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MINISTRY OF TRANSPORT,
INFRASTRUCTURE, HOUSING,
URBAN DEVELOPMENT
AND PUBLIC WORKS



TRANSPORT SECTOR
CLIMATE CHANGE
ANNUAL REPORT

2018
2019

Performance and Implementation of Climate Change Actions



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State Department for Transport

The transport sector climate change team has prepared this report with the input from the climate change focal persons in relevant state agencies namely; Kenya Railways, Kenya Urban Roads Authority, Kenya National Highways Authority, Kenya Rural Roads Authority, Kenya Maritime Authority, Kenya Ports Authority, Kenya Civil Aviation Authority, Kenya Airports Authority, and National Transport and Safety Authority.

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Foreword



Esther Koimett, CBS
Principal Secretary
State Department for Transport

Kenya has experienced the effects of climate change in many sectors of the economy including transport. Prolonged droughts with negative effects on agriculture, followed by heavy downpours with surface run-offs leading to damaged road infrastructure that paralyze transport services. It is in view of this that the country enacted the Climate Change Act in 2016. The Act provides the overall governance structure for climate change in Kenya. It has the necessary mechanisms to support development and implementation of specific activities to enhance climate change adaptation and mitigation actions for sustainable development. It helps the country to implement Paris Agreement requirements.

The State Department for Transport has put in place necessary programme to enhance implementation of identified mitigation and adaptation actions. This includes regular measurements, verifications and reporting of climate change actions through annual documentation on performance and progress within the transport sector as required by the Climate Change Act.

This report has been prepared by the Climate Change Unit of the State Department for Transport with the support from the Advancing Transport Climate Strategies “TraCS” project of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The report includes a detailed list of prioritized mitigation and adaptation actions, the sector’s greenhouse gas emission profile and sectoral support gaps for climate change actions.

The transport sector is committed to implement its outlined actions and measures in pursuit of a low carbon climate resilient development pathway. I therefore call upon all the sector stakeholders, including development partners and private sector players, to support the transport sector to implement its low carbon actions as well as its efforts to develop a sectoral climate change strategy and action plan. Continued cooperation and joint efforts towards both monitoring and implementation of the actions, will be key to achieving the transport sector’s NDC target.

Esther Koimett, CBS
Principal Secretary
State Department for Transport





Abbreviations and Acronyms

BRT	Bus Rapid Transit
CCCU	Climate Change Coordination Unit
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
GHG	Green House Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IPCC	Intergovernmental Panel on Climate Change
ITDP	Institute for Transportation and Development Policy
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KNBS	Kenya National Bureau of Statistics
KURA	Kenya Urban Roads Authority
LCV	Light commercial vehicles
LAPSSET	Lamu Port South Sudan and Ethiopia Transport Corridor
MTAR	Mitigation technical analysis report
MtCO ₂ e	Million tonnes of carbon dioxide equivalent
MOTIHUD	Ministry of Transport, Infrastructure, Housing and Urban Development and Public Works
NAMATA	Nairobi Metropolitan Area Transport Authority
NCCAP	National Climate Change Action Plan
NTSA	National Transport and Safety Authority
PHEM4	Passenger Car and Heavy-Duty Emission Model
SDOT	State Department for Transport
UNFCCC	United Nations Framework Convention on Climate Change



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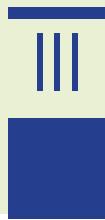






Photo: Boniface Muthoni

1 Sector Profile

The transport sector comprises of the road, rail, aviation and maritime subsectors. In the current government structure, these sub-sectors are in different state departments which undertake different functions to fulfil their mandate (Table 1). This section provides information on the represented state departments and their respective functions as well as the represented state agencies and the climate change focal points from those agencies.

1.1 Institutional arrangements for climate change

The State Department for Transport was supported to develop a draft paper on "Implementation of the Climate Change Act 2016." The paper includes a proposal for the institutional set-up and functions of a climate change unit in the State Department for Transport. The unit is yet to be operationalized, but a climate change coordination unit has already been established. On an ad hoc basis, the transport sector has formed a climate change working group with focal points representing the different modes of transport, i.e., road, air, rail and maritime transport. This team is headed by the Director of Road and Rail Services in the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, and coordinated by the planning officer in the planning unit within the same ministry.

The climate change team is comprised of three representatives from State Department for Transport (Head of Road and Rail Transport, Roads Department, and Planning Unit); one representative from the State Department for Shipping and Maritime Affairs; nine representatives from the different state agencies under Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works (representing road, air, rail and maritime subsectors); and one representative from the National Transport and Safety Authority (NTSA). The represented agencies are listed in Table 2 below.



Table 1: Sector profile

Ministry Name:	Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works
State Department:	State Department for Transport, State Department for Infrastructure, State Department for Shipping and Maritime Affairs
Represented sub-sectors (if applicable):	Road, rail, aviation and maritime subsectors
Represented state agencies:	National Transport and Safety Authority, Kenya Urban Roads Authority, Kenya National Highways Authority, Kenya Railways, Kenya Rural Roads Authority, Kenya Maritime Authority, Kenya Ports Authority, Kenya Civil Aviation Authority, Kenya Airports Authority
Reporting timeframe:	July 2018 – June 2019 (2015 for transport-related GHG emissions)
Summary of the state department for transport functions:	Transport policy management; rail and infrastructure management; fast-tracking identified northern corridor integration projects; oversight and coordination of LAPSET; civil aviation management and training; maritime transport management, registration and insurance of motor vehicles; motor vehicle inspection; national road safety management; national roads development policy management; mechanical and transport services; enforcement of axle load control; development and maintenance of airstrips.
Summary of the state department for Infrastructure functions:	National roads development policy; development, standardization and maintenance of roads; material testing and advice on usage; protection of road reserves; maintenance of security roads; registration of road constructors
Summary of the state department for Shipping and Maritime Affairs functions:	Promotion of maritime and shipping industry; ship registration in Kenya; marine cargo insurance; establishment of effective admiralty jurisdiction; development of a central data and information centre, management and research in support of Kenya's shipping industry; monitoring and advising on the usage of Kenya's exclusive economic zone in collaboration with other actors.

