through the selection of alternatives.

The cost effectiveness of a mitigation and adaptation measures will be project specific. This highlights the importance of comprehensive, quantitative and the integrated assessment of GHG management and climate risk in support of the planning, design, assessment and operation of these projects. The following section outlines recommendations for strategic actions to respond to the opportunity to build the environmental sustainability of the transport sector by mainstreaming the consideration of climate change mitigation and risk into project and programme development.

## 5.15.2 Strategic actions

### 5.15.2.1 Statutory requirement for Climate Risk and Vulnerability Assessment for all NTMP projects and programmes

The NTMP has identified 165 projects and programmes of varying sub-sectors, types and sizes that should be implemented between now and 2036 to deliver the vision and objectives. The implementation of these projects and programmes will aid Malawi in achieving a sustainable transport sector and support national economic, social and environmental development.

Some of these projects and programmes will directly contribute to climate change mitigation and resilience, such as the initiatives that will work to meet the NTMP objectives of facilitating a modal shift from road to rail and inland water transport, and of increasing citizens' access to all-weather roads. As well as direct climate change mitigation and adaptation projects and programmes, the consideration of climate change risk needs to be mainstreamed into the planning and development of NTMP projects and programmes. Appendix C summarises typical climate impacts and adaptation measures for different aspects of transport infrastructure in Malawi.

The NTMP recommends that the requirement for Environmental and Social Impact Assessment (ESIA) and Strategic Environmental Assessments (SEA) is statutory. In line with this, it is also recommended that there is a statutory requirement for an integrated Climate Risk and Vulnerability Assessment (CRVA) to be carried out for each project and programme. All transport infrastructure designs and relevant construction and maintenance contracts should include a CRVA explaining how climate (change) risks have been identified, quantitatively appraised and addressed through either structural or non-structural measures. A CRVA should therefore form a key requirement of the scope of work or terms of reference for their planning and development. The preparation and implementation monitoring of CRVA's should be done by an external body, preferably NEMA.

**The NTMP has identified 165 projects and programmes of varying sub-sectors, types and sizes that should be implemented between now and 2036 to deliver the vision and objectives.**

### 5.15.2.2 Revision of technical standards and guidelines to consider climate change

Adaptation will consist not just of 'hard' engineering solutions such as paving roads and irrigation but also 'soft' measures such as transportation operation and maintenance and the development of new design standards.

Current design standards for transport infrastructure do not take full account of climate risk and climate change adaptation. The development and revision of technical standards, specifications and guidance in response to the NTMP also provides the opportunity to incorporate the consideration of extreme weather and climate change tailored to the Malawian context as part of the 'Universal Design' principles.

This process should be supported by the development of tools and resources to ensure that adaptation to climate change is considered in a systematic way when the new standards are developed. These revised standards will then need to be enforced by an independent regulator, such as the proposed new National Surface Transport Authority (NSTA), to ensure that transport networks comply with technical and legal requirements.


### 5.15.2.3 Mainstreaming climate risk into transport plans and their implementation

Adequate road maintenance is the most critical and most efficient way of reducing the impact of a changing climate on transport systems. In the absence of an adequate maintenance regime, the damage caused by climatic events are exacerbated. The NTMP proposes the establishment of a road maintenance programme comprising routine and periodic maintenance, should as a minimum accommodate the following:

1. Timely patching of potholes to prevent major loss of pavement (monthly);
2. Regular cleaning of drainage systems to prevent any blockage leading to overtopping and washout of the highway infrastructure (annually prior to the start of rainy season and inspection to remove trees and large debris during the rainy season);
3. Re-gravelling of shoulders on sealed roads to prevent the sealed surface being undermined (8 to 12 year as periodic maintenance); and
4. Re-grading and re-compaction of unsealed roads to restore camber to shed water and maintain 'ride'.

The NTMP recommends that CEAR develops a media plan and liaise with the National Public Radio and other media over publicity regarding scheduled and unscheduled changes to the rail timetable or its operation. This initiative should be expanded to cover all transport sectors and include information from early warning systems for extreme weather, provided by the Ministry of Natural Resources, Energy and Environment.

Within the NTMP a long-term transport strategy for each district and a shorter-term three-year costed implementation plan for maintenance and improvement measures by mode/network is proposed.

These maintenance and improvement strategies and plans also need to take account of the risks posed by extreme weather events and a changing climate in terms of:

1. Underpinning the efficiency and effectiveness of incorporated climate change adaptation measures;
2. Taking preventative action to climate risks;
3. Emergency planning for extreme weather;
4. Monitoring and evaluation of asset resilience to inform climate change adaptation decision-making; and
5. The incorporation of adaptation measures to existing assets during planned maintenance and repairs.

The NTMP also recommends that Central East African Railways Limited (CEAR) develops a media plan and liaise with National Public Radio and other media over publicity regarding scheduled and unscheduled changes to the rail timetable or its operation. This initiative should be expanded to cover all transport sectors and include information from early warning systems for extreme weather, provided by the Ministry of Natural Resources, Energy and Environment.

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- Taking preventative action to climate risks;
- Emergency planning for extreme weather;
- Monitoring and evaluation of asset resilience to inform climate change adaptation decision-making; and
- The incorporation of adaptation measures to existing assets during planned maintenance and repairs.

#### 5.15.2.4 Develop and maintain a list of critical transport infrastructure vulnerable to climate change

The resilience of critical transport-related infrastructure (e.g. motorways, trunk and local roads, railways, signalling systems, bridges, tunnels etc.) to extreme weather and climate change is a key challenge for the Government and society. The NTMP recognises the susceptibility of transport-related infrastructure assets to climate change and extreme weather whilst also highlighting the need to improve resilience to climate change impacts.

The development and maintenance of a list of critical transport-related infrastructure assets that are vulnerable to climate (change) impacts is essential. The list, as well as a more robust understanding of the nature of the vulnerability of specific assets, can then be used to inform existing infrastructure asset, network and system planning (such as investment and emergency planning) and processes (i.e. design, risk assessments and operation).

In order to maintain an accurate list of critical infrastructure-related assets, frequent monitoring and evaluation would be required; this may pose a problem for the Government departments and institutions with limited budgets and capacity to explore issues and to identify risks. Prioritisation of these lists would therefore be recommended.

#### 5.15.2.5 Develop a clear pipeline of bankable transport sector climate change mitigation and adaptation initiatives

A clear pipeline of climate change mitigation and adaptation projects and project specific measures for NTMP projects and programmes should be developed. These should be supported by a business case, which quantitively (to the extent possible) demonstrates the direct and wider costs and benefits of climate change mitigation and adaptation to inform investment decision-making. Bankability in the context of climate change mitigation and adaptation goes beyond the determination of financial returns and profitability for an investor, to encompassing socioeconomic and social metrics, including, risk and vulnerability reduction, improvements in the resilience of communities, and/or alignment with national priorities.

#### 5.15.2.6 Present cost of implementing climate change mitigation and options as part of NTMP funding envelope

US$17.5 million has been earmarked for advancing gender equality and environmental sustainability as part of its implementation. A similar process should be carried out for climate change mitigation and whereby the required investment is calculated and ringfenced. Not taking account of the climate change mitigation and adaptation measures already incorporated within the proposed NTMP projects and programmes, the total required investment is estimated to be between US$0.437 billion and US$1.748 billion for adaptation measures alone. It is, however, worth noting that such investment is expected to have a cost benefit ratio of between 1.7 to 2.7.

#### 5.15.2.7 Raise awareness on climate finance

For Malawi to mobilise the scale of resources to meet the transport sector's climate change mitigation and needs, the country needs to consider the full spectrum of funding sources and their requirements; as well as the different mechanisms and the extent to which they can be combined. Successfully accessing resources from these funds depends on a good understanding of the funder's perspective and procedures as well as the bankability of projects.

#### 5.15.2.8 Establish/identify a lead unit within the MoTPW and in other relevant institutions, responsible for co-ordinating issues on climate change and transport

The availability of sufficient, well equipped and motivated personnel is one of the prerequisites for translating the climate change mitigation and adaptation objectives of the NTMP into action. A sufficient headcount of qualified staff for the task at hand is important to ensure those appointed are not thinly spread across too many issues. The climate change skills and performance of MoTPW staff both individually and collectively need to be enhanced to ensure the transport agenda is embedded in the national climate policy process cycle, while at the same time providing support for the interdependent functions necessary for efficient implementation.

The establishment of a Focal Point/dedicated teams to facilitate the drive for climate change mitigation and adaptation action within:

- The MoTPW – such as the identification of desk officers within key departments;
- Key line ministries;
- Universities and other research institutions;
- Non-governmental organisations; and
- The private sector.

The proposed individuals/teams will be responsible for liaising with the Ministry of Environment, which serves as Malawi's Focal Point for the UNFCCC and wider engagement on climate finance. A proposed transport climate unit within the MoTPW should also interface with the Department of Climate Change and Meteorological Services (DCCM). They would also be responsible for networking and cooperating with the relevant stakeholders externally as well as ensuring actions are implemented internally within the transport sector.

Building on the transport sector institutional reform agenda by the Government of Malawi, the NTMP has proposed the following for the MoTPW:

- An Inter-Ministerial National Transport Committee;
- Officer Working Group;
- Thematic Working Groups and Secretariat (located within MoTPW); and
- Review and restructuring of divisions and departments along functions and tier, streamlining, professionalisation and capacity building to create a modern and effective Ministry.

The NTMP is also proposing for the National Transport Committee (NTC) arrangements to be formalised and that the Committee itself and the supporting National Transport Officer Working Group (NTOG) and Secretariat develop appropriate standing orders and operating procedures in due course. It is important for the relevant government representatives on climate change to be included as a core members of both the NTC and NTOG, and for one of the thematic working groups to be focused on climate change.

#### 5.15.2.9 Identify capacity needs and ensure staff and relevant stakeholders undertake well-designed training sessions, capacity building programmes and workshops on transport and climate change

A country specific capacity needs assessment should be carried out for both climate-specific and climate-relevant capacities that are required to ensure Malawi's transport sector is resilient to climate change. This will help determine the appropriate training and capacity plans to be designed such that the MoTPW is well equipped with the appropriate human resources and skill sets to implement the potential mitigation and adaptation options to be identified for the NTMP projects, following their proposed CRVAs.

Adequate resources to cover the required climate change training programmes for staff need to be set aside. It is also vital that sufficient time is made available for staff to participate in these training programmes, digest the information received and more importantly apply/ put into practice what has been learnt to effect climate action in the transport sector.

Training should be consistent and carried out systematically over the period of the NTMP implementation with integrated feedback loops.

Climate change mitigation and adaptation should be integrated, to the extent possible, in all planned training and capacity building programmes being conducted by the MoTPW. In terms of adaptation, for example, the NTMP proposes that the MoTPW and the Ministry of Local Government and Rural Development (MoLGRD) jointly support a process of training, capacity building and technical and logistical support to Districts to improve their ability to:

- Prepare a robust and effective district Transport Infrastructure and Management Plan (DTIMP); and
- Deliver transport interventions using the funding allocated.

Workshops and training sessions should be carried out for both transport and climate change experts in concerned line ministries and departments such as the MoTPW, Department of Environmental Affairs (DEA), Department of Climate Change and Meteorological Services (DCCMS), Department of Disaster Management Affairs (DoDMA), local municipalities as well as the private sector. A specific example of a training session could be on the revised technical standards and guidelines that have incorporated climate change considerations to relevant stakeholders including municipalities and private sector.

#### 5.15.2.10 Develop MoTPW's readiness to access climate finance

Building the capacity of the MoTPW to access climate finance is of paramount importance, in ensuring the required resources are accessed for the implementation of climate mitigation and adaptation measures identified for the NTMP projects and programmes. Climate finance resources are channelled through an increasing number of international and regional funds, and via various financing mechanisms, hence accessing them can be a complex and onerous process.

Working in partnership with the DEA and DCCM, the MoTPW will need to build capacity across the following areas for climate finance readiness, including but not limited to:

- The identification of relevant funding sources and priorities;
- Financing options;
- Modes of access and spending rules;
- Transport sector climate change mitigation and adaptation pipeline development;
- Absorption of additional climate finance resources into national public finance systems for the implementation of transport adaptation projects;
- Monitoring and evaluation; and
- Stakeholder engagement.

#### 5.15.2.11 Carry out detailed research to determine climate (change) risks to Malawi's transport sector

Detailed research and analysis, led by the DCCMS and MoTPW, will help the Government of Malawi develop a better understanding of the relationships between climate-related factors and the performance of transport assets to enhance transport decision-making at all levels. This should include the generation and management of a comprehensive dataset of climate projections and risk for key climate variables and hazards. The research and analysis undertaken should also inform the development of a National Climate Risk and Vulnerably Assessment for the Transport Sector.

#### 5.15.2.12 Monitor and evaluate NTMP climate change mitigation and 'adaptation' action

It is important to develop a robust Monitoring and Evaluation (M&E) framework with an appropriate set of indicators identified to consider the effectiveness of NTMP programmes, policies and plans with respect to managing GHG emission increases from the transport sector and to reducing the transport sector's vulnerability to climate change. The outcome of this M&E process will provide useful information for feedback into the NTMP policy-making and knowledge management processes. It will enable the MoTPW assess the current progress on climate change mitigation and adaptation action and resilience building in Malawi's transport sector, and make requisite recommendations for enhancing progress including timely and well-informed decisions for addressing climate risks as well as maximising any opportunities presented by a changing climate.

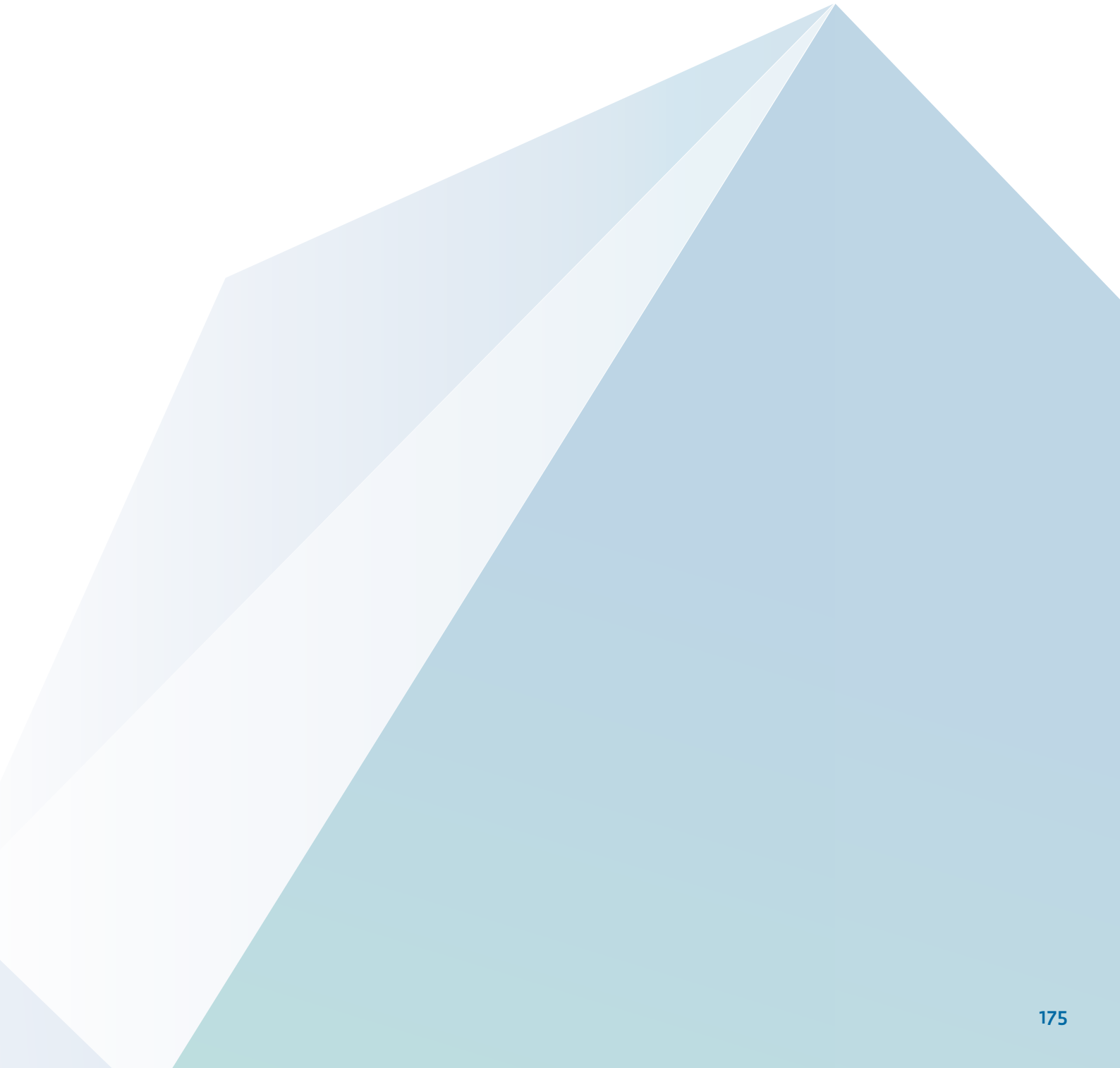
The NTMP has proposed for the MoTPW to lead the creation of a strategic framework and depository for all transport data, surveys and statistics, set common data collection, analytical and storage systems and processes, and serve as a knowledge exchange platform for research, technology and good practice. It is envisaged that this framework for transport data will also provide a basis for independently monitoring emerging outcomes of the NTMP as well as supporting its future review and update in light of progress made.

Given the dependency of indicator development on data availability, it is imperative that the proposed framework for transport data includes climate change considerations working in concert with relevant agencies and explicitly reports on climate variables.

#### 5.15.2.13 Propose regulatory change to require CRVA to be conducted for every new strategic investment

The NTMP recognises that climate change is a risk (such as more frequent and severe flooding and drought) to transport infrastructure. Alongside this, the programme suggests that the Government of Malawi is committed to using regulatory measures to deliver key elements of its reform programme. Specifically, it is in the process of drafting and seeking Parliamentary approval for a number of new laws that will impact the transport sector, including those focussed on aviation (private and commercial), road traffic and inland water services.

It is recommended that there is regulatory change to require that a CRVA be conducted for every new strategic investment. This will enable climate risks to be considered at the project level for every investment; a secondary benefit will be the consideration of wider sustainability issues as part of this process that may warrant further inspection and reduce overall costs. This strategic action is regarded as a high priority, with the opportunity follow a similar implementation path as the requirement for all road projects to be subject to an Environmental Impact Assessment.



Good road markings on a wide hard shoulder on both the sides.

ATKINS

Malawi National Transport Master Plan

# B: Reform Action Plan

Final Report

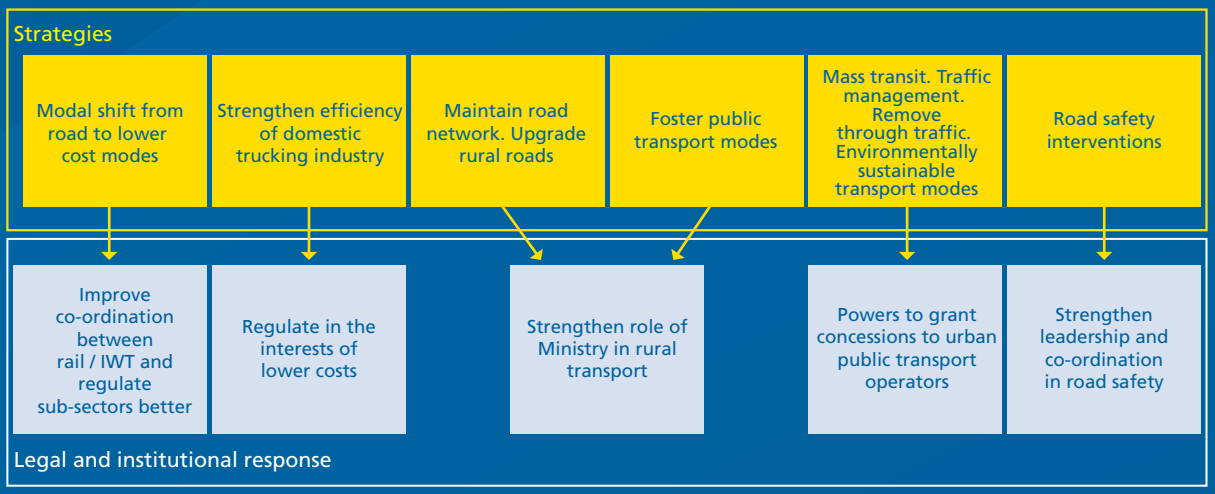
Service roads provide some forms of parking facilities in Lilongwe.

# 6 Institutional reform

## 6.1 The case for institutional reform

Based on the analysis of existing institutional arrangements provided in Chapter 5, and to support the realisation of the NTMP objectives set out in Chapter 4 and summarised in Figure 6.1, there is a strong case for proposals for institutional reform to be more clearly articulated and supported, and for the NTMP, in the 20-year plan period, to go beyond what the Government of Malawi itself has already proposed.

**Figure 6.1 Legal and institutional responses to the strategies**




This case for additional institutional change under the NTMP rests on several arguments. These are as follows:

- There is a commitment to further institutional reform as set out in the National Transport Policy and MoTPW's Strategic Plan, and in particular the further institutional separation of policy making, (autonomous) regulation and (commercialised, concessioned or privatised) transport network ownership, operation and service provision;
- There are a number of problems associated with existing arrangements in current levels and quality of service for providers and users of transport networks, including weak management of rail and marine concessions, poor and deteriorating asset conditions and outcomes, operator and user dissatisfaction, casualties from road crashes and high and rising transport costs;
- There is evidence of continued weak definition of roles and relationships between the Government departments and between the Government and other bodies at national and local level, with a lack of clarity over leadership and accountability in key functions;
- Shortages remain of human skills and capacity, technical processes, funding and resources, which may be used more efficiently via reformed institutional structures, giving the Government , donor agencies and others more confidence that their investment will be well used;
- Proposals contained within the NTMP call for significant improvements in infrastructure quality, level of service, co-ordination of operations and customer focus which are unlikely to be delivered under the current (or currently proposed) split of institutional responsibilities and decision making; and
- There are incomplete and un-actioned proposals for sector and sub-sector reform, including previous Government of Malawi proposals for a single Transport Regulatory Authority, TransRA, as well as sub-sector proposals for a National Ports Authority or Inland Waterway Authority.

International experience suggests that positive transport outcomes are more likely when policy development, planning and delivery is undertaken through strong, centralised or closely-co-ordinated institutional arrangements with separation and clarity on roles and responsibilities of key agencies and stakeholders. The NTMP builds on this and this Chapter summarises proposed objectives and measures for institutional reform.

A more extensive Institutional Reform Plan has been prepared as a Strategy Paper as part of the NTMP development process.

## 6.2 **Objectives and design principles of reform**

In order to meet the three strategic objectives of the NTMP, as introduced in Chapter 4, and to contribute towards realising the vision of the National Transport Policy, additional institutional reforms to Malawi's transport sector will be essential. In accordance with the NTMP's operational objectives a list of requirements for such reforms has been generated to guide the identification and development of related proposals, assess their potential impacts and monitor their effectiveness post-implementation. Reforms should:

- Map onto, monitor and seek to deliver the goals and key investment proposals of policy and the NTMP;
- Provide a clear, coherent, logical and structured mechanism for strategic leadership, control and co-ordination of the transport sector overall, and within or between sub-sectors;
- Address existing and future transport needs in line with the NTMP, which should include not just existing modal arrangements, but cover additionally rural transport, urban transport, and non-motorised modes, and promote the need to reduce transport costs for all;
- Promote the functional separation of policy, regulation and (commercialised) operations, in line with, and building on the Government's stated agenda, or addressing gaps, inconsistencies, practical challenges or delays in the agreed approach;
- Provide confidence to investors in the transport sector, whether public, private or development partner;
- Provide capacity to deliver sector and sub-sector improvements, with a view to incentivising key stakeholders to consider, invest in and promote improvements, including over and above, current commitments;
- Make best use of available capacity and skills with the local labour market, and avoid risks of over-stretching the resources available, especially within the public sector;
- Increase, and make best use of, private sector participation in the transport sector, including finance, delivery capacity, skills and innovation, and ensure that the legitimate requirement for commercial return on investment is balanced with protection and securing the public interest;
- Be practical to implement and support stable outcomes, including carefully justifying any need for new legislation and major organisational change management, managing risks of unforeseen consequences and disruption, and fostering transparency;
- Promote, or expand, broad stakeholder representation and involvement across those driving and affected by change, including the private sector and transport users;
- Command stakeholder support through extensive consultation;
- Be supported by appropriate and cost-effective data collection, analysis, sharing and reporting to allow strategic and business planning, monitoring and performance management; and
- Be supported by appropriate staff recruitment, training, rewards and motivational measures as may be required to make them effective and sustainable, including appropriate technical support from donor agencies.

It is also important to recognise that institutional reform carries practical and logistical challenges and financial costs, both in terms of start-up and operating expenses of new organisations, demobilisation or restructuring of existing organisations, and disruption of ongoing staff activities, morale and productivity.

An important principle, therefore, is that the costs of change should be carefully evaluated and efforts made to minimise these by careful institutional design, phasing and instigation of change management plans. Time should also be set aside to allow organisational changes to become embedded and the effects monitored and fully evaluated before further reform is considered.

## 6.3 Overview – 10 point reform plan

Within the NTMP, future institutional reforms to Malawi's transport sector being taken forward under ten areas of reform as follows:

1. Institutionalising NTMP implementation;
2. Separation of functions (such as vertical separation, the creation of regulatory functions and privatising or fully commercialising certain government operational functions);
3. Amalgamation of functions (for example to realise efficiencies by ultimately creating a National Surface Transport Authority (NSTA));
4. Decentralisation of local transport to districts;
5. Safety improvements, with a focus on enhancing related performance in the road sub-sector;
6. Mode-specific reforms;
7. Delivering better urban and rural transport;
8. Introduce enabling and complementary measures, such as parallel reforms to planning processes, capacity and skills, integrated programme management and funding;
9. Repurposing and restructuring MoTPW; and
10. Strengthening and leveraging stakeholder engagement.

Each area of reform is described below with further details.

## 6.4 Institutionalising NTMP implementation

The NTMP will represent a long-term vision, strategy and programme for investment and reform for Malawi's transport sector. The challenges of developing detailed implementation plans, co-ordinating delivery of schemes and initiatives across a number of public and private entities, monitoring progress, managing risk and resolving bottlenecks will be considerable. However, unless these challenges are met, there is a danger the NTMP will end up as a strategic plan "on the shelf" without tangible action and outcomes on the ground.

To this end, dedicated governance arrangements are required to take ownership of the NTMP upon its completion, guide the development of detailed plans for its delivery and monitor and performance manage achievement of outcomes. This should be done by making the NTMP itself a statutory framework and through the establishment of a National Transport Committee (NTC) as a Whole of the Government vehicle for its implementation and monitoring.

The NTC is intended to be an Inter-Ministerial Body, chaired by the Minister of Transport and Public Works[30] and with membership of a number of other interested Ministries at Minster or Permanent Secretary level. The latter might include, amongst others, the portfolios for finance, Local Government and rural development, health, gender, education, lands and urban development. It is suggested that the Chief Executives of key agencies, such as the Roads Authority, and representatives of Local Government and the wider stakeholder community (through JTSR) might also be members.

*30 The relative importance of Ministers may vary from time to time, and alternative chair may be proposed if this is more culturally appropriate and effective.*

The NTC will designate, and delegate certain responsibilities, to a National Transport Officer Working Group, selected thematic Working Groups[31], and a supporting Secretariat[32], to provide technical advice, capacity for implementation of key decisions, and general servicing.

The architecture of the NTC and its supporting structures is set out graphically in Figure 6.2. Based on this, the collective NTC governance arrangements will be responsible for:

- Identifying, enabling and monitoring the key steps from all relevant stakeholders to deliver the NTMP objectives and designated programmes within the defined timescales and budgets;
- Monitoring and reporting outcomes against NTMP strategic goals, operational objectives and targets, and taking remedial action to ensure progress remains on track;
- Acting as the Steering Group for any future review of the NTMP and the programmes for its delivery;
- Providing a mechanism for ensuring closer joint working between MoTPW with other Ministries to deliver the NTMP on a "Whole of the Government" basis, setting priorities and resolving differences as required;
- Providing a co-ordination mechanism between the Central and Local Government in delivering national transport objectives at the local level and ensuring effective delivery of the National Decentralisation Policy for transport infrastructure and services; and
- Acting as a forum for discussion of any other matter relating to transport at the national and regional level which the Committee may consider relevant.

It is proposed that the NTC arrangements are formalised and that the Committee itself and the supporting Officer Working Group and Secretariat develop appropriate standing orders and operating procedures in due course. For example, the Committee might meet at least twice a year in rotating locations around Malawi. Decision making by the Committee should generally follow a consensus model, but with formal voting for certain key matters or the resolutions of differences. Whilst formally structured and inclusive, procedures should be designed to be timely, efficient and focused on actions and outcomes set out in the NTMP, avoiding excessive bureaucracy and waste.

As currently designed, the NTC Secretariat is proposed to be provided by, and located within, the MoTPW and may comprise a Director, Administrator and a number of technical support staff. The NTC will also be the accountable body for the proposed National Road Safety Authority outlined below.

A National Transport Committee that would sit under the Minister of Transport and Public Works does not have a precedence within the Government structure. Its implementation might therefore prove difficult. An alternative is the strengthening the Joint Transport Sector Review forum (Section 6.14) as a means of enhancing the co-ordination and collaboration with key stakeholders as well as some level of oversight based on implementation of the agreed Action Plan. This proposal could also benefit from the review of the Sector Working Groups being conducted by the Department of Economic Planning and Development.

The implementation of the NTMP needs also to take account of climate change considerations. Proposals for this are set out in Section 6.9.

*31 For example, transport costs, rural transport, urban public transport or regional rail.*

*32 It is important that the Secretariat is effectively full time and fully capacitated.*

## 6.5 **Separation of functions**

Under the Government of Malawi's long-standing commitment to reform of the transport sector, a key objective has been the (functional and institutional) separation of public policy and planning, detailed regulation and management, financing and delivery, combined with the progressive commercialisation and privatisation of existing operations, as well as entry of new competitors. This rationale lies behind the creation of the Road Authority and Road Fund Administration, the creation of the National Construction Industry Council and concessioning of operations in rail, inland water, and commercial road freight and passenger transport.

The NTMP is built on this reform agenda, but takes it further towards the comprehensive vertical separation of all transport sub-sectors. The NTMP also needs to recognise that the MoTPW itself will need to change in parallel with the extraction of major regulatory and operational functions and associated headcount; major restructuring will therefore be required to focus on its policy and planning role. In particular, this means:

- Creation of regulatory functions, and institutional arrangements, separate from MoTPW, for aviation, rail, inland water and road operations, based on existing Government of Malawi intentions[33] or new proposals[34];
- Ensuring that all new regulatory functions and institutional arrangements have sufficient legal remit, powers, capacity and skills to discharge their responsibilities, ring-fenced sources of funding and a mandate to perform their duties independently of day-to-day political direction;
- Where applicable, improving standards of tendering, monitoring and management of private-sector concessions[35] as well as closer joint working between the sub-sector regulatory functions and the PPP Commission;
- Privatising or fully commercialising certain operational functions which currently remain within the Government, for example vehicle inspection, vehicle and plant hire and materials testing;
- Ensuring that the creation of new regulatory functions is undertaken with regards to economies of scale, best use of scarce skills and resources and modal-integration, including organisational amalgamation where feasible and appropriate; and
- Once key regulatory (and operational) functions and resources have been fully withdrawn from MoTPW, the Ministry itself is restructured to best undertake its new focus on policy, planning and sector oversight and monitoring, through a Functional Review and Change Management Strategy.

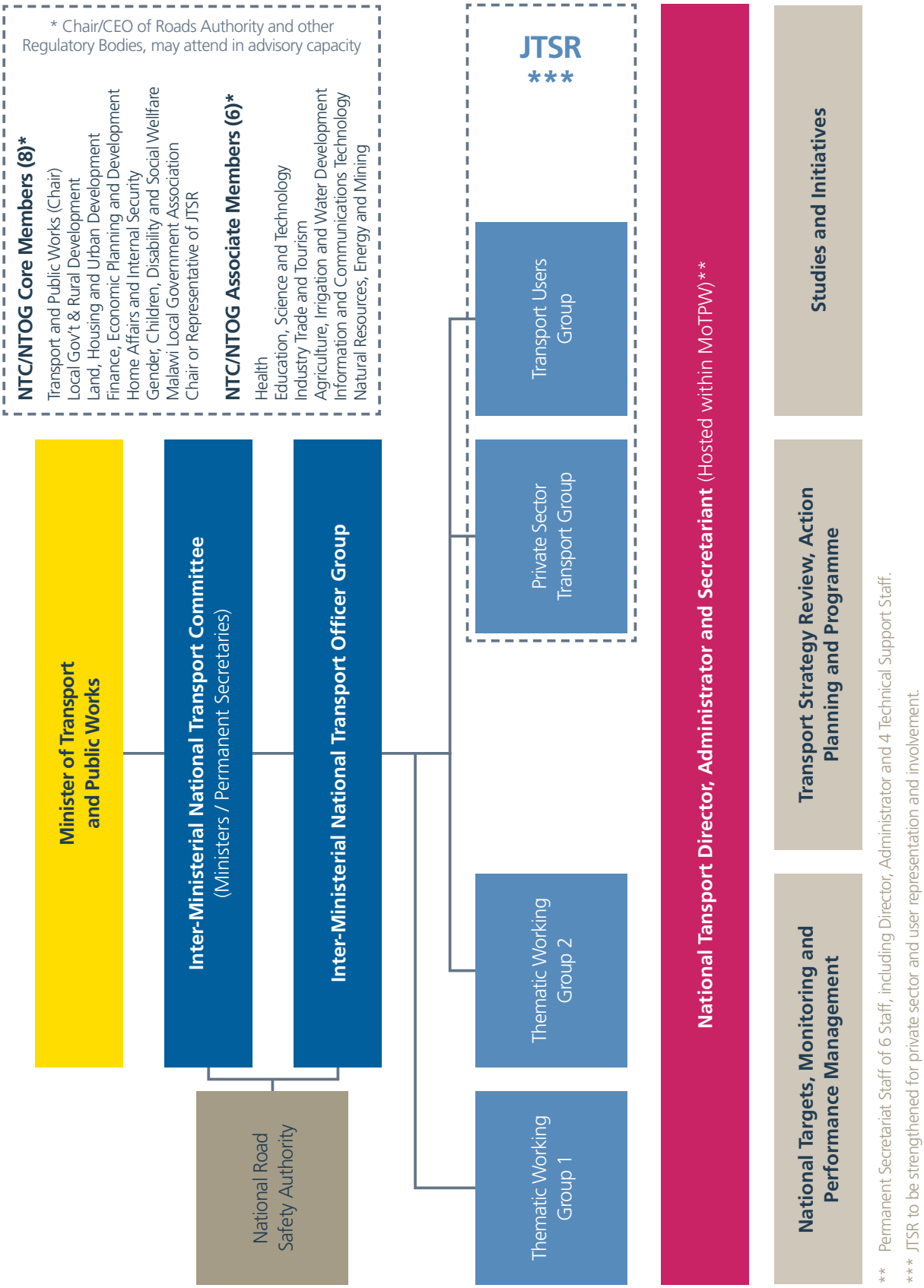
This proposal largely continues the Government of Malawi's existing reform commitments, but incorporates and strengthens them within the overall NTMP programme. In the short-term, it has implications for some actions the Government has already commenced, for example, the preparation of draft Railway and Inland Water Bills and ensuring the plans for the establishment of new or strengthened institutions are fully supported by enabling actions around capacity building, organisational development and sustainable funding.

33 *Specifically, creation of Civil Aviation Authority (from DCA), Roads and Traffic Authority (from DRTSS) and Rail Regulator (from DRS).*

34 *For example, a Ports and Inland Water Regulator.*

35 *For example, in operation of rail services, ports and inland waterways, and in management of airports.*

**Figure 6.2 Structure of National Transport Committee**




** Permanent Secretariat Staff of 6 Staff, including Director, Administrator and 4 Technical Support Staff.
*** JTSR to be strengthened for private sector and user representation and involvement.

## 6.6 **Amalgamation of functions**

Where new regulatory functions are required, it may be organisationally inefficient and financially costly to establish these as separate agencies. This is especially true for sub-sectors such as rail and inland water where the scale of supply and demand is currently too small to justify a stand-alone institutional solution.

With this in mind, **organisational amalgamation between planning and regulatory functions for different sub-sectors** is proposed to shape the way forward. The arguments for this approach, including the proposal for a single multi-modal regulatory authority for surface transport, have previously been set out in studies for Government of Malawi. The NTMP builds on these to ensure efficiency in resource use, a stronger mandate and integration of working practices.

The ultimate goal of this proposal will be the creation of a new National Surface Transport Authority (NSTA) combining road operations, rail and maritime and wider economic regulation of transport costs within a single body responsible for all forms of surface transport. The NSTA will sit alongside the existing Roads Authority and the proposed Civil Aviation Authority as a strong co-ordinating and regulatory body for surface transport modes and networks.

The ultimate NSTA will provide a strong, independent regulator which will supervise, monitor, direct and intervene as necessary to ensure Malawi's surface transport for the road, rail and marine networks comply with technical and legal requirements, are safe, efficient and deliver public objectives at reasonable cost. In carrying out this function, it will have the following objectives:

- Regulate all surface passenger and freight transport activities in Malawi, including concessions, licenses, permissions or contracts granted by the Government;
- Ensure transport access is arranged between operators on a fair, transparent and non-discriminatory basis, subject to concessions, licenses and contractual agreements which may apply;
- Solely, or in conjunction with other agencies, develop and enforce technical standards for infrastructure, vehicles, other assets and operations;
- Determine, monitor and enforce transport charges, tariffs and fares;
- Monitor, determine and refer to the relevant delivery and enforcement agencies, any anti-competitive, conducted, unsafe or other harmful behaviour by transport operators which may be against consumers' interest that unnecessarily disbenefits service users;
- Drive and promote the use of the surface transport sector, with a focus on those modes which are operationally efficient, economically advantageous and environmentally sustainable, as well as the integration between them, to the extent which is practicable and justified;
- Advise the Government on new policy, law and regulations for surface transport sector, including the management and granting of new concessions and contractual agreements with the private sector;
- Participate in, and ensure compliance with, bilateral, international or regional agreements; and
- Solely, or in conjunction with other independent bodies, monitor and enforce surface transport health and safety, protect users and undertake or support investigations into all accidents.

It is envisaged that the NSTA will have an independent Board and a supporting executive. As well as technical, economic and social remits, the Authority will also provide independent safety regulation, certification and assurance for the rail and inland water sub-sectors, as well as working closely with the proposed National Road Safety Authority on regulating health and safety standards of commercial road transport and reducing road casualties.

It is recognised that creating the NSTA represents an ambitious agenda at the current time, especially bringing in the Road Traffic Authority (RTA) as it reforms its own remit, structure and resources from DRTSS and in parallel reforms of a number of its existing operational functions. Therefore, the first stage of creating the NTA should be the creation of a new Rail and Maritime Regulatory Authority of Malawi (RAMRAM), with the potential to incorporate regulation of road operations of the RTA at a later date.

The first phase for RAMRAM will perform similar functions as the NTA for rail and inland water modes as well as wider economic regulation, but omit direct jurisdiction over road operations until restructuring involving DRTSS and its transition to RTA is complete and embedded.

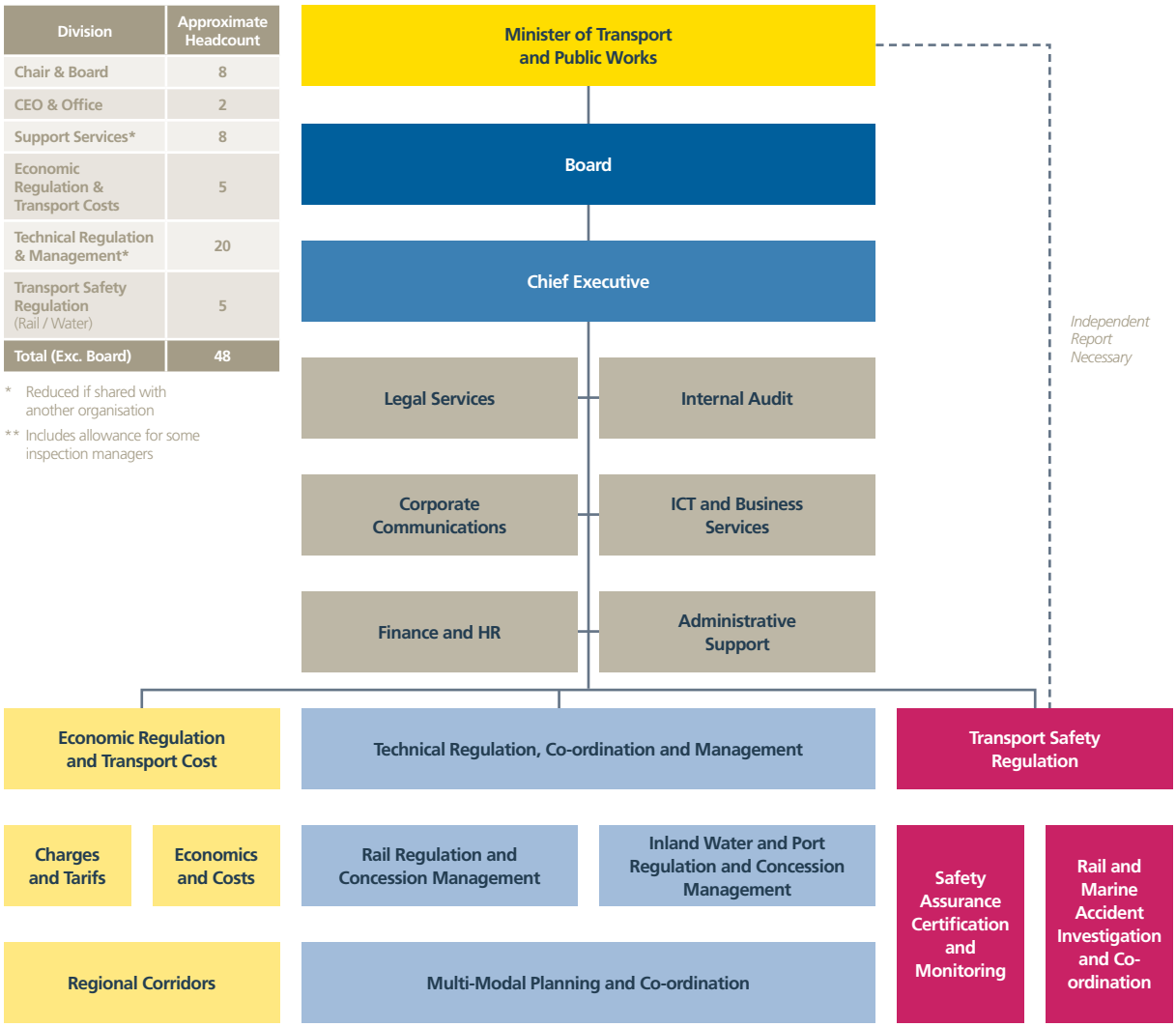
Proposed organisational arrangements and functions for the RMA and the end-state NSTA are set out in Figure 6.3 and Figure 6.4. In principle, RAMRAM should be created before 2020 and the full NSTA in the medium-term in the period 2022 to 2027. Establishing and building these bodies will be a major exercise and will require well-structured and sequenced implementation plans.