Table 2: Composition of the transport sector climate change team

Agency name	Department	No. of officers
Kenya Railways Corporation	Infrastructure	1
National Transport and Safety Authority	Motor vehicle inspection unit	1
Kenya Urban Roads Authority	Environmental safeguards	1
Kenya National Highways Authority	Environmental safeguards	1
Kenya Rural Roads Authority	Environment	1
Kenya Ports Authority	Environment	1
Kenya Maritime Authority	Environment	1
Kenya Civil Aviation Authority	Planning	1
	Meteorology department	1
Kenya Airport Authority	Environment	1

2

Performance and Implementation of Climate Change Actions



Below is an illustration of the agencies involved in the current transport sector's climate change team.

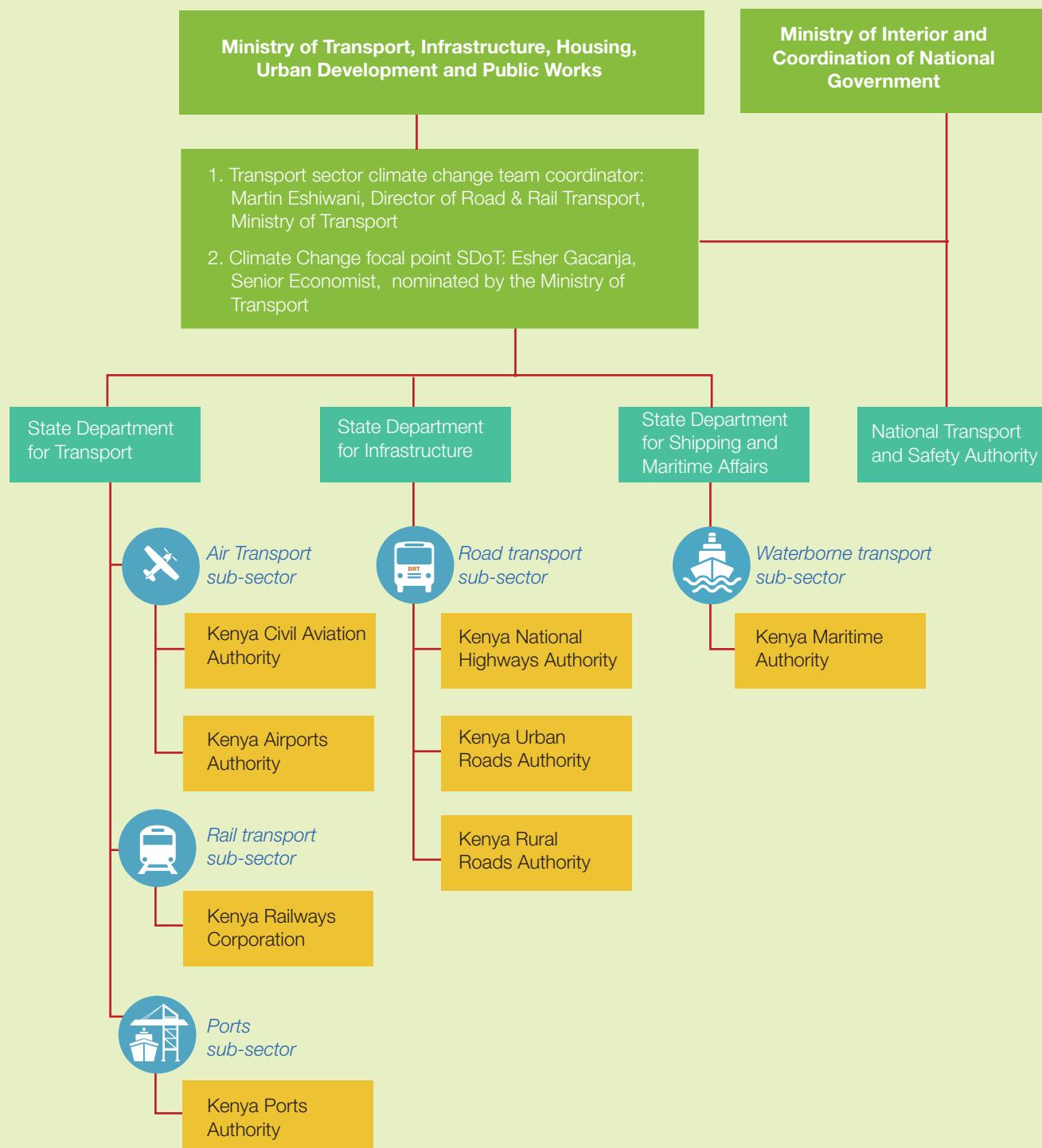
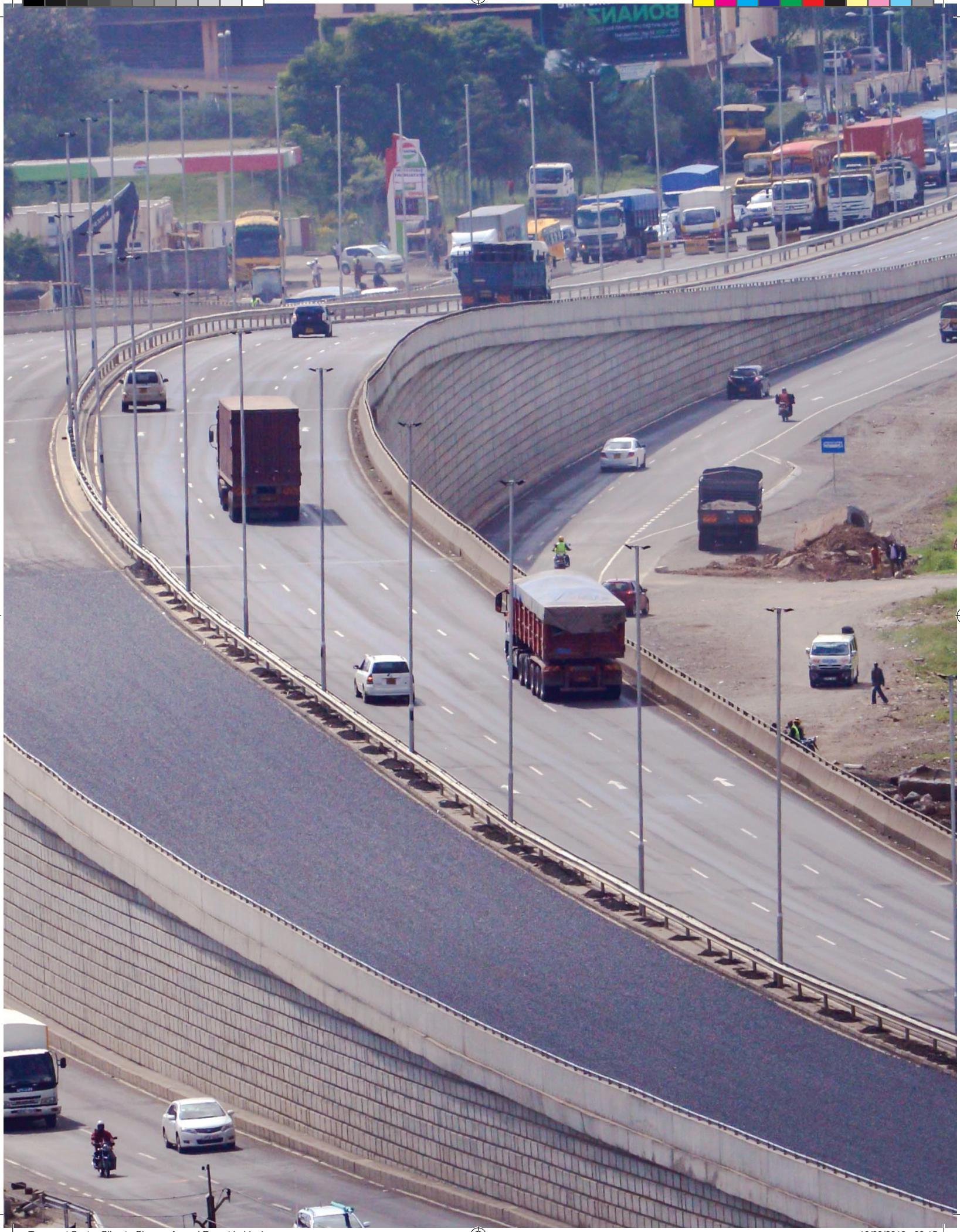


Figure 1: Transport sector climate change coordination team



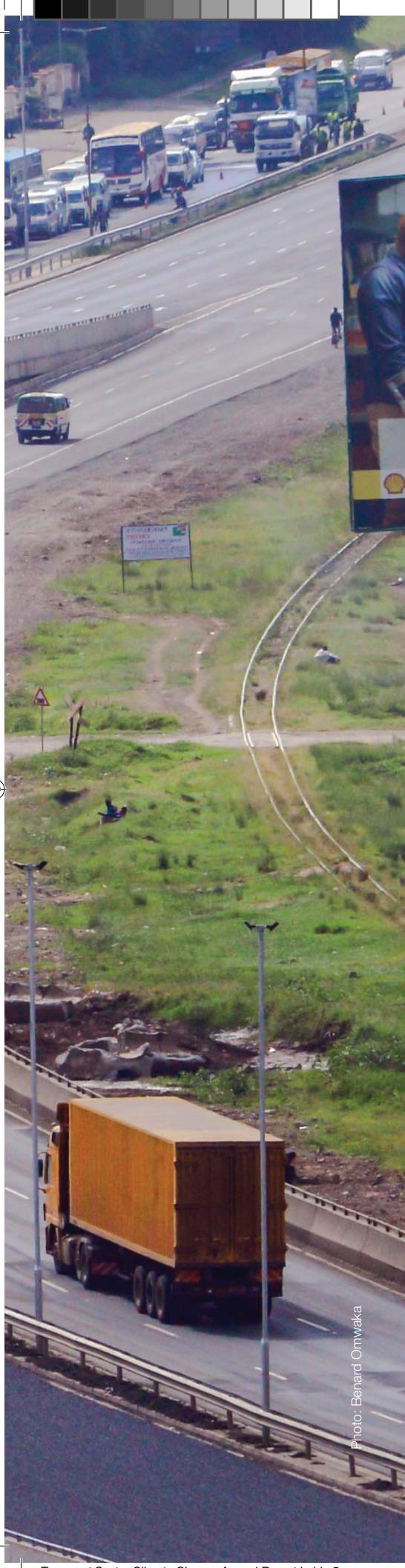


Photo: Benedict Omwaka

2 Sectoral Greenhouse Gas Emission Profile

This section outlines the transport sector's GHG emissions profile for the latest year available (2015). It highlights the results of the official top-down GHG inventory approach and compares it to preliminary research results of a bottom-up (transport activity-based) approach.

This is the first transport sector's GHG emissions report submitted to the Ministry of Environment and Forestry in fulfilment of Article 15.5 (b) of the Climate Change Act 2016. The Act requires state departments and national government public entities to report on sectoral GHG emissions for the national inventory.

The transport sector's GHG inventory is compiled according to IPCC 2006 guidelines covering emissions of CO₂e for all transport sub-sectors, i.e., road, rail, air and maritime.

2.1 Institutional arrangements

The coordinator of the Climate Change Coordination Unit at the State Department for Transport is responsible for the consolidation of transport data relevant for the GHG Inventory, as per the Climate Change Act. SDOT is also represented in the GHG energy sector team, which is a national inter-ministerial team responsible for national inventory development. The team is coordinated by the Ministry of Environment and Forestry and is in the final stages of finalizing the inventory (1995-2015) in readiness for submission to the United Nations Framework Convention on Climate Change (UNFCCC). The SDOT representatives in the team are Ms. Esther Gacanja and Mr. Francis Mwangi.