**Figure 6.3 Proposed Rail and Marine Regulatory Authority of Malawi**

| Division | Approximate Headcount |
|---|---|
| Chair & Board | 8 |
| CEO & Office | 2 |
| Support Services* | 8 |
| Economic Regulation & Transport Costs | 5 |
| Technical Regulation & Management* | 20 |
| Transport Safety Regulation (Rail / Water) | 5 |
| Total (Exc. Board) | 48 |

* Reduced if shared with another organisation

** Includes allowance for some inspection managers

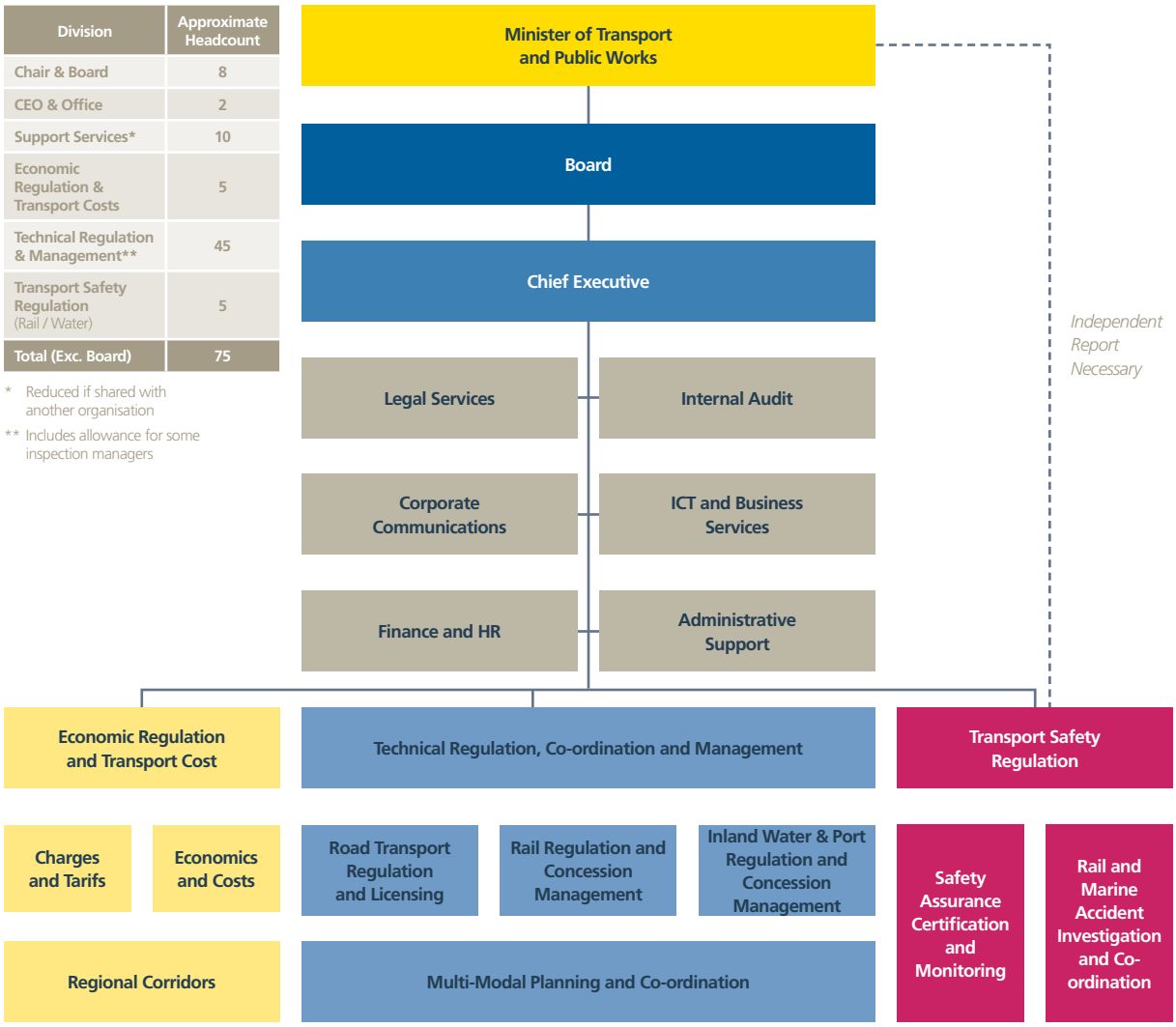


## Figure 6.4 Proposed National Surface Transport Authority

| Division | Approximate Headcount |
|---|---|
| Chair & Board | 8 |
| CEO & Office | 2 |
| Support Services* | 10 |
| Economic Regulation & Transport Costs | 5 |
| Technical Regulation & Management** | 45 |
| Transport Safety Regulation (Rail / Water) | 5 |
| **Total (Exc. Board)** | **75** |

* Reduced if shared with another organisation

** Includes allowance for some inspection managers



## 6.7 **Decentralisation of local transport to districts**

Consistent with the National Decentralisation Policy, the planning and co-ordination of transport infrastructure and services at a local level will be devolved to Malawi's district, city and municipal councils. This decentralisation of responsibilities for rural and urban transport will help to ensure that related delivery is reflective of, and accountable to, local communities. It will also contribute towards the building of capacity at the local level.

The framework for devolving transport planning and delivery to districts will be secured through a new system of District Transport Infrastructure and Management Plans (DTIMPs). Following good practice elsewhere , it is proposed these Plans should include:

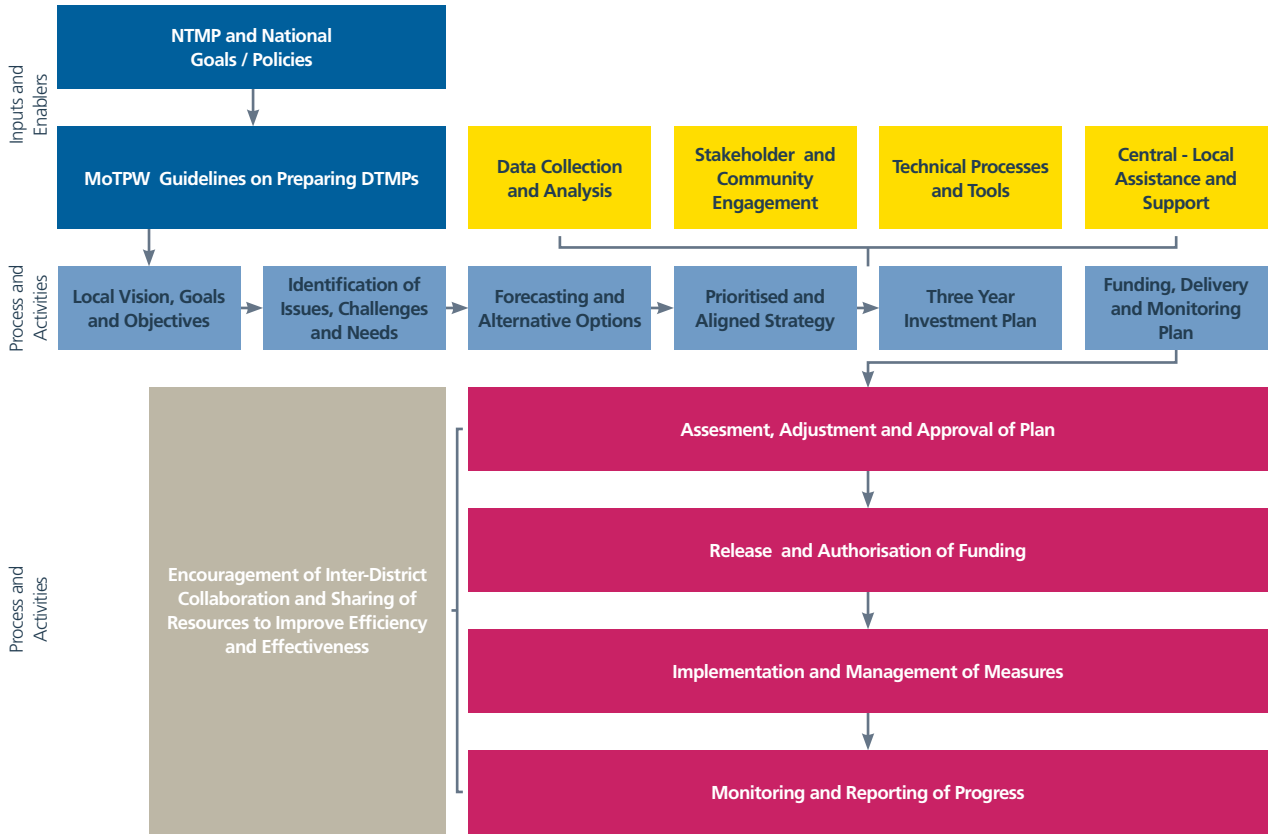
- Analysis of existing conditions and key challenges at the local level;
- Local interpretation and sub-division of the NTMP strategic goals as well as articulation of locally-relevant priorities;
- Coverage of local road infrastructure, facilities and non-infrastructure measures, including public transport, road safety and NMT;
- A long-term transport strategy for each district and shorter-term three-year costed implementation plan for maintenance and improvement measures by mode/network;
- Proposals for involvement and collaboration with relevant public agencies, private sector and users, including neighbouring districts;
- Proposals for integrating action by the districts with national transport initiatives (e.g. main road upgrades, new rail services) proposed by MoTPW, other public agencies or transport concessionaires; and
- Clear proposals for governance, funding, financing, skills and capacity and monitoring to deliver the proposed programme and objectives.

Preparation of each DTIMP will be undertaken against guidelines prepared by MoTPW. The Ministry will also provide data, technical support and review of each DTIMP prior to its adoption and a submission for funding. Funding is expected to be a combination of national (e.g. Roads Fund) and local sources (e.g. rates, user fees and private sponsorship/ support), with an expectation that Plans should reflect a realistic level of available resources rather than setting out investment aspirations without identification of funding sources.

It is suggested that each DTIMP must be approved by MoTPW before it can proceed. Initially, approval will be for specific schemes and programmes; funding awarded will be ring-fenced and cannot be spent on other local services. As confidence in local capacity, skills and competencies to plan and deliver on the ground increases, districts may receive greater discretion and flexibility on their spending provided this is consistent with NTMP objectives, wider NTMP aims and evolving Government of Malawi transport policies.

A graphical illustration of the proposed district planning process is set out in Figure 6.5. The length and complexity of Plans is expected to vary by district. The four largest urban areas (Lilongwe, Blantyre, Mzuzu, Zomba) will logically develop the most comprehensive Plans and consider a more complex combination of road infrastructure, traffic management, public transport and other urban mobility interventions. Bespoke governance arrangements may be required for this challenge. Smaller rural districts, by contrast, will focus on a more limited range of road maintenance and selective upgrading, providing a minimum level of public transport for villages and communities, and ensuring social inclusion in access to services and opportunities. The basic DTIMP process will remain the same for all districts, but be flexible enough to vary by scale, scope and intensity of local investment requirements.

**Figure 6.5 District transport infrastructure and management plan process**




Note: MoLGRD and other Line Ministries consulted as appropriate

It is proposed that MoTPW and the Ministry of Local Government and Rural Development (MoLGRD) jointly support a process of training, capacity building and technical and logistical support to districts to improve their ability to prepare a robust and effective DTIMP, and to deliver transport interventions using the funding allocated. The latter may include, for example, programme management, scheme design and specification, contractor procurement and management, commissioning and maintenance. In many cases, the capacity of the local private sector to offer an effective contractor supply chain to districts may also have to be strengthened and the National Construction Industry Council (NCIC) may have an important role in this regard. Strengthening district capacity and skills to plan and deliver local transport may also be a strong candidate for future technical assistance from donor agencies.

Depending on their size and capacity, whilst not mandatory, districts may be encouraged to share resources when developing their Plans or procuring contractors for works. They may, at least initially, delegate some their responsibilities to neighbouring authorities, or the Roads Authority until such time as they have adequate internal capacity to manage their own programmes. It will be the role of MoTPW to advise on the different combinations and extent that such sharing or delegation of district responsibilities may take.

In the largest urban areas, it is proposed that DTIMPs may be developed and implemented in conjunction with a proposed Urban Area Transport Authority. This is discussed further overleaf.

## 6.8 **Road and transport safety**

The launch of the National Road Safety Strategy in 2015 defines a multi-disciplinary and multi-stakeholder approach to tackling Malawi's poor road safety. The Strategy is currently being co-ordinated by DRTSS with a formally established National Road Safety Committee of the key stakeholders, at both Steering Group and Technical Group level. The Committee replaces the National Road Council of Malawi which was incorporated under DRTSS with the aim of enhancing organisational efficiency and integrating road safety considerations with vehicle and driver licensing and testing functions.

The current National Road Safety Committee arrangements, however, have been slow to establish themselves in practice and little impact has been felt. Further loss of focus and momentum may also be expected as DRTSS (understandably) concentrates on the transition from a government department to an autonomous Roads and Traffic Authority, as well as the externalisation of vehicle inspection and certification services. This is a concern given that international best practice suggests that tangible reductions in road casualties are most likely, and achievable over a sustained period, in the presence of quantitative national targets which are owned and directed by a strong institutional arrangement which combines multiple agencies and disciplines in the road safety effort.

For this reason, and in parallel with the creation of the RTA, the re-establishment of a new National Road Safety Authority as a statutory, focused institutional arrangement to reduce accidents and casualties on Malawi's roads is recommended.

The NRSA, sitting alongside the National Transport Committee (Point 1) will have the following functions:

- Advise the Government on road safety policy, laws and regulations, guidelines and policies;
- Develop, own and update the National Road Safety Strategy and Action Plan, monitor progress against targets and oversee the key supporting actions by all stakeholders;
- Own and improve road traffic collision and casualty data, reporting and dissemination of statistics, and undertake analysis which informs programme management;
- Take the lead for road safety education, campaigns and publicity;
- Research road safety policy, good practice and lessons learned from elsewhere;
- Develop sustainable road safety funding sources;
- Act as the point of engagement between public sector, private sector and donors/ NGOs; and
- Represent Malawi in respect of key international, regional and bi-lateral events and agreements.

The focus of the Authority will be on road safety. It will, however, have a shared agenda for the wider safety and security of the transport sector, including rail and maritime, with the Urban Areas Transport Authority.

A graphical representation of the structure of NRSA is shown in Figure 6.6, with the following elements:

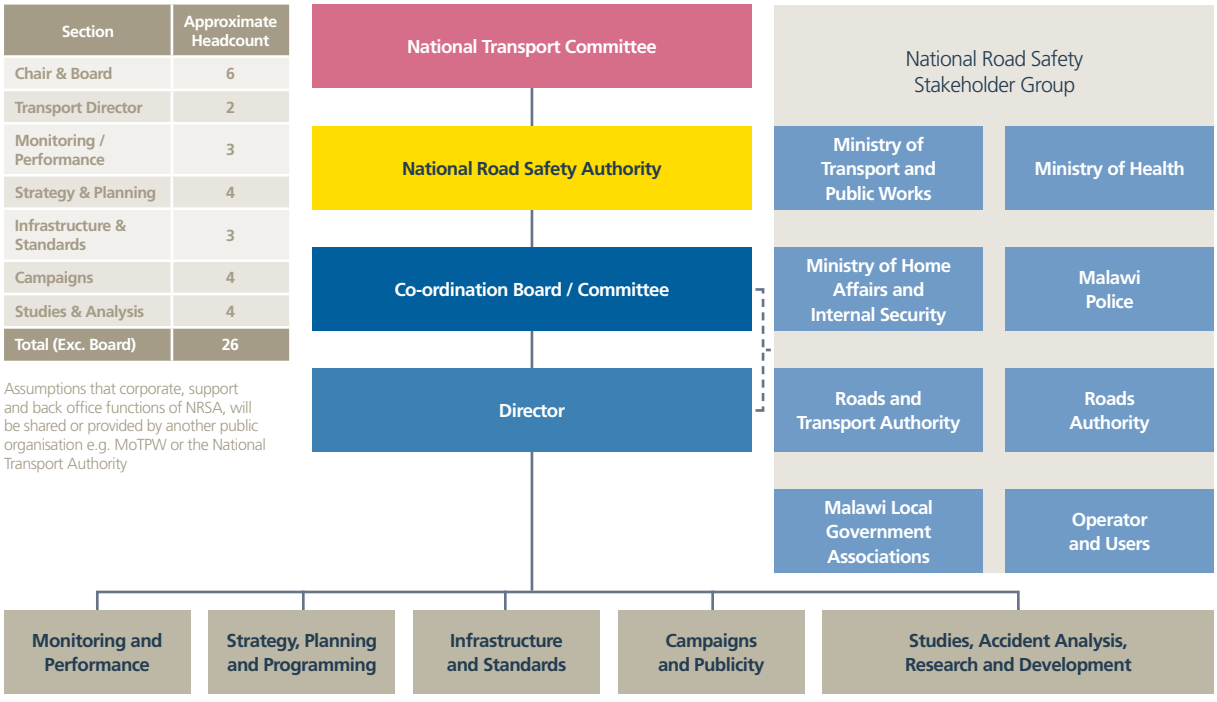
- The Authority itself will report to the proposed National Transport Committee, at Ministerial level, but have independent statutory standing;
- The Authority will have a Co-ordinating Board or Committee for oversight and key strategic decisions which will be implemented by an Executive led by a full-time Director;
- The Director will manage several functional sections, covering strategy and planning, monitoring and performance, infrastructure and standards, campaigns, and research and analysis;
- The Authority will have limited direct delivery powers, given the cross-agency nature of road safety initiatives, but will be supported in its work by a Stakeholders Working Group comprised of public sector agencies responsible for delivery, as well as representatives for users and operators;
- The Authority will be further supported by the apparatus of the National Transport Committee and a new Road Safety Unit to be established within MoTPW.

It is suggested that this proposed arrangement will provide policy and delivery focus on road safety within Malawi whilst using available capacity and skills in the most effective way. The proposed repurposing and restructuring of MoTPW set out under Point 10 of this Institutional Reform Plan will also serve to provide more of a policy focus on road safety in support target-driven, evidence-based, multi-disciplinary and multi-agency road accident and casualty reductions in line with NTMP objectives.

**Figure 6.6 Structure of proposed National Road Safety Authority**

| Section | Approximate Headcount |
|---|---|
| Chair & Board | 6 |
| Transport Director | 2 |
| Monitoring / Performance | 3 |
| Strategy & Planning | 4 |
| Infrastructure & Standards | 3 |
| Campaigns | 4 |
| Studies & Analysis | 4 |
| Total (Exc. Board) | 26 |

Assumptions that corporate, support and back office functions of NRSA, will be shared or provided by another public organisation e.g. MoTPW or the National Transport Authority



## 6.9 Institutional proposals for climate change

### 6.9.1 Overview

Managing the growth in GHG emissions from Malawi's transport sector, and increasing its adaptive capacity to respond to the impacts of climate change, is crucial. Actions to build the climate change mitigation and adaptation capacity of key actors will be required to underpin the climate change actions integrated both explicitly and implicitly within the NTMP, with consideration needed for developing the required level of supporting:

- Information and data;
- Awareness, knowledge, skills and training;
- Resources (financial, human, technical);
- Policy; and
- Innovation.

A gradual and phased approach over time may be required to bridge the gap from existing to required capacity.

### 6.9.2 Strategic actions

#### 6.9.2.1 Establish/identify a lead unit within the MoTPW, responsible for co-ordinating issues on climate change and transport

The availability of sufficient, well equipped and motivated personnel is one of the prerequisites for translating the climate change mitigation and adaptation objectives of the NTMP into action. A sufficient headcount of qualified staff for the task at hand is important to ensure those appointed are not thinly spread across too many issues. The climate change skills and performance of MoTPW staff both individually and collectively need to be enhanced to ensure the transportation agenda is embedded in the national climate policy process cycle, while at the same time providing support for the interdependent functions necessary for efficient implementation.

The establishment of a Focal Point / dedicated teams to facilitate the drive for climate change actions within:

- The MoTPW – Such as the identification of desk officers in the Planning Department;
- Key line ministries;
- Universities and other research institutions;
- Non-governmental organisations; and
- The private sector.

The proposed individuals/teams will be responsible for liaising with the Ministry of Environment, which serves as Malawi's Focal Point for the UNFCCC and wider engagement on climate finance. A proposed transport climate unit within the MoTPW should also interface with the Department of Climate Change and Meteorological Services (DCCMS). They would also be responsible for networking and cooperating with the relevant stakeholders externally as well as ensuring actions are implemented internally within the transport sector.

It is important for the relevant government representatives on climate change to be included as a core members of both the NTC and NTOG, and for one of the thematic working groups to be focused on climate change.

#### 6.9.2.2 Identify capacity needs and strengthen staff capabilities

A country specific capacity needs assessment should be carried out for both climate-specific and climate-relevant capacities that are required to ensure Malawi's transport sector is resilient to climate change. This will help determine the appropriate training and capacity plans to be designed such that the MoTPW is well equipped with the appropriate human resources and skill sets to implement the potential climate change mitigation and adaptation options to be identified for the NTMP projects, following their proposed CRVAs.

Adequate resources to cover the required climate change training programmes for staff need to be set aside. It is also vital that sufficient time is made available for staff to participate in these training programmes, digest the information received and more importantly apply/ put into practice what has been learnt to effect climate action in the transportation sector. Training should be consistent and carried out systematically over the period of the NTMP implementation with integrated feedback loops.

Climate change mitigation and adaptation should be integrated, to the extent possible, in all planned training and capacity building programmes being conducted by the MoTPW. For example, the NTMP proposes that the MoTPW and the MoLGRD jointly support a process of training, capacity building and technical and logistical support to districts to improve their ability to:

- Prepare a robust and effective District Transport Infrastructure and Management Plan (DTIMP); and
- Deliver transport interventions using the funding allocated.

Workshops and training sessions should be carried out for both transport and climate change experts in concerned line ministries and departments such as the MoTPW, Department of Environmental Affairs (DEA), Department of Climate Change and Meteorological Services (DCCMS), Department of Disaster Management Affairs (DoDMA), local municipalities as well as the private sector. A specific example of a training session could be on the revised technical standards and guidelines that have incorporated climate change considerations to relevant stakeholders including municipalities and the private sector.

#### 6.9.2.3 **Develop MoTPW's readiness to access climate finance**

Building the capacity of the MoTPW to access climate finance is of paramount importance, in ensuring the required resources are accessed for the implementation of climate change mitigation and adaptation measures identified for the NTMP projects and programmes. Climate finance resources are channelled through an increasing number of international and regional funds (section 11.3.6), and via various financing mechanisms, hence accessing them can be a complex and onerous process.

Working in partnership with the DEA and DCCM, the MoTPW will need to build capacity across the following areas for climate finance readiness , including but not limited to:

1. The identification of relevant funding sources and priorities;
2. Financing options;
3. Modes of access and spending rules;
4. Transport sector climate change mitigation and adaptation pipeline development;
5. Absorption of additional climate finance resources into national public finance systems for the implementation of transport sector climate change mitigation and adaptation projects;
6. Monitoring and evaluation; and
7. Stakeholder engagement.

#### 6.9.2.4 **Research climate change risks to Malawi's transport sector**

Detailed research and analysis, led by the DCCMS and MoTPW, will help the Government of Malawi develop a better understanding of the relationships between climate-related factors and the performance of transport assets to enhance transport decision-making at all levels. This should include the generation and management of a comprehensive dataset of climate projections and risks for key climate variables and hazards. The research and analysis undertaken should also inform the development of a National Climate Risk and Vulnerably Assessment for the Transport Sector.

#### 6.9.2.5 **Build flexibility (and adaptive management) into existing (and planned) policy and frameworks**

This report presents plans to create new semi-autonomous transport agencies alongside institutional reforms (including regulation) that are required to transform the Government of Malawi's current approach to infrastructure planning. The National Transport Policy recognises the importance of legal, regulatory and institutional measures and reforms to support climate change mitigation and adaptation. Most notably, the NTMP recognises the need to 'design in' climate change measures to improve resilience.

It is imperative that agencies receive the appropriate powers and are given the necessary autonomy to develop climate change mitigation and adaptation policy and mainstream adaptation into existing policy frameworks.

Given the nature of climate change and the mismatch with regards to the lifetime of policy and climate impacts (the latter typically being evident over appreciably longer timescales), a degree of flexibility (and adaptive management) is required to be built into existing policy and associated frameworks to allow for future changes to be accommodated. Accommodating change is an important principle in responding to climate change and will help to promote resilient approaches across all levels of governance and help to embed such approaches within existing (and planned) policy frameworks. At the institutional level, building capacity to allow decision-makers to take account of climate risks will be key to building resilience and in contributing to sustainable development. However, a lack of the skills and capacity of staff may limit implementation.

Therefore, the Ministry should adopt flexibility in its regulatory approach, with durability of the regulatory regime able to evolve in response to changing circumstances, the right of regulated entities to make representations during preparation of regulations and provide open feedback on their operation. In addition, enabling flexibility and allowing regulated entities to choose how best to achieve compliance provided the basic regulatory objectives are met (i.e. performance or process-based forms of sustainable and regulation) will be important to aid delivery of resilient outcomes.

## 6.10 Mode–specific reforms

The Sub-Sector Plans prepared alongside the NTMP contain a range of institutional proposals and recommendations which are relevant to each respective sub-sector. Reflecting these, Table 6.1 summarises the positions for institutional structures and processes by mode and thematic area across the baseline, Government of Malawi proposed reforms and final proposals to be set out in the NTMP. Further details can be found in the relevant Sub-Sectoral Plan.

From the developing Sub-Sectoral Plans, there is merit in drawing attention to three particular areas of change on a modal or thematic basis: these are governance of regional corridors, stronger quality regulation of road transport operators and progressing improvements for non-motorised transport.

### 6.10.1 Regional corridors

It is recognised that reducing the scale of transport costs on Malawi's economy, and therefore its economic competitiveness, will require action at and beyond the Country's borders, integrating with the SADC Protocol on Transport, Communications and Meteorology Protocol and other regional initiatives.

The **Protocol** enables Member States to establish Regional Development Corridors on a mode-specific or multi-modal basis to improve access and travel. In particular, Article 3.5 provides for establishment of multi-modal cross-border **Corridor Planning Committees** comprising public and private sector stakeholders of constituent States. As well as performance criteria and databases/inventories of transport infrastructure and services, such Committees are expected to establish institutional models with broad representation across the Government, public agencies, transport operators, trade bodies and users.

The Protocol does not prescribe the particular institutional form of a Committee, its functions or legal status since these will be determined locally. However, for Malawi, the Protocol does encourage stronger cross-border collaboration for the Nacala and other key Corridors which could be institutionalised.

Malawi has already worked with neighbouring Tanzania, Zambia and Democratic Republic of Congo to establish the **Dar es Salaam Corridor Committee** which follows the SADC Protocol by seeking to develop and adopt strategies and implementation plans which improve seamless transportation along the Corridor, set and monitor targets for performance, develop an annual programme and consider its budgetary implications. The Agreement also provides for the establishment of an Executive Committee, to which key decisions can be delegated, as well as a Secretariat headed by an Executive Director to provide technical advice, draft the annual work programme and monitor and report performance. Participation of the private sector is encouraged (and in some cases minimum levels of representative set) and the Agreement also provides for counterpart National Committees and Coordinators to support the work and objectives of the overall Corridor Committee at national level.

It is proposed that Malawi seek to adopt, and make fully effective, similar Committees for its other regional corridors, ensuring political commitment by the Governments (at Ministerial level) is matched by strong engagement of the private sector, development of multi-faceted action plans and investment profiles and outcome-focused targets which are monitored and reported over time. A particular priority is the **Nacala Corridor** and the co-ordination of rail infrastructure, technical standards and regulations, border customs and trade procedures and supportive national policies between Mozambique, Malawi and Zambia with a view to growing the rail market within the corridor, improving infrastructure condition and performance and harmonising technical standards and operating procedures in the interests of reducing transit times and costs. This will require strengthening the current Tripartite Agreement on the Nacala Development Corridor with specific items on the institutional arrangements.

It is important that corridor arrangements have political support, formal standing, an agreed programme of action and proper resourcing if they are to be effective. In the interests of sharing resources and economies of scale, it is possible that each Committee may share a single Secretariat and other support resources rather than adopting one of its own.

**Table 6.1 Mode and theme-specific proposals under NTMP institutional reform plan**

| Sub-sector | Scenario | | |
|---|---|---|---|
| | **Status quo** | **GoM proposed reforms** | **NTMP proposals** |
| **Road (Infrastructure)** | Road Fund<br>Roads Authority | Strengthened planning and delivery processes, and additional skills and capacity within Roads Authority | Evaluation and implementation of current Road Authority Operational Review<br>Operational Review and strengthened resourcing and management of Road Fund |
| **Road (Operations)** | Department of Road Traffic and Safety Services (DRTSS)<br>National Road Safety Committee | Road Traffic Authority<br>National Road Safety Committee (under RTA) | **Phase 1**<br>Rail and Maritime Authority<br>Road Haulage Industry Council<br>**Phase 2**<br>Road Traffic Authority<br>National Road Safety Authority<br>**Phase 3**<br>National Transport Authority (Road, Rail, Water)<br>Road, Rail and Port Infrastructure Bodies |
| **Rail** | Department of Rail Services (DRS) | Rail Regulatory Authority<br>Rail Infrastructure Body<br>MoTPW Rail Desk | |
| **Inland Water** | Department of Maritime Services (DMS) | DMS Incremental Capacity and Re-Organisation | |
| **Aviation** | Department of Civil Aviation (DCA) | CAA<br>MoTPW Aviation Desk | CAA<br>Airports Company (Focus: Lilongwe and Blantyre)<br>Air Accident Investigation under CAA or SADC |
| **District and Urban Roads and Transport** | Decentralisation but major De facto role to Road Authority | Emphasis on Decentralisation, including Reclassification of National Road Network | Urban roads devolved to districts via local transport planning process and funding managed by MoTPW<br>Urban transport policy and advice under new MoTPW Local Transport Division<br>Urban Transport Authority to provide initial national focus for complex urban challenges – transitioning to local bodies in larger urban areas |
| | | | Rural roads and transport devolved to districts via local transport planning process and funding managed by MoTPW<br>Rural transport policy and advice under MoTPW Local Transport Division |

**Table 6.1 Mode and theme-specific proposals under NTMP institutional reform plan (continued)**

| Sub-sector | Scenario | | |
|---|---|---|---|
| | **Status quo** | **GoM proposed reforms** | **NTMP proposals** |
| **Non-Motorised Transport** | No overall responsibility | No overall responsibility | Incorporated within local roads and transport responsibilities devolved to districts<br>Support under MoTPW Local Transport Division<br>Focus area of National Road Safety Authority |
| **Regional Corridors** | Ad hoc coverage | Mix of multi-lateral agreements for Regional Corridors and varying degrees of activity and effectiveness | Co-ordinated multi-modal Regional Corridor Transport Committees in line with SADC Protocols |
| **Stakeholder Collaboration** | Joint Transport Sector Review (JTSR) | JTSR | Strengthened JTSR leadership, processes, technical advice and user representation<br>Strengthened transport industry representation, capacity building, consolidation and price, safety and quality regulation (e.g. NCIC, RTIC, Minibus Assn) |
| **MoTPW** | Sector leadership with existing structure largely modally based at variable capacity and skills | Separation of certain regulatory functions (e.g. for aviation, rail and road operations) to new semi-autonomous agencies<br>Capacitation of certain departments (e.g. DMS) | Inter-Ministerial National Transport Committee, Officer Working Group, Thematic Working Groups and Secretariat, later located within MoTPW<br>Review and restructuring of divisions and departments along functions and tier, streamlining, professionalisation and capacity building |

Note: See NTMP Sub-Sector Strategies and Action Plans for further details.

### 6.10.2 Road haulage industry council

There is a recognised need to regulate the standing, operational health and safety, competitive practices and quality of service of road transport companies, especially in the freight sector. Whilst the existing Road Transport Operators Association fulfils this role for trucking companies to some extent, it is seen more as an interest and lobbying group than a body capable of setting and enforcing level and quality of service.

The NTMP therefore proposes the establishment, under law, of an entity to regulate, foster and strengthen the commercial road transport industry with the ultimate objective of reducing transport costs. For working purposes, this is called the Road Haulage Industry Council. Its objective will be to foster the commercial transport industry, improve its quality and seek to 'manage' transport costs within a competitive market. The intended focus will be only be freight transport, as this has a specific and measurable impact on the cost of imported and exported, as well as, domestic goods.

The Council will register all commercial road transport companies, including potentially foreign operators subject to SADC and COMESA rules, with only registered companies being able to operate in Malawi.

The Council will set the standards for registration, which might include a "competent operator" certification, based on such criteria as a permanent place of business, financial capacity, legal checks, compliance with employment law and health and safety regulations. In addition, companies will be graded and this grading used to inform the level and type of work taken on. Companies failing certain tests, or not complying with certain regulations (such as axle loading) might be fined or de-registered, subject to an appeals and arbitration process. Companies and individuals wishing to transport goods to/from and within Malawi will be encouraged only to use registered road haulage companies.

The Council will be funded and established by the road transport industry itself, and therefore pursue strengthened and sustainable self-regulation. There will be no cost to the public sector. The council will provide advice and training to members with a view to improving efficiency, quality of service, reliability and lower transport costs. The model is similar to that of NCIC.

### 6.10.3 Non-motorised transport

Improving conditions for pedestrians and cyclists, who make up a substantial proportion of trips, especially in rural areas, will be tackled principally as a local transport issue. Therefore, the proposals for District Transport and Infrastructure Management Plans (DTIMPs) will be the main governance vehicle for planning, implementing and monitoring the impact of initiatives.

Nevertheless, there is also a lack of detailed knowledge and skills for NMT planning within districts currently, and additional support will be provided through:

- Establishing a Non-Motorised Transport Unit or Section within a reformed MoTPW which will have the role of developing key planning and design concepts and guidelines for Malawian conditions, working with national and local agencies on implementation and monitoring impacts;
- Including NMT as a priority focus of the proposed National Road Safety Authority and Roads Authority with the onus on developing targets and casualty reduction measures for pedestrians and cyclists as particularly vulnerable and over-represented groups within road accident statistics;
- Ensuring that pedestrians and cyclists are recognised as "users" of the road and transport network in urban and rural areas and appropriate groups are established to represent their interests within the development of relevant investment programmes; and
- Setting specific budgets with national infrastructure programmes and local DTIMPs so that policy priority equates with adequate resourcing and delivery on the ground.

In the medium-term, MoTPW should consider the development of a focused NMT Strategy and Action Plan, to be progressed on a multi-agency and stakeholder basis.

### 6.10.4 Urban and rural transport

Future forecasts show that, despite economic growth and development, Malawi will retain a predominantly rural population and agricultural economy. However, there is no institutional focus on rural transport and accessibility and recent Technical Assistance has largely neglected rural focus.

In future, the focus on local devolution of transport planning and delivery to a district level, as described above, will implicitly bring rural transport issues to the fore and secure a greater level of investment. Guidelines on the development of DTIMPs should include a specific section on rural transport and districts should be required to engage at a village and community level in identifying challenges, developing improvements and implementing schemes on the ground. This should be further reinforced by a Rural Transport Unit or Section within the reformed MoTPW which will develop and advise on the roll-out of good planning and delivery practice in rural areas across Malawi.

Despite the continued rural focus of the population and economy, towns and cities across Malawi will also increase considerably in population and spatial extent. Lilongwe and Blantyre in particular are growing fast and this is already generating a range of challenges, such as traffic congestion, poor air quality, road accidents and constrained accessibility, the latter exacerbated by a fragmented, poorly co-ordinated and capacity constrained public transport system based on paratransit minibuses.

It is, however, the case that the transport issues – and the need for solutions – facing large urban areas are substantially more complex, multi-discipline and multi-stakeholder than those in rural and small urban centres. At the same time, districts face acute legacy issues of weak skills and capacity to tackle them, or at least to do so, in the short-term, in a manner which is cost effective and affordable from the local tax base.

In large cities in many countries, such problems have been addressed through creation of urban transport authorities or equivalent arrangements. These typically transcend municipal boundaries, cover public transport co-ordination and often other modes, and combine strategic planning with infrastructure and service delivery, operations and management. In Africa, examples which have been created or are planned include Lagos (LAMATA), Johannesburg (Gauteng Transport Authority) and Dar es Salaam (DUTA).

In the long-term the recommended approach in Malawi is therefore to devolve both rural and urban transport planning to the local authorities, with proportionate guidance and support from MoTPW via a new Local Transport Networks Division. This is consistent with the established National Decentralisation Policy. However, in the short-term to medium-term there is a need for institutional reform to support the primary urban transport strategy of moving towards organised and regulated public transport and mass transit. At present, it is not appropriate to grant powers to individual city assemblies to do this, since there is insufficient capacity. Nor would it be efficient to create urban transport authorities for each of the larger urban areas.

For these reasons, a national Urban Areas Transport Authority (UATA), with specific powers to plan, co-ordinate, and grant licences and concessions to appropriate public transport operators. In pursuance of this the Authority would have a remit to assist city assemblies in investigating, planning and resolving complex multi-modal transport challenges in designated towns and cities. Like recent experience in Kenya, this will initially be a single body at a national level with a centralised structure, working closely with city assemblies. It would have the legal basis, capacity and skills to identify, plan and deliver modern public transport solutions, and in the interests of integrated transport would assist assemblies to address the challenges of traffic management, land use and development control, public transport co-ordination, road safety and non-motorised transport. The Authority will work closely with the city assemblies to ensure that solutions are flexible to local circumstances and principles of democratic accountability and representation are observed.

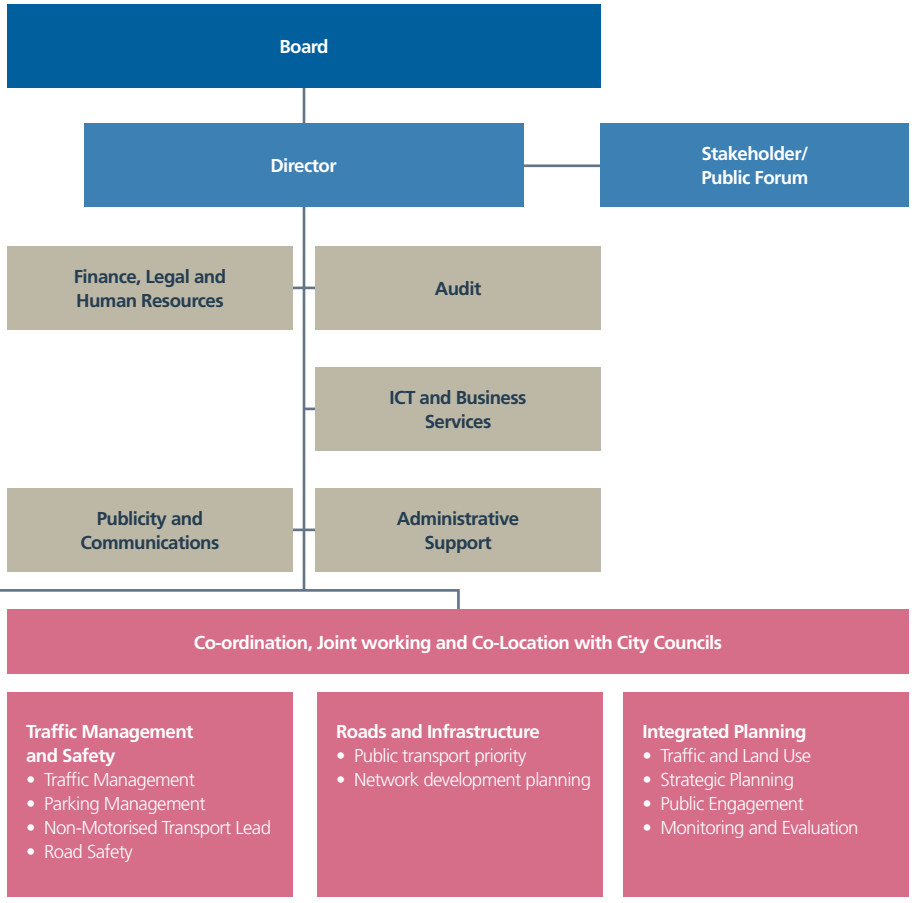
A potential structure for the UATA is shown in Figure 6.7. It will have legal powers to deal with the public transport functions. In the long-term it may devolve some of its responsibilities, especially in Lilongwe and Blantyre, as the capacity and the ability of Assemblies increases over time. For some functions the UATA as a national body may be a transitional arrangement.

This transitional period may relate particularly to the urgent challenge of regulating, licensing, co-ordinating and driving improvements to existing urban public transport, focused on the minibus sector.

This may present certain technical, logistical, legal and political obstacles which only a national body will have the capacity, mandate and authority to overcome. The requirements of Bus Rapid Transit and other complex public transport proposals in Lilongwe and Blantyre may also be beyond local capacities to plan and manage risks. Once such regulatory reform and infrastructure delivery is complete then it may be appropriate for the national urban transport body to hand over day-to-day responsibilities to the relevant city assemblies.

**Figure 6.7 Structure of proposed Urban Areas Transport Authority**

| Division | Approximate Headcount |
|---|---|
| Chair & Board | 8 |
| CEO & Office | 2 |
| Support Services* | 8 |
| Public Transport | 12 |
| Roads and Infrastructure | 4 |
| Traffic Management & Safety | 8 |
| Integrated Planning | 4 |
| Total (Exc. Board) | 46 |



## 6.11 Parallel reforms and enabling measures

Analysis carried out for the NTMP has drawn attention to a number of important enabling factors for a successful delivery chain and the achievement of key desired outcomes. In order to make a difference it is vital that institutional reforms are accompanied by a range of other factors. These include:

- **A clear legal and regulatory framework** – to ensure that institutions are supported by a clear mandate, function and powers in law;
- **Capacity building to develop people and their skills** – to ensure institutions have the right staff and competencies, appropriate rewarded and motivated to undertake key activities;
- **Processes and systems, within and between different organisations** – to ensure that institutions define and undertake their activities logically, sequentially, work together in the most effective and efficient manner, and use ICT to boost productivity and informed decision making;
- **Funding and finance** – to ensure that institutions are sufficiently resourced to plan and manage their own affairs, to invest in the sufficient infrastructure and services in line with policy objectives, and to reduce burdens on the State through appropriate deployment of the private sector; and
- **Data and analysis** – to ensure that institutions have data in the right format to support management decisions, to monitor and report implementation progress and results and to have a "single source of truth" which can inform planning, investment and operations across all modes and networks.

These factors are crucial and cited under each of the other proposals where relevant. Institutional arrangements in Malawi currently exhibit weaknesses in all these areas.

Four areas requiring particular improvement if the NTMP is to be successfully delivered are outlined below.

### 6.11.1 Enhancing staff capacity and skills

Malawi faces a substantial "skills gap" regarding the capacity to deliver the changes to transport infrastructure and services set out in this NTMP, effectively monitor NTMP delivery and outcomes, and to employ suitably qualified staff to work in the new public institutions proposed in this NTMP, as well as to work in their respective supply chains. Previous initiatives such as NCIC have focused on closing gaps in certain areas, but more must be done to upskill the transport sector including:

- Policy formulation, strategy and business planning;
- Development, management and enforcement of technical and economic regulation;
- Transport planning, including modelling, demand forecasting, option generation and multi-criteria appraisal, pre- and feasibility studies, outline design, economics and business case;
- Operations and maintenance, including asset management and traffic management;
- Transport assessment, environmental impact assessment and sustainability appraisal;
- Civil engineering and design, including road and rail, as well as possible urban transit systems;
- Transport technologies, including ICT, ITS and vehicle and fuel innovations;
- Project management, procurement, tender management and contract supervision;
- QHSE, especially if accreditation to appropriate international standards is sought; and
- Monitoring and performance management.

In order to address this, it is recommended that the National Transport Committee, working closely with MoTPW and district councils in particular, establishes a Malawi Transport Skills Initiative (MTSI) with the goal of identifying and closing the skills gap within the transport sector.

The initiative should commence with a sector needs assessment, review of existing supply and availability, and quantification of the gap which must be filled to implement the NTMP. Once the gap is known for both the public and private sectors, a phased MTSI Action Plan should be drawn up which seeks to build skills and capacity in key areas over time through a range of practical measures.

Such measures might include:

- Raising awareness of opportunities within the transport sector amongst existing government employees, school and university leavers;
- Professional training from transport consultancies of existing staff, subsequently extending to a wider range of new recruits;
- Secondment of international experts into selected Malawian transport institutions, with a remit to disseminate their knowledge to junior colleagues;
- Attending recruitment fairs at overseas universities, taking on junior staff with overseas graduate and postgraduate qualifications, as well as sponsoring selected Government of Malawi candidates on overseas postgraduate or equivalent courses[38];
- Establishing or supporting relevant courses and modules, and providing careers advice, for students at local training colleges;
- Developing induction and internal skills development schemes, linked to Continuing Professional Development (CPD);
- Requiring key government institutions to develop their own training needs assessments and deployment plans with targets set and monitored for delivery;
- Ensuring that contracts let to international firms include specific requirements for local training, secondments and skills transfer; and
- Developing local branches of established international professional institutions such as the Chartered Institute of Highways and Transportation within Malawi.

It is recommended that the MTSI is led by a Working Group established under the NTC, including the Government, local authorities, JTSR, industry and academia. The Group should be supported by a Project Manager who will work across all stakeholders to achieve the objectives set out in the MTSI Action Plan.

*38 MoTPW already does this in a relatively small number of instances.*

## 6.12 **Supporting data collection, research and benchmarking**

Work in developing the NTMP has demonstrated significant gaps in transport-related data and statistics in Malawi, including poor definitions, collection and analytical methodologies. The capacity to undertake large-scale survey or data analytical exercises is also largely lacking. This limits the ability of decision-makers to set and implement policy in a consistent and co-ordinated basis, grounded on robust evidence, as well as monitor the progress of agreed interventions.

Research and development is likewise poorly developed and rarely deployed in a manner which contributes to strategy, new policies and practices for transport management and the introduction, early adoption and wider take-up of new technology and innovative practices.

Early action is therefore needed to:

- Identify required key transport datasets, covering land use planning, passenger and freight supply and demand and public perceptions;
- Analyse current gaps in data and make proposals for the collection of relevant new data;
- Define appropriate national data classification, collection, storage and reporting standards, processes and systems;
- Establish minimum data accuracy requirements;
- Develop appropriate systems for data analysis, presentation, access, audit and quality control;
- Investigate the potential for technology, including Intelligent Transport Systems, to automate data collection and analysis;
- Develop appropriate transport modelling and appraisal tools; and
- Identify key topics for research, development and benchmarking.

The establishment of the National Transport Committee and the strengthening of MoTPW will, to some degree, address this situation since the Ministry will include functions for transport monitoring and research and technology and be able to include such items in its budget.

However, in addition to this, it is recommended that MoTPW lead the creation of a strategic framework and depository for all transport data, surveys and statistics, set common data collection, analytical and storage systems and processes, and serve as a knowledge exchange platform for research, technology and good practice. It will also provide a basis for independently monitoring emerging outcomes of the NTMP as well as supporting its future review and update in light of progress made. During the preparation of the NTMP specific data sets were created.

### 6.12.1 **Institutional integrity**

Despite commitments and recent efforts within the Government, there is evidence that irregular or corrupt practices continue to extract funding contributions, reduce the value of investments available, and weaken the reputation, effectiveness and integrity of key Government of Malawi departments and agencies. Malawi currently ranks 120 out of 176 countries in the (2016) Transparency International Corruption Perceptions Index, a poor performance at a global level although less so against a number of worse candidates within Sub-Saharan Africa.