For this year's report, the Climate Change Coordination Unit at the State Department for Transport has received technical assistance through the *Advancing Transport Climate Strategies* project implemented by GIZ. Additional and specialized human resources are required for the State



Department for Transport to be better positioned to prepare a sectoral inventory and contribute to the GHG sector teams independently. In this regard, it is suggested for the Ministry of Environment and Forestry to consider seconding technical experts to respective state agencies to facilitate sectoral emissions and climate change reporting.

2.2 Data source and methodology used

The top-down approach based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories was used to calculate the transport sector GHG emissions. The inventory year is 2015 and is an extension of the work done by the GHG energy sector team covering the years 1995-2015. The emissions reported are in carbon dioxide equivalent; this covers methane, carbon dioxide and nitrous oxide.

The primary sources of data are the economic surveys from the Kenya National Bureau Statistics who report on sector-specific data, which in this case include top-down fuel sales statistics per consumer category. The report relied on the fuel sales statistics to come up with emission estimates for the sector and by use of default emission factor and conversion factor values from the IPCC.

The basic formula, combining activity data (in this case total fuel sales) by emission factors (in this case default values from the IPCC) was used.

$$\text{GHG emissions} = \text{Activity data (AD)} \times \text{Emission factors (EF)}$$

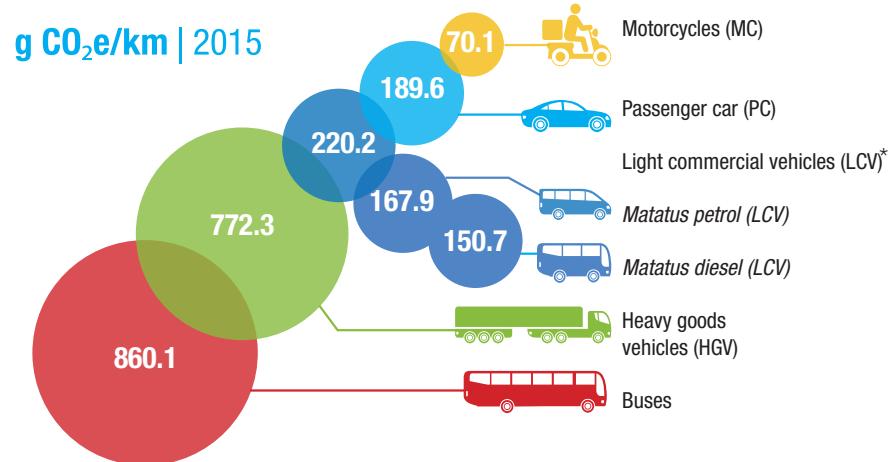
Lack of a distinction between fuel used in domestic aviation and shipping, vs. international aviation and shipping in the economic surveys, made it difficult to estimate emissions from these two sub-sectors. Only total fuel consumption of heavy fuel oil and jet fuels/kerosene is reported.

For a more detailed bottom-up approach to calculating GHG-emissions from road transport, data on the active vehicle fleet for road transport and average annual mileages of different vehicles, which would allow a break-down of the total fuel consumption in road transport into different modes, is not yet regularly reported in the national statistics system. The national statistics were therefore complemented by data from the National Transport and Safety Authority (on fleet numbers and fleet characteristics) and additional research that was conducted by the University of Nairobi and the Swiss INFRAS institute to undertake a bottom-up calculation of road-transport emissions in Kenya².

The bottom-up approach calculated the emissions for different vehicle categories by segment (i.e., vehicle size) based on the number of vehicles in each category segment and their responding emission factors in gCO₂e /km, which had been derived as part of the above-cited research (see footnote 1). The CO₂ emission factors were locally adapted based on values from the Handbook for Emission Factors for Road Transport (HBEFA), a European platform that maintains emission factors developed through collection of original data from various test laboratories and processed with the Passenger Car and Heavy-Duty Emission Model (PHEM4) of the Technical University of Graz (Austria). They were transformed into CO₂ equivalent (CO₂e) emission factors by using the ratio between CO₂ and CO₂e from the EN 16258 standard (EU methodology for calculation and declaration of energy consumption and GHG emissions of transport services, see CEN 2012). These ratios (CO₂e per CO₂) amount to 102.45% for petrol and 101.64% for diesel³.



The used emission factors for the bottom-up calculation are as follows:



* Light commercial vehicles include matatus/minibuses, vans, pickups etc. 220.2 gCO₂e/km refers to the average across these vehicle types.

Figure 2: Tank-to-wheel emission factors weighted average per vehicle category [g CO₂e/km] in 2015.
Source: Infras, 2018

2.3 Trends in transport sector's GHG emissions

Figure 3 below shows the overall trend in transport sector GHG emissions in the country. This is extracted from the energy sector draft inventory report that relied on fuel sales data from national economic surveys. The report estimated the distribution ratios of jet kerosene for domestic vs. international flights to be 5% domestic and 95% international. It also allocated all aviation gas to local flights and completely ignored the waterborne navigation due to difficulty in data acquisition and a known small share in the overall emissions profile. Efforts to improve the database to come up with more evidence-based estimates for the share of domestic fuel consumption in aviation and waterborne navigation are ongoing.

In the year 2015 total domestic transport sector emissions in Kenya amounted to 11.25 MtCO₂e. Considering the sectoral emissions target of 3.46 MtCO₂e in 2030 against a 21 MtCO₂e⁴ baseline means that annual emissions in 2030 should not exceed 17.54 MtCO₂e. This means that annual emissions must not grow more than 6.29 MtCO₂e compared to 2015, or not more than 0.4 MtCO₂e per year on average. **Between 2010 and 2015, average annual emissions were increasing by 0.6 MtCO₂e, putting the sector off track towards its 2030 target.**