Whilst such occurrences are not confined to the transport sector, and possibly no better or worse than other parts of the Malawian economy, they will, nevertheless, undermine the delivery of the NTMP if not identified, tackled and prosecuted. This is especially the case for funding from Donor Agencies which is conditional on resources being properly deployed in line with the objectives for which it is given.

Important milestones in the fight against corruption in Malawi have been the creation of a number of relevant institutions, laws, policies and strategies, including the National Anti-Corruption Strategy. Through the National Transport Committee, and working with other government agencies, efforts should be made to minimise instances of petty or grand corruption, conflicts of interest and nepotism in contracts and appointments. This should include the design of explicit measures to ensure the integrity of business systems in the new bodies proposed within the NTMP.

### 6.12.2 Technical assistance

Technical Assistance from the Donor Agencies might make a big difference to the chances of success of the NTMP, with the creation of JTSR (for wider stakeholder engagement) and TSPMIF (for data collection and monitoring) being two enduring examples from previous rounds of assistance. Engagement with Donor Agencies, co-ordinated currently by AfDB, is therefore required to ensure NTMP enabling measures are identified alongside institutional restructuring, specified and procured in a co-ordinated manner.

## 6.13 Restructuring MoTPW

The proposals above involve a lot of change to the role and functions of the MoTPW. In particular, the vertical separation of policy, regulation and operations will abstract substantial activities, capacity and resources from the core Ministry, significantly reducing its current headcount of over 1,500 staff.

At the same time, the Ministry also faces major current issues of skills and capacity deficits in its ranks, with a third of posts being vacant, poor office and support facilities, limited use of ICT to make internal procedures more efficient, and limited deployment of up-to-date planning techniques, data, processes and systems to carry out core activities. Irrespective of the wider sectoral reform programme, these weaknesses must be addressed.

In the medium-term, therefore, once the main regulatory changes have been enacted, it is recommended that the Ministry is subject to a comprehensive Functional Review which takes a top-down investigation of:

- What roles and activities, MoTPW officers will need to undertake in the future;
- Which functions should be added, strengthened or modified, and which functions should be divested;
- What new or amended techniques, data, planning processes and systems are required;
- What additional recruitment, training and other capacity building activities are required to populate new functions or deploy new processes, techniques and systems; and
- How should the Ministry be led and managed within a more complex stakeholder environment.

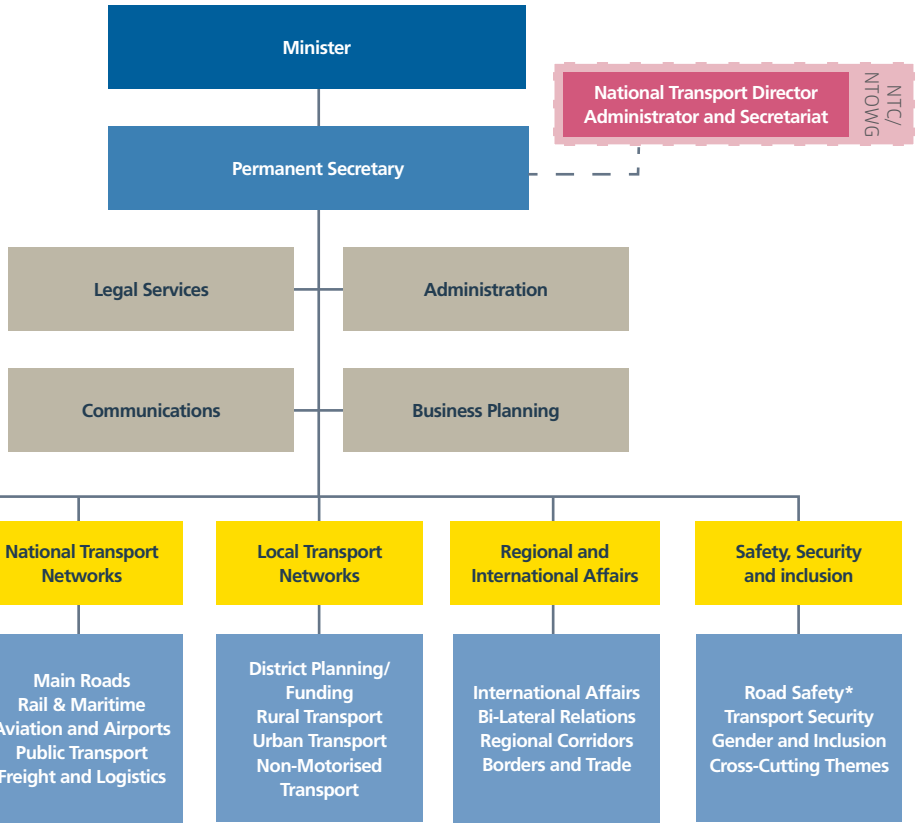
The Review should not look at the Ministry in isolation, but also the wider context of the changed governance arrangements across the transport sector as a whole, including the creation of the National Transport Committee, National Transport Authority, devolved arrangements for local transport planning at the district level and the need to monitor and performance manage the targets and KPIs set by the NTMP itself. It should also reflect the proposal that MoTPW host the National Transport Secretariat, National Road Safety Unit and Local Transport Network Division which will be crucial for broader servicing, maintenance and monitoring of the NTMP programme and desired outcomes.

The vision, in planning the way forward, is of a modern, rejuvenated, efficient and accountable Ministry with the required skills, processes and systems fit to meet the challenges of the transport sector and co-ordinate the activities of a more complex stakeholder environment. This will require major functional, structural, technical and cultural transformation.

It would be premature to define the full terms and dictate the findings of the Functional Review. However, Figure 6.8 shows one possible organisational arrangement for the Ministry in light of a re-examination of its roles and capacity.

## Figure 6.8 Potential new structure for MoTPW

| Division | Approximate Headcount |
|---|---|
| Chair and Board | 8 |
| CEO and Office | 2 |
| Support Services* | 10 |
| Economic Regulation & Transport Costs | 5 |
| Technical Regulation & Management* | 45 |
| Transport Safety Regulation (Rail / Water) | 5 |
| Total (Exc. Board) | 68 |




* Reduced if shared with another organisation.

These arrangements are set in the context of the transport sector as a whole and in further detail for the focus areas and activities of individual MoTPW Divisions and Sections. The latter are proposed to move away from a basic modal configuration into a format more around spatial tier, theme and process.

On this basis, it is anticipated that five new MoTPW divisions will be put in place for:

- **Transport Policy, Regulation and Planning** – responsible for investigating, advising and recommending policy to the Minister and its translation into plans, strategies, regulatory arrangements and governance arrangements;
- **National Transport Networks** – covering planning and oversight infrastructure, services, concessions and user needs for the key national road, rail, airport and inland water networks, working with the appropriate regulators;
- **Local Transport Networks** – covering the direction and support to district councils in planning and co-ordinating rural and urban transport networks across all modes, including the proposed DTIMP process, working closely with MoLGRD;
- **Regional and International Transport** – covering the key regional corridors through Mozambique, Tanzania and South Africa, as well as wider engagement with SADC and COMESA; and
- **Safety, Security and Social Inclusion** – including policy and oversight of road safety (working with the NRSA), crime and security on key transport networks, gender issues and rural accessibility.

These functional divisions would sit within a set of strengthened and professionalised administrative and support functions under the Permanent Secretary. In addition, MoTPW will host the Director, Administrator and Secretariat for the National Transport Committee and Officer Working Group. This will report to the Secretary as well as being accountable to the wider NTC. In addition, the same unit may host the secretarial and support functions for a strengthened Joint Transport Sector Review and it programme of activities.

This arrangement is illustrative only, and precise configurations and detailed divisional names and functions should be decided by detailed Functional Review. The Review will also determine an appropriate headcount for the new Ministry, recognising that it is likely to be a substantial reduction on the 1,500 currently employed, but working within a more professionalised, productive operations model, business-orientated culture, and with use of ICT to automate or support many tasks which are currently done by hand or through paper-based records and processes.

The Review should also address how recruitment and retention, skills identification and competence, and motivation and reward can be made more effective within the Ministry. Poor remuneration, limited career advancement relative to the private sector, recruitment freezes or delays in getting wider civil service approval for key appointments, mixed morale, and poor equipment and support facilities, for example, are major barriers to MoTPW effectiveness under current conditions and will need to be addressed. Solutions may require changes to wider civil service and the Government practices and not be just confined to MoTPW.

A specific recommendation concerns the residual role of the Department of Civil Aviation. When the CAA is established, policy and planning related to aviation should be placed within the Department of Transport Planning. The management of airports not under ADL should be placed in National Transport Networks with a view to divesting these airports to other Ministries, to local authorities and the private sector, and selling off the remainder.

## 6.14 Strengthening stakeholder engagement

More could be done to strengthen and give more focus to inter-agency and stakeholder engagement, especially as policy, regulatory and operational delivery functions will become more clearly separated in the future.

### 6.14.1 Joint transport sector review

The Joint Transport Sector Review (JTSR) is well supported with over 100 stakeholders from the Government, development partners and civil society attending the annual meetings and around 30 government and development partners attending Quarterly Joint Technical Committee. It has an action plan which are discussed. However, JTSR remains essentially a voluntary forum and has no formal powers beyond advice. Moreover, there is no explicit or binding linkage of its action plan to the plans and programmes of MoTPW, other partners in the Government and other important stakeholders (including the private sector). Figure 6.9 presents how the strengthening of JTSR can work.

Looking to the future, it is recommended that JTSR be retained, but reform is undertaken to build on some of its strengths and address its observed weaknesses. Potential changes include:

- Appointing an Independent Chair, with rotating candidates separate from the Government and with a focus on the private sector;
- Encouragement to the private sector and voluntary sector, including representatives of transport users, to not only attend the annual meetings, but participate in more focused initiatives and work;
- Developing a more focused JTSR Technical Group which meets every two months with a clear action-orientated agenda as an executive group of the wider grouping in between the Annual Meetings;
- More focus on action planning and monitoring against a structured set of activities and desired outcomes, and in particular responding decisively when agreed actions fall behind or do not deliver their intended benefits;

- These activities need to recognise and include initiatives by the private and voluntary sectors, such as service accreditation or sponsorship of named schemes, as well as those public-sector schemes aligned with the NTMP programme;
- Stronger communications, publicity and media relations for the JTSR in all its activities, including challenge to MoTPW or public agencies where required and appropriate; and
- Establishing Task and Finish Groups on key topics presenting particular challenges across agencies and stakeholders, with the membership, terms of reference and method of operation of these Groups bespoke to the topic in hand. Looking forward, JTSR should also become more integrated with the wider NTMP institutions. In particular, the JTSR Chair, or his or her representative, should be invited to sit on the National Transport Committee. The Group should also be served and informed by activities and data from the National Transport Secretariat hosted by MoTPW. This will give members more information and capacity to review and challenge national transport performance, initiate selected research and make informed statements and decisions.

### 6.14.2 Wider engagement with the private sector and users

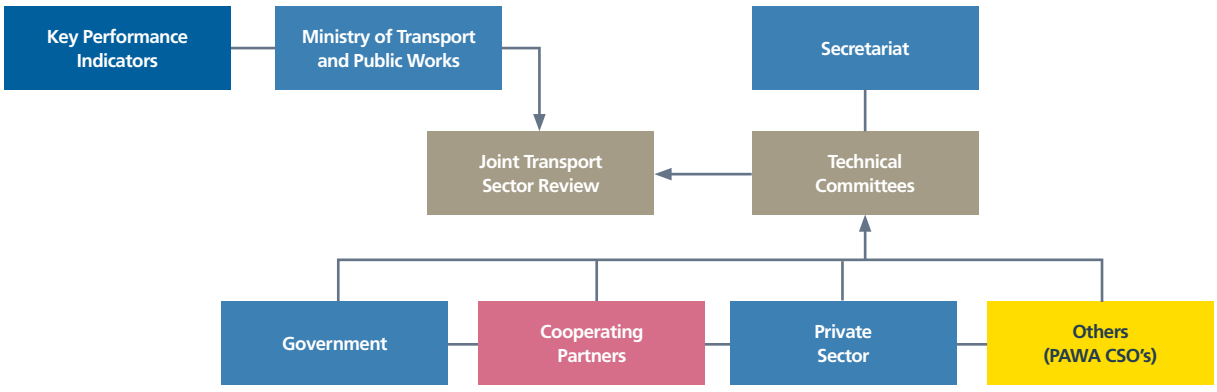
Alongside the strengthening of JTSR, efforts should be made to improve the capacity, co-ordination and representation of the private sector, as a crucial partner in NTMP delivery. An example is the Road Transport Industry Council above. The proposed Urban Areas Transport Authority, MoTPW and districts should also encourage consolidation and professionalisation of the urban minibus sector as part of wider efforts to improve urban public transport in the larger towns and cities.

Experience of transport sector delivery also suggests that strategies are most effective when grounded on the needs and expressed views of users, stakeholders and wider communities.

Opportunities for greater involvement of users, stakeholders and communities should therefore be therefore identified and progressed to make the NTMP more relevant and effective for those it is designed to serve. This may include, for example as part of DTIMPS or the development of operating franchises, inviting users to identify infrastructure defects, rate standards of provision and suggest improvements.

Encouragement could also be given to the establishment of Transport User Groups (TUGs) as community based organisations and advocates for transport at a local, particularly rural, level.

**Figure 6.9 Strengthening the JTSR**



The manner in which TUGs operate is for the Groups themselves to decide. However, functions could include working with national agencies or district councils to identify the need for transport infrastructure and services in particular locations or for particular modes; holding workshops and seminars on particular local transport issues; and promoting education of road users through the promotion of safe, more fuel efficient or environmentally beneficial means of transport.

"Champions" for the private sector and transport users should be designated on the JTSR and, along with the Chair, invited to attend meetings of the National Transport Committee and its associated groups.

## 6.15 Integrated programme of institutional reform

Figure 6.10 shows what Malawi's transport sector may look like should the NTMP proposals be implemented.

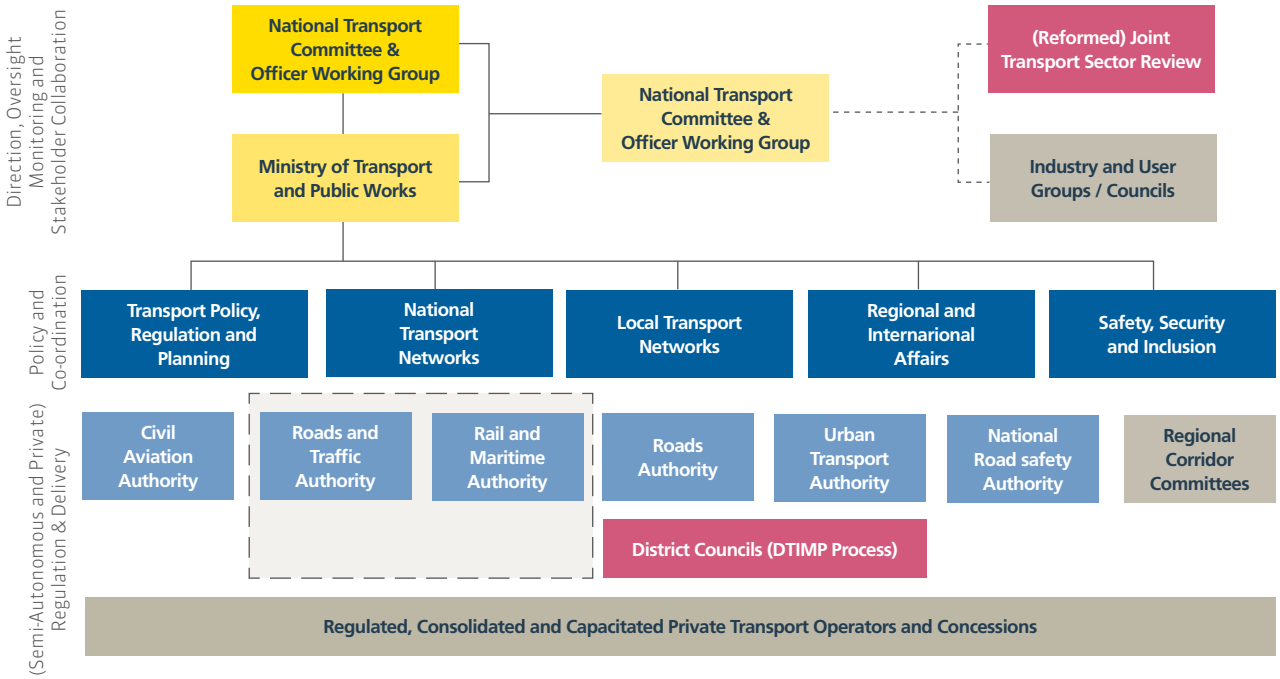
In summary, the revised institutional arrangements, when taken together:

- Give **purpose and focus** to all public and private stakeholders through the framework of the NTMP and its consequent objectives, targets and programmes;
- Strengthen Sector **leadership and co-ordination**, through the Inter-Ministerial National Transport Committee and reformed MoTPW, with a retention of high-level political control, whilst delegating planning, regulatory, and operations to those best placed to manage it;
- **Vertically separate functions**, allowing different tiers and organisational types to focus and specialise on the activities best suited to them;
- **Fill a number of modal and thematic gaps** in policy, including local transport, rural accessibility, urban public transport and traffic management, non-motorised transport and regional corridors;
- Reflect the **National Decentralisation Policy** and devolve decisions best made locally to district councils, within a framework of national guidance and standards;
- Secure **parallel improvements** to planning processes, capacity and skills, integrated programme management, funding and budgeting, as well as outcome monitoring and performance management;
- Consider how **private sector operations** can be better regulated, engaged and improved;
- **Strengthen joint working** at all levels, including a strengthened and more independent JTSR, and recognise the needs and contributions of transport users; and
- Are **practical, implementable, demonstrate value for money** in the use of resources and will ensure stability for the transport sector over time.

The reforms also seek to promote a cultural shift within the sector to support a transition towards a more professional, outcome-orientated, and dynamic organisation, which is necessary if it is to be capable of adapting to address the challenges that it will experience in coming years.

Change can be disruptive and carry its own risks, especially given the acute shortage of funding and technical skills within Malawi. Whilst a number of new bodies are suggested for creation, therefore, the opportunity has been taken to amalgamate functions organisationally into multi-sector arrangements where feasible, as well as promoting principles of organisational efficiency and integrity.

## Figure 6.10 Revised structure of Malawi transport sector under NTMP reforms




**A non-operational locomotive.**

# 7 Regulatory reform

## 7.1 Proposed approach to regulation

As with institutional change, the Government of Malawi is committed to using regulatory measures to deliver key elements of its reform programme. In particular, it is in the process of drafting and seeking Parliamentary approval for a number of new laws impacting the transport sector, including those focused on civil aviation, road traffic and inland water services.

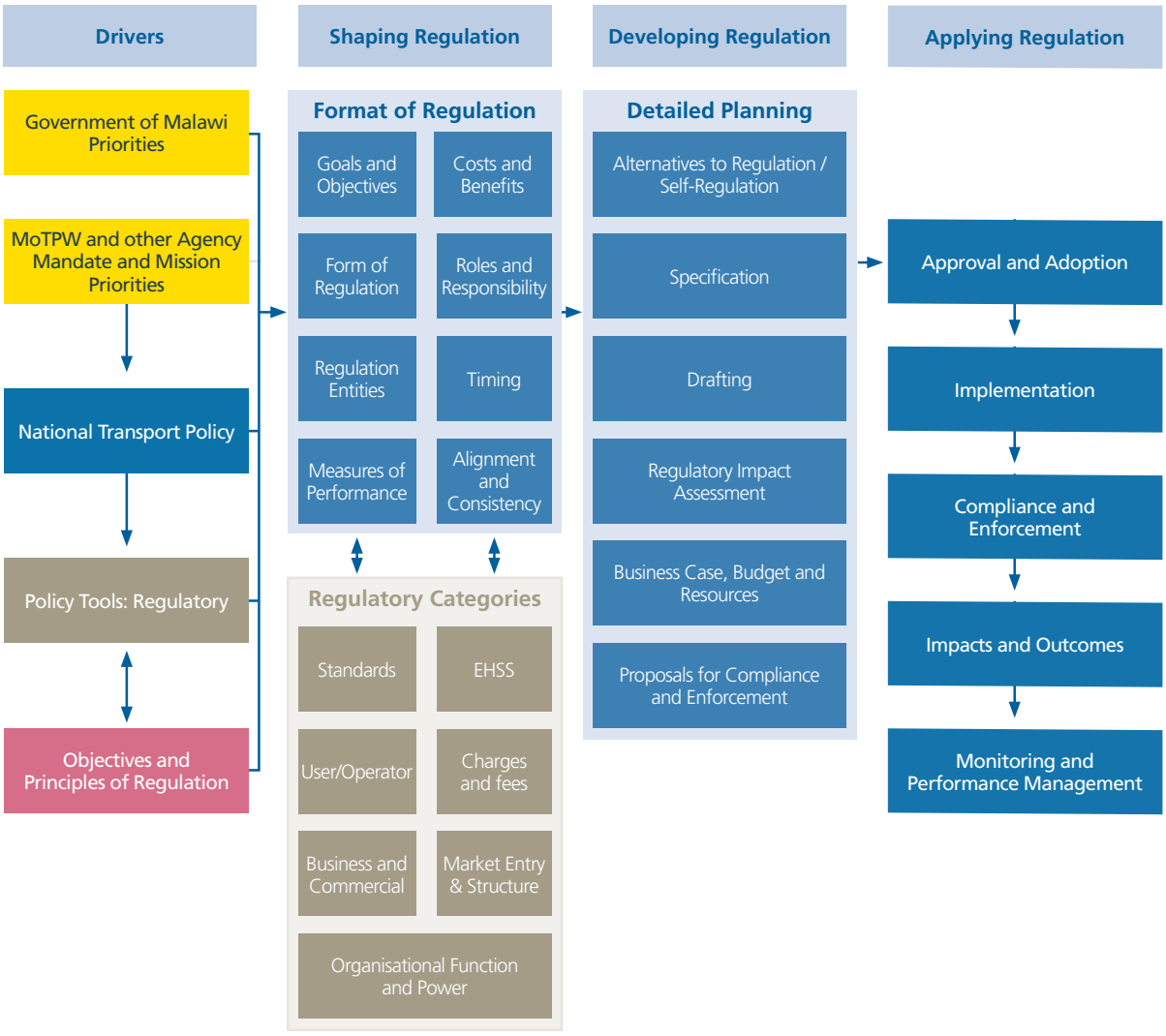
Looking ahead, the Government needs to use regulations to provide a clear basis against which transport infrastructure, services and other initiatives can be delivered, operated and maintained, whilst ensuring that the Government of Malawi's safety, social, environmental and other policy objectives are achieved.

MoTPW has already indicated its wish to maximise the involvement of the private sector in transport provision, including divesting itself of certain operational activities. This encourages a competitive market approach, but requires appropriate and proportionate regulation in the paramount interests of public safety, where there are risks of market failure or where competition might result in a lack of service co-ordination or harmful or negative practices for users, employees and communities. In addition, regulation of standards may be used to where infrastructure and services which might not otherwise be commercially viable are contracted or concessioned by, or on behalf of the Government.

In such cases, the NTMP proposes a new Regulatory Development Framework, set out in Figure 7.1, which the Government of Malawi should follow when originating and progressing new legislative and regulatory instruments. This process includes clear identification of need, an established basis in policy, informal and formal consultation with stakeholders and preparation of an implementation plan for measure following its approval and enactment.

**MoTPW has already indicated its wish to maximise the involvement of the private sector in transport provision, including divesting itself of certain operational activities.**

**Figure 7.1 Transport regulatory framework**




Within the Framework, MoTPW and regulatory agencies should adopt the following objectives in developing regulatory instruments and conducting regulatory practices:

- Intervene as a priority to prevent safety, security and environmental harms or manage risks, as well as generate economic and social benefits where these support the interests of businesses or welfare of communities;
- Enable flexibility where appropriate and feasible, allowing regulated entities to choose how best to achieve compliance provided the basic regulatory objectives are me (i.e. performance or process – based forms of regulation);
- Consider compliance and enforcement practices through existing regulations, including those under the jurisdiction of other agencies, in place of the creation of new measures if this is more efficient and likely to be effective; and
- Implement regulation efficiently and effectively, including minimising costs of administration and enforcement to the Government and compliance burdens on regulated entities.

Where enacted, regulations should be monitored for compliance and checks made that the desired outcomes are achieved. Proportionate inspection and enforcement action should be planned, adequately resourced and enacted to support this, including institutional strengthening of enforcement agencies with skills, equipment and effective funding as necessary.

**Regulations should be monitored for compliance and checks made that the desired outcomes are achieved.**

MoTPW should maintain, a register of transport laws and regulations in place, under development or proposed, and the department or agency responsible for its implementation, compliance monitoring and enforcement. It should regularly review existing regulations and update them as required to ensure they remain relevant and effective, and remove those which are no longer required.

## 7.2 Key regulatory principles

Under the NTMP, when developing, enacting and implementing regulations, MoTPW or current or new regulatory agencies should adopt the following key principles:

- Regulation will be adopted only where a robust, evidence based and clear case exists for the Government intervention and the benefits of such are shown to outweigh the costs;
- Regulation will be transparent in that it is related to stated policy objectives, explained clearly to those affected by it, based on consultation and feedback from stakeholders and formally published together with guidelines on how to comply;
- The Ministry will adopt a "right touch" approach to regulation in applying only the minimal degree of prescription and constraint necessary to achieve the desired result;
- The Ministry should emphasise principle, process and performance-based forms of regulation alongside and as well as more than prescriptive measures in order to allow flexibility and discretion in meeting the intended objectives in the most efficient way and minimising costs of compliance, monitoring and inspection;
- Before regulation is proposed or confirmed, non-regulatory mechanisms may be considered to achieve the same outcome through positive behaviours where feasible, such as stakeholder collaboration, voluntary codes of practice, user education and information, or collaborative working;
- The Ministry should adopt flexibility in its regulatory approach, with durability of the regulatory regime able to evolve in response to changing circumstances, the right of regulated entities to make representations during preparation of regulations and provide open feedback on their operation;
- A focus will be placed on certainty, with impacts of regulation being clearly understood, predictable, consistent with other regulatory practices and visible to regulated entities. In particular, risks of unintended consequences or excessive costs should be assessed and taken in account;
- The Ministry should ensure all regulations are (and designed to be) properly monitored and enforced, with periodic examinations to ensure they remain relevant and effective;
- The Ministry should update or remove regulations if they are no longer needed, fit for purpose or overtaken by circumstances; and
- The Ministry should create a central register of all transport regulations which are kept under regular review in respect of their intended and actual outcomes.

For all proposed measures, including new primary legislation, a Regulatory Impact Assessment should be prepared which sets clear objectives, considers options, addresses practicalities and defines costs and burdens to the Government and regulated entities of compliance, administration and enforcement, in all cases demonstrating that the benefits of regulation exceed the costs and proportionately serve the public interest.

In making the case for introducing new, or strengthening the level of existing, regulation, especially towards more prescription, the Ministry should also consider the following factors before taking action:

- The issue or problem under consideration has high risks or negative impacts for example previous or the potential for significant injury or loss of life;
- There is a need to meet, and ensure compliance with, international, regional or bi-lateral treaties, agreements and obligations;
- The efficiency or performance of transport networks could be significantly enhanced and the market, left to its own devices, is unable to deliver the required outcomes, or has acute distortions which prevent the socially-optimum result from being achieved;
- There is a substantial provision of public (or donor) funding being invested in infrastructure or services with a strong case for this investment to align with the Government policies;
- There is a need for absolute certainty of a change to behaviour amongst individuals, agencies or companies which otherwise cannot be assured (for example through self-regulation or collaborative working); and
- There is a history of non-compliance, negative practices and a demonstrated reluctance from the market to change and looser forms of engagement are deemed to have been ineffective.

## 7.3 Overview of proposals

In delivering the objectives and principles above, future legal and regulatory reforms to Malawi's transport sector being taken forward through the NTMP under eight areas of reform as follows:

- Laws and regulations should have a clear and transparent basis in policy;
- There should be a stronger relationship between primary legislation as enabling measures, and detailed secondary regulations and guidelines which can be developed, reviewed and updated flexibly;
- MoTPW should determine and adopt overall objectives and guiding principles in its approach to regulation, taking a top down approach to all regulatory activity, rather than progressing individual legal and regulatory instruments for individual modes and sub-sectors in isolation;
- There should be a consistent process to regulatory development, including the requirement for all legal and regulatory instruments to undergo a Regulatory Impact Assessment;
- All legal and regulatory instruments should have an implementation plan as part of their process of development and adoption, including budgets and resource estimates for manpower, new or adapted institutions, and procedures for compliance and enforcement;
- Technical Assistance should be provided to train staff in existing and new institutions in what legislation and regulations mean in practice and to develop effective policies, procedures, processes and systems to do the job;
- Legislation and regulations should be regularly reviewed and updated; and
- Government of Malawi should examine the interaction between general legislation, for example on PPP, and its application or compliance within the transport sector or key sub-sectors; and
- In addition, there are various specific recommendations on a sub-sector, mode and thematic-specific basis which align with the appropriate NTMP Sub-Sectoral Plan.

It is noted that significant elements of the NTMP proposals on regulatory development and application will be relevant not only to the transport sector, but other sectors where the Government is required, or feels the need to, intervene to achieve certain policy goals. In this case, other MDAs, for example Ministry of Justice, Competition and Fair Trade Commission, or PPP Commission, should be engaged.

Each area of reform is described briefly below with further details. As with institutional reform, a more detailed Strategy Paper covering a Regulatory Reform Plan has been prepared alongside the NTMP.

## 7.4 Overarching proposals

### 7.4.1 Basis in policy

Laws and regulations should have a clear and transparent basis in policy with no instrument drafted or taken forward without a clear demonstration of how it contributes to NTMP goals and objectives, or supports the wider strategy.

Ideally, proposals for new or amended regulations should trace back to specific measures as set out in the National Transport Policy or taken forward as strategic initiatives under the NTMP. For example, it should be possible to show how a particular proposal promotes better safety, aims to reduce transportation costs, protects the environment or improves accessibility in urban areas.

This principle also applies to new regulations which may be put forward by other MDAs from time to time in reaction to a specific challenge or incident; it should still be required to demonstrate how the suggested instrument aligns with an agreed policy.

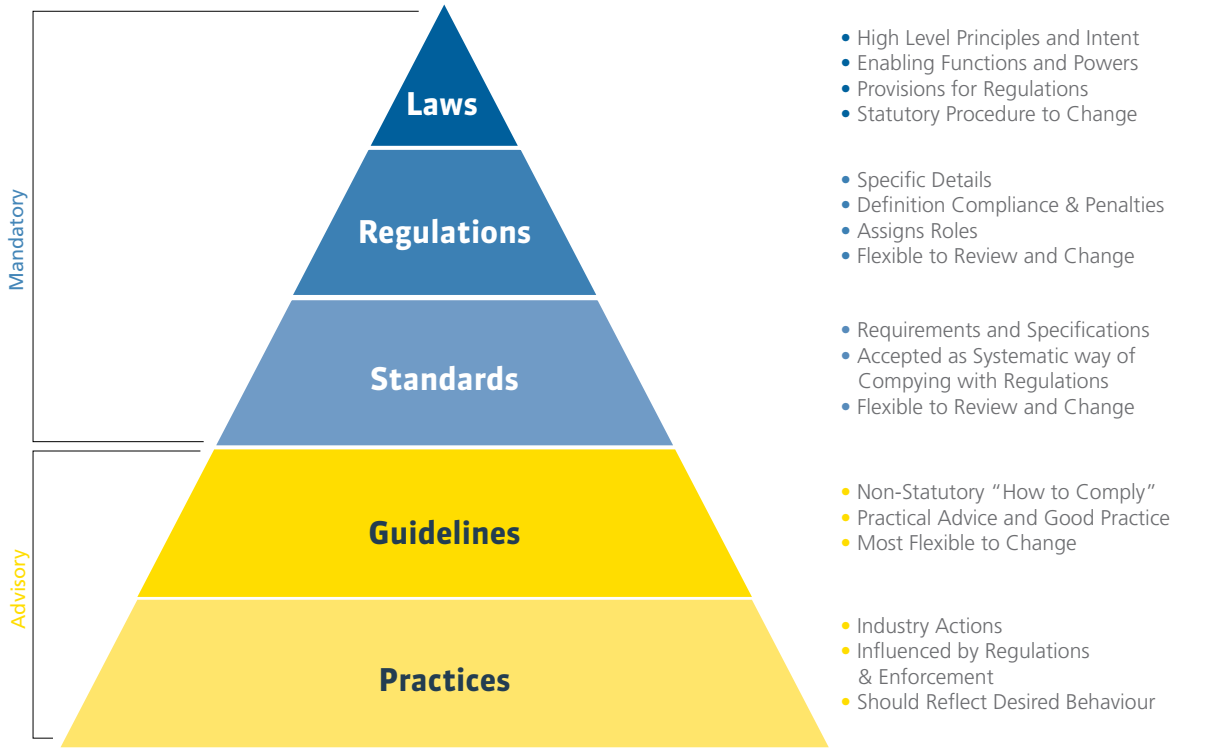
In some cases, a proposal may be put forward to give domestic effect to a regional or international obligation to which Malawi has given its signature. These may include, for example, ICAO, IMO, SADC or COMESA. In this case, the requirement may be one of lowering costs, protecting users or reducing barriers to trade from harmonisation of standards and procedures, but the overall policy objective, or challenge being addressed, should still be clearly set out from first principles.

### 7.4.2 Regulatory hierarchy

There should be an appropriate relationship and balance between primary legislation as an enabling measure, and detailed aspects in secondary regulations and guidelines which can be developed, reviewed and updated flexibly considering circumstances, practicality and level of compliance.

The hierarchy of regulatory measures set out in Figure 7.2 should be applied, with an emphasis on "shorter, better and smarter" enabling primary legislation put periodically to Parliament, but more detailed regulations and guidelines which can be produced and updated by MoTPW or regulatory agencies more frequently without the need to return to the original legal basis.

**Figure 7.2 Hierarchy of laws, regulations and guidelines**



**A balanced "right touch" approach to benefits versus costs of regulation.**

This proposal, which will save and proportionately distribute time and cost in evolving the overall framework of laws and regulations, it also places greater onus on the Government clearly explaining, through guidelines and other forms of engagement, to users of how to comply with regulations in the most efficient, practical and convenient manner. Non-statutory publicity, communications and information bulletins, written in plain language and available in a range of media, should therefore be prepared to this end, with budgets set aside to support such activity.

### 7.4.3 Regulatory objectives and guiding principles

MoTPW, working with other parts of the government, should determine and adopt overall objectives and guiding principles in its approach to regulation, taking a top down approach to all regulatory activity, rather than progressing individual legal and regulatory instruments for sub-sectors or challenges in isolation.

These objectives and guiding principles should include focusing on:

- A robust evidence base and clear case with the benefits shown to outweigh the costs;
- Transparency, consultation and feedback from stakeholders in regulatory development;
- A balanced "right touch" approach to benefits versus costs of regulation;
- Emphasis on principle and performance-based regulation over more prescriptive measures;
- Consideration of non-regulatory mechanisms, such as voluntary collaboration or publicity and promotion, to achieve the same outcome;
- Flexibility in regulatory approach, able to evolve with reasonable ease in response to changing circumstances;
- Understanding, certainty and predictability of impacts;
- Attention to proper compliance monitoring and enforcement, and investing in capacity, skills and systems to support these activities;
- Update or removal of regulations if no longer needed or fit for purpose; and
- Development a central register of regulations which is kept under regular review.

Once agreed, the objectives and guiding principles should be set out in a policy statement or guidance document "Transport Regulation in Malawi" which should be published under the auspices of the NTMP.

**A robust evidence base and clear case with the benefits shown to outweigh the costs.**

### 7.4.4 The process of developing regulations

There should be a consistent process to regulatory development, including the requirement for all proposals to undergo a Regulatory Impact Assessment, so that the benefits, direct costs and indirect economic burdens can be systematically assessed, understood and fine-tuned before they are introduced.

Regulatory Impact Assessment (RIA) is a particularly important concept, and one relatively new to Malawi. It is a process of systematically identifying and assessing the expected effects of regulatory proposals, using a consistent analytical method, such as cost-benefit analysis. The process is comparative, based on determining the objectives sought and identifying all the policy interventions that are capable of achieving them. These "feasible alternatives" must all be consistently assessed to inform decision-makers about the effectiveness and efficiency of different options and enable the most effective and efficient options to be systematically chosen.

According to the Organisation for Economic Co-operation and Development (OECD), RIA's most important contribution to the quality of decisions is not the precision of the calculations used, but the action of analysing, questioning, understanding real-world impacts and exploring assumptions. RIA should also be integrated with stakeholder consultation and give affected parties the opportunity to identify and correct faulty assumptions and logic. RIA is now used in most OECD countries and in many developing countries.

On this basis, the Government of Malawi should prepare, introduce and monitor the take-up of clear and consistent guidance for undertaking RIA for all regulatory proposals, including the transport sector.

### 7.4.5 Implementation, compliance and enforcement

All legal and regulatory instruments should have a costed implementation plan as part of their process of development and adoption. Indeed, this should be linked to the Regulatory Impact Assessment described above. The plan should include budgets and resource estimates for manpower, new or adapted institutions, and procedures for compliance monitoring and enforcement.

The plan should include the fact that enforcement activity may come from a different agency (e.g. traffic police, district councils) from that developing or making the regulation. Early engagement, development of practical monitoring and enforcement procedures, and potentially funding and capacity building, may be required to achieve this. The latter may include hypothecation of user fees or fines back into supporting effective enforcement activity as necessary in order to provide certainty of funding.

### 7.4.6 Technical assistance

Technical Assistance has long been provided to Malawi for a range of research, strategy development and advisory activities, for example by the European Union, World Bank and African Development Bank. Looking ahead, further Assistance should be provided to recruit, train and support professional staff in MoTPW and existing and new agencies under it to develop effective policies, procedures, processes and systems which can apply and oversee regulatory activity.

In the recent past, Technical Assistance has been deployed for direct drafting of new laws and regulations to be adopted within Malawi. However, developed out of context and with lack of ownership of the concerned agencies, such efforts have been limited in their success. In future, Technical Assistance should be more targeted at supporting and enabling Malawi's transport institutions to develop their own regulatory measures from first principles rather than stand-alone drafting activities in isolation from the local context.

Engagement with Donor Agencies, co-ordinated currently by AfDB, is required to ensure NTMP enabling measures are identified alongside regulatory development, specified and procured in a co-ordinated manner.

### 7.4.7 Regular review and update

Legislation and regulations should be regularly reviewed and updated to reflect changing policy objectives, innovation and technology, regional harmonisation and evolving regulatory practice, with measures removed or revised once they have ceased to be relevant, useful or cost-effective.

For this, the proposed National Transport Committee (NTC) and the multi-stakeholder Joint Transport Sector Review (JTSR) should both include oversight over regulations within their remits and duties. The latter is especially important to track the overall burden of laws and regulation on the private sector, and the incentive or disincentive for investment, in relation to the desired benefits and outcomes.

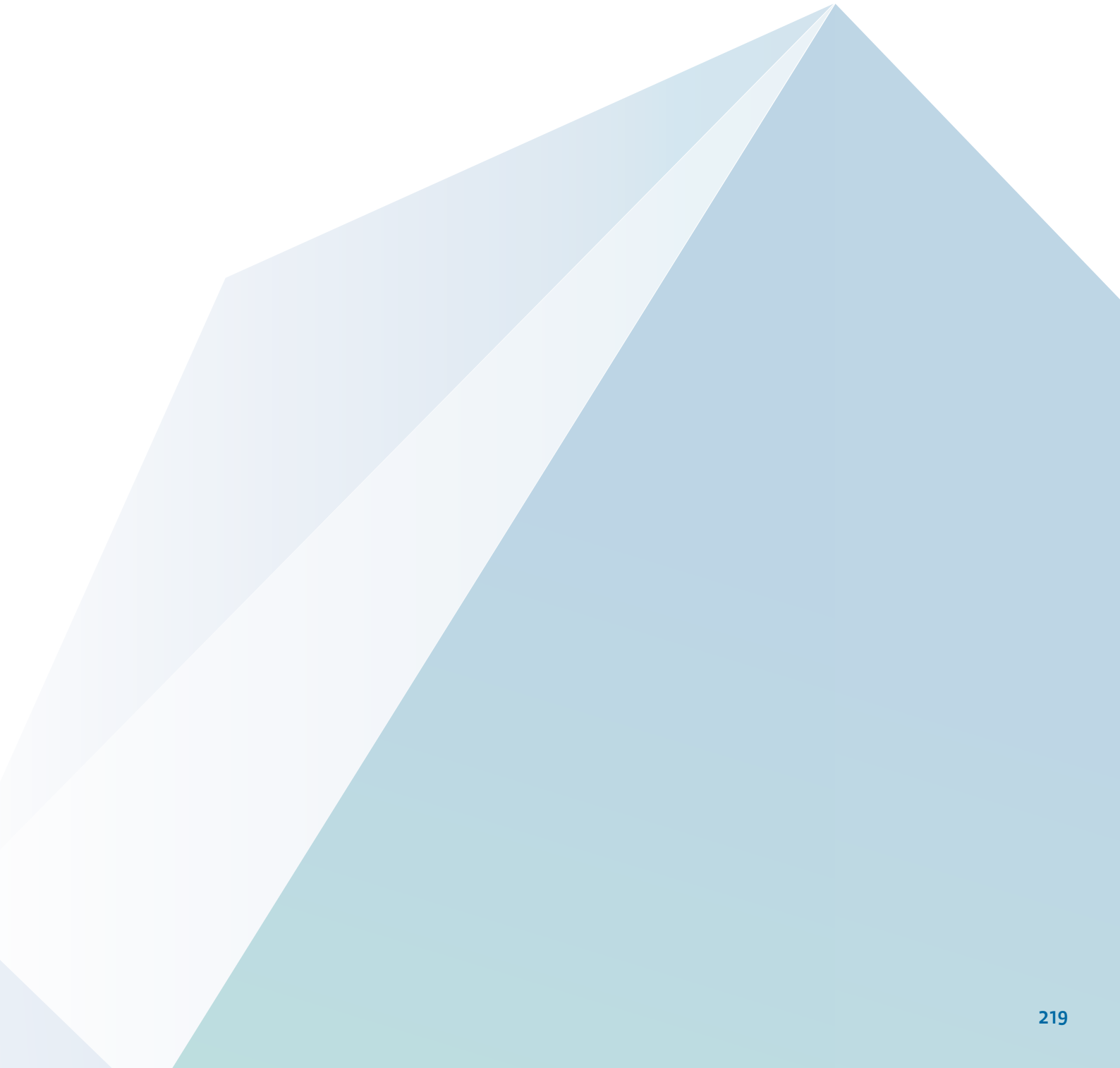
### 7.4.8 General and sector-specific legislation

It has been noted that some existing legislation is ambiguous or in potential conflict across different instruments. This includes, for example, legislation on inland water and rail and broader measures for letting of PPP concessions or management of fair competition.

Government of Malawi should examine the interaction between general legislation, for example on competition or PPP, with that applying within the transport sector or key sub-sectors, identifying and resolving conflicts. This will give certainty and confidence to regulators and the regulated entities alike on a clear way forward.

Equally, regulations for land use planning, whether in urban areas, development areas or in relation to the strategic road network, should consider transport aspects of development control, including requirement for a Traffic Impact Assessment and developer contributions/commuted payments to support mitigation measures.

The identification and mitigation of such conflicts should be part of the RIA process identified above.



**Monkey Bay to Dedza (S127) descending escarpment with good roadside drainage.**

# 8 Reform action plan

## 8.1 Short-term focus

Looking across the short-term time horizon between now and 2022, focus should be given to:

- Implementation of the Civil Aviation Act;
- A new Railway and Marine Regulation Act, modified from the 2015 draft and combining the institutional regulation of the rail sub-sector with that for the inland water sub-sector;
- A new Inland Waters Shipping Act, either in its own name, or in combination with the primary legislation for the rail sector as set out above;
- A new Public Roads Act to revise the current road hierarchy, revise and harmonise road standards;
- A new or amended Road Traffic Act, to establish an independent Roads and Traffic Authority from the current DRTSS, improve road safety and support decentralisation of local roads responsibilities;
- A new Urban Areas Transport Authority Act to establish the UATA grant it powers to concession urban public and transport operations; and
- A new Local Transport Act to establish a range of new institutional and regulatory arrangements for transport planning and delivery within local authorities.

This primary legislation will also drive a process of developing or updating more detailed regulations by MoTPW, existing and new regulatory authorities and district councils. For this reason, MoTPW, in tandem with other MDAs, should publish guidelines "Transport Regulation in Malawi" defining objectives, principles and processes for regulatory development, implementation, compliance and enforcement as a priority. It should ensure dissemination and training of key officers and professionals in these guidelines as required.

Beyond 2022, new legislation or secondary regulation should be planned and implemented to strengthen or make more efficient the initial measures, reflect changing policy objectives or implement new bilateral or regional agreements as may be required.

The immediate priorities are the establishment of:

- An Urban Areas Transport Authority; and
- Rail and Marine Regulatory Authority of Malawi.

**A new Local Transport Act to establish a range of new institutional and regulatory arrangements for transport planning and delivery within local authorities.**

## 8.2 Capacity building for city councils

City councils need to play a key role in local development, in which transport will be major part. A programme of capacity building for the four cities is proposed with the four components introduced below.

### 8.2.1. Local government finance

The objective is to increase the resource base of city authorities, and to improve transparency. Structural improvements to the framework of the local government finance are needed, along with reform of the fiscal architecture. This component would also develop financial instruments, e.g. financial management system software, output based budgeting, and harmonised audits.

### 8.2.2. Spatial planning

The capacities of city councils to apply GIS as a tool in spatial development and revenue enhancement will be improved. Fiscal cadasters will be developed. GIS will be supported in the planning process, and co-ordination of all stakeholders in spatial planning strengthened.

### 8.2.3. Development control

Development control procedures and operations will be strengthened, and transport implications of development proposals identified. Legislative gaps will be identified and submitted to the government.

### 8.2.4. Traffic management

There is a need for capacity building of public sector officials to facilitate the implementation of appropriate and effective traffic management schemes. The training provided should increase awareness of different measures and approaches that can be adopted, the pros, cons and risks associated with each, relevant codes of practice, requirements (for example regarding equipment), and health and safety considerations specific to traffic management. In terms of the measures covered, they should be comprehensive and include junction design, traffic signal design and operation, and related infrastructure needs of public transport and non-motorised transport.

## 8.3 Required actions

The Government should take the following actions:

1. Recognise the importance of comprehensive, evidence-based and practical laws and regulations as a key enabler of successful transport outcomes under the NTMP and invest in effective regulatory development alongside infrastructure, services and other interventions in the transport sector;
2. In line with the NTMP continue the reform programme of separating, functionally and institutionally, the roles of policy making, regulation and operations, including the privatisation or commercialisation of infrastructure and service delivery under a strengthened tier of regulatory agencies outside MoTPW;
3. Develop guidelines, provisionally called "Transport Regulation in Malawi" which set out the objectives, guiding principles and end-to-end process of regulatory development, implementation, compliance monitoring and enforcement within the transport sector and key sub-sectors;
4. Disseminate this document and request and deploy Technical Assistance to provide training, familiarisation and understanding of regulation amongst key Government of Malawi officers and professional staff;
5. Progress, in a timely manner, a range of primary legislation through Parliament under the NTMP, including Road Traffic, Public Roads, Local and Urban Transport, Railways and/or Inland Water;
6. Ensure that this new sectoral legislation is in conformity with existing general legislation such as PPP, fair competition, with ambiguities clearly addressed, and the strengthened legal and regulatory powers used to get greater social benefits out of existing transport concessions and private sector activity;
7. Accompany new legislation with clear implementation plans which address the institutional, organisational development, skills and capacity building implications of key clauses, which assign budgets and identify funding sources, including for compliance monitoring and enforcement;


8. Support primary legislation with the development of new or updated secondary regulation and advisory guidelines as required, balancing the different approaches available, including more flexible performance or outcome-based models ahead of more prescriptive forms of regulation;
9. Develop, adopt and implement a process of Regulatory Impact Assessment for all new regulatory instruments, including development of supporting materials to benefit officers and professionals; and
10. Ensure that the proposed National Transport Committee, National Transport Director and Secretariat, and Joint Strategic Transport Review, bodies that have been recommended to provide ongoing monitoring and performance management of the NTMP, are also responsible for reviewing regulatory initiatives, as well as reviewing physical interventions, and also for ensuring that adequate budgets are allocated to support regulatory reform when required.

## 8.4 **Specific actions**

The actions required to implement the measures above are listed in Table 8.1

**Table 8.1 Action plan for reforms**

| Action | Expected Date (Quarter/Year) |
|---|---|
| Cabinet Paper highlighting integrated institutional reforms and need to bring individual proposals to Cabinet in the future. | 4/17 |
| Detailed justification for Road Haulage Industry Council (RHIC) | 4/17 |
| Proposals for strengthening JTSR | 4/17 |
| Strengthening JTSR | 4/18 |
| Cabinet paper for RHIC | 1/18 |
| Establish traffic police/DRTSS co-ordination committee - Chaired by Minister to co-ordinate enforcement | 1/18 |
| Constitute private sector partnership for road safety funding and initiatives | 1/18 |
| Review proposals to strengthen road safety leadership and co-ordination and prepare a Cabinet Paper on options | 2/18 |
| Prepare Cabinet paper for Urban Areas Transport Authority (UATA) Bill | 2/18 |
| Prepare Cabinet Paper for establishment of Rail and Marine Regulatory Authority of Malawi (RAMRAM) | 3/18 |
| Establish urban transport co-ordinating committee | 2/18 |
| Review MoTPW structure to accommdate new priorities in Strategic Plan | 3/18 |
| Consult with Public Service Commission on above | 4/18 |
| Commission consultants to prepare full structural and organisational review of MoTPW | 1/19 |
| Cabinet paper to amend Road Traffic Act | 1/19 |
| Develop modalities for District Transport Plans | 3/18 |
| Adopt new road classification in Roads Act | 2/19 |
| Establish inter-ministerial rural transport working group | 1/19 |
| Continue multi-lateral discussions to establish corridor CMI's | 1/19 |
| Prepare Cabinet paper on surface Transport Regulatory Authority (TransRA) | 1/20 |

The proposed programmes for capacity building are listed in Table 8.2

**Table 8.2 Capacity building programmes required**

| Beneficiary | Justification | Expected Start Date (Quarter/Year) |
|---|---|---|
| MoTPW, stakeholder engagement | Need to improve engagement with private sector and civil society | 1/18 |
| Rail sub-sector, Government and concessionaire | Need to improve management, operations and concession management | 2/18 |
| Inland water transport concessionaires | Port and vessel operations, port and vessel maintenance | 3/18 |
| Department of Marine Services | Navigation, concession management | 1/19 |
| RAMRAM | Regulatory and concession management | When established |
| CAA | International obligations | When established |
| MoTPW | Corridor management | 4/18 |
| MoTPW, MoLGRD, districts | District Transport Plans | Under decentralisation |
| UATA | Bus route concessions and procurement | When established |
| RHIC | Transport cost efficiencies | When established |
| National Road Safety Authority | Stakeholder co-ordination and leadership | If established |
| City councils | Local government finance, spatial planning, development control and traffic management | 4/19 |


Road and rail access to Chipoka Port.

ATKINS


Malawi National Transport Master Plan

# C: Transport Sector Investment Programme

Final Report

The apron at Chileka International Airport.

# 9 Integrated options and appraisal

## 9.1 Appraisal method

The general principle for the appraisal of investment options is based on a high-level economic assessment of a scheme considering potential benefits from the scheme compared against the construction and maintenance cost. Costs beyond 'construction' are normally considered.

### 9.1.1 Approach

Several key Performance Indicators (KPIs) will be used for this economic case such as Net Present Value (NPV) of the scheme over its design lifetime, potential impact on the national economy and assessment of how the value-added benefit would contribute to national GDP.

Analysis which quantifies in monetary terms as many of the costs and benefits of a proposal as feasible, including items for which the market does not provide a satisfactory measure of economic value.

A standard cost benefit assessment involves assessing the costs and benefits associated with potential options on a common basis over a common time frame to provide a basis for comparing the relative net impact of each option.

These general principles are applicable for the assessment of transport investment schemes however complexity exists due to the presence of monetisable and non-monetisable impacts.

The appraisal method adopted is, however, not just about money and saving people's time. A wide spectrum of impacts is considered in a detailed appraisal, including various impacts on the economy, the environment and social welfare.

By adopting the approach that all investment decisions should follow this same high-level process, then objective comparisons of proposals for investment within and between projects and modes can be made. This approach is open and transparent, and is seen as best practice internationally.[39]

### 9.1.2 Appraisal components

Table 9.1 lists the steps in the appraisal process.

**Table 9.1 List of the steps in the appraisal process**

| Step | Component | Description |
|---|---|---|
| 1 | Strategic | Scheme is designed to meet policy objectives, and fits within the overall transport strategy |
| 2 | Economic | Scheme has demonstrable and quantifiable economic benefits to the nation |
| 3 | Commercial | Evidence of the commercial viability of a proposal and the procurement strategy that will be used to engage funders |
| 4 | Management | Assesses whether a proposal is deliverable. It tests the institutional and governance structure, risk management, communications and stakeholder management |
| 5 | Financial | Focusses on the affordability of the proposal, and its funding arrangements and technical accounting issues. Presents a financial profile of the scheme and its impact on the Government's accounts |

39 *Similar to the UK's Department for Transport, which uses a 'Transport Business Case' approach to support decision making for major investment.*

Individual investment options can be appraised under Steps 1 and 2 above; either ranked or on a pass/fail basis. Section 9.2 presents the strategic case of the schemes. The economic case needs some special considerations and they are explained in section 9.1.3. In Step 3, potential funding sources for schemes are identified, Step 4 points towards the institutional reforms set out in Chapter 7, for successful implementation. Step 5 then addresses the integrated plan, rather than individual schemes (presented in Chapter 11).

### 9.1.3 Economic case

The Economic Case assesses the impacts and the Value for Money implications of major project interventions. The economic, environmental, social, distributional and fiscal impacts of a proposal are assessed using qualitative, quantitative and monetised information. The main components are set out in Table 9.2. In this NTMP, aviation projects are excluded from the economic appraisal. They are instead treated as mandatory projects which meet international obligations or commercial interventions.

Table 9.3 lists the elements addressed in the economic appraisal by mode of surface transport. For rail and inland water transport projects the revenue and operating cost consequences of interventions are excluded from the economic appraisal. Revenues to the inland water or railway service operators are excluded as these are effectively transfer payments within the overall transport system, and what is most important is the saving in (financial) costs that accrue to the country as result of a modal shift. Equally the operating costs (which could include capital outlay) on rolling stock and vessels required to accommodate an increase in demand are excluded, as, in the concessioned environment, these are commercial consequences.

**Table 9.2 Economic appraisal**

| No. | Title | Detail | Includes | Output |
|---|---|---|---|---|
| 1 | Expression of monetised impacts | Calculation of those impacts, positive and negative, that can be expressed in money terms | Capital cost of the scheme and revenues | Initial Benefit Cost Ratio |
| 2 | Calculation of additional impacts | Include impacts where there is at least some evidence to support calculation of a money value | Reliability improvements, Option values and Non-use values, Regeneration, wider impacts | Adjusted BCR |
| 3 | Qualitative assessment of impacts | Consider and assess how scheme will affect each of the impacts individually | Impact of urban scheme on public realm, Severance and Security benefits | Judgment on wider VfM category |
| 4 | Sensitivity assessment | Test for against best and worst case scenarios | High and low demand forecasts, interest rates, required rates of return, GDP growth scenarios, high and low VoT | Assessment of robustness of schemes |
| 5 | Value for Money Statement | VfM statement | Final BCR, key risks and sensitivities | Value for Money Statement for each scheme |

**Table 9.3 Elements of the economic appraisal**

| Mode | Objective | Costs | Benefits |
|---|---|---|---|
| **Road** | ▪ Reduce road transport costs | ▪ Capital costs<br>▪ Maintenance costs<br>▪ Toll collection and management, if appropriate<br>▪ Losses in fuel levy | ▪ Time savings<br>▪ Vehicle operating cost savings<br>▪ Reduced fuel spending<br>▪ Reduced carbon emissions<br>▪ Accident reduction<br>▪ Revenue on toll roads |
| **Rail** | ▪ Modal shift to rail<br>▪ Reduced transport costs | ▪ Capital cost<br>▪ Losses in fuel levy | ▪ Transport cost saving from modal shift<br>▪ Road benefits (as above) from reduction in road traffic |
| **Inland Water Transport** | ▪ Modal shift to inland water<br>▪ Reduced transport costs | ▪ Capital cost<br>▪ Losses in fuel levy | ▪ Transport cost saving from modal shift<br>▪ Road benefits (as above) from reduction in road traffic |
| **Urban Transport** | ▪ Reduce transport costs | ▪ Capital cost<br>▪ Operating cost | ▪ Passenger fare reduction<br>▪ Time savings<br>▪ Fuel savings<br>▪ Reduce carbon emissions |

## 9.2 **Individual scheme appraisal**

The major interventions appraised for this NTMP are set out in Table 9.4 along with their policy and strategy justifications.

**Table 9.4 Major project interventions**

| Scheme name | Description | Objective | National Transport Policy outcome |
|---|---|---|---|
| **Rural Roads Upgrading (Table 5.19)** | Programme of 1,418 km of currently earth rural roads, to be upgraded to paved standard | Designed to reduce transport costs primarily for the movement of agricultural produce, and to increase rural accessibility | ▪ Reduced travel times and costs for persons and goods<br>▪ Enhanced access to inputs and to local and international markets by producers<br>▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling |
| **M12 Safety Project** | Introduction of segregated non-motorised transport lanes, primarily to protect cyclists and pedestrians from motorised traffic on the M12 from Lilongwe to Mchinji (90km) | To reduce road accidents, and to allow marginal increase in effective capacity on the main carriageway for increase in motorised traffic | ▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling<br>▪ Accidents and their derived human and economic costs reduced |
| **M1 Safety Project** | Introduction of segregated non-motorised transport lanes, primarily to protect cyclists and pedestrians from motorised traffic on the M1 in two stages:<br>(i) Mponela to Dedza (143km)<br>(ii) Dedza to Blantyre (250km) | To reduce road accidents, and to allow marginal increase in effective capacity on the main carriageway for increase in motorised traffic | ▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling<br>▪ Accidents and their derived human and economic costs reduced |
| **S143 Safety Project** | Introduction of segregated non-motorised transport lanes, primarily to protect cyclists and pedestrians from motorised traffic on S143 (10km) | To reduce road accidents, and to allow marginal increase in effective capacity on the main carriageway for increase in motorised traffic | ▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling<br>▪ Accidents and their derived human and economic costs reduced |

**Table 9.4 Major project interventions (continued)**

| Scheme name | Description | Objective | National Transport Policy outcome |
|---|---|---|---|
| **M6 Safety Project** | Introduction of segregated non-motorised transport lanes, primarily to protect cyclists and pedestrians from motorised traffic on M6 between Blantyre and Mwanza | To reduce road accidents, and to allow marginal increase in effective capacity on the main carriageway for increase in motorised traffic | ▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling<br>▪ Accidents and their derived human and economic costs reduced |
| **M1 Dualling** | Provision of an additional carriageway on the M1 from Lilongwe to Blantyre (338 km) | To provide capacity for increase in traffic, and reduce motorised transport costs | ▪ Reduced travel times and costs for persons and goods<br>▪ Improved reliability, levels of service and efficiency<br>▪ Enhanced access to inputs and to local and international markets by producers |
| **Lilongwe Eastern Bypass** | New 12 km dual 2-lane carriageway connecting the end of the existing Lilongwe bypass at the M12 to the M1 north of Kanengo | To reduce through traffic in Lilongwe city, and to consequently reduce journey times and transport costs for public transport users and private vehicles | ▪ Reduced travel times and costs for persons and goods |
| **Lilongwe Western Bypass** | New 20 km dual 2-lane carriageway connecting the M1 Bunda turn off to the M1 north of Kanengo. This road may be tolled in order to provide a revenue stream to fund maintenance and part of the capital cost | To reduce through traffic in Lilongwe city, and to consequently reduce journey times and transport costs for public transport users and private vehicles | ▪ Reduced travel times and costs for persons and goods<br>▪ Increased private sector investment in the operation and management of transport infrastructure |
| **Blantyre Inner Relief Road** | New 10km 2-lane road from M1 along Chileka Road, Chirimba Industrial Area, north-east of Ndirande to the M3 at Limbe | To reduce through traffic in Blantyre city, and to consequently reduce journey times and transport costs for public transport users and private vehicles | ▪ Reduced travel times and costs for persons and goods |

**Table 9.4 Major project interventions (continued)**

| Scheme name | Description | Objective | National Transport Policy outcome |
|---|---|---|---|
| **Blantyre Elevated Expressway** | New 8km road above the existing Chipembere highway | To remove traffic from the Chipembere highway to allow for reduced journey times for local traffic and public transport users | ▪ Reduced travel times and costs for persons and goods<br>▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling |
| **Lilongwe Bus Rapid Transit (BRT)** | New 20 km dedicated highway capacity bus route from Kanengo to Old Town on the west side of Lilongwe | Reduced journey times and costs for public transport users | ▪ Reduced travel times and costs for persons<br>▪ Improved reliability, levels of service and efficiency<br>▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling |
| **Reconstruction of the Sena Line** | New and rehabilitated railway linking Limbe to the Port of Beira in three phases:<br>(i) Beira –Marka (72km)<br>(ii) Beira-Marka-Bangula (116km)<br>(iii) Beira-Marka-Bangula-Limbe (245km) | Reduced transport costs for freight through transfer to rail. Reduced journey times and vehicle operating costs on roads due to reduction in goods vehicles | ▪ Reduced costs for goods<br>▪ Enhanced access to inputs and to local and international markets by producers |
| **Moatize Avoiding Line** | New 13 km railway chord connecting the Nkaya-Moatize line with the Moatize-Beira line, wholly within Mozambique | Reduced transport costs for freight through transfer to rail. Reduced journey times and vehicle operating costs on roads due to reduction in goods vehicles | ▪ Reduced costs for goods<br>▪ Enhanced access to inputs and to local and international markets by producers |
| **Chipata-Serenje** | New 388 km railway from Chipata via Petauke to Serenje on the TAZARA line, wholly within Zambia | Reduced transport costs for freight through transfer to railway access to the Port of Dar es Salaam. Reduced journey times and vehicle operating costs on roads due to reduction in goods vehicles | ▪ Reduced costs for goods<br>▪ Enhanced access to inputs and to local and international markets by producers |

**Table 9.4 Major project interventions (continued)**

| Scheme name | Description | Objective | National Transport Policy outcome |
|---|---|---|---|
| **Mbeya-Chliumba** | New 234 km railway from Mbeya to Chilumba via Karonga, allowing rail access to the Port of Dar-es-Salaam | Reduced transport costs for freight through transfer to railway access to the Port of Dar-es-Salaam. Reduced journey times and vehicle operating costs on roads due to reduction in goods vehicles | ▪ Reduced costs for goods<br>▪ Enhanced access to inputs and to local and international markets by producers |
| **Dry Port at Salima** | New intermodal connection at Salima to allow road freight to transfer to rail | Reduced transport costs for freight through transfer to railway in order to access the Port of Nacala. Reduced journey times and vehicle operating costs on roads due to reduction in goods vehicles | ▪ Reduced costs for goods<br>▪ Enhanced access to inputs and to local and international markets by producers<br>▪ Improved intermodal competition |
| **Lake Malawi Mtwara Corridor** | Development of Nkhata Bay Port to allow for provision of roll-on-roll-off freight service between Nkhata Bay and Mbamba Bay on the Mtwara Corridor | Reduced transport costs for road freight to access the Port of Mtwara. | ▪ Reduced costs for goods<br>▪ Enhanced access to inputs and to local and international markets by producers<br>▪ Improved intermodal competition |
| **Lake Malawi North South Service** | Scheduled freight service operating between Chilumba and Monkey Bay with associated port developments | Reduced transport costs for freight through transfer to inland water transport. Reduced journey times and vehicle operating costs on roads due to reduction in goods vehicles | ▪ Reduced costs for goods<br>▪ Enhanced access to inputs and to local and international markets by producers<br>▪ Improved intermodal competition |
| **Lilongwe City Centre Relief Road** | New 4kmtwo lane road connecting Mzimba Street with Presidential Way via Youth Drive, on east side of Areas 13 and 33. Includes some river training and embankment works | To provide an alternative route to and around city centre from the south | ▪ Reduced travel times and costs for persons and goods<br>▪ Improved access to social and public services for the urban and rural population including consideration of walking and cycling |

## 9.3. Introduction to the integrated plan

Table 9.5 lists freight volumes for the various rail scenarios tested, and Table 9.6 shows the same for the inland water transport scenarios.

**Table 9.5 Forecast port volumes to/from Malawi, 2036 (tonnes), rail interventions**

| Intervention | Beira | Nacala | Dar es Salaam | Total | % by Rail |
|---|---|---|---|---|---|
| Do Minimum | 0 | 468,600 | 0 | 468,600 | 13 |
| Moatize Avoiding Line | 372,600 | 451,500 | 0 | 824,100 | 23 |
| Beira to Marka | 979,500 | 406,200 | 0 | 1,385,700 | 38 |
| Beira to Bangula | 1,616,000 | 373,000 | 0 | 1,989,000 | 52 |
| Beira Direct | 1,664,000 | 364,000 | 0 | 2,000,000 | 55 |
| Dar via Chipata | 0 | 468,300 | 9,900 | 478,200 | 13 |
| Mbeya-Chilumba | 0 | 440,400 | 340,500 | 789,900 | 22 |
| Salima Dry Port | 0 | 478,500 | 0 | 478,500 | 13 |

**Table 9.6 Forecast port volumes to/from Malawi, 2036 (tonnes), inland water transport interventions**

| Intervention | Nacala | Dar es Salaam | Mtwara | Total | % by rail/IWT |
|---|---|---|---|---|---|
| Do Minimum | 468,600 | 0 | 0 | 468,600 | 13 |
| Nkhata Nay to Mbamba Bay | 459,300 | 0 | 81,600 | 540,900 | 15 |
| Chilumba to Monkey Bay | 468,900 | 31,800 | 0 | 503,700 | 14 |
| Chilumba to Liwonde | 480,500 | 47,500 | 0 | 529,000 | 15 |

The transport cost savings to the country, as a result of the potential rail and IWT interventions are set out in Table 9.7.

**Table 9.7 Transport cost savings, rail and inland water transport interventions**

| Intervention | Annual saving in transport cost (US$ million) in 2036 |
|---|---|
| Moatize avoiding line | 4.8 |
| Beira to Marka | 23.9 |
| Beira to Bangula | 38.6 |
| Beira Direct | 42.0 |
| Dar via Chipata | 0.1 |
| Mbeya-Chilumba | 9.4 |
| Salima Dry Port | 0.4 |
| Nkhata Nay to Mbamba Bay | 4.5 |
| Chilumba to Monkey Bay | 16.5 |
| Chilumba to Liwonde | 24.8 |

Table 9.8 presents the economic case of the schemes.

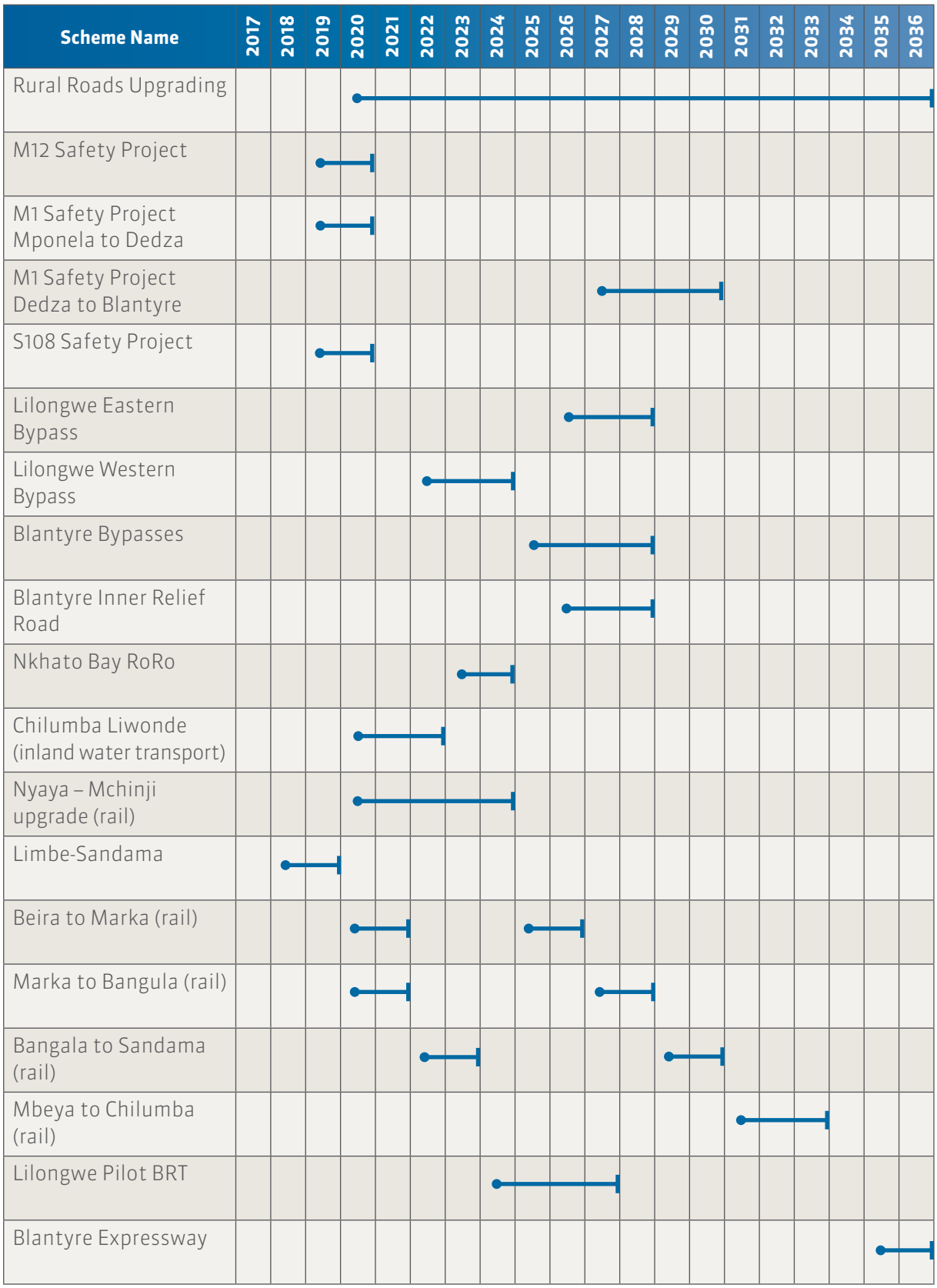
**Table 9.8 Economic appraisals of projects**

| Scheme | Opening year | NPV (US$) | NPB (US$) | NPC (US$) | IRR (US$) | BCR (US$) |
|---|---|---|---|---|---|---|
| Rural Roads Upgrading (2027 ) | 2027 | 8,546,905 | 282,475,761 | 273,928,856 | 10.28% | 1.03 |
| M12 Safety Project | 2020 | 14,223,539 | 43,899,177 | 29,675,638 | 13.15% | 1.48 |
| M1 Safety Project | 468,900 | 31,800 | 0 | 503,700 | 14 | 14 |
| Mponela to Dedza (road) | 2020 | 12,698,041 | 49,747,323 | 37,049,282 | 12.29% | 1.34 |
| M1 Safety Project Dedza to Blantyre | 2030 | 2,296,580 | 19,917,490 | 17,620,910 | 11.26% | 1.13 |
| S143 Safety Project | 2020 | 934,762 | 325,603 | 1,260,365 | 2.72% | 0.26 |
| M6 Safety Project | 2020 | 15,941,510 | 3,656,514 | 19,598,024 | 0.97% | 0.19 |
| S108 Safety Project | 2024 | 39,840 | 817,736 | 777,897 | 10.40% | 1.05 |
| Lilongwe Eastern Bypass | 2020 | 43,620,648 | 105,669,732 | 62,049,084 | 15.87% | 1.70 |
| Lilongwe Western Bypass | 2020 | 82,180,506 | 124,540,424 | 42,359,918 | 23.88% | 2.94 |
| Blantyre Inner Relief Road | 2026 | 62,155 | 6,621,001 | 6,558,846 | 10.10% | 1.01 |
| Blantyre Elevated Expressway | 2036 | 5,916,941 | 7,491,159 | 13,408,100 | 4.58% | 0.56 |
| Moatize Avoiding Line | 2027 | 2,813,794 | 33,080,866 | 30,267,072 | 11.58% | 1.09 |
| Beira to Marka Rail | 2026 | 28,050,933 | 519,132,894 | 491,081,960 | 10.53% | 1.06 |
| Beira to Bangula Rail | 2024 | 20,235,007 | 260,932,161 | 240,697,154 | 10.8% | 1.08 |
| Beira to Limbe | 2030 | -107,117,122 | 111,280,307 | 218,457,430 | 3.65% | 0.51 |
| Mbeya to Chilumba (rail) | 2032 | 4,519,818 | 244,397,861 | 239,878,043 | 10.21% | 1.02 |
| Salima Dry Port | 2020 | 1,563,581 | 22,164,620 | 20,601,038 | 10.64% | 1.08 |
| Nkhata Bay RoRo | 2022 | 592,038 | 20,044,124 | 19,452,086 | 10.26% | 1.03 |
| Chilumba to Monkey Bay (inland water transport) | 2020 | 52,803,563 | 87,472,112 | 34,668,548 | >15% | 2.52 |
| Chilumba to Liwonde (inland water transport) | 2020 | 42,478,209 | 95,225,938 | 52,747,729 | 15% | 1.81 |

## 9.4. **Preliminary programming**

The schemes in Table 9.8 have been programmed according to their economic performance, and potential opening year. This is shown in Figure 9.1.

**Figure 9.1 Major project programming**



## 9.5. **Appraisal of integrated options**

Table 9.9 lists the benefits of the integrated options. These comprise the transport cost savings resulting from a transfer of cargo to lower cost modes (rail and inland water transport) from road, and the economic benefits that result from fewer trucks on roads in Malawi, which will cause a reduction in vehicle operating.

**Table 9.9 Integrated option benefits, 2036**

| Scenario | Schemes | Transport cost saving (US$ million) | Economic benefits (US$ million) | Total benefits (US$ million) | Total cost (US$ million) | Net Present Value (US$ million) |
|---|---|---|---|---|---|---|
| **Integrated Scenario 1** | Rail: Beira – Nsanje | 48.6 | 144.0 | 192.6 | 280 | 177 |
| | Dry port: Salima | | | | | |
| | IWT: Chilumba – Nkhata Bay – Salima – Liwonde | | | | | |
| **Integrated Scenario 2** | Rail: Beira – Bangula | 63.1 | 147.0 | 210.1 | 1,477 | 70 |
| | Rail: Moatize avoiding line | | | | | |
| | Road: M1 Dualling – Songwe to Blantyre | | | | | |
| | IWT: Chilumba – Nkhata Bay – Salima – Liwonde | | | | | |
| **Integrated Scenario 3** | Rail: Beira – Limbe Direct | 87.0 | 189.0 | 276.0 | 1,528 | 212 |
| | IWT: Chilumba – Nkhata Bay – Salima – Liwonde | | | | | |
| | IWT: Nkhata Bay – Mpamba Bay | | | | | |
| | Road: Blantyre Expressway | | | | | |
| | Rail: Chilumba – Mbeya | | | | | |
| **Integrated Scenario 4** | Rail: Beira – Limbe Direct | 70.8 | 165.0 | 235.8 | 744 | 128 |
| | IWT: Chilumba – Nkhata Bay – Salima – Liwonde | | | | | |
| | IWT: Nkhata Bay – Mpamba Bay | | | | | |

Considering the benefits it would generate, Scenario 3 is by far the best scenario amongst the four integrated alternatives. The cost of this scenario is high owing to the high cost of the railway link between Bangula and Limbe. An alternative lower cost scenario would be to construct the line only up to Bangula from Beira and additionally the Moatize Avoiding Line, which are part of Scenario 2. It would however yield lesser benefit than Scenario 3. Therefore, the recommended integrated scenario is Scenario 3.

The NTMP assumes that there may not be a rail link between Chipata and Serenje to the Tazara line. In the short-term both Zambia and the region would benefit from a dry port at Chipata, which could later be moved to Petauke. In either event this could generate significant traffic on the Nacala Corridor and the existing Malawian railway network.

The NTMP seeks to take advantage of the Mtwara Corridor and therefore investments are required in Nkhata Bay and Mpamba Bay and these will build on existing investment in the corridor on the M5 and the M1. The NTMP provides for additional investment on the M1 and the M12 on the Mtwara Corridor to further cement this.

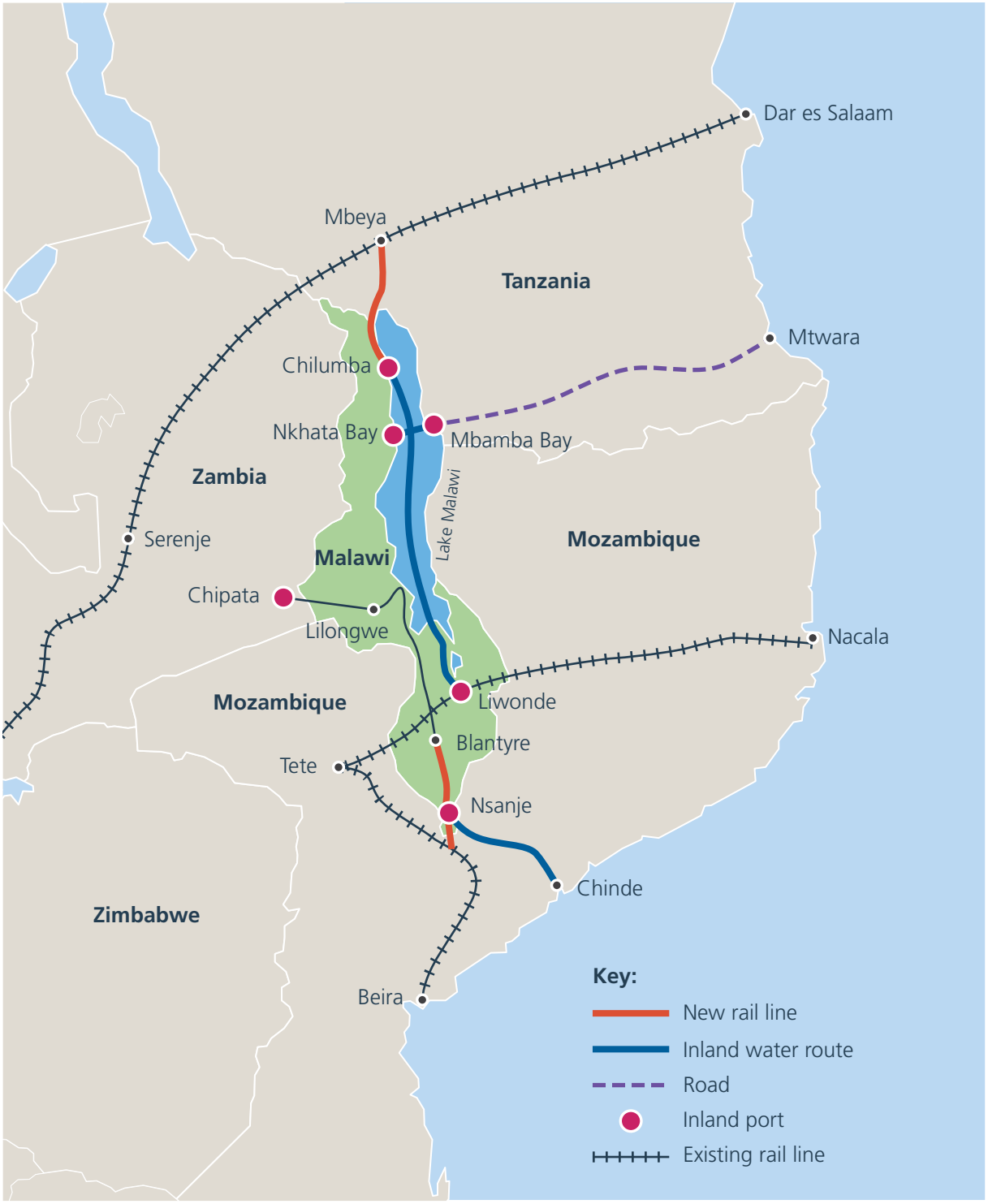
The NTMP includes a significant IWT north south component that serves to reduce costs and remove some of the burden from the M1 (North –South Corridor). There is a proposal for a river port at Liwonde and a full feasibility into this is required.

The proposed Chilumba-Mbeya rail link is a potentially redundant component within the NTMP since a lot of the focus is on transferring road traffic to rail and IWT to/from the Port Beira. The proposed rail link is strategic alternative to the use of Beira should there be civil unrest in Mozambique. However, this link would have a transformative effect on the economy of northern Malawi.

From the plan, it can be seen that, the underlying philosophy is to extend rail links into the country as opposed to attempting to build outwards from the existing rail network. This is not only cost effective but allows for future expansion when actual traffic online demonstrates the case.

The resultant integrated option is shown in Figure 9.2. There is a phasing implication in that if the railway runs to Bangula from the south and to Makhanga then a case can be built for a bridge across the Shire River. That case is different to a full line opening now.

**Figure 9.2 Integrated National Transport Master Plan**



## 9.6 **Cost of the NTMP programme**

This section provides the total cost of the NTMP programme from 2017 to 2037. The funding requirement has been presented in a number of formats, including break-downs by maintenance and capital investments, by sub-sector, potential funding sources and by type of projects and programmes. This will in turn inform forward planning by Government of Malawi and the identification of financial resources for delivery of the programme. The cost of the NTMP programme at US$9.15 billion is very high relative to historic spend, but gives an account of the required funds for the sector to address maintenance and development expenditures that will result in an improved transport sector for Malawi. Compared to the cost of the TSIP mentioned above, the NTMP programme costs are for all programmes in the sector covering 20 years. The TSIP only addressed specific projects for a 5-year period.

Though the total cost of funding the NTMP programmes appears enormous, this should not deter stakeholders in the sector to implement these programmes. Transport infrastructure is too important to the economy to be subject to across the board budget cuts and erratic funding allocations without first ensuring that alternate revenue streams are available. The NTMP programme is of the view that each transportation mode should be made as self-supporting as possible via direct user fees.

All infrastructure projects requiring large investments that will yield long-lived infrastructure should not be funded from annual cash flow, rather they should be financed and paid for over time, as the users of that infrastructure derive benefits from it.

The combined capital and maintenance costs for all the five sub-sectors in five year blocks is indicated below in Table 9.10. The required funding for the 20-year period has been split into five years blocks with the total cost for each five year period being relatively consistent. It is crucial for funding and financing requirements to be consistent throughout the entire period. The proportion of total funding attributable to each sub-sector is further shown in Figure 9.3 and indicates a significant requirement of NTMP funding resources are for strategic interventions around:

- Major projects which relate to all major infrastructure capital investments that have to be made across the sub-sectors;
- Minor capital works and programmes which include safety programmes, maintenance works and rehabilitations works. This category also includes infrastructure developments required to support existing services and facilities;

**US$9.15 billion**
NTMP total cost up to the year 2037. This covers all items to be expended by Government of Malawi, development partners, user fees, IFIs, PPPs and private sector sponsorship.

**US$540 million**
of which the Urban Transport Sub-Sector needs for maintenance and capital investments from 2017 to 2037.

**US$5.35 billion**
of which the Road Sub-Sector needs for maintenance and capital investments from 2017 to 2037.

**US$2.31 billion**
of which the Rail Sub-Sector needs for maintenance and capital investments from 2017 to 2037.

**Table 9.10 NTMP programme cost (US$'000)**

| | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| **Road sub-sector** | | | | | |
| Major projects | 581,000 | 464,500 | 688,000 | 600,500 | 2,334,000 |
| Minor capital works and programmes | 734,680 | 743,900 | 748,900 | 725,500 | 2,952,980 |
| District transport infrastructure and management | 6,500 | 12,000 | 12,000 | 12,000 | 42,500 |
| Institutional and regulatory | 10,250 | 3,350 | 3,350 | 3,350 | 20,300 |
| **Total of Road sub-sector** | **1,332,430** | **1,223,750** | **1,452,250** | **1,341,350** | **5,349,780** |
| **Rail sub-sector** | | | | | |
| Major projects | 344,000 | 412,000 | 733,000 | 726,000 | 2,215,000 |
| Minor capital works and programmes | 38,000 | 13,000 | 5,000 | 5,000 | 61,000 |
| Institutional and regulatory | 14,250 | 6,250 | 6,250 | 6,250 | 33,000 |
| **Total of Rail sub-sector** | **396,250** | **431,250** | **744,250** | **737,250** | **2,309,000** |
| **Inland Water Transport sub-sector** | | | | | |
| Major projects | 10,000 | 72,000 | 30,000 | 65,000 | 177,000 |
| Institutional and regulatory | 10,250 | 1,250 | 1,250 | 1,250 | 14,000 |
| **Total of Inland Water Transport sub-sector** | **20,250** | **73,250** | **31,250** | **66,250** | **191,000** |
| **Civil Aviation sub-sector** | | | | | |
| Major projects | 225,150 | 120,000 | 98,500 | 58,500 | 502,150 |
| Minor capital works and programmes | 11,500 | 117,000 | 68,500 | 4,500 | 201,500 |
| Institutional and regulatory | 10,850 | 3,450 | 0 | 0 | 14,300 |
| **Total of Civil Aviation sub-sector** | **247,500** | **240,450** | **167,000** | **63,000** | **717,950** |
| **Urban Transport sub-sector** | | | | | |
| Major projects | 39,000 | 100,000 | 111,000 | 101,000 | 351,000 |
| Minor capital works and programmes | 32,500 | 52,000 | 47,000 | 47,000 | 178,500 |
| Institutional and regulatory | 9,500 | 1,000 | 0 | 0 | 10,500 |
| **Total of Urban Transport sub-sector** | **81,000** | **153,000** | **158,000** | **148,000** | **540,000** |
| **Transport corridors** | **9,000** | **9,000** | **9,000** | **1,000** | **28,000** |
| **Cross-cutting issues** | **4,750** | **4,250** | **4,250** | **4,250** | **17,500** |
| **Total estimated cost of the NTMP** | **2,091,180** | **2,134,950** | **2,566,000** | **2,361,100** | **9,153,230** |

**US$718 million**
of which the Civil Aviation sub-sector needs for maintenance and capital investments from 2017 to 2037.

**US$17.5 million**
for mainstreaming cross cutting issues including advancing gender equality and environmental sustainability.

**US$191 million**
of which the Inland Water Transport Sub-Sector needs for maintenance and capital investments from 2017 to 2037. including the construction of a new ship building yard and small landing facilities in the northern region to assist users of IWT.

**US$28 million**
for transport corridors and ensuring Malawi's connectivity to the region.

- District transport infrastructure and management relates to all works that have been ear marked for the districts. This category does not include all the costs required to fund district infrastructure, but relates to the major funding requirements for supplementing the local governments to ensure that they have the capacity to implement the NTMP programmes; and
- Institutional and regulatory relates to the funds required for setting up the Institutions that have been mentioned in the previous chapters, including the running costs. This category also includes funds required for capacity building.

The programme also reflects the needs of the whole transport sector to be developed to ensure that each sector has the right infrastructure to encourage competition and support inter-modality.

The costs of the draft NTMP appear to be well in excess of the budget currently allocated to Malawi's transport sector, including from the Government of Malawi, development partners and private sector contributions. Inevitably, it is almost axiomatic that the infrastructure deficit is in line with the country's inability to fund it.

It has been a necessity to develop sub-sectoral responses to a holistic sectorial problem. This unavoidably leads to a duplication of resources across sub sectors[41]. In order to make the NTMP affordable and implementable a review is necessary in consultation with the key stakeholders in order to remove duplication and move towards a more effective solution.

However, funding proposals have been explored and are set out below for the whole NTMP.

In order to meet the required funding of US$ 9.2 billion, funding and financing sources are assumed to make contributions as detailed in Figure 9.4. Of the total cost of the programme, US$ 5.6 billion is for major projects. Minor capital works, maintenance and programmes comprise of US$ 3.4 billion which is essential to support the sector, including safety initiatives, but also for other required maintenance on existing assets.