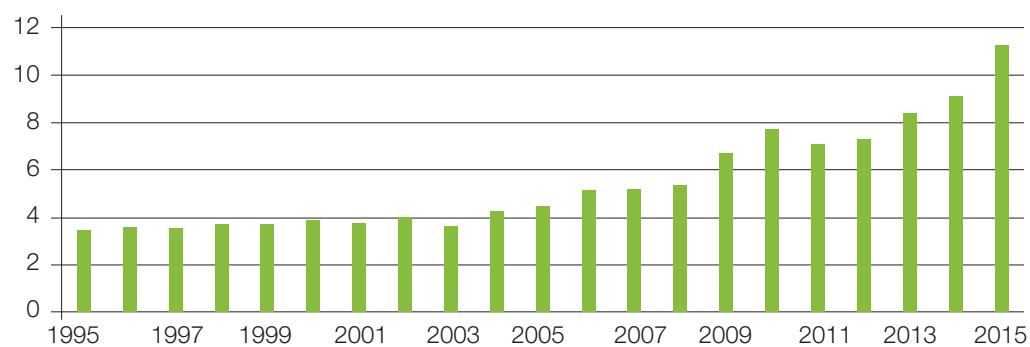


Figure 3: Trend of transport sector emissions (MtCO₂e), excluding waterborne navigation
Source: based on data from the KNBS



Road subsector

The emissions reported for the road sub-sector cover the year 2015, it also includes an overview of emissions from previous years since 1995. This is based on fuel sales data collected from the national economic survey and combined with default conversion and emission factor values from the UNFCCC. The data was compiled by the energy sector GHG team.

The road sub-sector (Figure 4) was responsible for 10.97 MtCO₂e in 2015 in the year 2015. The graph below shows this growing trend of emissions since 1995. A spike in 2010 is noticed, which may have been driven by increased fuel consumption during the referendum campaigns.

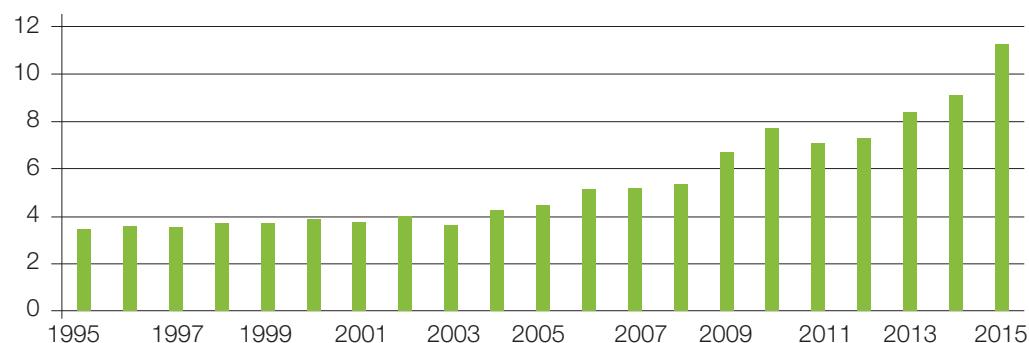


Figure 4: Trend of road sub-sector emissions (MtCO₂e). Source: based on data from the KNBS economic survey.

A closer look at the activity data in the sector shows that the total mileage of road transport vehicles was approximately 29'000 million vehicle kilometers in 2015. As a result, CO₂e emissions based on the first bottom-up calculation estimated for comparison purposes amounted to 6.9 MtCO₂e in 2015 and originated from the different transport modes (Figure 5).

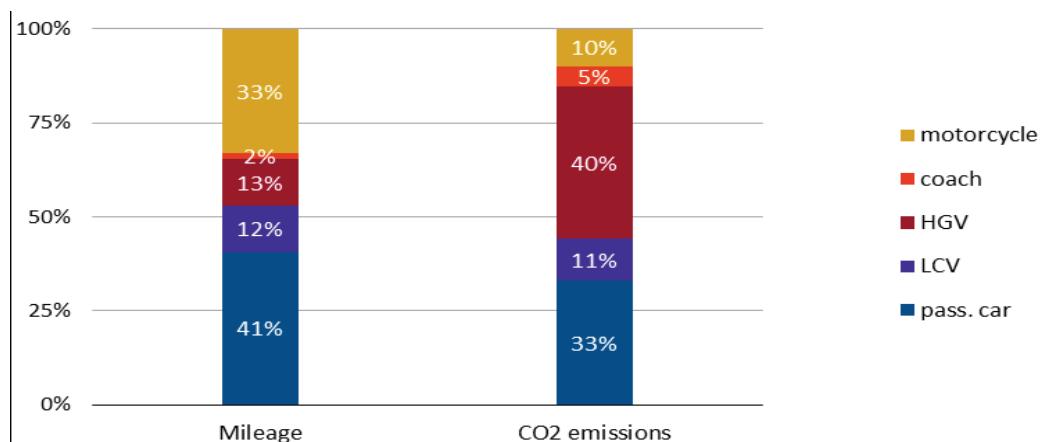


Figure 5: Results of bottom-up calculation of road transport emissions. Source: Infras, 2018



In as much as passenger cars dominate in mileage numbers, trucks emit the most emissions (see Figure 5 above).

The difference between the bottom-up and top-down calculations of transport emissions can have several reasons:

- Caution with fuel sales data: Petroleum products may be purchased at road-side petrol stations for non-transport uses including powering electric generators, water-pumps, lawn mowers, agricultural equipment, etc. leading to an overestimate of fuel sales for transport, in particular, diesel.
- Transit traffic in the freight sector: The bottom-up approach only accounts for the Kenyan vehicle fleet. Due to the large amounts of transit traffic along the Northern Corridor, significant of non-Kenyan trucks might be fuelling in Kenya, thereby leading to higher fuel consumption.
- Uncertainty in fleet composition: The bottom-up calculation is based on an estimated in-use vehicle fleet in Kenya. While plausible, uncertainties remain, and the fleet might be slightly underestimated.
- Uncertainty in mileage data: Data for average mileages was collected in a filing station survey, but some vehicle categories were hardly covered (large trucks, large buses) and uncertainties remain for all vehicle categories.
- Emission factors for motorcycles: Emission factors were derived based on the Kenyan vehicle fleet and an estimate for traffic situations in Kenya, using European GHG emission factors for those combinations of vehicle characteristics and traffic. While a good approach for most vehicle categories, for motorcycles this might have led to an underestimation of emission factors for motorcycles due to higher load factors in Kenya compared to Europe.