41 *And of course, reflects sub-sectoral interests.*

**Figure 9.3 Funding requirements by sub-sectors as a percentage of the total programme cost**

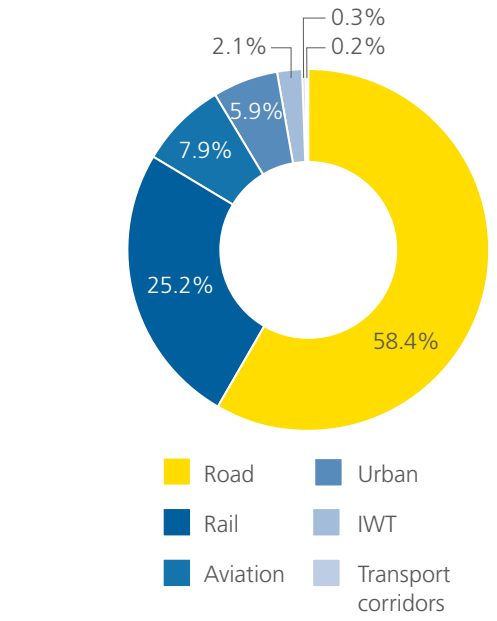



**Figure 9.4 Potential funding sources (MWK 000,000s)**

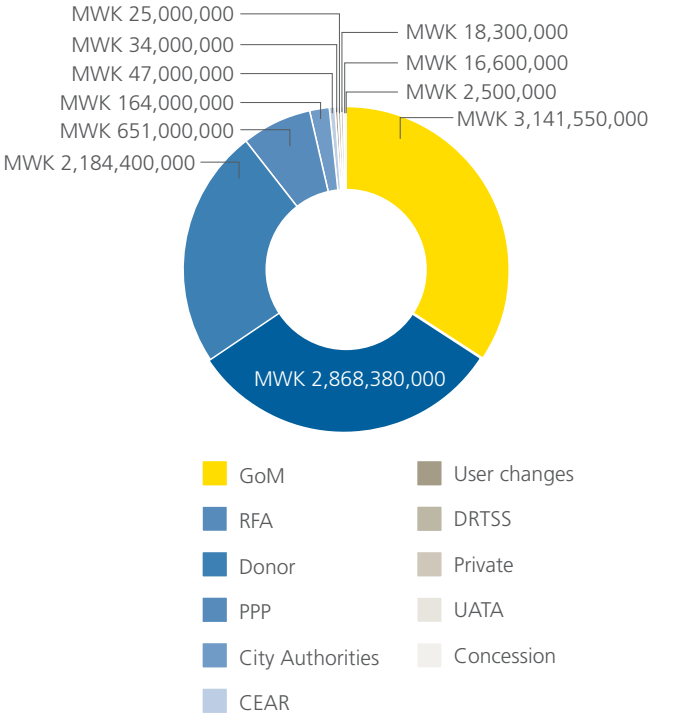
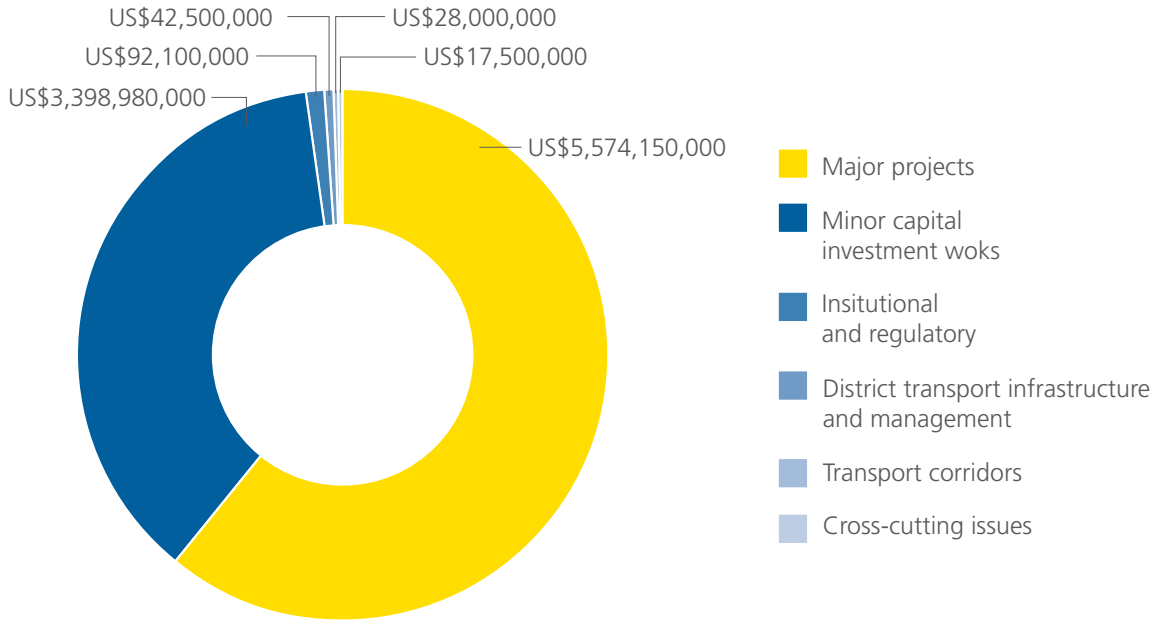


**Figure 9.5 Funds allocation by programme type, US$ 000,000s**




The sources of funding are diversified to ensure that there is no reliance on a major source as has been in the past years. The Government allocations to the sector are expected to continue but there is an emphasis to ensure that user charges are retained for the respective sub-sector they are generated in. There needs to be a stronger focus on ensuring the collection of fees.


Passenger and freight service operated by CEAR.

# 10 Social and environmental review

## 10.1 Environmental and social issues and opportunities

A high-level review of potential environmental and social issues related to the NTMP, Sub-Sectoral Plans, and their constituent infrastructure schemes is provided below. The significant infrastructure schemes are associated with urban transport, rail, aviation and inland water transport.

Appendix D provides details of the potential impacts and opportunities of the NTMP and its Sub-Sectoral Plans. The key potential environmental and social benefits associated with their adoption include the following:

- Enhanced sustainable transport policy and strengthened governance and enforcement;
- Better intermodal connectivity, including better transferability between road, rail, air and water transport;
- Reduction in transportation costs;
- Improvement in public transport and transport facilities, and improved access and equity of access to those facilities;
- Within urban centres, improved road user hierarchy that prioritises walking, cycing and public transport with knock on health, safety and security improvements;
- Improvement of standards of living in urban areas as well as for rural communities through increased access to facilities, services and markets, including by enhancing the resilience of transport infrastructure to climate change impacts;
- Improved network for freight movements to facilitate local, regional and international trade;
- Improved network for business opportunities e.g. tourism, commercial, trade;
- Noise, local pollutant and GHG emission reductions, especially in the longer term with a move towards these;
- Employment opportunities, in particular related to the construction of large infrastructure projects; and
- Opportunity to diversify the economy for example through improved access for industry, extractives and tourism.

Negative effects are predominantly associated with new infrastructure projects and any upgrades that will require land take.

## 10.2 Review of major schemes

A number of larger infrastructure schemes are proposed in this NTMP. These include:

**Urban transport schemes:**

- Lilongwe bus rapid transit (BRT);
- Lilongwe western bypass;
- Lilongwe eastern bypass;
- Blantyre elevated expressway; and
- Blantyre inner relief road.

**Port schemes:**

- Development of a ro-ro berth at the existing Nkhata Bay Port (currently acting as a passenger port); and
- Development of a river port at Liwonde.

**Aviation schemes:**

- New airport at Nkhata Bay; and
- Extension of Kamuzu International Airport.

**Rail schemes:**

- Refurbishment of the existing railway line from Limbe to Marka, including a new bridge across the Shire River at/near Chiromo.

The new infrastructure will, inevitably, result in some negative adverse effects, predominantly in the construction phase, though many of these effects will be of a temporary nature and can be managed through an Environmental and Social Management Plan. Note that construction impacts may also apply to upgrading measures proposed within the NTMP, particularly where additional land take may be required. Each project or measure proposed that is considered in more detail in the future should be subject to an appropriate level of environmental and social assessment in accordance with an environmental and social procedure developed for the transport sector, taking into consideration site specific environmental and social conditions.

## 10.3 Environmental and social recommendations

The measures set out in the NTMP have focused on a core principle of increasing sustainability in the transport sector. The NTMP, as a whole, will have positive environmental and social impacts in terms of improving and strengthening regulatory structures and policy, providing a clear direction for future planning, development, monitoring and enforcement. The measures proposed, including upgrading, maintenance and new developments, could result in greater efficiency, connectivity, access and equity. They could also result, particularly in urban and built up areas, in reduced congestion, local air pollutants, GHG emissions and noise impacts. New projects will, inevitably, result in some adverse effects during construction and operation, such as the potential loss of biodiversity and increased localised traffic movements, however, if managed appropriately in line with the further measures proposed here, will result in a more sustainable approach to transport growth.

**The measures set out in the NTMP have focused on a core principle of increasing sustainability in the transport sector.**

Transport development that is planned will ultimately have fewer adverse effects than uncontrolled development, though new interventions must balance the gains of easier access against the environmental and social costs, through the inclusion of environmental protection and management measures.

Recommendations to strengthen the environmental and social aspects of the NTMP are as follows:

- Institutional reform should include the requirement for specific Sustainability, Environmental, Social and Quality policy within the proposed National Transport Authority (NTA) and its individual transport sector departments. The purpose of this is to ensure that future transport planning is underpinned by core sustainability principles such as:
  - Protection of people and environment;
  - Adopting green technologies and practices;
  - Health, safety and security;
  - Equality of access; and
  - Stakeholder engagement.
- A strong link should be developed between the MoTPW, NTA and the Ministry of Environment/EAD;
- A lead unit should be identified/ established within the MoTPW to be responsible for co-ordinating issues on climate change and transport;
- An environmental and assessment procedure for all transport measures (upgrading, maintenance and new projects) should be developed by the NTA, including environmental and social safeguards (or adopt those set out in international standards) and the mainstreaming of climate change considerations;

- The proposed transport sector departments should develop their capacity to prepare and process documentation for environmental and social assessments, land acquisition, and resettlement plans, and also in relation to the climate change specific, and climate change relevant, capacities that are required to ensure that all measures and projects reflect the climate change mitigation potential of the transport sector and the potential to increase resilience to climate change impacts;
- Strategic Environmental Assessment (SEA) should be enshrined in national legislation; and, pending legislative implementation, should be a requirement of all projects developed as part of future implementation of the NTMP;
- Sectoral Environmental Impact Assessment (EIA) guidelines for the transport sector should be developed;
- Sectoral guidelines should cover land acquisition, resettlement and compensation guidelines for transport sector projects;
- All relevant measures and projects should be subject to environmental and social assessment in accordance with national legislation – to determine requirement for a statutory EIA and to assess impacts of individual projects against environmental and social baseline conditions;
- Information and data to inform the above should be routinely collected;
- Where international funding is sought, projects should be undertaken in accordance with the Equator Principles (comprising the IFC Performance Standards) and/or individual Lender requirements;
- The MoTPW's readiness to access climate finance should be increased to ensure that the required resources are accessed for the implementation of climate change measures;
- A resettlement action plan should be prepared for any measures requiring land acquisition and/or resettlement; and
- An Environmental and Social Management System/Plan should be prepared for all new projects (regardless of whether a statutory EIA is required) to manage construction and, where necessary, operational impacts.

Bridge over the Shire river at Mangochi.

# 11 Funding

## 11.1 Introduction and context

As well as reducing transport costs, transport development also needs to meet the needs of the individual, providing equal access to labour markets and essential public services, increasing economic opportunities for all citizens in society. To achieve this, the NTMP programme has identified six cross-cutting issues covering the areas of Environmental, Social and Gender, as detailed throughout.

Despite the Government of Malawi's recognition of the transport sector as a key priority area for the enablement of the economic growth of Malawi, investment to the sector has historically been constrained; this is not necessarily a fault of the Government of Malawi. Transport sector operations, including periodic maintenance of existing roads, and capital costs for enhancements to infrastructure across all sub-sectors, have grown significantly, this coupled with slow economic growth and raising public debt, there is increasing pressure on the resources that the Government of Malawi can allocate to the transport sector.

In response to the current state of the transport sector, the NTMP has identified 165 projects and programmes of varying sub-sectors, types and sizes that should be implemented between now and 2036 in order to deliver the vision and objectives defined in Chapter 4. The implementation of these projects and programmes will aid Malawi achieving a sustainable transport sector and support national economic, social and environmental development. In order to ensure the implementation of these programmes, the NTMP has been fully costed and resourced to identify potential sources of funding and financing. The specific methods of funding and financing have been identified for both development and recurrent expenditures and this section answers the basic question of how the NTMP can be effectively and sustainably resourced.

**The funding and financing of Malawi's transport sector has been insufficient in recent years.**

## 11.2 Recent trends, issues and challenges

The funding and financing of Malawi's transport sector has been insufficient in recent years in that it has failed to meet the minimum requirements to develop transport infrastructure and to maintain existing facilities and services. The Government of Malawi increased the appropriations to the sector from 2012 to 2017. The 2016/17 national budget provided an allocation of MWK 69.9 billion (US$99.9 million) for the transport sector, representing 22% of the overall budget.

This insufficiency of funding has been evidenced in the increasing road maintenance backlog that has yet to be cleared by RA, inadequate facilities at airports which fail to match international standards, fragmented and ineffective urban public transport and degrading port facilities on Lake Malawi. There is increasing acceptance by Government of Malawi that the sources of funding must be diversified and expanded and, where commercially viable, for the private sector to be involved.

However, irrespective of such policies, Government of Malawi's ownership of transport sector infrastructure facilities is likely to remain substantial, and therefore public sector obligations to adequately fund maintenance and enhancement works is likely to remain substantial.

There is a strong focus on allocating more funds to the road sub-sector (Figure 11.1). On average, since 2010, the road sub-sector has received 95% of total funds in the sector. The result is the current lack of development and deteriorating facilities and infrastructure in the other sub-sectors. This type of allocation of funds cannot create a sustainable transport system and is likely to result in increasing transport costs.

### 11.2.1 Transport Sector Investment Programme (TSIP)

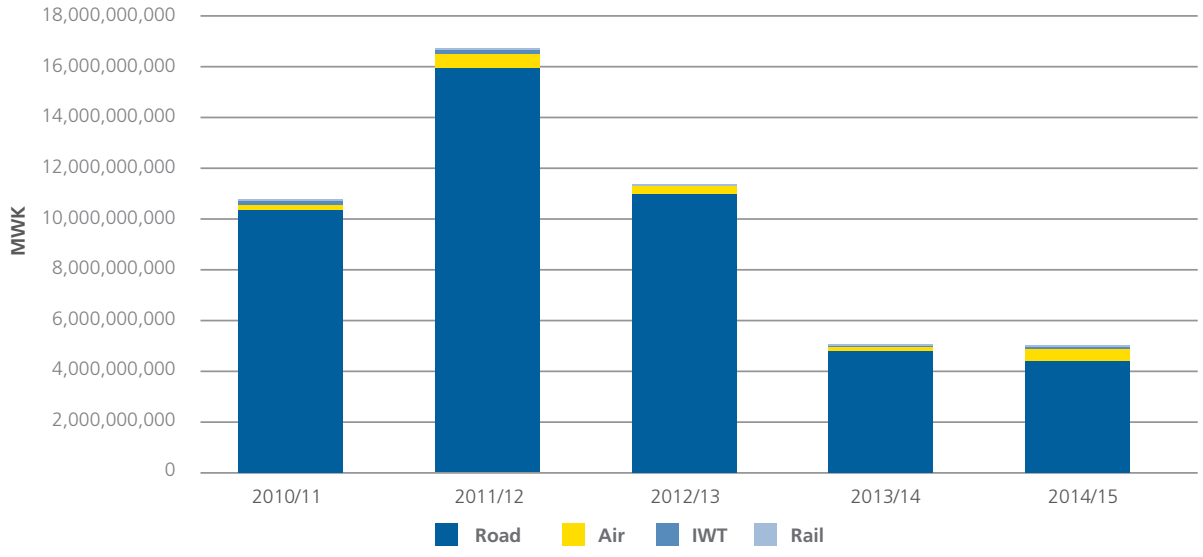
There have been a number of attempts to systematically plan and fund Malawi's transport sector in the past. In particular, the Transport Sector Investment Programme (TSIP) set out a planning process to enable it to plan for the transport sector effectively over a 5-year period, 2011 to 2016. Whilst not ultimately implemented, it contained prioritised sub-sector projects aligned to cost projections and availability of resources. Phase 1 of the TSIP was costed at MWK 505,854 million (US$722.65 million) with a total resource funding deficit of 14%.

However, this costing included sub-sector specific investment from private concessionaires Mota-Engil, Vale and CEAR. Removing these specific investments, the total programme cost was MWK217,186 million (US$310.26 million) with a funding deficit of 33%. Figure 11.2 shows that there was a Year on Year ("YoY") deficit in funding the proposed projects during the TSIP 5-year period.

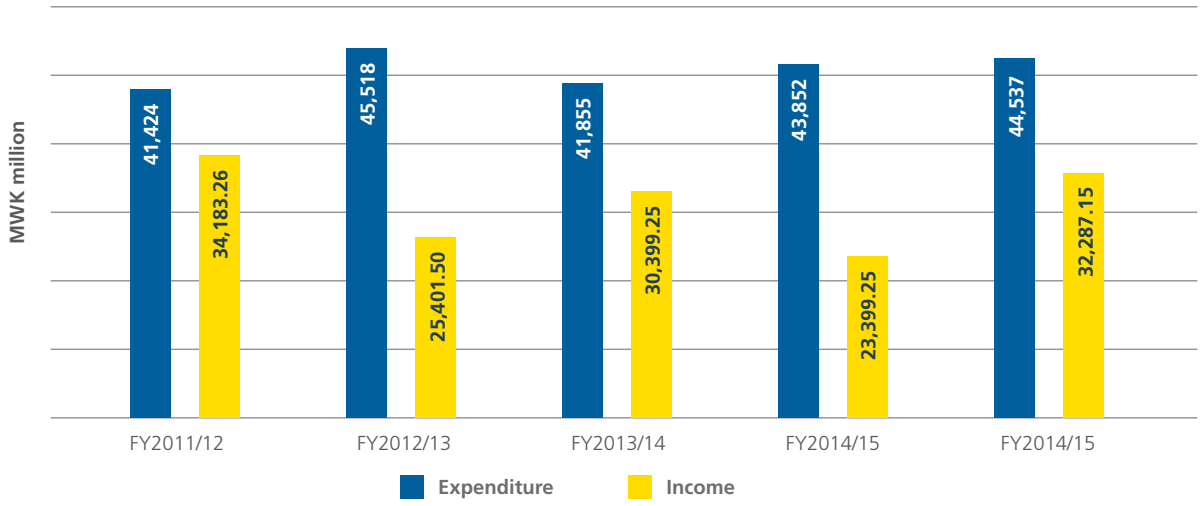
Notwithstanding the funding deficit, the following issues were identified with the programme:

- It was not clear as to whether the total required funding was representative of the optimal level required for development to satisfy projected demand requirements;
- Costing of the programme was done by converting the USD amount to Malawi Kwacha at MWK140 to the dollar. Since 2012, the exchange rate has more than quadrupled (see Figure 11.3), this resulted in the final cost of the TSIP being unrealistic. This was a major concern to development partners; and
- Despite Government of Malawi's policy to develop the transport sector and specifically to promote competition within and between the modes and achieve effective co-ordination amongst the sub-sectors, the majority of funds were allocated to the road sub-sector (Figure 11.4). This adversely impacted other transport sub-sectors.

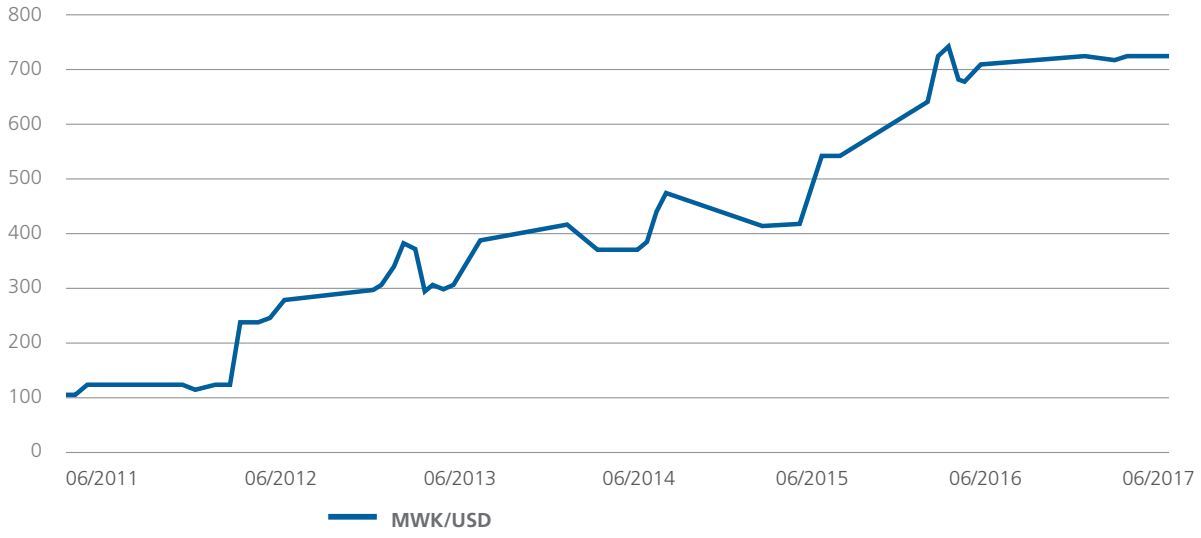
**Figure 11.1 Funds allocation to sub-sector by Government of Malawi**



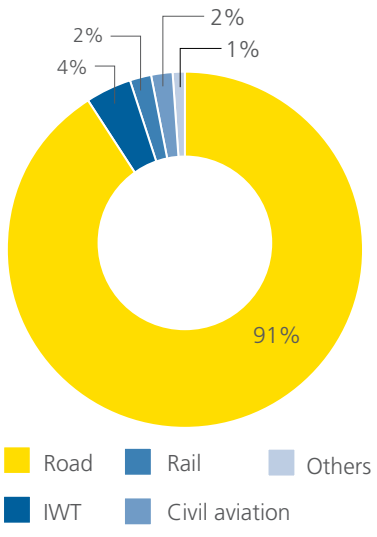
### Figure 11.2 TSIP Funding




### Figure 11.3 MWK/USD exchange rate history




### Figure 11.4 TSIP funding allocation by sub-sector



### 11.2.2 Road sub-sector

Maintenance and rehabilitation of the public roads is the responsibility of RFA.The cost of routine and periodic maintenance of the roads that are under the responsibility of local authorities is shared between RFA and local authorities. The bulk of the funding for these works comes from the Fuel Levy, though the RFA also receives income from user charges mainly international transit fees (Figure 11.5).

Due to resource constraints, the RFA budgeted their expenditures based on projected income and not on needs assessment. The current expenditure towards maintenance and rehabilitation of roads, with an asset value of US$6,799 million, is not sustainable.

### 11.2.3 Civil Aviation sub-sector

DCA collects the most significant revenue in the transport sector and is the third highest revenue source for Government of Malawi's appropriations. However, appropriations from Government of Malawi to the sector are very low and this has led to the deteriorating status of airports, aerodromes and services offered in the sub-sector. The current arrangement is not sustainable for the sub-sector.

The sub-sector has the potential to become fully sustainable in the event that revenues are retained by the proposed CAA, to the extent that existing costs could be met, plus an amount to attain and maintain the level required by international standards.

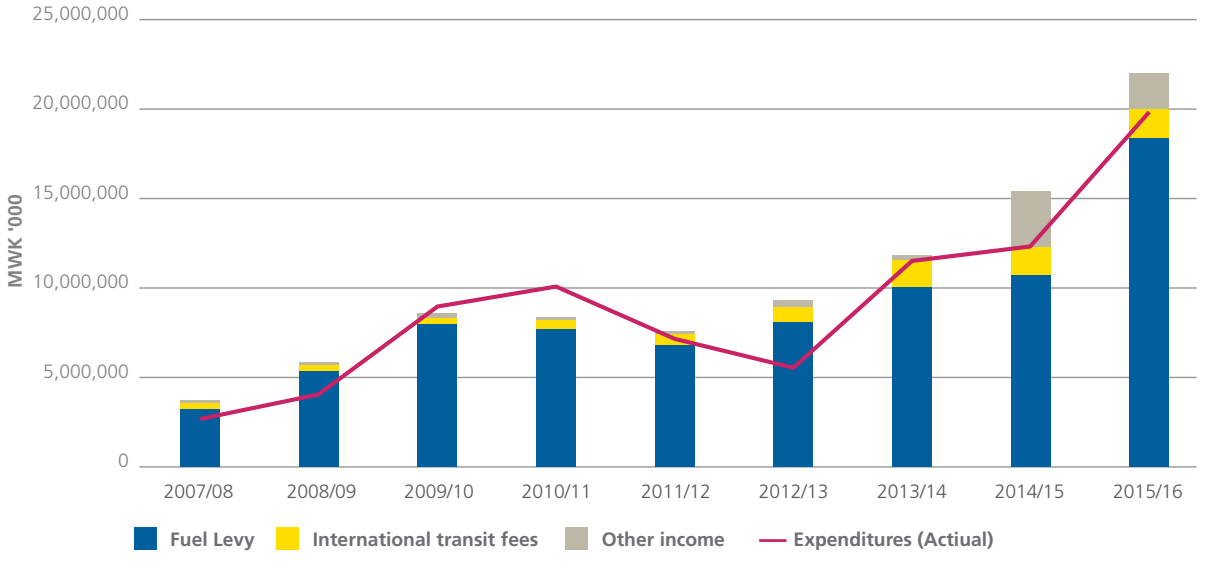
### 11.2.4 Inland Water Transport sub-sector

DMS collect fees from vessel licencing, inspection and crew licensing and these fees are estimated at MWK167 million (US$0.23 million) for the year ended 2016/17. The two concessions with MPC and MSC also provide an alternative source of revenue by way of concession fees though these are not sufficient to cover the required expenditures for the rehabilitation of port infrastructures. With the required maintenance and development in the sub-sector, as it stands, the sub-sector is not sustainable Figure 11.7.

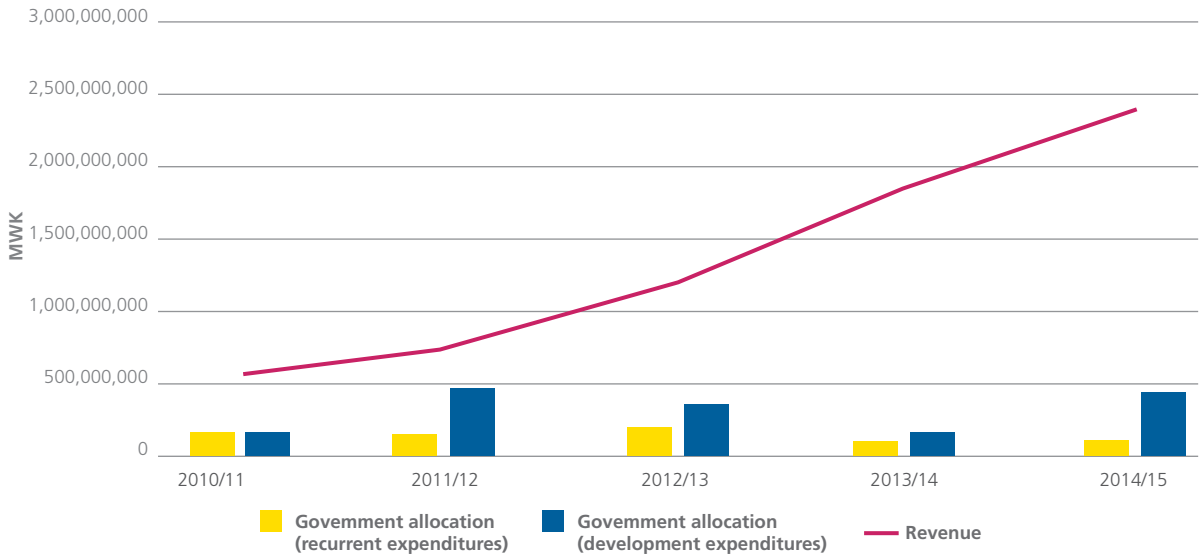
### 11.2.5 Rail sub-sector

Concession fees paid by CEAR are the largest source of revenue to the sub-sector and are sufficient to fund the current level of management costs. Alongside improved regulation and concession management and to ensure that the required development is achieved for the sub-sector for facilities and services, there is a need for an increase in the income to the sub-sector as shown in Figure 11.8.

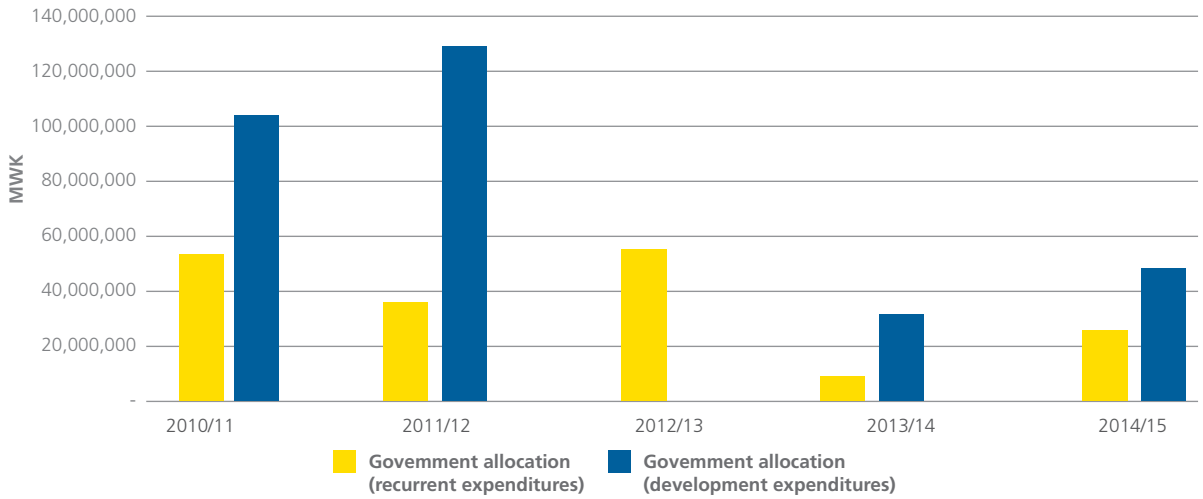
**Figure 11.5 RFA income and expenditures**



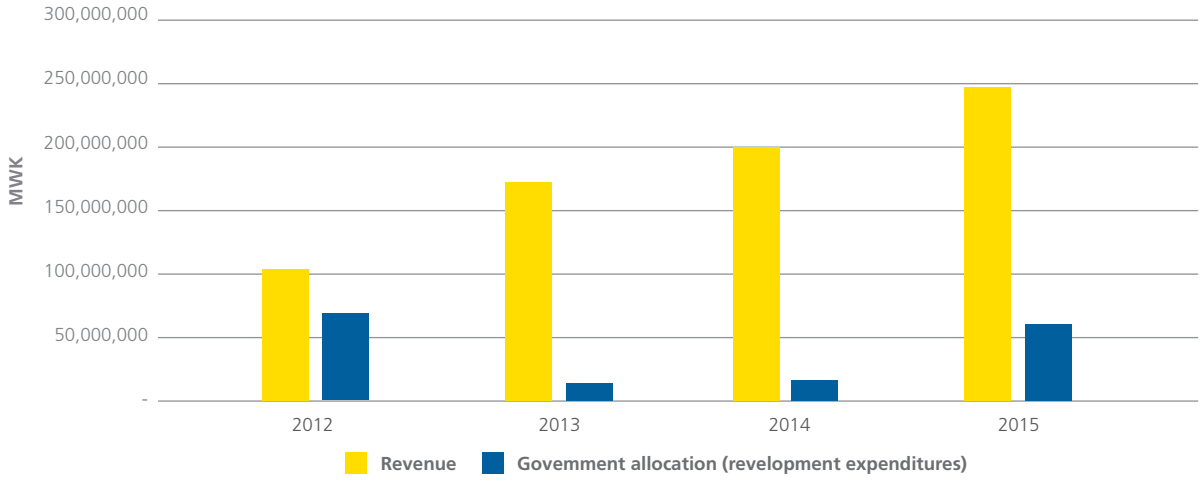
### Figure 11.6 DCA revenue v. expenditures




### Figure 11.7 Government of Malawi allocations for marine expenditures




### Figure 11.8 Rail revenue and expenditures



### 11.2.6 Development partner funding

Development partner funding to the sector is in the forms of grants, loans and technical assistance. Funding from the development partners helps to extend the range and depth of the sector's investments, balancing risks and rewards, temporarily compensating for funding gaps and supporting with capacity development of the institutions in the sector. Based on the Ministry of Finance dashboards, the top five sectors that received the bulk of development partner funding are Health (34%), Agriculture (10%), Economic governance (10%), Education, Research and Development (nine percent) and Water, Sanitation and Irrigation (eight percent). The transport sector received (five percent) during the same period, clearly a lower priority for development partners.

The sector does make the top five sectors to receive funds when looking at the planned disbursements by the development partners. This indicates that there is strong interest from the development partners to fund the sector, the sector just needs to package the development programmes and capital expenditures better. Analysis of the development partner funding to the sector has indicated a decline Figure 11.9.

## 11.3 Funding sources

There are several funding sources and potential financing streams available for funding the NTMP programme as shown in Figure 11.10. Public sector funding for transport infrastructure projects is not only through the Ministry of Transport and Public Works. Programmes such as the Agriculture Sector Wide Approach have financed upgrading, rehabilitation and maintenance of rural roads. It will be, therefore, useful to bear in mind the beneficiary sectors as outlined in Chapter 4 as they could be in a position to finance some infrastructure projects.

In addition, the Government can consider issuing bonds to raise capital for project funding. These would prove attractive if linked to a sustainable revenue stream, e.g. from the project itself, or from specific levies.

Municipal bonds are an option on the longer-term, when city councils have a stronger resource base.

**Figure 11.9 Top six development partners to the sector**

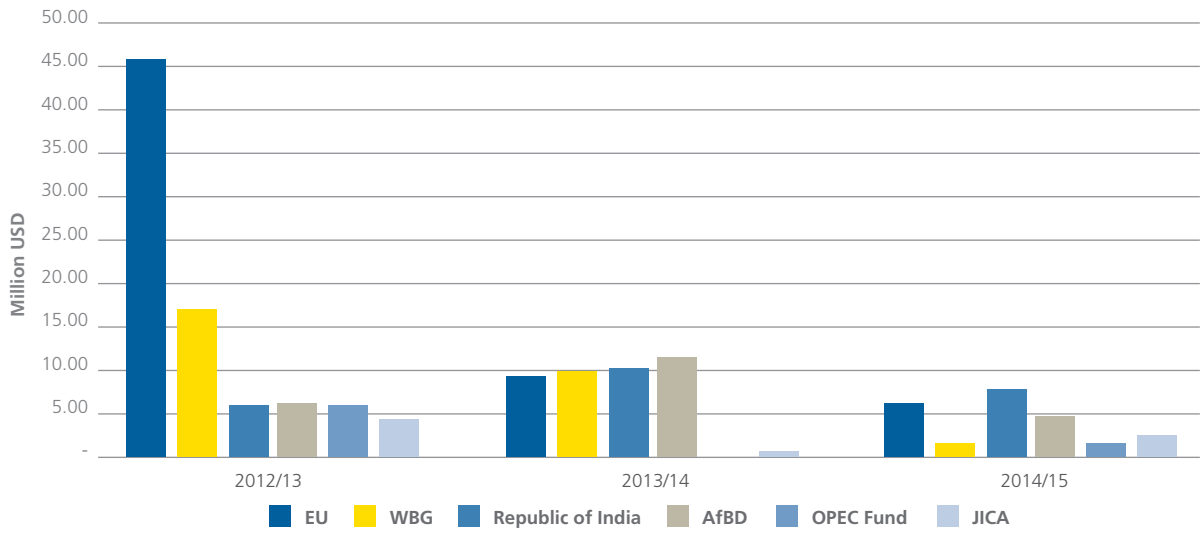


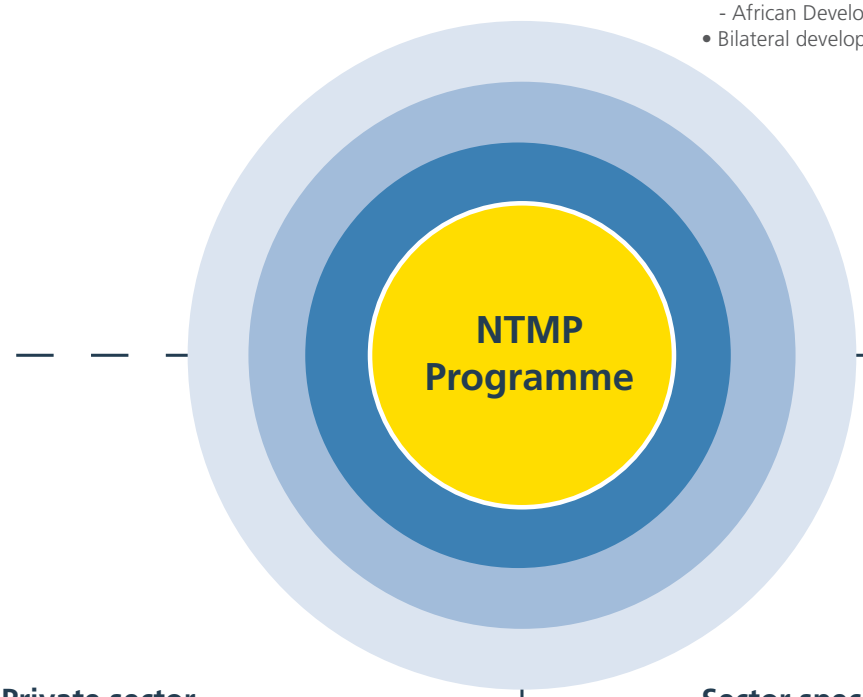
**Figure 11.10 NTMP programme potential funding sources**

## General Government revenues

- Taxes
  - Pay As You Earn (PAYE)
  - Fringe Benefits Tax (FBT)
  - Non Resident Tax (NRT)
  - Withholding Tax (WHT)
  - Value Added Tax (VAT)
  - Excise Duties
  - Dividend Tax
  - Penalties
  - Miscellaneous Duties
- Dividends from parastatals
- Domestic borrowing
- External borrowing

## International Financing Institutions

- Multilateral Development Banks (MDBs)
  - World Bank
- Multilateral Financial Institution (MFIs)
  - European Commission (EC)
  - European Investment Bank (EIB)
  - OPEC Fund for International Development (ORID)
  - Arab Bank for Economics Development to Africa
- Bretton Woods Institutions
  - International Monetary Fund (IMF)
  - International Bank for Reconstruction and Development
  - International Finance Corporation (IFC)
  - International Finance Association (IDA)
  - Multilateral Investment Guarantee Agency (MIGA)
- Regional Development banks
  - Islamic Development Bank (IsDB)
  - African Development Bank (AfDB)
- Bilateral development Bank and Agencies




## Private sector

- PPPs
  - Leases
  - Design, Finance Build Operate
  - Build Operate Transfer (BOT)
  - Build Own Operate Transfer (BOOT)
  - Concessions
  - Privatisation
- Institutional investors
  - Transfer (DFBOT)

## Sector specific revenues

- Landing fees
- Licensing fees
- Air navigation fees
- Parking fees
- Passenger service charges
- Rent
- Sale of publication
- Sale of tender documents
- Fuel levy
- International transit fees
- Road user levies
- Roads fund bond

## 11.4 Specific proposals for NTMP delivery

### 11.4.1 The Government's role

The Government as the policy maker, needs to create an enabling environment for transport infrastructure investment. In this context, it should:

- Deliver a visionary narrative of the real benefits that transport infrastructure led schemes, programmes and strategies will make to the areas in which they are implemented and for the country as a whole. It means that the transport sector decision making should be made on scheme-by-scheme basis while focusing on the wider strategy;
- Operate in a way that enables transport infrastructure programmes to be integrated with wider policy priorities across different sectors. Currently there is a lack of joined up thinking about how infrastructure provision can tackle problems in other sectors. This means that project costs and rationale often seem unpalatable when viewed in isolation, whilst in reality they may have the potential to deliver far reaching and hugely valuable benefits;
- Emphasise its broad vision for inter-modal transport strategies in planning for all transport investment, where this can be maintenance or development of a new infrastructure. This will allow the implementation of transportation programmes including infrastructure that could have far reaching benefits towards developing a future or sustainable growth for the economy of Malawi. MoTPW needs to ensure that during the implementation of the NTMP programmes, planning and designing of the transport infrastructure must consider that individual projects are integrated into broader inter-modal strategies at national, regional and local level; and
- Ensure cooperation amongst key delivery partners and other stakeholders for the successful delivery of the planned projects.

**Aside from creating the enabling environment, the Government of Malawi will also have to play a key role in attracting investment for the NTMP.**

Aside from creating the enabling environment, the Government of Malawi will also have to play a key role in attracting investment for the NTMP. In this context, it should:

- Provide a clear pipeline of investment opportunities through PPPs and investor driven project opportunities with appropriate policy and planning settings. The planning and designing of public infrastructure projects by MoTPW needs to be sped up, with projects then brought to market for the private sector to invest in. All the project risks need to be mitigated. For example all planning approvals like land acquisition, environmental assessment need to be in place. In order to do this:
  - Departments and the local government have to provide well-constructed business cases;
  - MoTPW, along with the relevant implementing institution, need to appropriately evaluate a project for funding or financing. They need to prioritise nationally significant projects through a consistent evaluation and appraisal approach;
  - Where applicable preference should be given to opportunities to optimise and upgrade existing infrastructure where that is the most cost-effective option; and
  - Streamline the planning approvals process for infrastructure projects within and across the Government to reduce delay and cost.

- Implementing a program to recycle funds and obtain operational efficiencies from privatising infrastructure assets. This can be done through:
  - Transferring the ownership of mature infrastructure assets to the private sector, such as pension funds, for two reasons. One to enable efficient private management of the assets, and secondly to release funds that can be dedicated to paying for new high-value infrastructure projects; and
  - Sale or lease of the Government owned assets and use the funds towards new infrastructure investment.
- Make development risk manageable for investors by ensuring that procurement agencies must avoid any "stop and go" when launching infrastructure projects and clearly articulate the frameworks in which they will assess market driven proposals. This will be instrumental to building credible pipelines of investable opportunities and enabling institutional investors to actually engage;
- Ensure decision making and regulations are built on hard data. Data driven approach gives the Governments the incentives they need to be more efficient, effective and transparent. It will enable a significant change in public-policy performance management across the entire spectrum of the Government activities;
- Assess in advance tax incentives targeted to boost and encourage investment in the transport sector and other sectors such as mining and agriculture that will complement transport infrastructure. The tax incentives should be evaluated using cost benefit tests on a periodic basis to gauge whether their effectiveness. In addition to enable proper evaluation and assessment, the specific goals of a given tax incentive needs to be explicit on the outset. "Sunset clauses" calling for the expiry of the incentive should be included to provide opportunity to assess whether the availability of the incentive should be extended or not;

- Diversify funding sources for transport infrastructure and match the funding model to the project. User-pays should be deployed as much as possible on transport projects. This will entail a need for an accompanying communications strategy to explain the necessity and the benefits of the user-pays approach to the community, backed by strong leadership. Value-capture initiatives should also be expanded so that wider beneficiaries of a project, such as local landholders and businesses, also make a contribution; and
- Mitigate the risks of major infrastructure and make them more attractive to private sector investments. Alternatively, provide public sector minimum guarantees that provide minimum patronage or revenue for a defined period once a project is completed.

### 11.4.2 International Financial Institutions (IFIs)

The early involvement of financial institutions is the first step towards infrastructure investment. Commercial financial institutions can play a leading role by making use of their advantages as partners in cross-border services. These organisations that have been identified in Figure 11.10 can support the NTMP programmes through:

- Preparing and delivering technical assistance in the form of policy advisory services, training and capacity programmes and pre-feasibility studies; and
- Implementation of infrastructure investment projects including assistance with funding and financing and also assist with institutional strengthening,

modernisation and reforms. The development partners will also be crucial in ensuring that institutional capacities are aligned with requirements to implement the NTMP programmes efficiently and effectively.

### 11.4.3 Securing sector specific revenues

It is imperative for revenues generated by the sector to be ring fenced for the sub-sector in which it is generated. Ring fencing revenue for investment is essential in increasing funding support for each sub-sector. Possible actions are:

- The proposed CAA should be allowed to retain as a minimum 70% of all the revenue that it collects. These funds should be used for:
  - Ensuring CAA is self-sustainable and is able to meet its operational costs without reliance on the Government of Malawi; and
  - Funding maintenance works and small investments in the aviation sector, including fencing minor airfields.
- There should be increased enforcement in the accountability of user charges that are collected in the sub-sectors. This includes increasing collection, remitting to the appropriate institutions and/or departments and ensuring full records are provided. This will ensure more funds in the sub-sectors are collected, which will be allocated to some of the NTMP programmes.
  This includes but is not limited to:
  - City councils should ensure that all parking fees collected should be recorded and accounted for; and
  - Traffic fines collected by the police should be remitted to DRTSS to aid funding with safety programmes.
- Specific road user charge, generating significant revenues, can be utilised to invest in and improve the public transport offerings. The option for consideration is a tolled bypasses where users can be charged to access a road in return for less traffic and a faster journey than an alternative route;
- A vehicle emissions tax should be introduced and paid annually on all registered vehicles. This should duly be graduated according to the carbon dioxide emissions (carbon tax) of the vehicle. This revenue stream can be ring fenced for non-motorised transport development; and
- Revenue streams to support the NTMP programmes should also be obtained from advertising and sponsorship, which is a non-conventional method of raising funds for transport related activities.

### 11.4.4 Bankable projects

It is vital that bankable projects are created in order to secure the financing. A robust ex-ante evaluation of a project is required in order ensure bankability of a project. The essential steps in creating bankable projects are presented in Table 11.2.

**Table 11.2 Steps to creating in bankable project**

| Component | Purpose |
|---|---|
| **Supply and demand** | Understand the market for the service |
| **Technical, engineering and procurement** | Options, choices and costs |
| **Financial** | Cash flow, financing, return on investment |
| **Economic** | Cost benefit analysis |
| **Social** | Positive and negative impacts on the well-being of the target and other affected people |
| **Environmental** | Opportunities, risks and compliance to be considered from the beginning |
| **Institutional questions** | Is the entity managing the project organised, equipped and administratively capable for the project?<br>Are local capabilities and facilities being properly utilised?<br>Are changes needed in the policy and institutional setup, outside the local entity? |

### 11.4.5 Increasing PPPs in the sector

Given the massive financial requirements for developing and maintaining the transport sector in the country and the limited budgetary resources and borrowing capacities of the Government of Malawi, the sector needs to attract more private sector participation in the form of PPPs and private sector ownership and operating of transport facilities and providing services. In summary, the reasons for adopting the PPP approach are:

- Access to private capital under PPP arrangement, where a project will be financed using private resources, and as such PPP will reduce the pressure on the public budget. It also realises projects which would not be otherwise feasible due to public sector budgetary constraints;
- Better allocation of a risks of a particular project in a way that they are to be transferred to the economic partners who are best equipped to mitigate them. For example, construction risks could be more adequately managed by private contractors, thereby making projects more likely to be delivered on time and on budget; and
- Obtain improved value for money by leveraging incentives which encourage creativity, diligence, cost-effectiveness and value for money.

The available PPP and sole private sector ownership procurement schemes at the disposable to the sub-sectors are detailed in Figure 11.11.

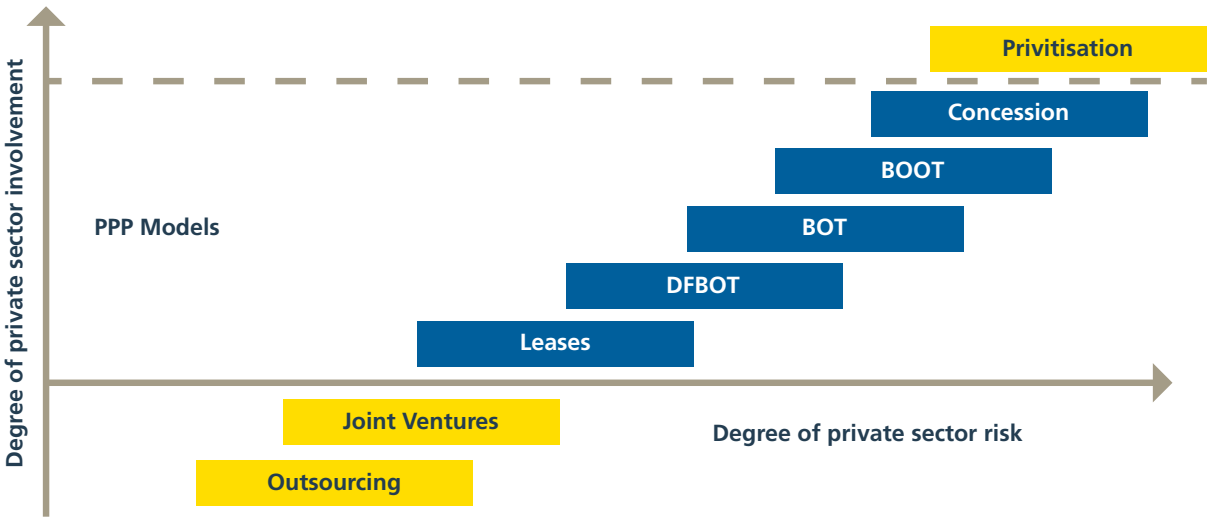
The PPP process adds high transactions costs due to the complexity and cost of contracts and the need for stratified and extended negotiations etc. Hence the comparative advantage leans towards large projects which can bear these.

Whilst a PPP project can attract finance for non-revenue projects (e.g. a non-toll road project in the public domain) the ability of a project to generate revenue (e.g. a toll road or BRT system) tends towards easier financing deals on better terms.

The complexity of projects adds another dimension. A relatively complex project (e.g. a BRT) provides more scope for innovation and opportunities for enhancing value for money through creative solutions.

The contribution of the private sector to total transport infrastructure investments is still rather low even in countries that have made great strides with regulatory and institutional reforms and which are considered to be highly creditworthy.

**Figure 11.11 Allowable PPP and private sector ownership procurement schemes**




**KEY**

**BOOT** - Build Own Operate Transfer
**BOT** - Build Operate Transfer
**DFBOT** - Design, Finance, Build Operate, Transfer

The private sector in the UK, for example, which has a rather mature market for PPP and in which the conditions for PPP are probably more favourable than in many other countries, still only manages to contribute 20% of the total expenditure in the UK. For roads in the UK, it is minimal with the public sector financing close to 100%. The picture for rail is somewhat better with the private sector contributing around 30% of financing. For airports, the private sector has been contributing 86% of the total which is substantially better[42].

For comparative purposes OECD data showing the percentage contribution of private investments to total infrastructure investments is provided in Table 11.3.

Kenya is somewhat advanced in the deployment of PPP schemes and currently preparing for five roads project under a BOT scheme and will implement a PPP scheme for the construction of a new railway spur to Jomo Kenyatta International Airport. Even so these represent a small proportion of total transport spending in Kenya.

For Malawi, it is therefore unlikely that more than five percent can be funded through a formal PPP arrangement which will amount to US$500 million. Due to Malawi's inexperience in this mode of finance, it is recommended that Malawi targets PPP projects of types that have already provided success elsewhere. This points to potential aviation and toll road projects. The following three projects are therefore proposed as pilots, with a total value of around four percent of the NTMP cost:

- Lilongwe Eastern Bypass (US$70 million);
- Chileka cargo centre (US$100 million); and
- Blantyre Elevated Expressway (US$182 million).

42 *Source McKinsey & Company, Keeping Britain Moving, The United Kingdom's Transport Infrastructure Needs.*

**Table 11.3 Selected national private sector contributions to infrastructure investments**

| Percentage contribution to total infrastructure investment | Countries |
|---|---|
| 0-5% | Australia, Canada, Denmark, Hungary, France, Netherlands, Spain, Germany |
| 5%- 10% | Czech Republic, Greece, Ireland, Italy, South Africa, UK |
| 10% -15% | Australia, Korea |
| >20% | Chile, Mexico |

Above all, it is critical that the below fundamentals are established in order to creating a PPP market that will enable the sector to take advantage and implement PPPs:

- There needs to be strong political support to address and standardise issues of profiteering and transparency, to ensure that the PPP model is able to responds to changing market conditions through reflection, reform and innovation;
- The objective of value for money should be central in assessing the usefulness of PPPs, an area where the transport sector has not been strong at addressing; and
- The legal framework applicable to PPP projects has to be clear with regards to which laws apply. There also needs to be a consistent policy orientation to protect private sector players from changing governments that could result in a reversal of a PPP. As part of creating an enabling environment for PPPs there needs to be a pilot project from the NTMP for demonstrating how PPPs in the sector should be conducted. This project should follow the above framework and the recommendations detailed in the report on the funding and financing of the transport sector in Malawi.


### 11.4.6 **Implementation of programmes**

As part of the 5-year Transport Investment Programme (TSIP), MoTPW and the Government should ensure performance monitoring which should begin immediately and be reported on annually:

- At MoTPW level, the key indicator will be the Asset Value which will be an annual recalculation of transport asset values that will reveal how well to plan and finance development and maintenance activities;
- At provider level, e.g. Roads Authority or DMS, the indicators should reflect production performance e.g. centering on condition improvements or deteriorations; and
- At the service user level, the indicators should reflect the performance indicators showing satisfaction with the quality of service/value for money and overall condition.

It is imperative that targets must be set with care and that the right targets are selected, they are easily (and unambiguously) measurable and they are realistic, achievable and fundable.

The Government of Malawi should adopt the practices in Table 11.4 which could save projects a significant amount of time and money up to delivery stage, as well as safeguarding ROI. It is critical to remember that in projects where investments are made up-front regarding the contracting strategy, delivery model, full quantitative risk assessment, team capability, processes and systems the likelihood of success is far higher.

**Table 11.4 Leading practices to limit the impact of root causes of project failure**

| Root cause | Leading practice |
|---|---|
| Not focusing on commercial structure early enough | Develop a robust, executable plan as part of the financing phase, with a detailed understanding and mitigation of key risks, to attract financing and negotiate the cost of capital to the optimum level. Running a shadow credit rating well before seeking finance is a useful exercise to identify areas that will improve the project's attractiveness for investors. |
| Immature project design | Misalignment or lack of collaboration between the design and other phases can lead to misunderstandings and delays at delivery phase. Leading practices to remedy this include implementing a virtual "digital asset" that is capable of modeling costs, timing and total cost of ownership at the design stage; involving contractors early to confirm buildability; and working with operations at design stage to ensure full O&M benefits are embedded. |
| Misaligned delivery model and execution strategy | To avoid contractual issues, cost increases and schedule delays, successful projects need a detailed delivery strategy and execution plan, which incorporates appropriate staffing and skills capability; teams also need to understand and be ready with mitigation for major contractual risks. |
| Inadequate understanding of project risks | Complex projects will only succeed if they have an active, robust risk capability with aligned processes, systems and reporting fully integrated across the entire project, from the initial concept phase onward. This should be used and supported by everyone from the project board to individual project team members. |
| Project not set-up for delivery | Embed robust project performance reporting to provide timely, actionable insight for project leaders. This will create a "single version of the truth," which is transparent and available to all, enabling collaboration and allowing project leaders and steering groups to take corrective action if needed. |
| Inadequate project performance insight | Leading practice is to have a project performance management approach that creates a single version of the truth, which is transparent and provides timely and actionable insights for the project leadership and project steering groups to make impactful early interventions, if and when required. |

## 11.5 Investment in climate change adaptation

### 11.5.1 Overview

Historically, investment in the transport sector has been constrained in Malawi, due to a significant increase in transport sector operations costs coupled with slow economic growth and rising public debt. For example, the Transport Sector Investment Programme (TSIP) covering the period 2011 to 2016 had a year on year deficit. In recent times (from 2015 onwards) a concerted effort has been made by the Government of Malawi to increase transport sector investment, however this has still been insufficient to meet the growing needs. There is a consensus within the Government that sources of funding must be diversified and expanded, including private sector engagement where appropriate.

The total costs of implementing the NTMP programme over its 20-year period (2017 to 2037) is estimated at US$9.15 billion. To protect this investment, and prevent wider socio-economic loses, it is imperative that these investments are climate resilient. Malawi National Climate Change Investment Plan (NCCIP), covering the period 2013 to 2018, supports such investment in resilience.[43] However, as outlined in the previous section, this may require an additional total investment of between five percent and 20%.

Well-designed development projects often enhance climate resilience. Likewise, well designed climate change adaptation projects also contribute to wider development goals. Alignment of funding between these two areas of investment, such that development projects access climate funding and that climate projects access development funding, should be a key aspiration for project developers.[44]

43 *Malawi National Climate Change Investment Plan. http://www.nccpmw.org/index.php/documentation/doc_download/51-national-climate-change-investment-plan-short-version-final.*

44 *ADB 2014 Aligning Climate Finance and Development Finance for Asia and the Pacific: Potential and Prospects https://www.adb.org/sites/default/files/publication/152437/sdwp-033.pdf.*

**The total costs of implementing the NTMP programme over its 20-year period (2017 to 2037) is estimated at US$9.15 billion.**

There are specific climate funds to support climate action (mitigation and adaptation). To gain access to these funds investments will need to demonstrate a significant contribution to climate action. Malawi is a signatory to the UNFCCC[45] and the climate funds under its financial mechanism which cover adaptation in various sectors including transport are presented in Section 11.6.3.

Bilateral Development Banks and Multilateral Development Banks (MDBs) also provide market rate or concessional finance and grant funding to support climate action. Similarly, to the climate funds, investments will need to demonstrate a significant contribution to climate action and meet the requirements of the respective climate finance tracking methodology.[46]

Malawi has experience in engaging with climate funds and accessing resources for climate action, however none of these resources have been directed at the transport sector. Given the nature and size of the investment associated with the NTMP, climate finance presents a significant opportunity to finance these projects and programmes and drive climate 'adaptation' action.

45 *Malawi signed the climate change convention on 10 Jun 1992. This was ratified on 21 Apr 1994, and entered into force on 20 Jul 1994.*

46 *August 2016. 2015 Joint Report on Multilateral Development Banks' Climate Finance. Available at: http://www.eib.org/attachments/documents/joint_mdb_report_on_climate_finance_2015.pdf.*

## 11.5.2 Strategic actions

### 11.5.2.1 Develop a clear pipeline of bankable transport sector climate change adaptation initiatives

A clear pipeline of climate change adaption projects and project specific measures for NTMP projects and programmes should be developed. These should be supported by a business case, which quantitatively (to the extent possible) demonstrates the direct and wider costs and benefits of climate change adaptation to inform investment decision-making. Bankability in the context of climate change adaptation goes beyond the determination of financial returns and profitability for an investor, to encompassing socioeconomic and social metrics, including, risk and vulnerability reduction, improvements in the resilience of communities, and/or alignment with national priorities.[47]

### 11.5.2.2 Cost of implementing adaptation options

US$17.5 million has been earmarked for advancing gender equality and environmental sustainability as part of its implementation. A similar process should be carried out for climate change adaptation whereby the required investment is calculated and ring-fenced. Not taking account of the climate change adaptation measures already incorporated within the proposed NTMP projects and programmes, the total required investment is estimated to be between US$0.45 billion and US$1.8 billion. Such investment is expected to have a cost benefit ratio of between 1.7and 2.7.

### 11.5.2.3 Raise awareness on climate finance

For Malawi to mobilise the scale of resources to meet the transport sectors climate change adaptation needs, the country needs to consider the full spectrum of funding sources and their requirements; as well as the different mechanisms and the extent to which they can be combined. Successfully accessing resources from these funds depends on a good understanding of the funder's perspective and procedures as well as the bankability of projects.

47 *CDKN 2017. Working Paper: Understanding 'bankability' and unlocking climate finance for climate compatible development. Available at https://cdkn.org/resource/understanding-bankability-unlocking-climate-finance-development/?loclang=en_gb.*

## 11.5.3 Funding sources for climate change mitigation and adaptation

### 11.5.3.1 Global funds

**The Adaptation Fund (AF):** The AF finances projects and programmes that help vulnerable communities in developing countries adapt to climate change. Initiatives are based on country needs, views and priorities[48]. The financial instrument / delivery mechanism used by the AF is grants. A South-South Cooperation grant of US$50,000 was approved in February 2016 to support Malawi's accreditation application process to the AF. The grant is designed to promote peer to peer learning and support among accredited National Implementing Entities (NIEs) of the Adaptation Fund and those seeking accreditation. The NIE for this activity is the Kenya National Environment Management Authority (NEMA)[49].

**The Least Developed Countries Fund (LDCF):** The LDCF was established to meet the adaptation needs of least developed countries (LDCs). Specifically, the LDCF has financed the preparation and implementation of National Adaptation Programs of Action (NAPAs) to identify priority adaptation actions for a country based on existing information. The financial instrument / delivery mechanism used by the LDCF is grants. The Global Environment Facility (GEF) administers the LDCF and Operational Focal Points (OFPs) are responsible for co-ordination in country. The Ministry of Finance and Ministry of Natural Resources, Environment Affairs Department host Malawi's GEF OFPs[50].

Malawi's NAPA was submitted in 2006 to the United Nations Framework Convention on Climate Change (UNFCC) by the Ministry of Natural Resources, Environment Affairs Department. Financial support was provided by the GEF and technical support was provided by the United Nations Development Programme (UNDP)[51].

48 *The Adaptation Fund https://www.adaptation-fund.org/about/.*

49 *Adaptation Fund Malawi South-South Cooperation Grant https://www.adaptation-fund.org/project/south-south-cooperation-grant-8/.*

50 *The GEF Focal Points for Malawi https://www.thegef.org/focal_points_list.*

51 *Environmental Affairs Department (2006) Malawi's NAPA http://unfccc.int/resource/docs/napa/mwi01.pdf.*

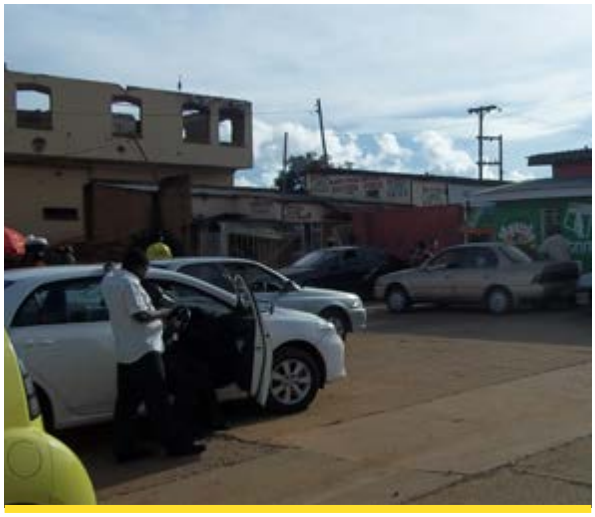
**The Special Climate Change Fund (SCCF):** The SCCF was established to address the specific needs of developing countries under the UNFCCC with respect to covering incremental costs of interventions to address climate change relative to a development baseline. Adaptation to climate change is the top priority of the SCCF and in addition to this, it finances projects relating to technology transfer and capacity building in the energy, transport, industry, agriculture, forestry and waste management sectors. The SCCF is administered by the GEF and its financial instrument / delivery mechanism is grants.

**The Pilot Program for Climate Resilience (PPCR):** The PPCR provides funding for climate change adaptation and resilience building. It aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning and implementation by providing incentives for scaled-up action and initiating transformational change. It is a targeted program of the Strategic Climate Fund (SCF), which is one of two funds within the Climate Investment Funds (CIF) framework. The financial instrument / delivery mechanism for the PPCR is grants and loans[52].

Malawi's PPCR programming is underway and resources are being utilised to mainstream climate change considerations into long-term policy making, build institutional capacity for disaster risk mitigation, and facilitate knowledge sharing at multiple scales[53]. Malawi's Focal Point for the PPCR is the Ministry of Finance, Economic Planning and Development (MoFEPD).

52 *Pilot Program for Climate Resilience https://www.climateinvestmentfunds.org/fund/pilot-program-climate-resilience.*

53 *Malawi-PPCR Programming https://www.climateinvestmentfunds.org/country/malawi/malawi-ppcr-programming.*



**The Green Climate Fund (GCF):** The GCF seeks to promote a paradigm shift to low-emission and climate-resilient development, taking into account the needs of nations that are particularly vulnerable to climate change impacts. The GCF aims to deliver equal amounts of funding to mitigation and adaptation and its activities are aligned with the priorities of developing countries through the principle of country ownership. The financial instrument / delivery mechanism for the GCF is grants, loans, equity or guarantees.

One of the first eight investments to be approved by the GCF was the, "Scaling Up the Use of Modernised Climate Information and Early Warning Systems", in Malawi. The UNDP is the implementing entity for this project[54]. Malawi's designated Focal Point for the GCF is the Environment Affairs Department.

#### 11.5.3.2 Regional fund

**The Africa Climate Change Fund (ACCF):** The ACCF aims to support African countries transition to climate resilient and low-carbon mode of development, as well as scale-up their access to climate finance. The ACCF serves as a catalyst with a scope broad enough to cover a wide range of climate resilience and low-carbon activities across all sectors. Priority for funding is given to the following themes; supporting small–scale or pilot adaptation initiatives to build resilience of vulnerable communities; and supporting direct access to climate finance.

54 *GCF Press Release http://www.greenclimate.fund/-/green-climate-fund-approves-first-8-investmen-1.*

## 11.6 **Conclusions and final recommendations**

In order to implement the NTMP programme, there needs to be better co-ordination between the Government, development partners, IFIs and the private sector. The cost of the programme appears to exceed the historic funding and financing to the sector, based on sources including the figures presented in this report, and it is crucial that the Government of Malawi takes a leading role in ensuring that the major stakeholders are informed and are part of this programme. The Government of Malawi and development partners in particular will need to organise themselves to achieve the required level of resourcing. In order to meet the funding and financing requirements for the NTMP programme, the Government needs to ensure that it maintains a single national transport programme and budget process for the sector. It is recommended that the following actions be taken:

**In order to implement the NTMP programme, there needs to be better co-ordination between the Government, development partners, IFIs and private sector.**

1. Produce a consistent pipeline, backed by a strong business case and appropriate feasibility studies, which includes the high quality public transport infrastructure projects already initiated by the Government. This will help to speed up and prioritise the planning of high value transport infrastructure projects that can be financed.
2. Implement a programme to recycle funds and obtain operation efficiencies from privatising infrastructure assets.
3. Develop and define the funding roles of the Central Government and the Local Government. This should follow the framework for devolving transport planning and delivery to districts under the DTIMPs.
4. Match the funding and financing model to the project by building the capability in the public sector to design funding and financing models suitable for each project and be flexible to avoid a once-size-fits all approach; leveraging value by choosing the most appropriate investment amounts and funding options; improving risk allocation through appropriate Government de-risking strategies and adopting more diverse options for funding and financing transport infrastructure by first considering all options on the table before determining the best approach for an individual project.
5. Improve and make better use of PPPs by ensuring consistent suitability of PPPs for every major project; reducing the costs of delivering PPPs; continue to develop the PPP model to allow it to be used across sectors; ensuring monitoring and collection of fees from such arrangements; benchmark the PPP procurement environment in Malawi with the World Bank Group's Benchmarking PPP Procurement.
6. Develop capital markets by growing demand for project debt by supporting and facilitating increased funding of major infrastructure projects through pensions funds and developing demand for longer-term debt and improving liquidity in the bond market.
7. Address the taxation treatment of long-lived transport infrastructure investments by promoting taxation reforms that will encourage investment in transport infrastructure.
8. Continue to develop sustainable markets for transport based on the principles of user pays and applying economic regulation where needed.
9. Government of Malawi should step away from tackling national transport infrastructure needs individually, or on a sector by sector basis and encourage and ensure integration across different sectors of the economy.
10. Develop readiness to access climate finance to support the transport sector's climate change mitigation and adaptation needs and explore the full spectrum of related funding sources and their requirements, as well as the different mechanisms and the extent to which they can be combined.


**The M1 through Mzuzu: very high motorised and non-motorised vehicle conflict at the market place.**

# 12 Implementation and monitoring

## 12.1 Ownership

This NTMP, in its final form, needs to be owned by the Government of Malawi. Certainly, it should be endorsed by the Minister, and preferably by the Cabinet. This allows for future actions that flow from this NTMP, and which require Cabinet approval, to have a genesis in a Cabinet decision.

The NTMP should be made as public as possible, to enable Malawian citizens to understand to the long-term vision for the transport sector, and so that they are able to secure a level of accountability for its implementation. Publicity can be given by publishing the NTMP on the Ministry's website, TV and radio talk shows, and the publication of a summary brochure for general distribution.

## 12.2 Responsibility

A single institution needs to take the lead in the NTMP's implementation, even if it has no executive functions itself. At present, this ought to be the Department of Transport Planning (DTP) within the Ministry of Transport and Public Works, and nothing in this NTMP seeks to change that. However, the DTP needs to have adequate resources to administer this task, as well as all the additional planning activities that flow from the NTMP's implementation. A full-time Unit within the DTP is recommended which would act as both a secretariat and technical lead on implementation matters. It would report to the NTC (section 7.4 above).

**Publicity can be given by publishing the NTMP on the Ministry's website, TV and radio talk shows, and the publication of a summary brochure for general distribution.**

## 12.3 Implementation

### 12.3.1 Overall

The NTMP provides a long-term view of the future transport system, and many of the issues dealt with are strategic in nature. To maximise the effectiveness of the NTMP, an Implementation Plan will be developed to outline specific actions that will be completed to meet the NTMP's goals and strategic objectives. In the Implementation Plan, and ultimately in the DTP's work programmes, a direct link will be made between each strategic objective and the specific plans, programmes and action items formulated to meet them. This will be done for each mode of transport.

It is recommended that the Implementation Plan be updated every five years. The Implementation Plan will review evaluation criteria and consider a system for prioritising projects based on the NTMP objectives.

### 12.3.2 Enabling actions

Table 12.1 lists the immediate enabling actions required for implementation of the NTMP, along with key stakeholders that need to be consulted.

**Table 12.1 NTMP enabling actions**

| Issue | Lead responsibility | Remarks |
|---|---|---|
| Detailed justification for RHIC | MoTPW | Consult with RTOA, NCIC |
| Cabinet paper for RHIC | MoTPW | |
| Cabinet paper for carbon tax | MoTPW | Consult with Ministry of Finance |
| Establish traffic police/DRTSS co-ordination committee - Chaired by Minister to co-ordinate enforcement | Minister for Transport and Public Works | |
| Constitute private sector partnership for road safety funding and initiatives | DRTSS | |
| Cabinet paper to amend Road Traffic Act | DRTSS | |
| Paper of agricultural profit tax | MoTPW | Consult with Ministry of Agriculture |
| Constitute private sector partnership for sponsoring routine maintenance | RA | |
| Comprehensive safety campaigns | DRTSS | |
| Strengthen road safety leadership and co-ordination | MoTPW | |
| Primary school road safety curriculum | DRTSS | Consult with Ministry of Education |
| Train trainers in Teachers Training Colleges on road safety | Ministry of Education | |
| Design guidelines for urban roads and transport | MoTPW | |
| Draft theory course on driving for provisional licence holders | DRTSS | |
| Prepare inventory of, and review status of, all level crossings | RA | Consult with CEAR |
| Amend geometric standards to better protect NMT | Department of Roads | Consult with RA |
| Adopt Universal Design Principles | MoTPW | Consult with PAWA and disability groups, Ministry of Gender |
| Develop modalities for District Transport Plans | MoTPW | Consult with local authorities |
| Adopt new road classification in Roads Act | Department of Roads | Consult with RA, district councils |
| Let consultancy contract for Rural Transport Master Plan | MoTPW | |
| Develop strategy for alternative fuel use | MoTPW | Consult with Ministry of Energy |
| Establish inter-ministerial rural transport working group | MoTPW | Consult with Ministry of Local Government |
| Procure CCTV for weighbridges | RA | |
| Procure weigh-in-motion weighbridges | RA | |

**Table 12.1 NTMP enabling actions (continued)**

| Issue | Lead responsibility | Remarks |
|---|---|---|
| Detailed identification of sites for inland weigh bridges (WIM) | MoTPW | Consult with RA |
| Research fuel gas pipeline | MoTPW | Consult with Ministry of Energy |
| Detailed feasibility and design for rural road upgrade programme | RA | Consult with Ministry of Agriculture |
| Establish inter-ministerial transport and mining working group | MoTPW | Consult with Ministry of Energy, Mining and Natural Resources |
| Establish inter-ministerial transport and tourism working group | MoTPW | Consult with Ministry of Tourism, and private sector |
| Detailed design for Lilongwe Western bypass | RA | Consult with City Council |
| Appoint Transaction Adviser for Lilongwe Eastern Bypass | RA | |
| Detailed design of M12 safety projects | RA | |
| Detailed design of other main roads safety projects | RA | |
| Feasibility and design of Blantyre bypasses and relief roads | RA | Consult with City Council |
| Feasibility and design of Blantyre elevated expressway | RA | Consult with City Council |
| Asset management strategy | RA | |
| Pilot performance based maintenance contract | RA | |
| Proposal for contractor facilitated finance | RA | |
| Cabinet paper for UATA bill | MoTPW | |
| Establish urban transport co-ordinating committee | MoTPW | |
| Sensitise minibus owners and drivers | MoTPW | |
| Report on appropriate bus capacities, engine types and fuel types | MoTPW | |
| Identify corridors for public transport priority improvements | UATA | |
| Pre-feasibility report for Lilongwe BRT | UATA | |
| Pre-feasibility report for Blantyre BRT options | UATA | |
| Feasibility and detailed design for pilot BRT scheme - Lilongwe | UATA | |
| Establish BRT infrastructure and operating modalities | UATA | |
| Long-term paper on fuel types in urban areas | MoTPW | Consult with Ministry of Energy |
| Cycle lane designs for urban areas | City Councils | |
| Establish council-cycle operator's forum | City Councils | |
| Paper on bicycle sharing | City Councils | |

**Table 12.1 NTMP enabling actions (continued)**

| Issue | Lead responsibility | Remarks |
|---|---|---|
| Footway improvement programme for urban areas | City Councils | |
| Pedestrian crossing programme for urban areas | City Councils | |
| Develop advisory truck routes in the four urban areas | City Councils | |
| Implement Blantyre CBD traffic management plan | Blantyre City Council | |
| Traffic management plans for three urban areas | City Councils | |
| Identify junctions for conversation to traffic signals | City Councils | |
| Undertake parking inventories | City Councils | |
| Prepare legislation for commuted sums for parking | MoTPW | |
| Investigate options for on-street parking control | City Councils | |
| Identify park and ride sites | City Councils | |
| Legislation for traffic impact assessments | MoTPW | |
| Investigate staggering working and school opening hours | MoTPW | Consult widely |
| Identify sites for coach terminals | PPPC | |
| Street lighting plans | City Councils | |
| Private sector participation in parking | PPPC | |
| Establish baseline data and monitoring system for social inclusion | MoTPW | Consult with Ministries of Health, Gender, and Education |
| Draft NMT policy for Cabinet resolution | MoTPW | District councils |
| Establish rail freight users group | MoTPW | Consult with CEAR |
| Clear customs at Nkaya | MRA | |
| Submit Cabinet paper on drafting principles for RAMRAM | MoTPW | Consult with CEAR and more widely |
| Commission detailed design of Nkhata Bay Port redevelopment as RoRo terminal | MoTPW, DMS | Consult with Ministry of Trade |
| Commission pre-feasibility study into wet port at Liwonde | MoTPW, DMS | Consult with CEAR, MRA, Ministry of Trade |
| Replace lighthouses on Lake Malawi | DMS | |
| Prepare rationalised passenger service plan for lake transport | DMS | Concessionaire |
| Work with concessionaire to produce timetabled freight services | DMS | |
| Amend concession agreement | DMS | Consult with PPPC |
| Draft regulations for Vessel Management System | DMS | Consult with Department of Fisheries, and lake users |
| Prepare report on accident blackspots and publicise results | DRTSS | |
| Establish a programme to monitor developments in autonomous vehicles | DRTSS | |

**Table 12.1 NTMP enabling actions (continued)**

| Issue | Lead responsibility | Remarks |
|---|---|---|
| Prepare market analysis and equipment acquisition plan for next five years | Malawi Airlines | |
| Fence and secure designated airfields | DCA | |
| Prepare disposal plan for designated airfields to local authorities, private sector, police and military | DCA | |
| Prepare plan for enhancing facilities at designated tourism airfields | DCA | Consult with Department of Tourism |
| Prepare concession for second ground handling company | DCA | Consult with PPPC |
| Draft regulations for licensing UAS pilots and craft | DCA | Consult with ICAO |
| Draft regulations for Unmanned Traffic Management Systems | DCA | Consult with ICAO |
| Examine potential for SEZ's near airports | DCA | Consult with Ministries of Trade and Agriculture |
| Commission feasibility study on large scale cargo facility at Chileka | MoTPW | |
| Prepare paper on possible fiscal measures to encourage electric vehicles | MoTPW | Consult with MRA, Ministry of Finance |
| Designate focal point for all climate change issues | MoTPW | |
| Identify specific funding modalities for climate change actions | MoTPW | |
| Commission specialist consultants to identify capacity needs and ensure staff and relevant stakeholders undertake well-designed training sessions, capacity building programmes and workshops on transport and climate change | MoTPW | |
| Engage consultant to research current and future risks and impacts of climate change on Malawi's transport sector to inform CRVAs | MoTPW | Consult with DCCMS |
| Engage consultant to identify country specific data needs on transport and climate change and collect data | MoTPW | Consult with DCCMS |
| Disseminate lessons learned from model transport climate adaptation projects and programmes at JTSR | MoTPW | |
| Develop and maintain a list of critical transport-related infrastructure assets that are vulnerable to climate change, using information from MDA's | MoTPW | Consult with agencies and departments |

## 12.4 Monitoring

The success of the NTMP as a long-term plan depends on a number of variables. The Government must be aware of its progress towards its strategic goals and transportation strategic goals through an effective monitoring framework objectives so that it can add or modify priorities as needed. An effective monitoring framework for the NTMP must closely consider the strategic objectives, and manage their implementation. The monitoring framework will consist of a series of progress measures and outcomes that are reported yearly. Progress measurement requires a consistent approach for systematically collecting, analysing, utilising and reporting the measures.

Measuring progress is sometimes difficult given that some data may not be available or accurate or the cost of obtaining some information may outweigh the benefits that the information could provide. Therefore, information that is already collected and available should be utilised wherever possible, as this is a cost-effective, practical approach to further integrating progress measurement into transportation planning. Emphasis is placed on strategic progress indicators that measure system-wide, long-term changes that are easily understood by the public.

### 12.4.1 Monitoring framework for NTMP delivery

Table 12.2 outlines the proposed monitoring framework for the NTMP, which sets out how progress towards achieving the NTMP's vision can be monitored. It lists Key Performance Indicators (KPIs) that correspond to the nine operational NTMP objectives and also the source of the data required to quantify performance in relation to each.

It is important to recognise that the need for monitoring and evaluation extends beyond assessing the contribution of planned NTMP interventions to realising its operational objectives. The suitability of its proposals, for example, needs to be continually reviewed in terms of the wider context for implementation. The rate of economic growth, population growth, urbanisation, changes in demography, and wider social and economic policies and development will all, for example, impact upon whether changes to the NTMP proposals and timeframes are required.

### 12.4.2 Institutional requirement for the monitoring framework

The MoTPW should take the lead responsibility for monitoring and evaluation, but the need for the collection of data of a sufficient volume and rigour to support the monitoring and evaluation of the impact of NTMP implementation, and changes to its wider context, needs to be recognised as a priority by all of Malawi's public and private sector transport institutions. The MoTPW must also ensure that sufficient resource and processes are in place to support the analysis and management of data collected, with a channel established to ensure that the implications for policy, practice and enabling frameworks are promptly recognised and adaptations made as appropriate.

The MoTPW should ensure that a record is kept not only of outcomes (performance against KPIs and quantitative targets, as per Table 12.2) but also of inputs (expenditure) and outputs (scheme delivery). This will help to ensure that delivery of the NTMP and its impact can be reported in a clear and transparent manner. There is merit in the MoTPW commissioning an external contractor to conduct the required surveys, and it should establish protocols for regularly receiving the other data from the public and private sector institutions indicated in Table 12.2. It is suggested that the data be collected twice a year, which will facilitate the regular identification of trends, judgement of progress, and review and update of interventions.

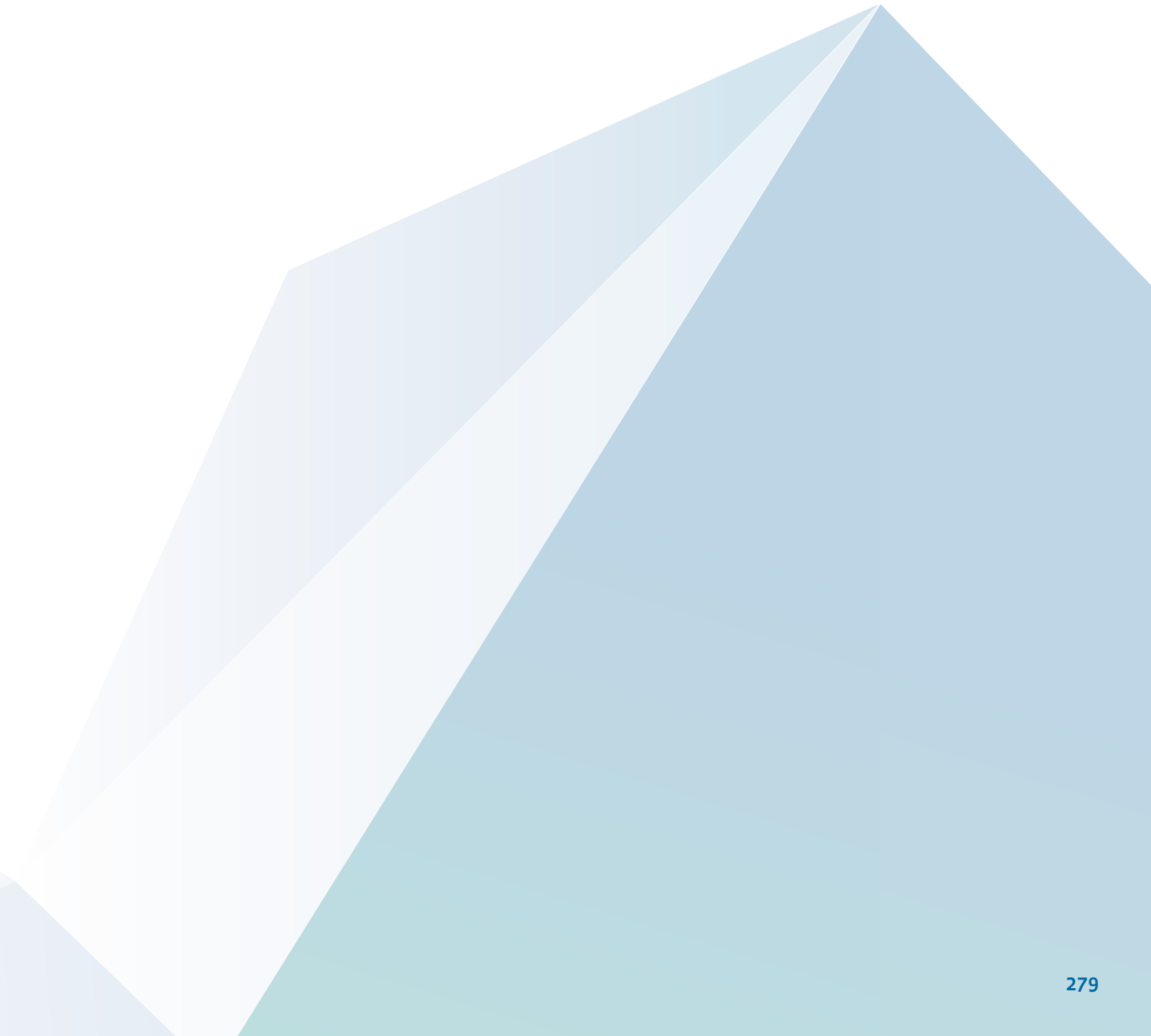
It is important to recognise that the need for monitoring and evaluation extends beyond assessing the contribution of planned NTMP interventions to realising its operational objectives. The suitability of its proposals, for example, needs to be continually reviewed in terms of the wider context for implementation. The rate of economic growth, population growth, urbanisation, changes in demography, and wider social and economic policies and development will all, for example, impact upon whether changes to the NTMP proposals and timeframes are required.

**Table 12.2 Monitoring framework for NTMP delivery**

| Objective | Key Performance Indicator (KPI) | Data Source |
|---|---|---|
| To facilitate a modal shift from road to rail transport | Modal share of the rail sub-sector (%) | Surveys, rail company patronage data |
| To mainstream safety and security considerations into transport projects, policies and related processes | Number of people killed and seriously injured on Malawi's roads | Hospital and police records |
| | Number of collisions and crimes reported on Malawi's transport network (total and by mode) | Police records |
| To increase citizens' access to all-weather roads | Percentage of the population living within 2 km of an all-weather road (%) | Road network and census data |
| | Expenditure on road maintenance and rehabilitation (MWK million and MWK as a percentage of transport sector budget) | MoTPW |
| To improve intermodal integration | Average exchange time between modes (minutes) | Public transport user survey |
| | The number of formal and equipped intermodal transfer points | MoTPW, public transport operators |
| To enhance the connectivity of rural areas, including to support continued growth of the agricultural sector | Number of motorised trips per citizen per year | Rural transport survey |
| | Average trip length (km) | Rural transport survey |
| | Average journey speed (km/ hr) | Rural transport survey, public transport operators |
| | Public transport service frequency (services per direction per hour on routes of high travel demand) | Rural transport survey |
| | Percentage of the population living within 2km of a public transport service | Census data, public transport operators |
| | Cost of transporting agricultural goods (MWK/ km) | Rural transport survey, public transport operators |
| | Volume and distance of agricultural produce transported (tonne kms) | Rural transport survey, Ministry of Finance, Planning and Economic Development |
| To foster transport systems to support the development of oil and mining sectors | Volume of product carried by road (tonnes per annum) | Extractive industries |
| | Volume of product carried by other modes (tonnes per annum) | |

**Table 12.2 Monitoring framework for NTMP delivery (continued)**

| Objective | Key Performance Indicator (KPI) | Data Source |
|---|---|---|
| To improve the resilience of transport infrastructure and services | Number of disruptions to the movement of people or goods owing to climate related damage to transport infrastructure | District Councils |
| To develop the domestic freight industry | Freight tonne kms transported by Malawian freight operators by land transport | Freight operators |
| | Expenditure on road maintenance and rehabilitation (MWK million and MWK as a percentage of transport sector budget) | MoTPW |
| To reduce dependence on Mozambique for access to international markets | Percentage of imports and exports being transported via Mozambique (%) | Ministry of Finance, Planning and Economic Development |



# Bibliography

| Task Name/ID | Report name |
|---|---|
| **Inception** | Inception Report |
| **A1** | Document Review |
| **A2** | Transport Conditions |
| **A3** | Transport Conditions Outside Malawi |
| **A4** | Review of Current Transport Costs |
| **A5** | Review of Freight and Logistics |
| **B1, B2, B3** | Review of Policy and Governance |
| **C1, C2, C3, B4** | Review of Funding and Financing of the Transport Sector |
| **B5** | Financial Costs of Road Accidents |
| **D1, D2** | Baseline and Economic Projections |
| **D5** | Identification of Transport Needs |
| **GIS** | GIS and Database Specification |
| **Rural Transport** | Rural Transport Paper |
| **Transport Model** | Transport Model Specification Report |
| **Tourism** | Tourism and Transport |
| **Regional Visits** | Report on Regional Visit to Zambia |
| **Regional Visits** | Regional Visit to Mozambique |
| **Regional Visits** | Report on Regional Visit to South Africa |
| **Regional Visits** | Report on Regional Visit to Tanzania |
| **JTSR** | National Transport Master Plan: Findings and Progress |
| **Strategy Paper** | Road Sub-Sectoral Plan |
| **Strategy Paper** | Rail Sub-Sectoral Plan |
| **Strategy Paper** | Inland Water Transport Sub-Sectoral Plan |
| **Strategy Paper** | Civil Aviation Sub-Sectoral Plan |
| **Strategy Paper** | Urban Transport Sub-Sectoral Plan |

ATKINS

Malawi National Transport Master Plan

# Appendices

Final Report

# Appendix A **Stakeholder consultations**

| Date | Subject | Stakeholders | Location |
|---|---|---|---|
| 23 March 2016 | NTMP launch | Minister and Ministry of Works and Transport Departments and agencies, private sector, development partners | Lilongwe |
| 19th April 2016 | Transport surveys, database and GIS | Ministry of Works and Transport, departments and agencies | Lilongwe |
| 26th April 2016 | Inception Report | Ministry of Works and Transport, departments and agencies | Lilongwe |
| 3rd May 2016 | Inception Report | Steering Committee | Lilongwe |
| 17th May 2016 | Transport surveys | Ministry of Works and Transport, departments and agencies | Lilongwe |
| 25th May 2016 | Transport conditions | Ministry of Works and Transport, departments and agencies | Lilongwe |
| 31st May 2016 | Transport costs | Ministry and private sector transporters and exporters | Blantyre |
| 14th June 2016 | Transport surveys | Transport operators, academics | Blantyre |
| 8th June 2016 | Institutional reform | Ministry of Works and Transport, departments and agencies | Lilongwe |
| 23rd June 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Dedza |
| 24th June 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Salima |
| 27th June 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Nkhata Bay |
| 27th June 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Mzimba |
| 29th June 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Chitipa |
| 29th June 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Karonga |
| 30th June 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Rumphi |
| 1st July 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Kasungu |
| 13th July 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Mchinji |
| 14th July 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Nkhotakota |
| 14th July 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Ntchisi |
| 15th July 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Balaka |
| 18th July 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Chiradzulu |
| 19th July 216 | Transport needs and rural transport | Local Government officers and district stakeholders | Mwanza |
| 19th July 2016 | Transport needs and rural transport | Local Government officers and district stakeholders | Mangochi |
| 20th July 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Machinga |
| 20th July 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Chikwawa |

| Date | Subject | Stakeholders | Location |
|---|---|---|---|
| 21st July 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Zomba |
| 21st July 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Phalombe |
| 22nd July 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Mulanje |
| 21st July 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Thyolo |
| 25th July 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Ntcheu |
| 10th August 2016 | Tourism and Transport | Ministries responsible for transport and for tourism, private sector | Lilongwe |
| 19th August 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Nsanje |
| 24th August 2016 | Urban transport in Lilongwe | City Councillors, technical officers, Government representatives, private sector | Lilongwe |
| 5th September 2016 | Climate change and sustainable transport | Stakeholders in environment, transport and safety in all modes | Lilongwe |
| 6th September 2016 | Inland water transport | Stakeholders in IWT and lake tourism | Mangochi |
| 13th September 2016 | Transport needs and rural transport | Local Government Officers and district stakeholders | Likoma |
| 25th October 2106 | Transport sector financing | Ministry of Transport of Transport and Public Works, Ministry of Finance, Economic Planning and Development, PPPC, JICA, World Bank | Lilongwe |
| 15th November 2016 | Civil Aviation Sub-Sectoral Plan | All aviation sector stakeholders | Lilongwe |
| 12th December 2016 | Progress and findings of NTMP | Joint Transport Sector Review | Lilongwe |
| 31st January 2017 | Urban transport in Mzuzu | CEO, Chief Engineer, Mzuzu City Council | Mzuzu |
| 7th February 2017 | Model specification and validation | Ministry and agencies | Lilongwe |
| 9th February 2017 | Transport needs assessments | Ministries and agencies, World Bank, AfDB, JICA | Lilongwe |
| 14th February 2017 | Roads sub-sector | All road sector stakeholders, except Road Fund Administration | Lilongwe |
| 16th March 2017 | Urban transport in Zomba | CEO, Chief Engineer and Chief Planning Officer, Zomba City Council | Zomba |
| 17th March 2017 | Urban transport in Blantyre | Council officers | Blantyre |
| 22nd May 2017 | Draft Roads Sub-Sectoral Plan | MoTPW and departments and agencies, concerned Ministries, PPPC | Lilongwe |
| 23rd May 2017 | Draft Rail Sub-Sectoral Plan | MoTPW and departments and agencies, concerned Ministries, CEAR and PPPC | Lilongwe |
| 31st May 2017 | Draft Urban Transport Sub-Sectoral Plan | MoTPW and departments and agencies, concerned Ministries, representatives of City Assemblies, PPPC | Lilongwe |
| 31st May 2017 | Draft Civil Aviation Sub-Sectoral Plan | MoTPW and departments and agencies, concerned Ministries, ACL, ADL, and PPPC | Lilongwe |

| Date | Subject | Stakeholders | Location |
|---|---|---|---|
| 31st May 2017 | Draft Inland Water Transport Sub-Sectoral Plan | MoTPW and departments and agencies, concerned Ministries, Mota Engil, and PPPC | Lilongwe |
| 4th August 2017 | Draft NTMP | MoTPW and departments and agencies, concerned Ministries, MITC, Lilongwe City Council, ADL, LIHACO | Salima |
| 10th August 2017 | Draft NTMP | MoTPW, World Bank, AfDB, JICA | Lilongwe |
| 31st August 2017 | Draft Final NTMP | MoTPW, Steering Committee | Salima |
| November 2017 | Final Workshop | Minister and Ministry of Works and Transport Departments and agencies, private sector, development partners | Lilongwe |
| December 2017 | NTMP Launch | Minister and Ministry of Works and Transport Departments and agencies, private sector, development partners | Lilongwe |
| First Quarter 2018 | Investor Conference | Minister and Ministry of Works and Transport Departments and agencies, private sector, development partners | Lilongwe |

# Appendix B
# **Corridor Management Institution**

## B.1 **Overview**

Transport corridors require an appropriate management system and framework to ensure that the corridor expectations are achieved across borders. To this end, Corridor Management Institutions (CMIs) have been established for the North-South Corridor, but are not yet established for the Mtwara and Nacala corridors. The NTMP proposes that trans-national institutional arrangements should now be established for all three corridors.