While the bottom-up calculation is still too uncertain to be used for the national GHG inventory and reporting to the UNFCCC, it gives a good indication of how emissions are split up, between the different road transport sub-sectors, informing the development of mitigation actions in the sector.

Table 3: Fuel consumption and emissions by vehicle category and fuel

Road Transport	Fuel type	2015 (tonnes of fuel)	2015 (tCO2e)	% of fuel type
Passenger Cars	Diesel	44,694	144,741	3.6
	Petrol	667,358	2,099,024	73.7
Light Commercial Vehicles	Diesel	218,879	708,833	17.5
	Petrol	23,899	75,170	2.6
Heavy Goods Vehicles	Diesel	871,117	2,821,081	69.6
Buses	Diesel	116,847	378,404	9.3
Motorcycles	Petrol	214,338	674,151	23.7
All categories	Diesel	1,251,537	4,053,059	100
	Petrol	905,595	2,848,345	100
TOTAL		2,157,132	6,901,404	



Rail sub-sector

The rail sub-sector was responsible for 0.13 MtCO₂e emissions in the year 2015. This is the highest recorded value in the rail subsector in the country's historical emission profile and is an indication of the growing activities within the sub-sector. It is assumed that the spike in 2015 was driven by increased activity during construction of the Standard Gauge Railway as fuel data recorded may have included values of all fuel used during the transportation of materials and equipment, used in construction of the SGR. In 2010, data by KNBS had populated a consumption value of 0.2 thousand tonnes of fuel for the entire rail sector, this is despite activity data for the year being higher than the previous year's data which had recorded a value of 8.5 thousand tonnes. Since no clear explanation had been given, the values were replaced with those sourced directly from the Kenya Railways Corporation which gave a figure of 14.25 thousand tonnes giving a plausible historical emission profile as shown in the graph below. This also implies that since data was sourced directly from KRC, data on rail fuel from privately run companies—Tata Chemical Magadi—was not recorded for 2010.

The graph below show the emissions trend for the period beginning 1995 to 2016.

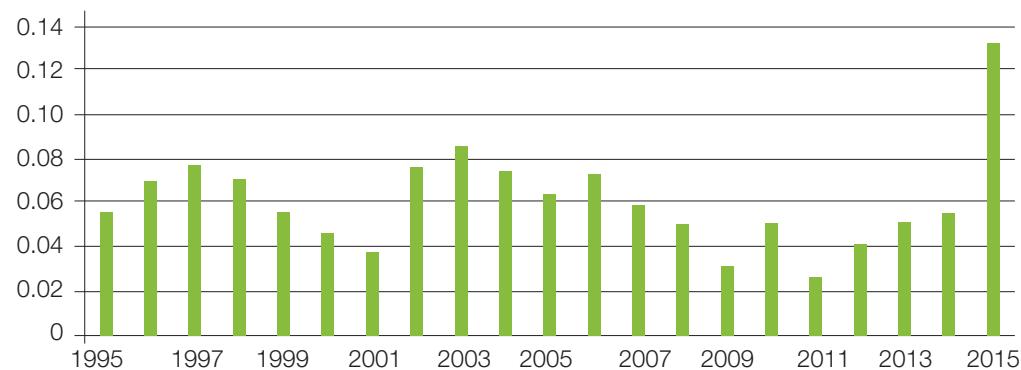


Figure 6: Trend of rail transport emissions (MtCO₂e). Source: based on data from KNBS economic survey and KRC





Aviation sub-sector

Calculating of emissions from domestic aviation required estimation of fuel consumed by all civil aviation domestic flights for operators of passenger and freight traffic inside the country. This includes take-offs and landings for these flight stages. Based on expert judgement, it was assumed that 100% of aviation gasoline recorded in the KNBS economic survey, is used by domestic flights, while only 5% of the total recorded value for Jet kerosene is used by the domestic traffic⁵.

The graph below shows the growth of the domestic emission based on the fuel consumption for the given periods.