The establishment of an autonomous CMI is designed to improve corridor infrastructure management, performance and contribute to reducing transport costs and delays. CMIs can play a co-ordination, as well as an advisory, role to both to the Regional Economic Communities (RECs) such as SADC and COMESA, as well as individual corridor member states with regards to the implementation of strategic transport objectives, including trans-national infrastructure investment, regional integration and harmonisation of standards.

In terms of efficiency, CMIs are generally more technical and focused than transport units within the RECs which generally lack staffing and mandate, and, with dedicated resourcing, tend to be stronger on skills and capacity. They also have less bureaucratic and more autonomous structures, geared to outcomes.

When establishing a CMI, it is important to prescribe its coverage, infrastructure facilities, and broad challenges and to ensure stakeholder support. The following provides an additional checklist of activities to be undertaken:

- Mapping of the corridor over its entire geographical coverage showing its infrastructure facilities;
- Surveys and forecasts of the traffic, and conditions, passing through the Corridor;
- Determination of the mandate of the CMI given by the scope of services and a clear definition of issues and challenges to be addressed; and
- Advocacy and consultation with policy makers at the Government level, and non-government stakeholders, in participating states to obtain ownership, willingness and active support.

Transport corridor management systems deployed by CMIs should focus on trade and transport facilitation by carrying out the following functions:

- Monitoring the state of physical infrastructure covering ports, roads, railways, inland terminals, and border posts, identifying gaps, weaknesses and bottlenecks;
- Monitoring the compliance with the implementation of corridor agreed trade and transport facilitation instruments;
- Establishing appropriate databases (transport observatories) and preparing and disseminating information based on agreed Key Performance Indicators;
- Trans-national resource mobilisation for corridor programmes;
- Facilitating capacity building for both policy makers, oversight agencies, service providers, economic operators and corridor neighboring communities;
- Promotion and support to research and studies on issues relevant to improving corridor performance, based on clear evidence and structured decision making; and
- Undertaking advocacy functions for the Corridor to promote its use and supporting investment.

## B.2 **Corridor stakeholders**

Transport corridor activities typically involve many stakeholders from the public and private sectors. Different countries and government agencies are involved at different levels, while private operators may provide transport and logistics services within the corridor. It is therefore imperative to ensure that the corridor is managed in a manner that takes into account the views and interests of the different actors, and that enables each to conduct their roles efficiently whilst being sensitive to language, cultural and ideological differences.

It is important to clearly define the roles and responsibilities of each actor involved in corridor activities, and create an enabling environment to optimally achieve their goals. A clear definition of this kind will avoid the risk of duplication or conflicts, ensuring complementarity and synergies between different actors.

## B.3 **Enabling instruments for establishing CMIs**

The actual establishment of a CMI requires a clear enabling instrument in legal terms. As shown from the experience in the Eastern and Southern Africa regions, CMIs have been set up through the following types of instrument:

- Intergovernmental Agreements;
- Memoranda of Understanding (MOUs);
- Constitutions; and
- Company Registration.

Intergovernmental agreements are negotiated, concluded and signed by governments of participating states. The Northern and Central corridor CMIs, for example, were established this way. The Proposed Djibouti Corridor CMI is also expected to be established through an intergovernmental agreement to be concluded by Ethiopia, Djibouti, South Sudan and Sudan. By contrast, Memoranda of Understanding have been employed as enabling instrument for the establishment of a number of CMIs in Southern Africa, for example the now operational Trans Kalahari Corridor and envisaged for the Nacala Corridor.

Where the CMI is established with a mix of public and private sector stakeholders, it is necessary to prepare a differing enabling instrument such as a Constitution or a Company. This will establish an entity that has a legal personality and can operate within the mandates with which it is vested. However, it is also important that governments also undertake to provide the necessary political support through some form of guarantees that will ensure the right of the entity to be facilitated and operate freely within the corridor states.

The use of a Constitution as the enabling instrument for the establishment of a CMI was employed for the Dar es Salaam Corridor. The constitution is signed by relevant government ministries and private stakeholders in the participating countries namely, Democratic Republic of Congo, Malawi, Tanzania and Zambia.

The above four enabling instruments for the establishment of CMIs provide for the objectives, functions, governance structures, executing agencies and the modalities of funding operating and capital budgets in each case. However, the SADC region has clearly demonstrated its preference for Memorandum of Understanding (MOU) as its preferred enabling instrument for the establishment of CMIs.

## B.4 **CMI role and mandate**

Irrespective of the precise enabling instrument, the roles and mandates of functions of the CMIs must be clearly stipulated and documented. Agreements can usually be rapidly concluded if they are in the same REC as most policies and instruments are already harmonised. It may take time and require long negotiation processes if member states are affiliated to different RECs, as some level of policy and regulation harmonisation may be required prior to the conclusion of the agreement.

After the agreement around the enabling instrument, the participating countries should assign a mandate to the new CMI, defining its legal status, organisational structure, institutional arrangements, and providing clarify over funding sources, and operational arrangements. The CMIs mission is usually prepared in accordance with the given mandate and the long-term objectives contained in the enabling instruments. The achievement of the mission objectives is through strategic plans and annual work programmes, which should be tightly monitored and performance managed.

Once the legal and operational framework is in place, member countries should allocate resources and make the CMI operational. To be efficient, a CMI should be a relatively small in terms of headcount, but autonomous, with a technical, rather than administrative, orientation, and closely involved in regional dialogue on all issues related to corridor development. In terms of activities, the CMI actors should concentrate on the key determinant factors of corridor performance, which include the quality and competitiveness of transport and logistics services, the capacity and condition of corridor infrastructure and facilities, and the regulations governing services provision at national, bilateral and regional levels.

The success of a CMI depends on the support it receives from the political authorities, public agencies and the business community at national and regional levels. CMI efficiency requires the full cooperation and support of the various agencies in charge of infrastructure and facilities, trade and transit legislation, standards, regulations of corridor transport service provision and regulations enforcement. Trade and transport facilitation instruments applied within a transport corridor should also be developed and adopted at REC level.

While the RECs have been actively involved in facilitating the establishment of CMIs, they are never signatories to their enabling instruments. However, CMIs need to work in collaboration with RECs and share information, resources and programmes for their activities; this is because in many cases, CMIs may be better placed than RECs to implement some projects which may be of their common interest.

## B.5 **Relationships between CMIs and member states**

In the cases where the establishment of CMIs has been made through the signing of intergovernmental agreements and MOUs, the member states who are signatories normally designate the structures and governance arrangements that have the final decision making roles on the operation of the CMI.

These structures, if they follow the SADC Protocol on Transport, Communications and Meteorology, may include a Council of Ministers and an Executive Committee of senior officials drawn from the relevant government departments. In the case where the Constitution is the enabling instrument, it is usually signed additionally by key economic operators such as ports, transporters, shippers and shippers' representatives. In the latter case, it will be necessary to develop elaborate and clearly structured institutional linkages with the Governments, regulatory and oversight agencies and transport service providers along the corridor. As noted, these arrangements may need to be sensitive to, and span, differences in language, culture and political orientation.

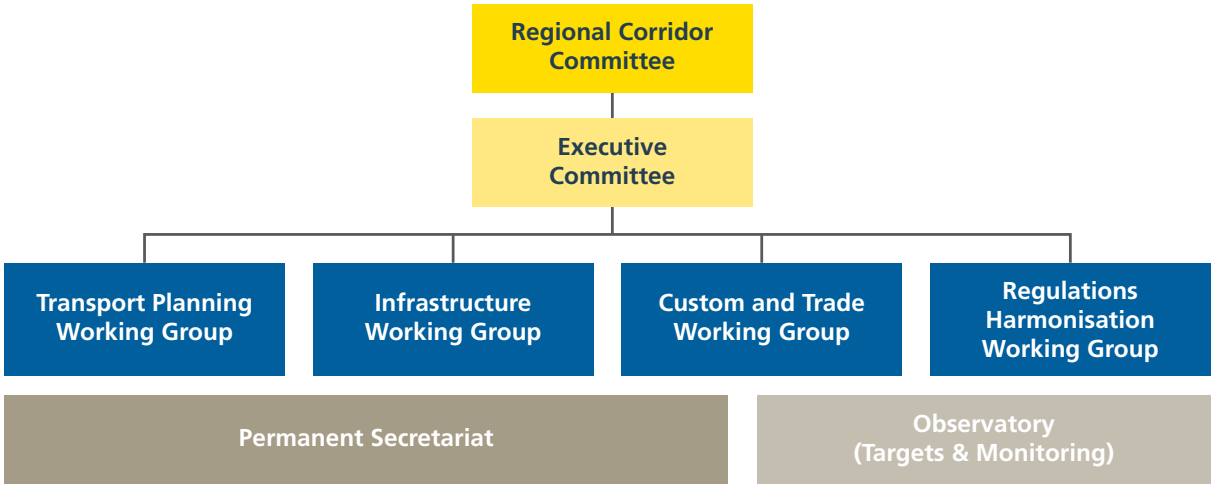



**Figure B.1 Potential structure of Corridor Management Institution (Regional Corridor Committee)**
Note: Precise structure may vary by enabling instrument, corridor priorities and stakeholder decisions.

In the final case where CMI is a registered company, the entities who prepare the Articles and the Memorandum of Association should also provide for the establishment of a management board.

In all cases, it is important that the CMI designates appropriate working groups to deliver its mandate and functions, address the key challenges faced and secure political support to the solutions brought forward. The CMI should also have a secretariat function to ensure good management and governance is properly resourced, as well as an "observatory" to monitor defined Key Performance Indicators and report progress back to the CMI management and wider stakeholder community.

A generic structure for a CMI, based on the SADC Protocol model is shown in Figure B.1, and this, or an equivalent structure, needs to be in place for all three transport corridors passing through Malawi.

## B.6 **Key areas for intervention**

Once established, CMIs, including those proposed for Malawi, can play a critical role in the following areas:

**Corridor Co-ordination:** that cannot be efficiently ensured by the Government agencies, RECs or private operators on their own. The co-ordination role of CMIs aims to create a productive environment that facilitates the parties to coherently implement tasks in a way that improves overall corridor performance. This includes infrastructure investment, information exchange, and management approaches between stakeholders, to develop consensus on the initiatives to be taken, as well as the monitoring of progress.

**Advocacy:** corridors should be dynamic and promote reforms to better respond to regional vision and priorities. Reforms often involve advocacy at several levels including the decision makers within the member governments, IFIs and other pan-national bodies. This may be the case for the revision of a corridor convention, introduction of new regulations, policy reforms or new or improved infrastructure.

**Corridor Promotion:** CMIs can promote the corridor to the business community, other potential users and investors. This may be done through the production and dissemination of quality information on the corridor potential, programs and activities, regulations and operational procedures, indicators and performance, infrastructures and services, and comparative advantages relative to other corridors.

Strong and effective promotion may stimulate the corridor activities including the increase of import-export volumes and the related transport operations. This can contribute to reducing transaction costs, transport costs and prices, and can mobilise further investment in corridor infrastructure and services.

**Corridor Monitoring:** CMIs provide an appropriate framework for monitoring corridor performance, on the basis of outcome data generated by a transport observatory that may be created within the CMI structure or under its supervision, as discussed above.

**Trade and Transport Facilitation:** requires an open and inclusive dialogue between the corridor stakeholders. CMI's can serve as a good platform for facilitating the dialogue on corridor performance, challenges and opportunities, aimed to achieve an efficient movement of goods throughout the corridor.

## B.7 Transport corridor strategies

Assuming they are established for all three regional corridors connecting to and across Malawi, the following tasks are actions that CMIs should pursue, either on their own account or in partnership with the relevant RECs, corridor stakeholders and with technical assistance from IFIs as appropriate.

### B.7.1 Improving connectivity to boost cross-border trade

CMIs can advise RECs and corridor member states on:

RECs and member states have responsibility for the implementation of the integrated African road network, including the Trans African Highway (TAH), and most corridors or corridor sections across the continent are expected to be part of the integrated network. CMIs can advise RECs and corridor states on the development of the corridor sections identified that form the TAH, ensure that the technical standards of the corridor infrastructure and facilities are harmonised, road and rail networks are integrated and implementation schedules are harmonised across borders.

The economic development of Africa requires the modernisation of the transport infrastructure, equipment and services. The use of appropriate Intelligent Transport Systems (ITS) on African corridors, would improve their safety, efficiency and competitiveness. CMIs can contribute to promote the use of ITS and advise on suitable harmonisation of standards and procedures.

SMART corridors should be developed, as a strategy, to achieve an efficient traffic movement monitoring and a trade and transport facilitation tool that generates and disseminate real-time information to the corridor stakeholders. The development of SMART corridors will permit benefits as promoted by WCO and WTO to facilitate the administrative procedures of international trade and transport, aimed to eliminate paper documents through electronic documents and data exchange. Again, CMIs have a key role in promoting such approaches and the optimum solution to ensure consistent practices across borders.

CMIs can advise RECs, member governments and port authorities on the strategies for improving port capacity and performance, port reforms, upgrading, extension, and developing hub ports where feasible, with supporting access strategies. CMI's may facilitate the port dialogue with the major stakeholders including international shipping lines and port operators/ concessionaires.

Similar efforts should improve the performance of private service providers, which may include the revision of undergoing port concessions and services contracts, aimed at improving performance, including the reduction of port dwell time, and quality of service delivery. CMIs can advise on a strategy to coherently improve the overall corridor performance, all corridor components (gateway, link, nodes) being considered. Some analytical works and assessments on the existing situation can be conducted, with recommendations on more efficient policies, strategies and programs. CMIs can facilitate intensive and inclusive port dialogue.

### Electronic Cargo Tracking Systems within African Transport Corridors

The movement of transit cargo on most corridors in Africa are monitored by electronic cargo tracking systems, at least on the corridor sections of the coastal countries. Some transit and destination countries have equally acquired tracking systems, or are in the acquisition processes. However, no corridor in East, Central and Western Africa regions is covered by one single system and tentative negotiations to harmonise or develop a regional tracking system have failed. The most rational solution would be the extension of the best existing system on the whole corridor, if it is technically and economically efficient to do this.

Most systems have been acquired several years ago, on the initiative of the customs administrations in association with private or public partners through non-competitive processes, making the technical performance and costs evaluation required by the other corridor countries difficult before negotiating the extension or making decision. Considering the rapid development of the new information technologies, new efficient and cheaper IT systems may be deployed to replace the old tracking approaches, if the corridor countries commit to better cooperate, especially the port countries which provide most data to feed the system.

The tracking systems generally permit removal of the escort systems for transit cargos, and prevent most fraudulent practices of offloading goods in transit countries including the port country. However, efforts should be made to avoid the triple overlapping of tracking systems, customs bond guarantee and escort as it is on some corridors. Escort fees without physical escort have even been reported in some corridor countries. These unnecessary practices increase the transport costs and delays and impact on the corridor performance.

In the East African region, Uganda and Rwanda are finalising the establishment of a cargo tracking system on their respective corridor sections, supplied by the same operator B-SMART. It is not yet clear if Kenya will adopt the same system. However, given the high level of cooperation developed between the 3 countries in the area of trade facilitation, it can be anticipated that in the near future, a single cargo tracking system will be deployed at least on the Kenya-Uganda-Rwanda section of the Northern corridor. This will improve the fluidity and security of the related transit traffic.

## B.7.2 Efficient logistics to reduce import costs and foster exports

Most transport corridors in Africa face high transport costs due to poor infrastructure, transport chain unreliability, high vehicle operating costs, high port dwell time, delays at corridor check points and border posts.

CMIs can advise REC's and corridor member states on strategies and actions aimed at improving efficiency and reducing logistics costs, and encouraging them to adopt and implement policy reforms where required. The following areas may be considered:

- Advising the institutions in charge of transport infrastructure in corridor member states and RECs on the strategies for the sustainable development, maintenance and management of road and railway networks, ensuring they are kept in good condition and contribute to reduced vehicle operating costs;
- Advising member states, road haulage industry and other corridor stakeholders on strategies to renew truck fleets, liberalisation of transport market and creation of a positive business environment;

### The Automation Program of e-GUCE Cameron: Douala Single Window

The Single Window for External Trade Procedures of Cameroon (GUCE) is located in Douala Port, and created in 1999 as a joint association of different government and private stakeholders to physically co-locate the key stakeholders involved in the domestic clearance process of imported goods.

Following its introduction, GUCE has been progressively reinforced with IT equipment and systems, and used to collect, process and disseminate useful information on port and customs operations in relation with imported goods. From 2007, key procedures of import/export operations have been automated and this has contributed to reduce the port dwell time, especially the automation of the cargo manifest sharing and the electronic payment. Unfortunately, the time saved through the automation is lost through inefficiencies of other actors involved in the import-export operations, including resistance from the different stakeholders, involved in the dematerialisation process. A strong political commitment and support at high level was required to address this, achieved through the establishment of a new "Steering Committee" of the dematerialisation program, chaired by the Permanent Secretary of the Prime Minister's Office, with a Technical Secretariat led by the Director General of the Customs.

However, despite systematic approach followed, and the well committed technical and managerial team, Douala Single Window has taken too long to achieve its objectives: the final objective of getting a fully operational electronic single window is not yet achieved. While similar systems in other countries have been implemented in one or 2 years (under a project approach like in Togo, Ivory Coast, Rwanda etc.), e-GUCE establishment has already taken more than 8 years and is not yet fully completed.

- Facilitating regional dialogue aimed to address corridor bottlenecks and inefficiencies which increase transport delays and costs at all stages of the transport chain. CMIs can advocate solutions which have been successfully implemented across the world, such as the establishment of electronic single windows to facilitate electronic data exchange in port and border operations, electronic cargo tracking systems to monitor or manage the corridor traffic, and effective one stop border posts;
- Facilitating border operation harmonisation between agencies operating on both sides, including adapting working hours to avoid unnecessary delays and long queues at the border; and
- Facilitating development of efficient multi-nodal transport within the corridors. CMI's can collect and disseminate information on multi-nodal transport, and facilitate the regional dialogue aimed to promote multi-nodal transport (meetings, seminars, workshops), and facilitate training.

CMIs can help corridor governments and RECs to improve their planning systems and processes, ensuring harmonisation and coherence in their respective development programs and projects.

## B7.3 Promoting regional economic growth by transforming transport corridors into development corridors

CMIs can assist in transforming transport corridors into economic development corridors through:

- Advising RECs and corridor member states on how to address transport logistics and facilitation constraints by removing bottlenecks to investment, within a broader vision of economic development;
- Encouraging RECs, corridor member states and corridor partners to adopt a joint approach of mobilisation and packaging of investment for the development of corridor infrastructure and services;

### Promoting Multi-Modal Transport

Although many transport corridors are multi-modal, the corridor management institutions often focus on the road transport mode. Very limited efforts are made to monitor the performance of rail transport, as well as inland waterways where it exists. Even at a country level, there is a need for better co-ordination and synergy between the institutions in charge of rail and road transport modes, taking into consideration the multi-modal dimension, and the potential benefits, including the reduction of transport costs and prices and the complementarity of the different modes of transport.

This lack of interest has sometimes been due to the poor performance of the rail sector over past decades due to poor management, infrastructure and equipment. After 2000, different initiatives were taken in most African regions to reform the rail sector through concession contracts with private operators that were expected to revitalise the sector and stimulate investment. Although some timid improvements were observed in a few countries like Cameroon with CAMRAIL, such reforms are generally complex and long processes, and will take time to meet the expectations.

CMIs can help the corridor countries and RECs to reinforce the multi-modal dimension of the corridors in question, through technical advice in the preparation, negotiation and implementation of rail concession contracts and associated regulations. This would help avoid unfair competition and optimise the exploitation of the existing transport systems.

- Advocating for the harmonisation of transport policies and planning systems, regulations and standards, the promotion of fair competition through the market liberalisation of the provision of transport infrastructure and services, creating an enabling environment for the participation of the private sector to the development and/or management of corridor infrastructure, logistics and transport services;
- Encouraging RECs and member countries to establish and implement customs unions to facilitate free trade and economic development;
- Advocating sustainable and efficient funding mechanisms improvements to transport corridors, including developing mechanisms for leveraging private finance in infrastructure development, and mitigating risks in order to give the private sector confidence to invest on a long-term basis;
- Assisting in the establishment of legal and regulatory instruments related to transport corridors; and
- Developing feasibility studies, lobbying for, and preparation for corridor development projects.

### B.7.4 Fostering safe and secure means of transport

The provision of safe transport infrastructure and services requires efficient and harmonised transport sector planning and management systems. CMIs can advise RECs and corridor member countries on:

- Establishing appropriate modal frameworks for road, rail and inland water transport safety;
- Reinforcing the technical capacity of the institutions in charge of transport safety at national level;
- Introducing road and rail safety audit policies, build required capacity for conducting efficient safety audits, and ensure that audit recommendations are implemented;
- Reinforcing the structures in charge of road safety, enabling them to efficiently conduct technical inspections, develop and implement safety regulations, and regulate axle load and speed limit; and
- Implementing the African Road Safety Charter.

### B.7.5 **Promoting sustainable transport infrastructure and services and minimising adverse impacts on the environment and communities**

CMIs can promote sustainable transport in corridor development and management, by advising RECs and corridor member states on policies, strategies, programs and actions aimed at:

- Reduction of the use of fossil fuels by promoting the use of alternatives, the most appropriate international standards of fuel efficiency, and the removal of old and fuel inefficient vehicles from the road networks;
- Capacity building to national and regional institutions in charge of transport and environment protection;
- Promotion of multimodal corridor transport through rail and/or inland water transport using clean energy; and
- Sensitisation of the environmental dimension in transport infrastructure and services provision, particularly on the cost of pollution, as well as pollution charging strategies based on the "polluter pays" principle.

### B.7.6 **Improving overall sector governance**

In addition to the actions proposed, CMIs can advise on actions on regulations allowing fair competition within and between modes, and securing efficient transport systems, through:

- Reforming the transport market towards more competition and liberalisation, setting access conditions on the transporter profession, and eliminating market distortions or inequalities;
- Eradicating non-tariff barriers along corridors which include proliferation of legal and illegal check-points by police and security forces, customs, sanitary services, freight bureaux, and transport agencies;
- Implementing regional trade and transport facilitation best practice measures, aimed at ensuring a smooth movement of goods on the corridor, monitoring and reducing transport costs and delays;
- Promoting strategies to leverage private sector finance and expertise in the funding, development and management of trans-national transport infrastructure and services; and
- Regulating vehicle weights and axle loading so as to monitor, detect and combat overloading and ensure that payment for use of the infrastructure reflects a proper assessment of impact.

# Appendix C **Climate impacts and adaptation**

## Table C.1 **Typical climate change impacts and adaptation options for major project sectors**

| Aspect | Impact: precipitation (increasing) | Impact: precipitation (decreasing) | Impact: temperature (increasing) | Impact: wind | Adaptation |
|---|---|---|---|---|---|
| **Road** | | | | | |
| **Un-engineered earth roads**<br>**Engineered earth roads**<br>**Gravel roads** | ▪ Flooding<br>▪ Softening of material<br>▪ Impassability<br>▪ Erosion of surface<br>▪ Loss of shape<br>▪ Traffic disruption and congestion | ▪ Increased wear and loss of gravel<br>▪ Increased dust emissions over longer periods<br>▪ More rapid deterioration of gravel<br>▪ Increased development of loose material and roughness | ▪ Cracking, development of roughness and generation of loose material<br>▪ Reduced visibility and operational disruption (fires) | ▪ Deterioration<br>▪ Accumulation of sand | ▪ Higher degree of compaction<br>▪ Appropriate material selection and construction<br>▪ Accounting for climate risks in maintenance regimes<br>▪ Raise riding surface and appropriate drainage<br>▪ Upgrade to engineered, gravel or paved standard |
| **Paved roads** | ▪ Loss of strength of layer materials<br>▪ Damage to structure and surfaces<br>▪ Erosion of unpaved shoulders<br>▪ Traffic disruption and congestion | ▪ Damage to thin surfaces and asphalt<br>▪ More rapid binder deterioration | ▪ Ageing of bituminous binders<br>▪ Softening, deformation and damage to bitumen in asphalt<br>▪ Expansion and buckling of concrete roads and structures<br>▪ Reduced visibility and operational disruption (fires) | ▪ Accumulation of sand<br>▪ Wind-loading of structures | ▪ Appropriate structural designs, surfaces and construction<br>▪ Use different (harder) binders in asphalt<br>▪ Changes to concrete mixes and reinforcing<br>▪ Accounting for climate risks in maintenance regimes |

| Aspect | Impact: precipitation (increasing) | Impact: precipitation (decreasing) | Impact: temperature (increasing) | Impact: wind | Adaptation |
|---|---|---|---|---|---|
| **Rail** | | | | | |
| **Railways** | ▪ Flooding (damage and disruption)<br>▪ Loss of strength of layer materials<br>▪ Damage to structure and surfaces<br>▪ Low adhesion | ▪ Lineside fires | ▪ Expansion of material and structures<br>▪ Rail buckling and/or associated misalignment problems<br>▪ Lineside fires<br>▪ Failure rate of assets<br>▪ Reduced visibility and operational disruption (fires) | ▪ Wind loading of structures<br>▪ Damage to lineside trees<br>▪ Obstructions from fallen trees, branches and third party objects<br>▪ Speed restrictions on bridges or other exposed locations | ▪ Appropriate structural designs, material selection and construction<br>▪ Accounting for climate risks in maintenance and replacement regimes<br>▪ Speed restrictions on bridges or other exposed locations<br>▪ Green infrastructure |
| **Rolling stock/ buildings** | ▪ Flooding (damage and disruption)<br>▪ Loss of strength of layer materials<br>▪ Damage to structure and surfaces | | ▪ Increase demand on air conditioning and ventilation systems<br>▪ Decreased reliability of air conditioning and ventilation systems<br>▪ Reduced passenger and worker discomfort (particularly stranded and overcrowded trains)<br>▪ Overheating of diesel trains | ▪ Overturning of vehicles<br>▪ Damage to buildings | ▪ Passive design<br>▪ Warning systems |
| **Line side equipment** | ▪ Signalling or other electronic equipment failures | ▪ Electronic equipment failures<br>▪ Earth faults with signals or power distribution | ▪ Overheating of electronic equipment<br>▪ Failure of point operating equipment<br>▪ Damage and disruption (fires) | ▪ Damage to electronic equipment | ▪ Temperature stabilising design<br>▪ Strategic placement of equipment<br>▪ Green infrastructure |

| Aspect | Impact: precipitation (increasing) | Impact: precipitation (decreasing) | Impact: temperature (increasing) | Impact: wind | Adaptation |
|---|---|---|---|---|---|
| **Port** | | | | | |
| **Port infrastructure** | ▪ Damage to structure and surfaces<br>▪ Flooding of stacking and stockpiling yard<br>▪ Closure of supporting transport network<br>▪ Operational disruption | ▪ Lowering of water levels and consequential impacts on operations | ▪ Expansion and buckling of structures and surfaces<br>▪ Increased energy consumption for cooling<br>▪ Damage and disruption (fires) | ▪ Wind-loading of structures<br>▪ Closure of supporting transport network<br>▪ Toppling of containers in stacking yard<br>▪ Delays to unloading/ loading<br>▪ Damage to equipment<br>▪ Power disruption | ▪ Appropriate structural designs, surfaces and construction<br>▪ Accounting for climate risks in maintenance regimes<br>▪ Appropriate drainage<br>▪ Paved surfaces<br>▪ Energy efficiency measures<br>▪ Changing work regimes<br>▪ Insurance<br>▪ Automation of logistics<br>▪ Locking positions for equipment<br>▪ Re-organisation of storage and reduced stacking height of containers<br>▪ Underground power supply<br>▪ Warning systems<br>▪ Green infrastructure |
| **Airports** | | | | | |
| **Airport infrastructure** | ▪ Loss of strength of layer materials<br>▪ Damage to structure and surfaces<br>▪ Traffic disruption and congestion<br>▪ Flooding (damage and disruption)<br>▪ Electronic equipment failures | ▪ Damage to thin surfaces and asphalt<br>▪ More rapid binder deterioration | ▪ Ageing of bituminous binders<br>▪ Softening, deformation and damage to bitumen in asphalt<br>▪ Expansion and buckling of<br>▪ concrete surfaces and structures<br>▪ Reduced visibility and operational disruption (fires)<br>▪ Increase demand on air conditioning and ventilation systems<br>▪ Decreased reliability of air conditioning and ventilation systems<br>▪ Reduced passenger and worker discomfort<br>▪ Overheating of electrical equipment<br>▪ Damage and disruption (fires) | ▪ Wind-loading of structures<br>▪ Operational impacts<br>▪ Damage to buildings, assets and equipment | ▪ Accounting for climate risks in operational planning and maintenance regimes<br>▪ Appropriate structural designs, surfaces and construction<br>▪ Automation of logistics<br>▪ Changes to concrete mixes and reinforcing<br>▪ Changing work regimes<br>▪ Energy efficiency measures<br>▪ Green infrastructure<br>▪ Insurance<br>▪ Locking positions for equipment<br>▪ Passive design<br>▪ Strategic placement of buildings, equipment and assets<br>▪ Temperature stabilising design<br>▪ Underground power supply<br>▪ Use different (harder) binders in asphalt<br>▪ Warning systems |

| Aspect | Impact: precipitation (increasing) | Impact: precipitation (decreasing) | Impact: temperature (increasing) | Impact: wind | Adaptation |
|---|---|---|---|---|---|
| **All** | | | | | |
| **Earthworks** | ▪ Increased slope instability<br>▪ Soil saturation<br>▪ Erosion of surface<br>▪ Undercutting<br>▪ Excessive vegetation growth | ▪ Earthworks failure due to desiccation<br>▪ Damage to vegetation and more difficult to establish erosion protection measure | | ▪ Erosion | ▪ Higher degree of compaction<br>▪ Appropriate drainage<br>▪ Appropriate structural design<br>▪ Maintenance<br>▪ Slope stabilisation measures<br>▪ Green infrastructure (deep-rooted, drought resistant vegetation) |
| **Subgrade soils** | ▪ Soil softening, erosion collapse and settlement<br>▪ Deformation of rigid structures | ▪ Shrinkage and cracking | | | ▪ Robust survey and assessment to inform design<br>▪ Isolation of susceptible soils<br>▪ Appropriate structural design<br>▪ Appropriate drainage<br>▪ Construct at in-service moisture conditions |
| **Drainage** | ▪ Blockages<br>▪ Water accumulation<br>▪ Erosion and scour of structures and surfaces<br>▪ Softening of subsurface materials | ▪ Erosion, silting and sedimentation | ▪ Expansion, cracking and erosion<br>▪ Loss of vegetation | | ▪ Appropriate structural design and construction<br>▪ Modify extreme rainfall return periods in design<br>▪ Maintenance<br>▪ Increase culvert and bridge openings<br>▪ Concrete and reinforcement<br>▪ Green/blue infrastructure |

| Aspect | Impact: precipitation (increasing) | Impact: precipitation (decreasing) | Impact: temperature (increasing) | Impact: wind | Adaptation |
|---|---|---|---|---|---|
| **Construction** | ▪ Difficult working conditions<br>▪ Excessive moisture in materials<br>▪ Reduced working periods and increased delays<br>▪ Water damage | ▪ More dust<br>▪ Evaporation of construction water | ▪ Enhanced reactions when cement stabilising and drying of concrete<br>▪ Difficult working conditions<br>▪ Damage and disruption (fires) | ▪ Difficult working conditions<br>▪ More dust<br>▪ Evaporation of construction water | ▪ Construct in dry season<br>▪ Greater use of unslaked lime<br>▪ Modified and innovative construction techniques<br>▪ Water efficiency measures<br>▪ Dust management plan |
| **Operation and maintenance** | ▪ Additional damage and maintenance requirement<br>▪ Reduced opportunities maintenance<br>▪ Operational disruption | | | | ▪ Adequate resources and capacity in place<br>▪ Local community maintenance programmes<br>▪ More regular maintenance and preventative action<br>▪ Underpinning the efficiency and effectiveness of incorporated climate change adaptation measures<br>▪ Emergency planning for climate impacts<br>▪ Early warning systems<br>▪ Monitoring and evaluation of asset resilience to inform climate change adaptation decision-making<br>▪ The incorporation of adaptation measures to existing assets during planned maintenance and repairs<br>▪ Water efficiency measures |

# Appendix D **Environmental and social impacts**

## Table D.1 **Potential environmental and social impacts of the NTMP Sub-Sectoral Plans**

| Environmental and Social aspect | Potential environmental and social impacts | Additional mitigation | Urban transport | Road | Port | Rail |
|---|---|---|---|---|---|---|
| **Institutional strengthening** | A National Transport Authority (NTA) is proposed that will combine regulation of road operations, rail and maritime and wider economic regulation of transport costs within a single body responsible for all forms of surface transport. This will result in improvements in integration of the different transport sub-sectors, policy making and clarify the direction of transport planning. However, there is no specific identification within the NTMP for inclusion of environmental and social assessment within proposed new institutions.<br>Capacity building and training is identified as necessary.<br>No identification within the NTMP of wider institutional strengthening required to address transport-related environmental and social assessment, risks, issues and opportunities. | Develop cross-cutting environmental, social, health, safety and quality policy, which should be at the core of the NTA.<br>Develop procedures for transport environmental and social assessment, including guidelines for land acquisition and resettlement.<br>Strengthen environmental and social monitoring and enforcement through policy, procedures and training. | x | x | x | x |
| **Biodiversity, flora and fauna** | No landtake within or adjacent to protected sites is anticipated as a result of the NTMP, however individual interventions would need to be assessed on a case-by-case basis.<br>Any measures involving landtake may result in the loss, fragmentation and degradation of habitat, and severance of animal migration routes and pathways. Construction activities could potentially have temporary noise, dust and pollution effects on flora and fauna.<br>Construction activities and opening up access to remote areas could lead to greater demand for bushmeat (from the workforce and wider community), stimulate the wildlife trade and facilitate access to hunting areas. New development into remote areas can also lead to land clearance for agriculture, and increased disturbance and pressure on natural resources.<br>Measures resulting in increased capacity at existing facilities can also result in increased noise and dust impacts on fauna, increased severance of habitat, and increased incidence of deaths (predominantly from increased use of roads in more rural areas).<br>However, appropriate planning as promoted though the NTMP will allow the natural increased demand for transport to be managed in a way that reduces adverse impacts than if allowed to develop in an unplanned manner. | Careful route selection and siting of all projects, with advice from biodiversity authorities/ wildlife specialists.<br>Check for loss of any critical habitats - if loss of Critical Habitat is inevitable, development/ implementation of an Offsets Programme.<br>Consideration of the creation of buffer zones where appropriate, especially where works are undertaken close to sensitive sites.<br>Rehabilitation of cleared areas with native species, and ecosystem restoration of habitats of conservation value, using specialist advice and input, supported by a monitoring programme and corrective actions as necessary.<br>Wildlife crossings for terrestrial animals, and design of culverts/ crossing structures to avoid impacts on animal movement.<br>Minimisation of area impacted during construction works, clear demarcation of remaining intact areas of habitat, and prohibition of activity into those areas for any purpose; maintenance of wildlife corridors between fragmented areas wherever possible.<br>Bushmeat Hunting and Wildlife Trade Management Plan. | x | x | x | x |

| Environmental and Social aspect | Potential environmental and social impacts | Additional mitigation | Urban transport | Road | Port | Rail |
|---|---|---|---|---|---|---|
| **Biodiversity, flora and fauna** | Positive impacts are expected in terms of reductions in noise and emissions to air due to reduced congestion, use of vehicles with improved emission ratings and modal shift, which will have a positive effect on flora and fauna. | - | x | x | x | x |
| | Direct mortality to birds/bats from collisions with aircraft, especially if frequency of aircraft is increased. | Implementation of procedures to deter birds (e.g. "bird-scarers").<br>Where appropriate, clearance and/or control of vegetation that attracts birds in the immediate vicinity of airports, in liaison with a bird specialist. | | | | |
| **Water** | Water requirements are not specifically identified in the NTMP. Any new projects will require water during construction. Some may also have water demands during operation (e.g. airports and ports).<br>New structures can affect drainage patterns and groundwater recharge. Installation of piers and other structures can result in potential changes to movement of water and hydrogeology.<br>Construction works and, in some cases, operation can result in pollution of groundwater and surface water, for example as a result of discharges, accidental spills, sediment mobilisation and poor waste management.<br>During operation, the, use of hazardous materials at airports, and wastewater discharges from ships and leakages of oils from ships, ports and related facilities could result in water pollution. | Survey of hydrogeological conditions and aquifers and groundwater quality in project area.<br>Where appropriate, water quality survey and monitoring.<br>No abstraction of water should occur without the prior approval of relevant authorities.<br>Promotion of water efficiency (including leak detection, preventative maintenance of equipment) and water recycling at construction and, where relevant, operational sites.<br>Restrictions on work and other activities around waterbodies (e.g. vehicle washing).<br>Installation of sewage treatment to meet required standards; hygiene training for workforce.<br>Prepare a Water Management Plan to manage water demand, sustainable water use, and drainage and pollution prevention and control.<br>Emergency response plans in place during construction and operation. | x | | x | x |
| **Soil, geology and topography** | New projects may have a negative impact on soils and geology associated e.g. bridges, piling activities, soil erosion, soil compaction, soil contamination, etc.<br>Possibility of slope failure due to cutting and filling (upgrading or new railways and roads). | Examine topography and geological conditions at sites and ensure appropriate design measures are put in place to avoid risks. Avoidance of areas liable to flooding, slope instability, and water crossings where possible.<br>Prepare a Soil Management Plan.<br>Retention of topsoil for restoration as soon as practicable. | x | | x | x |

| Environmental and Social aspect | Potential environmental and social impacts | Additional mitigation | Urban transport | Road | Port | Rail |
|---|---|---|---|---|---|---|
| **Air quality** | Emissions are targeted through measures that that encourage modal shift and seek to provide infrastructure to support this modal shift. Measures proposed for pedestrian, cycling and public transport infrastructure will positively impact emissions. | Inventory of major air pollution sources and monitoring of ambient air quality.<br>Dust Management Plan.<br>Tree planting along roads. | x | x | x | x |
| | Air emissions expected to rise during any construction works due to earth moving equipment and generation of dust, poor emission control and insufficient maintenance and inspection. | As above. | x | | x | x |
| | Adoption of minimum emission standards for all vehicles would ensure a signification reduction in fuel consumption and CO2 emissions.<br>In the long-term, proposals to use electrically powered buses will also reduce emissions. | - | x | x | | |
| **Climate change / greenhouse gas (GHG) emissions** | There are several operational measures that target increase public transport patronage, and improved facilities for cyclists and pedestrians in order to encourage modal shift. These measures will all contribute to reducing GHG emissions from the transport sector.<br>Proposals for road based mass transit vehicles (conventional buses, guided buses, bus rapid transit) have more efficient engines than smaller vehicles leading to reduced fuel consumption and a significant reduction in CO2 emissions. The potential use of electric buses in the long-term will further contribute to these reductions.<br>Adoption of minimum emission standards for all vehicles will ensure a signification reduction in fuel consumption and CO2 emissions. | Climate proofing new infrastructure. | x | x | x | x |
| | Increase in the aviation sector will result in increased in emissions, however the NTMP recommends that airlines should be encouraged to use fuel-efficient and will be expected to meet any future requirements under the Kyoto Agreement or under current and future emissions Trading Schemes. | - | | | | |
| **Noise and vibration** | Noise and vibration may increase locally during construction of new projects and new measures, from the use of equipment, construction traffic and construction activities.<br>During operation, there may be increased noise and vibration due to an increase in vehicles/ transport movements related to new projects.<br>An increase in air traffic could result in local increased noise and vibration, however the NTMP recommends that airlines should be encouraged to use less noisy aircraft types. | Inventory of major sources of noise and vibration in study area and noise monitoring.<br>Data on existing noise complaints.<br>Use of modern equipment fitted with abatement devices (e.g. mufflers, noise enclosures); good maintenance regime.<br>Strict controls of timing of construction activities.<br>Where necessary, use of noise barriers and screening with tree planting. | x | x | x | x |
| | In areas of existing congestion, particularly in urban centres, the NTMP is likely to have a positive effect in reducing noise and vibration as measures proposed are likely facilitate improved flow and movement of vehicles and people. | - | x | x | | |

| Environmental and Social aspect | Potential environmental and social impacts | Additional mitigation | Urban transport | Road | Port | Rail |
|---|---|---|---|---|---|---|
| **Waste** | Wastes will be generated during maintenance, upgrades and particularly during the construction of new projects. Inefficient waste management during construction, operation and maintenance activities can lead to excess materials consumption, generation of wastes/ emissions, soils and water pollution. | Prepare a Waste Management Plan following the waste hierarchy, supported by staff training.<br>Earthworks to be designed to achieve a balance between cut and fill wherever possible.<br>Use of authorised contractors for hazardous and any other wastes which the project cannot dispose of safely. | x | x | x | x |
| **Material assets** | The impact on material assets is generally considered positive primarily through the improvement of road space through the proposed measures to provide facilities for pedestrians, cyclists and public transport. The sharing of road space is an important component to attract modal shift away from the private car.<br>Rail offers Malawi the opportunity to become a logistics nexus – at the centre of the regional economy for parts of Mozambique and Zambia, and even potentially from as far as South Africa, Zimbabwe and Tanzania. Improved IWT to Tanzania can also contribute towards transport freight from landlocked adjacent countries to the coast and reduce costs for imports and exports.<br>Improved air access will also contribute towards national and international movement of people and trade. | - | x | x | x | x |
| **Land use and tenure** | Upgrades and new projects requiring landtake may have a direct impact on existing land uses through the loss of land, structures, crops and trees. | Avoid/minimise involuntary land acquisition and resettlement.<br>Survey of encroachment on wayleave (roads, railways). Where land acquisition necessary, undertake detailed inventory survey of plots, structures and people living within a wayleave/ landtake.<br>Compensation and resettlement planning.<br>Information disclosure with stakeholders. | x | x | x | x |
| | New projects may have adverse indirect effects through providing accessibility to remote areas previously undeveloped, resulting in changes to existing land uses (particularly loss of natural resources such as flora) and increased development. | Land use and livelihoods assessment.<br>Information disclosure with stakeholders. | | | x | x |
| | Improved accessibility and reliability may have a positive effect on land uses, improving access to markets with a knock-on effect for improved productivity and maximising existing land uses. | Land use and livelihoods assessment.<br>Information disclosure with stakeholders. | x | | x | x |

| Environmental and Social aspect | Potential environmental and social impacts | Additional mitigation | Urban transport | Road | Port | Rail |
|---|---|---|---|---|---|---|
| **Socio-economics** | Beneficial local and wider economic effects as a result of reduced transport costs, improved access and interconnectivity, and reduced travel times. This could assist in the development of existing and new markets (mining, tourism), reduce the costs of imports and exports, and open new market opportunities. This may, in the long run, facilitate diversification of the economy. The Civil Aviation Sub-Sectoral Plan, for example, recommends that the Government should identify specific development areas close to airports that can benefit from an airport's proximity such as Special Economic Zones (SEZ's) with various tax and land servicing incentives for investors. Improved rail services will open access to international ports and international markets through cost efficient transport of goods over long distances.<br><br>New measures and construction projects could result in demand for local goods and products. | Procedures for sustainable local procurement, in consultation with local authorities and community leaders.<br><br>Information disclosure and stakeholder engagement. | x | x | x | x |
| | Beneficial effects on employment due to easier and cheaper access to markets, easier access to jobs through improved transport and reduced commuting times, and employment opportunities on transport construction projects. | Development of an Employment Plan. Provide transport construction project employment opportunities to locals within the project area, including project affected persons and vulnerable people. Provide transparent and culturally appropriate communication with communities regarding employment opportunities. Fair and transparent hiring and staff management procedures. | x | x | x | x |
| | Potential easier access to social services, in particular access to schools. | Review of local service provision and access. | x | x | | x |
| | Beneficial effects on livelihoods through reduced transport costs and time taken to travel. | Information disclosure and stakeholder engagement. | x | x | x | x |
| | Improved equity of access, due to improved access and predominately through the inclusion of Universal Design which makes provision for ensuring that there is appropriate pedestrian access for the elderly, those in wheelchairs and people walking with small children or with pushchairs. Whilst this will have the most significant positive effect in urban areas, it will also positively impact all transport modes. | - | x | x | x | x |
| | Potential adverse effects in local community structures and livelihoods due to access to remote areas and/or construction activities for significant new projects where a large influx of temporary workers is required. | Review of local social conditions and governance/community structures at a project specific level.<br><br>Influx Management Plan. | x | | x | x |
| | For new measures and projects, temporary demand on existing social infrastructure e.g. health centres, water, electricity, during construction and a lesser extent during operation. | Environmental and Social Management Plan. | x | x | x | x |

| Environmental and Social aspect | Potential environmental and social impacts | Additional mitigation | Urban transport | Road | Port | Rail |
|---|---|---|---|---|---|---|
| **Health, safety and security** | Positive effects on human health through measures that seek to reduce emissions through promotion of modal shift, and in terms of safety through measures to improve congestion and improve safety (such as improved signalling, lighting, improved vehicles and fleet, maintenance of equipment, etc.). Training and safety awareness, will reduce risks and improve response to incidents and accidents. | Survey of health conditions, including prevalence and cause of dominant diseases, in particular respiratory diseases.<br>Collect and analysis accident data.<br>Public awareness campaigns.<br>Emergency Preparedness and Response Plan. | x | x | x | x |
| | Discharges from increased activity e.g. discharge of toilets from trains onto tracks without treatment, discharge from ships could result in water and soil pollution and consequent effects on humans. | Waste Management Plan. | | | x | x |
| | Increased risk of accidents during any construction works due to presence of construction equipment, vehicles and personnel. Real or perceived disruption to normal community life, through the physical presence of a construction workforce.<br>Construction emissions from equipment and vehicles can have adverse effects on noise, dust and air quality locally. Influx of personnel and interaction between workforce and local communities may contribute to an increase locally in communicable diseases, including HIV/AIDS and sexually transmitted diseases (STDs).<br>Poor management of occupational health and safety could lead to accidents, injuries and illnesses among workers. | Public awareness Public awareness campaigns.<br>Environmental and social management plan for all projects.<br>Stakeholder Engagement Plan and implementation of a Grievance Procedure.<br>Implementation of an Occupational Health and Safety Plan for construction workforce.<br>Training and awareness for workforce and their dependents on HIV/AIDS and other STDs, and communicable diseases including malaria; health awareness raising campaigns for communities on similar topics. | x | x | x | x |
| | There is the potential for an increase in accidents due to increase volume in traffic movements as result of implementation of the larger NTMP schemes, large scale accidents (such as planes, trains); however improved planning, design, controls and enforcement could ultimately reduce risks. | Public awareness campaigns.<br>Emergency Preparedness and Response Plan. | x | x | x | x |
| **Landscape** | Landscape impacts are potentially likely where new infrastructure projects are proposed in sensitive areas. | Projects that are within close proximity to designated areas and/or residential properties should be assessed for their landscape impacts.<br>Tree planting and screening. | x | x | x | x |
| **Cultural heritage and archaeology** | Cultural heritage impacts may arise from any landtake associated with new projects or upgrades. Impacts may include loss of existing cultural heritage and unknown archaeology due to landtake and excavations; and impacts on setting of sites due to the presence of new infrastructure. Reduced emissions and congestion could have a positive impact on cultural heritage buildings and monuments. | Inventory survey of tangible and intangible cultural heritage sites related to project works.<br>Avoid routing new projects over or close to such sites.<br>Development of a Cultural Heritage Management Plan covering tangible and intangible (e.g. local traditions and practices) cultural heritage.<br>Ensure Chance Finds Procedures in place for any construction works – if any unknown archaeology found, report and consult with relevant Ministry. | x | x | x | x |