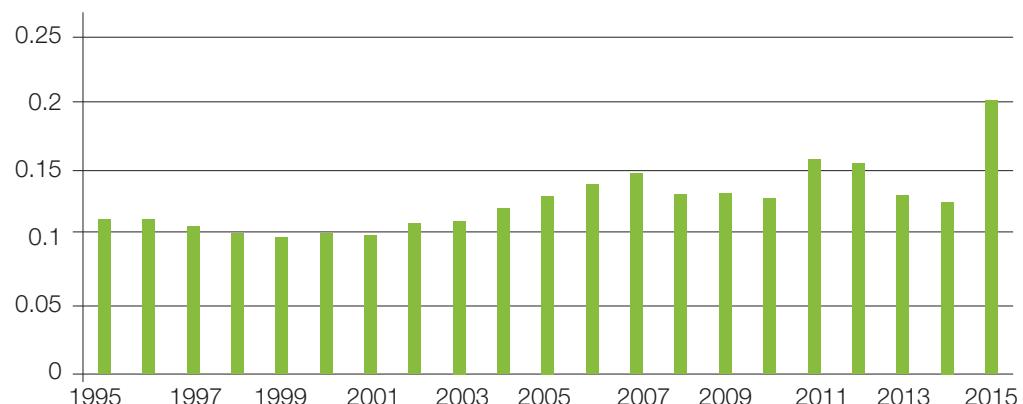


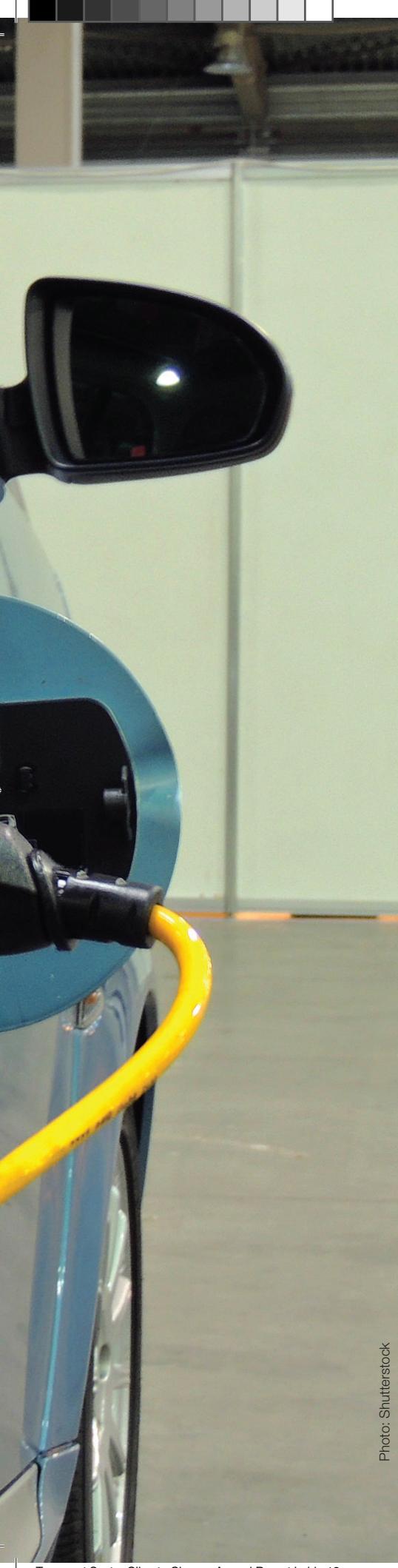
Figure 7: Aviation sub-sector emissions (MtCO₂e). Source: based on data from KNBS

The Kenya Civil Aviation Authority is working on a mechanism that will compel local airlines to provide data on domestic fuel consumption. This will facilitate the development of future inventories by ensuring estimations of domestic fuel consumption are easy to get and much closer to the true value. A lot of effort has also been put into place by KCAA in order to ensure international requirements by the International Civil Aviation Organisation (ICAO) are abided to with regards to international aviation emissions.

Waterborne transport

Domestic emissions from the shipping sector (waterborne navigation) will be reported in the subsequent inventory. This will be facilitated by the sector's ongoing work to build effective arrangements for data provisions especially towards ensuring reasonable estimates of the domestic share of heavy fuel oil are reached. However, due to the relatively small estimates of total shipping emissions in the overall GHG budget for transport, the even smaller share of emissions of domestic shipping is considered almost negligible; i.e., the majority of emissions is caused by international shipping. International maritime emissions, on the other hand, are governed under the Marine Environment Protection Committee of the International Maritime Organisation (IMO).





3 Mitigation of greenhouse gas emissions

This section presents a summary of mitigation actions the transport sector is undertaking to reduce GHG emissions in order to achieve the sectoral mitigation target of 3.46 MtCO₂e against the baseline in 2030. The sectoral actions are summarised in the table below. It includes activities listed in the National Climate Change Action Plan (NCCAP, 2018-2022)⁶, as well as additional activities included in the Mitigation Technical Analysis Report to the NCCAP (MTAR)⁷.

Transport emissions are reported at the sectoral level (in section 3), not at the level of a single mitigation action.



Table 4: Transport sector mitigation actions

Expected outputs	Supporting policies/ measures	KPIs	Progress	Relevant institutions	Responsibilities
NCCAP M1: Develop an affordable, safe and efficient public transport, including a Bus Rapid Transit System in Nairobi					
 Construction of 70km of the BRT for Nairobi (NCCAP main document)	<ul style="list-style-type: none">- Vision 2030 blueprint, which identifies transport infrastructure as an enabler- MTP 3 provides a detailed guide on the planned indicators for achieving transport infrastructure development, including BRT	<p>Length of BRT system installed and operational (NCCAP main document)</p> <p>Passenger-km traveled by the BRT (NCCAP main document)</p>	<ul style="list-style-type: none">- Feasibility studies have been conducted for various BRT lines- Cabinet Secretaries for Transport, Infrastructure, Housing, Urban Development and Public Works & National Treasury and Planning have presented the proposed development of BRT line 3 and its requisite proposed funding to the cabinet for consideration and approval.- Line 2 tender process is ongoing- Construction is underway for Line 1 Lot 3, leaving provision for BRT lanes and stations. Detailed designs have been completed for Line 1 Lot 1- NAMATA, in partnership with the Institute for Transportation and Development Policy (ITDP), is preparing a citywide public transport service plan	MOTIHUD NAMATA KENHA KURA Development partners – GIZ, KFW, EIB, AFD, EU, World Bank, JICA	NAMATA is overseeing activities geared towards Nairobi BRT operationalization
 Construction of 150km non-motorised transport facilities to complement BRT (NCCAP main document)	<ul style="list-style-type: none">- Roads Act 2007 outlines KURA's mandate in the provision of urban road network, which meets the needs of both motorized and non-motorized road users.- Nairobi City County NMT policy	No specific KPIs listed in the NCCAP	KURA has planned for construction of 160.4km of NMT in all the roads in the financial year 2018/2019	MOTIHUD NAMATA NTSA KENHA KURA Motorists Association of Kenya (MAK)	BRT NMT Infrastructure to be funded by development partner(s). However, GoK agencies will complement the funding requirements.
 Extension of SGR from Nairobi to Naivasha (NCCAP main document)	East African Rail Masterplan is in place	No specific KPIs listed in the NCCAP	Ongoing expected to be complete by June 2019 Construction process as of March 2019: 89.3%	MOTIHUD KR	KR – implementing entity, determining and surveying the land required for the project China Road and Bridge Corporation (CRBC) – contractor