# Table D.2 **Key potential environmental and social impacts of proposed large infrastructure projects**

| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **Lilongwe bus rapid transit (BRT)** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br><br>The scheme will be built on new infrastructure where possible to avoid having to convert and widen existing roads, and therefore minimal impacts in terms of land take or physical or economic displacement are anticipated.<br><br>BRT will provide greater access to the city centre and places of work, with a benefit to commuters.<br><br>Potential to discourage car use through the provision of a more reliable public transport network.<br><br>Economic benefits to users as cheaper than private car use, minibuses or taxis.<br><br>Mass transit vehicles have more efficient engines than smaller vehicles leading to reduced fuel consumption and reduced air emissions - in terms of both fuel consumption and CO2 emissions a bus could replace the equivalent of 14 private vehicles.<br><br>Improved access could foster development along growth corridors within Lilongwe. The system will link the employment centres of Kanengo and Old Town to the large and growing residential areas of Area 25, Area 47, and Area 49 as well as serving the National Stadium and the retail areas of CrossRoads and City Mall.<br><br>Improved health and safety, for example through the provision of secure and covered bus stations.<br><br>The inclusion of Universal Design at all bus stops will improve equity of access to public transport. | There may be some minimal economic and physical displacement to accommodate the BRT infrastructure.<br><br>Could result in conflicts over road space allocation, depending on location.<br><br>Potential consequent loss of employment in the minibus industry. | If/where land acquisition necessary, undertake detailed inventory survey of plots, structures and people living within a wayleave/land take. Compensation and resettlement planning.<br><br>Engagement and information disclosure with stakeholders.<br><br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan.<br><br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce. |

| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **Lilongwe western bypass, Lilongwe eastern bypass** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br><br>Operation of a bypass could result in a reduction in congestion within the city centre and improved efficiency of movement within the city centre due to a reduction in through traffic; and improve travel times within and around the city centre.<br><br>A bypass may also result in a reduction in air emissions and GHGs, due to a reduction in congestion and waiting vehicles; however, overall reductions are likely to be small as a new bypass will also encourage increased vehicle use. Most beneficial effects on air quality are likely to be felt locally within the city centre.<br><br>Improved access could foster development along growth corridors.<br><br>Larger goods movements and vehicles may also be reduced through the city, as a bypass could allow industrial transport of goods around rather than through the city as currently takes place. This could improve transport time and costs for business, and result in improvements to pedestrian and other road user health and safety. | Construction of a bypass will result in land take and, given the location of either bypass, is likely to result in potentially significant economic and physical displacement, including the need for resettlement. This could result in the loss of houses, businesses and agricultural land and the need for compensation provision. Land take could also result on impacts on local cultural heritage and result in damage to buried archaeology.<br><br>Construction works can result in temporary adverse effects on air quality and ambient noise, nuisance, waste generation and demand for local services (e.g. water, energy) as a result of the influx of construction workers, construction traffic, and use and movement of construction equipment. Adverse effects may arise in the form of pollution events and accidents/ incidents as a result of poorly managed and controlled construction site activities. Where the new road crosses watercourses, the risks of pollution are higher.<br><br>The construction of a new road could interrupt hydrogeology and groundwater flows from excavation and ground clearance, and the provision of permanent hardstanding reducing infiltration rates. Runoff and stormwater drainage could result in pollution during operation.<br><br>Provision of new road infrastructure will result in an increase in air pollution and noise disturbance locally. | Avoid/minimise involuntary land acquisition and resettlement. Where land acquisition necessary, undertake detailed inventory survey of plots, structures and people living within a wayleave/land take. Compensation and resettlement planning.<br><br>Detailed alignment to take account of local groundwater conditions and avoid areas liable to flooding, slope instability, and water crossings where possible.<br><br>Environmental and social impact assessment.<br><br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan.<br><br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce.<br><br>Management of excavation wastes, and retention of topsoil wherever possible.<br><br>Where necessary use of localised noise barriers e.g. berms, bunds, vegetation planting.<br><br>Appropriate drainage and stormwater design. |

| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **Blantyre elevated expressway between Blantyre and Limbe** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br>This 8km of elevated road would run above the Kamuzu Highway in Blantyre between Limbe at the M2/M3 junction to Mbayani on the M1. It would provide a connection between these two points as well as having free-flowing on/off ramps at Chichiri, College of Medicine, and Blantyre CBD. The expressway would offer a fast flowing alternative to the congested Kamuzu Highway, and provide relief to it at the same time which would allow for the provision of dedicated lanes for fast urban public transport.<br>The location of the elevated road along exiting road corridors is likely to result in minimal economic or physical displacement. | This intervention is likely to have adverse visual impacts and potentially increased noise disturbance to local residents that will be difficult to mitigate due to the height of the structure.<br>This option is expensive and therefore costs may need to recuperated though users, and therefore not be as financial accessible to the general public as alternatives. | If/where land acquisition necessary, undertake detailed inventory survey of plots, structures and people living within a wayleave/land take. Compensation and resettlement planning.<br>Engagement and information disclosure with stakeholders.<br>Environmental and social impact assessment.<br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan.<br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce. |

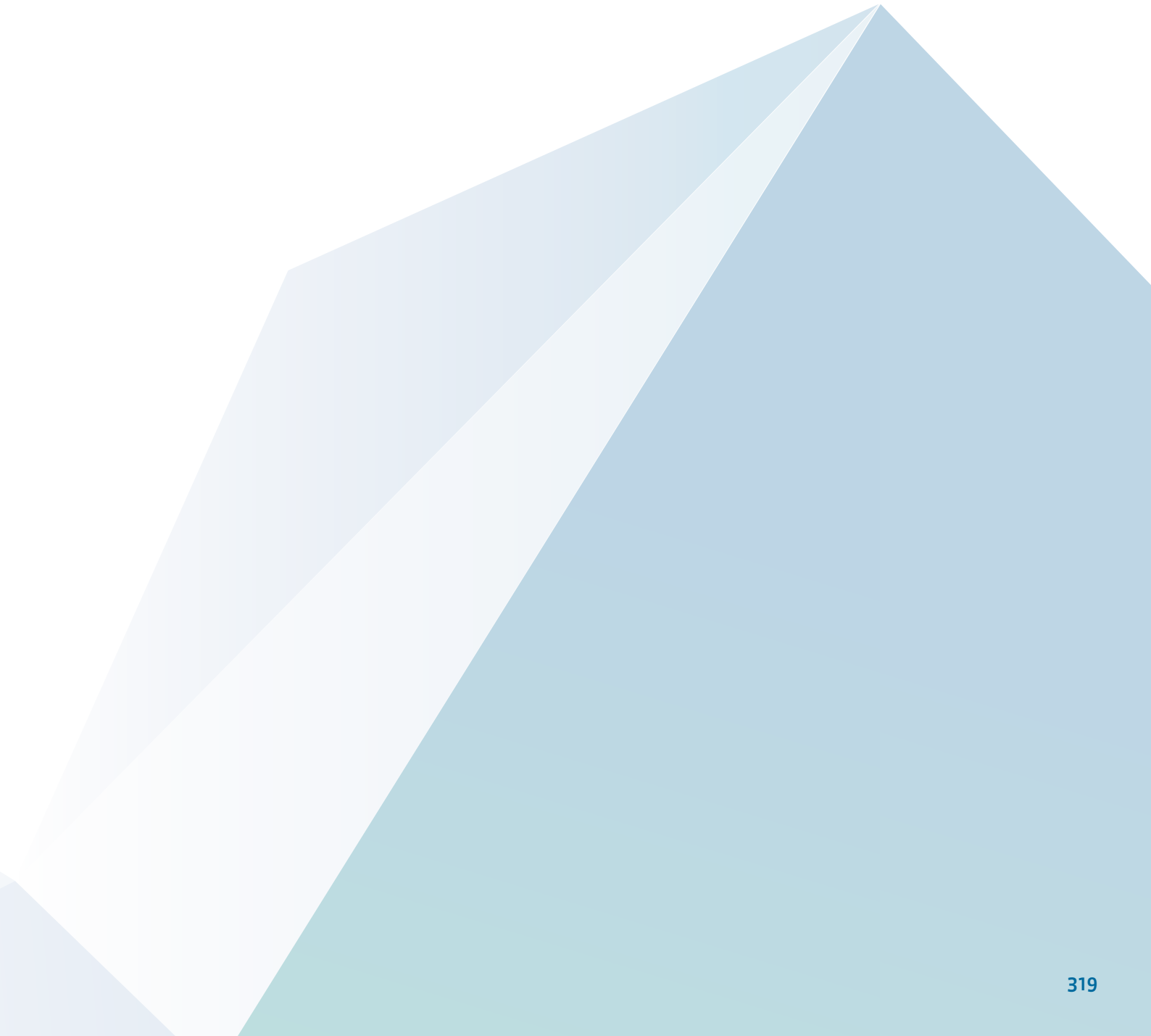
| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **Blantyre inner relief road** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br>Operation of a relief road could result in a reduction in congestion within the city centre and improved efficiency of movement within the city centre due to a reduction in through traffic; and improve travel times within and around the city centre.<br>A relief road may also result in a reduction in air emissions and GHGs, due to a reduction in congestion and waiting vehicles; however, overall reductions are likely to be small as a new road will also encourage increased vehicle use. Most beneficial effects on air quality are likely to be felt locally within the city centre.<br>Improved access could foster development along growth corridors.<br>Larger goods movements and vehicles may also be reduced through the city, as a relief road could allow industrial transport of goods around rather than through the city centre. This could improve transport time and costs for business, and result in improvements to pedestrian and other road user health and safety. | Construction of a relief road will result in land take and, given its proposed location, is likely to result in potentially significant economic and physical displacement, including the need for resettlement. This could result in the loss of houses, businesses and agricultural land and the need for compensation provision. Land take could also result on impacts on local cultural heritage and result in damage to buried archaeology.<br>Construction works can result in temporary adverse effects on air quality and ambient noise, nuisance, waste generation and demand for local services (e.g. water, energy) as a result of the influx of construction workers, construction traffic, and use and movement of construction equipment. Adverse effects may arise in the form of pollution events and accidents/ incidents as a result of poorly managed and controlled construction site activities. Where the new road crosses watercourses, the risks of pollution are higher.<br>The construction of a new road could interrupt hydrogeology and groundwater flows from excavation and ground clearance, and the provision of permanent hardstanding reducing infiltration rates. Runoff and stormwater drainage could result in pollution during operation.<br>Provision of new road infrastructure will result in an increase in air pollution and noise disturbance locally. | Avoid/minimise involuntary land acquisition and resettlement. Where land acquisition necessary, undertake detailed inventory survey of plots, structures and people living within a wayleave/land take. Compensation and resettlement planning.<br>Detailed alignment to take account of local groundwater conditions and avoid areas liable to flooding, slope instability, and water crossings where possible.<br>Environmental and social impact assessment.<br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan.<br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce.<br>Management of excavation wastes, and retention of topsoil wherever possible.<br>Where necessary use of localised noise barriers e.g. berms, bunds, vegetation planting.<br>Appropriate drainage and stormwater design. |

| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **Development of ro-ro facilities at Nkhata Bay** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br><br>During operation, there will also be some additional direct employment opportunities above the existing port requirements.<br><br>Due to its geographical position (proximity to the northern shore lake communities, Likoma islands and Tanzania), Nkhata Bay has the potential to become a maritime transport hub on Lake Malawi. This could result in increased local trade and development, increased and cheaper freight movements, and knock on positive effects on the local and national economy.<br><br>Improved passenger facilities could also have a positive effect on tourism in the region, supporting and growing existing tourist activities in northern Malawi.<br><br>Provision of inter-modal links as Nkhata Bay is located on the Mtwara corridor providing connection to road networks between Tanzania and Zambia. | The footprint of the proposed new ro-ro facilities could result in the direct loss of aquatic species, though the existing species richness could be degraded as the port is in current use.<br><br>During construction, works within the Lake could affect water rights/ access (formal and informal) and result in disturbance to fishing areas/ spawning grounds, for example through piling activities, dredging and/or the mobilisation of sediments. Turbidity may be increased as a result of any dredging and spoil disposal; with a risk of water pollution from contaminated dredged material.<br><br>Construction works within and adjacent to the Lake can also result in pollution through accidental spills and leaks.<br><br>During operation, water pollution may arise due to ship wastewater discharges and leakages of oils from ships, ports and related facilities.<br><br>An increase in the frequency of ship movements could result in the disturbance to fishing areas/spawning grounds; conflict with existing lake uses and users; and an increased risk to local fishermen, boats, etc. from collisions with vessels, and from transport of dangerous goods.<br><br>Potential for direct mortality to aquatic animals from collisions with vessels, entrainment during dredging, or smothering during dredge disposal.<br><br>Potential safety risks associated with increased traffic in the area around the port, including project-related vehicles (e.g. mobile machinery; trucks transporting fuel, equipment, cargo) and other vehicles (e.g. private cars, buses, trucks transporting people and cargo to and from the site). | Survey of water rights and fishing rights. Engagement and information disclosure with stakeholders.<br><br>Environmental and social impact assessment and aquatic and water user surveys.<br><br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce.<br><br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan and Waste/Hazardous Materials Management Plan.<br><br>If required, development of a Dredge Management Plan. Use of appropriate modern dredging techniques and equipment, including measures to contain sediment plumes.<br><br>Early installation and regular maintenance of drainage and diversion structures, silt traps, etc.<br><br>Materials handling and control procedures.<br><br>Implementation of speed restrictions for vessels, and observation and avoidance procedures for sensitive marine/aquatic species.<br><br>Avoid incidents through implementation of a Safety Management Plan (e.g. establishment of exclusion/ transit zones, use of patrol vessels, communication of risks to local communities).<br><br>Opportunity to align with principles of the port development with the European initiative, Ecoports, where relevant. |

| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **New airport at Nkhata Bay** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br><br>During operation, there will also be direct employment opportunities (though fewer than during construction).<br><br>The development of the airport will tie in with proposals for a Special Economic Zone (SEZ) at Chincheche, and the proposed development of Nkhata Bay port on the Mtwara corridor. It may also provide services for development of the oil and gas industry; as well as provide opportunities for increasing international tourism in the north of Malawi. This could result in increased business, employment opportunities and trade, having beneficial effects on the local and national economy.<br><br>Operational safety is likely to be improved as a result of the proposed interventions. | The proposed new airport will result in landtake and therefore is likely to result in economic and physical displacement, including potentially the need for resettlement, both for temporary construction works and the permanent footprint of the airport.<br><br>Construction works will result in temporary adverse effects on air quality and ambient noise, nuisance, waste generation and demand for local services (e.g. water, energy) as a result of the influx of construction workers, construction traffic, and use and movement of construction equipment. Depending on the final site, clearance of vegetation is likely to be required, which could have adverse effects of sensitive flora and fauna. Adverse effects may arise in the form of pollution events and accidents/ incidents as a result of poorly managed and controlled construction site activities.<br><br>Airport development could displace animals and disturb their habitats, by direct disturbance during construction and operation (e.g. from noise, light disturbance at night).<br><br>An influx of construction workers can result in adverse effects on local communities (conflict, increase in communicable diseases, etc.).<br><br>Operation of the airport will result in increased noise and air quality emissions locally, which could adversely affect humans and flora and fauna.<br><br>The airport footprint and aircraft movements could sever terrestrial and aerial bird routes used for migration or for access to feeding and breeding areas. Potential for direct mortality to birds/bats from collisions with aircraft, especially during takeoff and landing. This also poses a safety risk to the aircraft and could increase the risk of accidents.<br><br>Potential for major incidents with potential for considerable loss of life or injury to passengers, airport staff, and the public.<br><br>Use of hazardous materials could result in soil and water pollution. Stormwater runoff may include pollutants associated with leaks and spills of oil, diesel, and jet fuels during operation and maintenance of ground service vehicles, and fuel storage and handling activities.<br><br>Operation of the airport will also result in an increased demand for water and energy, and result in increased waste generation.<br><br>Airports also pose occupational hazards for workers. | Sensitive local access route selection (e.g. avoiding proximity to residential communities), and siting of permanent facilities with, where necessary, advice from local authorities/ wildlife specialists.<br><br>Avoid/minimise involuntary land acquisition and resettlement. Where land acquisition is necessary, undertake detailed inventory survey of plots, structures and people living within a wayleave/ landtake. Compensation and resettlement planning.<br><br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce.<br><br>Engagement and information disclosure with stakeholders.<br><br>Environmental and social impact assessment.<br><br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan and a Waste/Hazardous Materials Management Plan.<br><br>Where necessary use of noise barriers e.g. berms, bunds, vegetation planting to reduce noise impacts on local residents. Noise preferential arrivals and departure routings to minimise aircraft noise exposure for local residents.<br><br>Use of fuel-efficient and less noisy aircraft types and ground equipment.<br><br>Strict controls of timing of activities, e.g. air traffic minimised at night.<br><br>Good maintenance of air traffic control and all other systems, and emergency response vehicles and equipment.<br><br>Deployment of “bird-scaring” measures to reduce the risk of bird/bat strikes.<br><br>Occupational Health and Safety Plan. |

| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **Extension of Kamuzu airport** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br><br>During operation, there may be a few additional employment opportunities (though fewer than during construction).<br><br>Improved facilities could attract intercontinental airlines to Malawi, with increased state revenue.<br><br>Potential increase in passengers and visitors to Malawi as a result of improved services. Potential for improved cargo transport, with positive economic effects. Improved services could therefore facilitate international and regional trade and tourism.<br><br>Operational safety is likely to be improved as a result of the proposed interventions.<br><br>Management of the long grasses around the airport could result in a reduced potential for bird strike. | It is likely that works will take place within the existing footprint of the airport. However, temporary construction works may require temporary land take. Therefore, whilst overall land take is likely to be minimal, there may be some localised economic and displacement.<br><br>Construction works will result in temporary adverse effects on air quality and ambient noise, nuisance, waste generation and demand for local services (e.g. water, energy) as a result of the influx of construction workers, construction traffic, and use and movement of construction equipment. Adverse effects may arise in the form of pollution events and accidents/ incidents as a result of poorly managed and controlled construction site activities.<br><br>An influx of construction workers can result in adverse effects on local communities (conflict, increase in communicable diseases, etc.).<br><br>Increased operation of the airport will result in increased noise and air quality emissions locally, which could adversely affect humans and flora and fauna.<br><br>Potential increase for major incidents due to the increase operability, with potential for considerable loss of life or injury to passengers, airport staff, and the public.<br><br>Improvements will result in an increased use of hazardous materials, which could result in soil and water pollution. Stormwater runoff may include pollutants associated with leaks and spills of oil, diesel, and jet fuels during operation and maintenance of ground service vehicles, and fuel storage and handling activities.<br><br>Increased operation at the airport will also result in an increased demand for water and energy, and result in increased waste generation. | Should any land take be required, undertake detailed inventory survey of plots, structures and people living within a wayleave/land take. Compensation and resettlement planning.<br><br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce.<br><br>Engagement and information disclosure with stakeholders.<br><br>Environmental and social impact assessment.<br><br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan and a Waste/Hazardous Materials Management Plan.<br><br>Where necessary use of noise barriers e.g. berms, bunds, vegetation planting to reduce noise impacts on local residents. Noise preferential arrivals and departure routings to minimise aircraft noise exposure for local residents.<br><br>Use of fuel-efficient and less noisy aircraft types and ground equipment.<br><br>Strict controls of timing of activities, e.g. air traffic minimised at night.<br><br>Good maintenance of air traffic control and all other systems, and emergency response vehicles and equipment.<br><br>Deployment of “bird-scaring” measures to reduce the risk of bird/bat strikes.<br><br>Occupational Health and Safety Plan. |

| Interventions | Positive effects | Negative effects | Mitigation measures |
|---|---|---|---|
| **Refurbishment of railway line from Limbe to Marka, and new bridge across Shire River at/ near Chiromo** | Construction works will result in temporary employment opportunities, as well as demand for local goods and services.<br>During operation, there will also be direct employment opportunities (though fewer than during construction).<br>The re-opening of the line will improve transport options for freight and potentially result in reduced transport costs, which will have economic benefits and potential further indirect employment opportunities due to the facilitation of additional business investment and growth. It will also open up international transport, in particular to the Beira international port in Mozambique.<br>The use of the railway over road freight transport for long distance travel is also likely to have a positive effect in terms of an overall reduction in air and noise emissions, and reduced risk of road accidents (both human and animal roadkill). | Works will involve refurbishment of an existing line, therefore new land take is likely to be minimised. However, it is possible that there has been some encroachment onto the line along more built up sections. Whilst overall land take, therefore, is likely to be minimal, there may be some localised economic and displacement for both permanent and temporary works.<br>Construction works will result in temporary adverse effects on air quality and ambient noise, nuisance, waste generation and demand for local services (e.g. water, energy) as a result of the influx of construction workers, construction traffic, and use and movement of construction equipment. Some limited clearance of vegetation is likely to be required, however, given that this is an existing route the likely adverse effects on sensitive fauna is unlikely to be significant. Adverse effects may arise in the form of pollution events and accidents/incidents as a result of poorly managed and controlled construction site activities.<br>An influx of construction workers can result in adverse effects on local communities (conflict, increase in communicable diseases, etc.).<br>Works in, around and over watercourses can result in pollution through accidental spills and through the mobilisation of sediment during the construction of structures, dewatering activities, etc. The Shire River is likely to be particularly sensitive to such activities during the construction of a new bridge. Pollution events can have effects on aquatic flora and fauna and downstream river users; and construction activities in the river can interfere with existing river users.<br>The existing track may currently be used by people as a route to local areas, as well as crossed by migrating animals. During operation, there is an increased risk of accidents and mortality from collisions with rolling stock, or contact with electrified elements, as a result of the revival of use of the track. Furthermore, level crossings (at-grade road / rail intersections) represent high-risk accident locations.<br>Depending on the nature, speed and frequency of trains, there may be increased noise and vibration disturbance where the line runs close to residential properties. Increased noise and vibration can also adversely affect fauna.<br>Fuel and waste management is also a key issue. For example, unmanaged discharge of passenger sewage effluent may pollute soils and watercourses.<br>If dangerous goods are transported by rail, there is a potential risk of release to the environment in the event of an accidents or poor storage. | Avoid/minimise involuntary land acquisition and resettlement. Survey of encroachment on wayleave. Where land acquisition is necessary, undertake detailed inventory survey of plots, structures and people living within a wayleave/land take. Compensation and resettlement planning.<br>En vironmental and social impact assessment, including survey work.<br>Engagement and information disclosure with stakeholders.<br>Development of an Employment Plan, with clear employment requirements and procedures for the construction workforce.<br>Environmental and social impact assessment.<br>Environmental and Social Management Plan, including an Emergency Preparedness and Response Plan and Waste/Hazardous Materials Management Plan.<br>Public awareness campaigns.<br>Use of modern, fuel-efficient, low-emission locomotives.<br>Control speed of trains in built up areas.<br>Where necessary use of noise barriers e.g. berms, bunds, vegetation planting.<br>If necessary, use of barriers, fencing and crossings to limit animal movement within railway alignment.<br>Implementation of standard good wastewater management procedures and hygiene training for workforce. Operation Waste Management Plan in place.<br>Where relevant, appropriate planning and management of the transport of any dangerous goods.<br>Appropriate safety and signalling should be provided at level crossings. |



# Appendix E **NTMP Cost**

## Table E.1 **Estimated costs (US$) of NTMP projects and programmes 2017 to 2037**

| NTMP projects and programmes | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| **Road sub-sector** | | | | | |
| **Major projects** | | | | | |
| Rural roads upgrade | 75,000 | 214,000 | 224,000 | 195,000 | 708,000 |
| District transport plans | 40,000 | 56,000 | 56,000 | 56,000 | 208,000 |
| M12 Safety project | 30,000 | 0 | 0 | 0 | 30,000 |
| M1 Safety projects | 40,000 | 0 | 70,000 | 0 | 110,000 |
| Lilongwe western bypass | 0 | 40,000 | 0 | 0 | 40,000 |
| Lilongwe eastern bypass | 0 | 0 | 70,000 | 0 | 70,000 |
| Mthandizi - Mpingwe | | | | | |
| (Blantyre) | 0 | 8,000 | 0 | 0 | 8,000 |
| Misesa - Soche Hill - Manja | | | | | |
| (Blantyre) | 0 | 0 | 9,000 | 0 | 9,000 |
| Blantyre inner relief road | 0 | 0 | 100,000 | 0 | 100,000 |
| Blantyre elevated expressway | 0 | 0 | 0 | 182,000 | 182,000 |
| Reconstruction (ongoing) | 150,000 | 0 | 0 | 0 | 150,000 |
| Planned reconstruction | 9,000 | 21,500 | 54,000 | 82,500 | 167,000 |
| Major works (Commited | 197,000 | 0 | 0 | 0 | 197,000 |
| Major works (Planned) | 40,000 | 125,000 | 105,000 | 85,000 | 355,000 |
| **Sub-total** | **581,000** | **464,500** | **688,000** | **600,500** | **2,334,000** |
| **Minor capital works and programmes** | | | | | |
| Road maintenance | 700,000 | 700,000 | 700,000 | 700,000 | 2,800,000 |
| Level crossings | 10,000 | 10,000 | 10,000 | 0 | 30,000 |
| Increase fuel levy to 20% of pump price | 0 | 0 | 0 | 0 | 0 |
| Remove all other levies and give only to road | 0 | 0 | 0 | 0 | 0 |
| Road tolls | 0 | 0 | 0 | 0 | 0 |
| Agriculture access | 0 | 0 | 0 | 0 | 0 |
| Ring fence RFA income for rural roads | 0 | 0 | 0 | 0 | 0 |
| Sponsorship of road maintenance | 100 | 0 | 0 | 0 | 100 |
| Carbon tax | 0 | 0 | 0 | 0 | 0 |
| Data analytics and technology | 1,000 | 1,000 | 1,000 | 1,000 | 4,000 |
| Education and awareness | 2,000 | 3,000 | 3,000 | 3,000 | 11,000 |
| Link RTA system, MALTIS | 1,000 | 0 | 0 | 0 | 1,000 |
| Ring fence traffc fnes | 0 | 0 | 0 | 0 | 0 |

| NTMP projects and programmes | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| Increase insurance surcharg | 0 | 0 | 0 | 0 | 0 |
| Signs and markings | 1,000 | 2,000 | 2,000 | 2,000 | 7,000 |
| Road safety in school curriculum | 2,000 | 2,000 | 0 | 0 | 4,000 |
| Road safety clubs in schools | 1,000 | 1,000 | 1,000 | 1,000 | 4,000 |
| Public awareness | 2,000 | 3,000 | 3,000 | 3,000 | 11,000 |
| Issue based enforcement | 3,000 | 5,000 | 7,000 | 7,000 | 22,000 |
| Design standards - all other roads | 500 | 0 | 0 | 0 | 500 |
| Street lighting | 4,000 | 5,000 | 6,000 | 7,000 | 22,000 |
| Rest stops | 80 | 400 | 400 | 0 | 880 |
| Climbing lanes | 0 | 4,000 | 8,000 | 0 | 12,000 |
| Automation of processes and systems | 1,000 | 1,000 | 1,000 | 1,000 | 4,000 |
| Sensitisation | 500 | 500 | 500 | 500 | 2,000 |
| CCTV | 5,000 | 0 | 0 | 0 | 5,000 |
| Inland weighbridge stations (Inc. WIM) | 0 | 6,000 | 6,000 | 0 | 12,000 |
| Fuel gas pipeline feasibility study | 500 | 0 | 0 | 0 | 500 |
| **Sub-total** | **734,680** | **743,900** | **748,900** | **725,500** | **2,952,980** |
| **District transport infrastructure and management** | | | | | |
| District road safety councils | 2,000 | 2,000 | 2,000 | 2,000 | 8,000 |
| Capacity building for districts | 4,500 | 0 | 0 | 0 | 4,500 |
| NMT facilities and integrated cycle lanes | 0 | 10,000 | 10,000 | 10,000 | 30,000 |
| **Sub-total** | **6,500** | **12,000** | **12,000** | **12,000** | **42,500** |
| **Institutional and regulatory** | | | | | |
| Road Traffc Authority (RTA) establish | 3,000 | 0 | 0 | 0 | 3,000 |
| RTA running costs | 2,500 | 2,500 | 2,500 | 2,500 | 10,000 |
| National Road Safety Authority (NRSA) | 2,000 | 0 | 0 | 0 | 2,000 |
| NRSA running costs | 750 | 750 | 750 | 750 | 3,000 |
| Legislation review and update | 500 | 0 | 0 | 0 | 500 |
| Strengthen MoTPW | 500 | 0 | 0 | 0 | 500 |
| Establish Rural Transport working group | 500 | 100 | 100 | 100 | 800 |
| Establish road haulage industry council | 500 | 0 | 0 | 0 | 500 |
| **Sub-total** | **10,250** | **3,350** | **3,350** | **3,350** | **20,300** |
| **Grand total for Road sub-sector** | **1,332,430** | **1,223,750** | **1,452,250** | **1,341,350** | **5,349,780** |

| NTMP projects and programmes | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| **Rail sub-sector** | | | | | |
| **Major projects** | | | | | |
| Beira - Marka | 0 | 158,000 | 0 | 0 | 158,000 |
| Marka - Bangula | 0 | 0 | 249,000 | 0 | 249,000 |
| Bangula - Limbe | 0 | 0 | 0 | 242,000 | 242,000 |
| Nkaya - Mchinji | 254,000 | 254,000 | 0 | 0 | 508,000 |
| Nkaya - Limbe | 80,000 | 0 | 0 | 0 | 80,000 |
| Mbeya - Chilumba | 0 | 0 | 484,000 | 484,000 | 968,000 |
| Liwonde Intermodal facility (wet port) | 10,000 | 0 | 0 | 0 | 10,000 |
| **Sub-total** | **344,000** | **412,000** | **733,000** | **726,000** | **2,215,000** |
| **Minor capital works and programmes** | | | | | |
| Train control - North line | 18,000 | 0 | 0 | 0 | 18,000 |
| Train control - South line | 11,000 | 0 | 0 | 0 | 11,000 |
| Level crossings | 5,000 | 3,000 | 3,000 | 3,000 | 14,000 |
| Limbe - Balaka - Nayuchi passenger service | 2,000 | 0 | 0 | 0 | 2,000 |
| Mchinji - Salima passenger service | 2,000 | 0 | 0 | 0 | 2,000 |
| Heritage rail | 0 | 10,000 | 2,000 | 2,000 | 14,000 |
| **Sub-total** | **38,000** | **13,000** | **5,000** | **5,000** | **61,000** |
| **Institutional and regulatory** | | | | | |
| Establish RAMRAM | 2,000 | 0 | 0 | 0 | 2,000 |
| RAMRAM running costs | 1,250 | 1,250 | 1,250 | 1,250 | 5,000 |
| Business planning processes | 5,000 | 5,000 | 5,000 | 5,000 | 20,000 |
| Capacity building - Department of Rail | 4,500 | 0 | 0 | 0 | 4,500 |
| Capacity building - RAMRAM | 1,500 | 0 | 0 | 0 | 1,500 |
| **Sub-total** | **14,250** | **6,250** | **6,250** | **6,250** | **33,000** |
| **Grand total for Rail sub-sector** | **396,250** | **431,250** | **744,250** | **737,250** | **2,309,000** |
| **Inland Water Transport sub-sector** | | | | | |
| **Major projects** | | | | | |
| NhataBay RoRO terminal | 0 | 25,000 | 0 | 0 | 25,000 |
| Chipoka Port | 0 | 15,000 | 0 | 0 | 15,000 |
| Chilumba Port | 0 | 2,000 | 0 | 0 | 2,000 |
| Nkhotakota jetty | 0 | 5,000 | 0 | 0 | 5,000 |
| Upper Shire navigation | 0 | 0 | 0 | | 0 |
| New shipyard Nkhata Bay | 0 | 0 | 30,000 | 45,000 | 75,000 |
| New river port Liwonde | 0 | 0 | 0 | 20,000 | 20,000 |
| New passenger vessels | 5,000 | 0 | 0 | 0 | 5,000 |
| Replacement of passenger vessel fleet | 0 | 10,000 | 0 | 0 | 10,000 |

| NTMP projects and programmes | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| RoRo vessels | 0 | 15,000 | 0 | 0 | 15,000 |
| New freight vessels | 0 | 0 | 0 | 0 | 0 |
| Nsanje world inland port | 0 | 0 | 0 | 0 | 0 |
| Small landing projects | 3,000 | 0 | 0 | 0 | 3,000 |
| Establish new passenger routes | 1,000 | 0 | 0 | 0 | 1,000 |
| Establish regular freight service | 1,000 | 0 | 0 | 0 | 1,000 |
| **Sub-total** | **10,000** | **72,000** | **30,000** | **65,000** | **177,000** |
| **Institutional and regulatory** | | | | | |
| Establish RAMRAM | 1,000 | 0 | 0 | 0 | 1,000 |
| RAMRAM running costs | 1,250 | 1,250 | 1,250 | 1,250 | 5,000 |
| Merge concessions | 1,000 | 0 | 0 | 0 | 1,000 |
| Improve safety regulations | 5,000 | 0 | 0 | 0 | 5,000 |
| Training programme investment | 1,000 | 0 | 0 | 0 | 1,000 |
| Asset management plan | 1,000 | 0 | 0 | 0 | 1,000 |
| **Sub-total** | **10,250** | **1,250** | **1,250** | **1,250** | **14,000** |
| **Grand total for Inland Water Transport sub-sector** | **20,250** | **73,250** | **31,250** | **66,250** | **191,000** |
| **Civil Aviation sub-sector** | | | | | |
| **Major projects** | | | | | |
| Chileka terminal development phase 1 | 35,000 | 0 | 0 | 0 | 35,000 |
| Chileka expansion of concourse check in areas | 25,000 | 0 | 0 | 0 | 25,000 |
| Chileka ATS and fire station | 0 | 30,000 | 30,000 | 0 | 60,000 |
| Chileka runway rehabilitation | 25,000 | 0 | 0 | 0 | 25,000 |
| Chileka runway extension | 0 | 35,000 | 0 | 0 | 35,000 |
| Chileka wayfnding and advertising | 500 | 0 | 0 | 0 | 500 |
| Chileka cargo centres, cross wind runway apron | 40,000 | 30,000 | 30,000 | 0 | 100,000 |
| Chileka car parking | 10,000 | 0 | 0 | 0 | 10,000 |
| Chileka back-up power supply | 50,000 | 0 | 0 | 0 | 50,000 |
| Chileka AGL | 1,350 | 0 | 0 | 0 | 1,350 |
| Chileka renaming | 1,000 | 0 | 0 | 0 | 1,000 |
| KIA terminal phase 1 and radar | 23,500 | 0 | 0 | 0 | 23,500 |
| KiA terminal phase 2 | 0 | 0 | 0 | 30,000 | 30,000 |
| KIA fre vehicle replacement | 4,500 | 4,500 | 0 | 4,500 | 13,500 |
| KIA ADB-S | 800 | 0 | 0 | 0 | 800 |
| KIA wayfnding and advertising | 500 | 0 | 0 | 0 | 500 |

| NTMP projects and programmes | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| KIA car parking | 3,000 | 0 | 0 | 0 | 3,000 |
| KIA cargo aprons and warehousing | 4,000 | 0 | 6,000 | 4,000 | 14,000 |
| KIA runway widening | 0 | 9,000 | 0 | 0 | 9,000 |
| KIA new apron | 0 | 7,500 | 7,500 | 0 | 15,000 |
| KIA taxiway strengthening | 0 | 4,000 | 0 | 0 | 4,000 |
| KIA terminal expansion | 0 | 0 | 25,000 | 20,000 | 45,000 |
| KIA renaming | 1,000 | 0 | 0 | 0 | 1,000 |
| **Sub-total** | **225,150** | **120,000** | **98,500** | **58,500** | **502,150** |
| **Minor capital works and programmes** | | | | | |
| Statistical system for passenger records | 1,000 | 1,000 | 500 | 500 | 3,000 |
| Fence minor airfelds | 3,000 | 0 | 0 | 0 | 3,000 |
| Dispose of airfelds | 0 | 4,000 | 0 | 0 | 4,000 |
| NkhataBay Airport | 0 | 95,000 | 65,000 | 0 | 160,000 |
| Upper air observation station | 5,000 | 0 | 0 | 0 | 5,000 |
| Weather radar | 0 | 8,000 | 0 | 0 | 8,000 |
| Automation of meteorological reporting | 0 | 6,000 | 0 | 0 | 6,000 |
| External airport security | 2,500 | 3,000 | 3,000 | 4,000 | 12,500 |
| **Sub-total** | **11,500** | **117,000** | **68,500** | **4,500** | **201,500** |
| **Institutional and regulatory** | | | | | |
| Establish Civil Aviation Authority (CAA) | 10,000 | 0 | 0 | 0 | 10,000 |
| CAA running costs | 0 | 0 | 0 | 0 | 0 |
| Digitisation | 0 | 2,500 | 0 | 0 | 2,500 |
| AIS | 850 | 0 | 0 | 0 | 850 |
| ADS-B | 0 | 800 | 0 | 0 | 800 |
| Adopt UTM | 0 | 150 | 0 | 0 | 150 |
| Extend ADL mandate | 0 | 0 | 0 | 0 | 0 |
| Introduce second handling company | 0 | 0 | 0 | 0 | 0 |
| GoM sell stake in Malawi Airlines | 0 | 0 | 0 | 0 | 0 |
| **Sub-total** | **10,850** | **3,450** | **0** | **0** | **14,300** |
| Grand total for Civil Aviation sub-sector | 247,500 | 240,450 | 167,000 | 63,000 | 717,950 |
| **Urban Transport sub-sector** | | | | | |
| **Major projects** | | | | | |

| NTMP projects and programmes | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| BRT design and feasibility | 5,000 | 3,000 | 0 | 0 | 8,000 |
| BRT pilot | 0 | 60,000 | 60,000 | 0 | 120,000 |
| BRT schemes | 0 | 0 | 20,000 | 80,000 | 100,000 |
| Mzuzu bypass | 2,000 | 6,000 | 0 | 0 | 8,000 |
| Coach terminals | 10,000 | 20,000 | 20,000 | 10,000 | 60,000 |
| Road widening schemes | 22,000 | 11,000 | 11,000 | 11,000 | 55,000 |
| **Sub-total** | **39,000** | **100,000** | **111,000** | **101,000** | **351,000** |
| **Minor capital works and programmes** | | | | | |
| Traffc signal programmes | 5,000 | 10,000 | 10,000 | 10,000 | 35,000 |
| Traffc management | 5,000 | 3,000 | 3,000 | 3,000 | 14,000 |
| Cycle lanes | 5,000 | 12,000 | 12,000 | 12,000 | 41,000 |
| Footways | 5,000 | 15,000 | 15,000 | 15,000 | 50,000 |
| Design guidelines for roads - urban areas | 500 | 0 | 0 | 0 | 500 |
| Road safety programmes | 5,000 | 3,000 | 3,000 | 3,000 | 14,000 |
| Cycling | 3,000 | 1,000 | 1,000 | 1,000 | 6,000 |
| Truck routes | 1,000 | 1,000 | 1,000 | 1,000 | 4,000 |
| Car parking plans | 1,000 | 0 | 0 | 0 | 1,000 |
| Park and Ride operations | 0 | 5,000 | 0 | 0 | 5,000 |
| Street lighting | 2,000 | 2,000 | 2,000 | 2,000 | 8,000 |
| **Sub-total** | **32,500** | **52,000** | **47,000** | **47,000** | **178,500** |
| **Institutional and regulatory** | | | | | |
| Establish Urban Areas Transport Authority (UATA) | 3,000 | 0 | 0 | 0 | 3,000 |
| Improve revenue collection | 0 | 0 | 0 | 0 | 0 |
| Capacity building | 5,000 | 0 | 0 | 0 | 5,000 |
| Adoption of sustainable urban transport policy | 500 | 0 | 0 | 0 | 500 |
| Develop public transport networks | 1,000 | 0 | 0 | 0 | 1,000 |
| Off-street parking - concessions | 0 | 0 | 0 | 0 | 0 |
| Off-street parking structures - licensing | 0 | 0 | 0 | 0 | 0 |
| Big bus concessions | 0 | 0 | 0 | 0 | 0 |
| Develop standards for long-term low emission vehicles | 0 | 1,000 | 0 | 0 | 1,000 |
| **Sub-total** | **9,500** | **1,000** | **0** | **0** | **10,500** |
| **Grand total for Urban Transport sub-sector** | **81,000** | **153,000** | **158,000** | **148,000** | **540,000** |
| **Transport corridors** | | | | | |
| One stop border post | 8,000 | 8,000 | 8,000 | 0 | 24,000 |

| NTMP projects and programmes | FY2017 to FY2022 | FY2022 to FY2027 | FY2027 to FY2032 | FY2032 to FY2037 | Total |
|---|---|---|---|---|---|
| Corridor management institutions | 1,000 | 1,000 | 1,000 | 1,000 | 4,000 |
| **Grand-total for transport corridors** | **9,000** | **9,000** | **9,000** | **1,000** | **28,000** |
| **Cross cutting issues** | | | | | |
| Gender transport needs study | 500 | 0 | 0 | 0 | 500 |
| Incentives for rural transport and marginalised groups | 1,000 | 1,000 | 1,000 | 1,000 | 4,000 |
| Increase Malawian participation in transport sector | 500 | 500 | 500 | 500 | 2,000 |
| HIV/AIDS awareness and preventative actions | 1,500 | 1,500 | 1,500 | 1,500 | 6,000 |
| Environmental management | 750 | 750 | 750 | 750 | 3,000 |
| Public education to reduce vandalism | 500 | 500 | 500 | 500 | 2,000 |
| **Grand total** | **4,750** | **4,250** | **4,250** | **4,250** | **17,500** |
| **Total cost of NTMP Programme** | **2,091,180** | **2,134,950** | **2,566,000** | **2,361,100** | **9,153,230** |

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