Expected outputs	Supporting policies/ measures	KPIs	Progress	Relevant institutions	Responsibilities
 Upgrade Nairobi commuter rail system (MTAR)	Nairobi Railway Masterplan is in place	No specific KPIs listed in the NCCAP	<ul style="list-style-type: none"> - Rehabilitation of existing commuter rail network is ongoing - Programme to acquire additional rolling stock (Diesel Multiple Units) is in progress to be operational by the end of 2019 - Plans to expand the Nairobi commuter rail network are in place. 	MOTIHUD KR	KR overseeing the implementation
 Shift at least 30% of road passengers to rail (Nairobi – Mombasa) (MTAR)	KR and Ministry of Transport is ensuring that the SGR services being offered daily are on schedule and are offered on a competitive basis to encourage more passenger-shift	No specific KPIs listed in the NCCAP	Ongoing. Jan 2018-Dec 2018 passengers transported using SGR between Mombasa and Nairobi was 1.6 Million. KR operates four trains per day between Mombasa and Nairobi on the SGR, all trains ferrying approximately 4564 passenger's day. This translates to 91 buses off the road assuming one bus has 50 passengers.	MOTIHUD KR	KR- Implementing entity
NCCAP M2 (NCCAP main document): Reduce fuel consumption and fuel overhead costs, including electrification of the SGR					
 Electrification of the SGR (NCCAP main document)		Passenger-km and freight-km moved by electric trains (MTAR)	Planned	MOTIHUD; KR; KETRACO	So far KETRACO is to oversee the initiative
 Shifting freight from road to rail (NCCAP main document)	KPA supports the nomination of cargo to Nairobi Inland Container Depot	No specific KPIs listed in the NCCAP	<p>KR operates 6.26 up trains (Mombasa to Nairobi) ferrying 107 TEUs and 3.48 down trains (Nairobi to Mombasa) ferrying 10 TEUS. This translates to 705 TEU excluding empty containers translating to approximately 705 trucks off the road assuming each truck off the road has carried 20 TEU</p> <p>NB: Including empty containers the average TEUs ferried down is 261 TEUs translating to averagely 261 empty trucks off the road.</p>	MOTIHUD; KR KPA	Kenya Railways oversees the freight service to ensure facilitation of trade through provision of seamless service among Kenya Revenue Authority, Kenya Ports Authority, and Kenya Railways Corporation.
 Improving heavy-duty truck efficiency (NCCAP main document)		Average efficiency of the heavy-duty truck population (MTAR)	TMEA is promoting cost-efficient and low polluting driving of the heavy-duty trucks. Monitoring data will be provided by TMEA.	MOTIHUD Kenya Transporters Association	





Expected outputs	Supporting policies/ measures	KPIs	Progress	Relevant institutions	Responsibilities
 Develop and start the implementation of a roadmap for the improvement of heavy-duty truck efficiency (MTAR)		No specific KPIs listed in the NCCAP	Under planning	MOTIHUD	To be determined
 Construct and commission the 2nd runway at JKIA to reduce holding of aircrafts and diversions by 2022 (MTAR)	KAA Act Airport master plan	No specific KPIs listed in the NCCAP	Planned	Kenya Airports Authority (KAA)	KAA Currently sourcing for financing
 Establish a new air navigation area control by 2020 (MTAR)	- KCAA Act - Airspace master plan - KCAA strategic plan 2018-2022 - Kenya Aviation Action Plan on CO ₂ reduction	No specific KPIs listed in the NCCAP	<ul style="list-style-type: none"> - 28 new performance-based navigation routes were developed by 11th Oct 2018 - A parallel track between JKIA and Wajir have also been developed to ease air traffic. Construction of the new area control centre is ongoing - Completion of the building construction is at 86.75% 	Kenya Civil Aviation Authority (KCAA)	<ul style="list-style-type: none"> - KCAA is overseeing these activities - KCAA will equip the center once construction is done
NCCAP M3 (NCCAP main document): Encourage low carbon technologies in the maritime sector					
 Install shore power infrastructure for four berths to provide power to the ships while at berth instead of using their engines (NCCAP main document)	Integrated Transport Policy, Merchant Shipping Act, KMA Act, KPA Act	Number of berths with shore power (NCCAP main document)	Feasibility studies were undertaken	MOTIHUD KPA Kenya Maritime Authority Kenya Ferry Services Kenya Power	MOTIHUD KPA



Expected outputs	Supporting policies/measures	KPIs	Progress	Relevant institutions	Responsibilities
 Domesticate and implement international standards on maritime (MARPOL Annex VI) by 2020 (MTAR)	Merchant Shipping Act, 2009 KMA Act	No specific KPIs listed in the NCCAP Ratification of MARPOL Annex VI National legislation/regulations domesticating MARPOL Annex VI	Ratification done Domestication of the Annex on-going	KPA KMA MOTIHUD IMO	MOTIHUD KMA
NCCAP M4 (NCCAP main document): Encourage low technologies in aviation sectors					
 Purchase of 2 new aircraft (B787) which have fuel efficient engines (NCCAP main document)	Kenya Action Plan on CO ₂ reduction Kenya Airways strategic plan	Number of fuel-efficient aircraft purchased (NCCAP main document)	2 new aircrafts purchased	Kenya Airways MOTIHUD KCAA KAA	Purchased by Kenya Airways
 Implementation of Service Charter on Sustainable Aviation Fuels (certification and use of biodiesel production for captive use at the airports) by 2020 (NCCAP main document)	Action Plan KCAA strategic plan	No specific KPIs listed in the NCCAP	Feasibility study report in place and shared with all relevant agencies on 18 th January 2019 for implementation of the roadmap for the development of sustainable aviation fuels in Kenya	MOTIHUD KCAA Kenya Airport Authority and other relevant agencies	KCAA is overseeing the implementation



Expected outputs	Supporting policies/measures	KPIs	Progress	Relevant institutions	Responsibilities
 Installation of 0.5 MW of solar power plant at Moi International Airport by 2018 (NCCAP main document)	Action Plan KAA master plan KAA strategic plan	No specific KPIs listed in the NCCAP	- Solar power plant constructed - Awaiting connection to the grid - To be commissioned	MOTIHUD KCAA KAA	Joint coordination between KCAA and KAA
 Domesticate and implement international standards on aviation (ICAO Annex 16 Vol 4) by 2021 (MTAR)	Action Plan KCAA ACT Draft regulations 2019	No specific KPIs listed in the NCCAP	- Aeronautical Information Circular on CORSIA issued to all airlines on 19 th Nov 2018 - KCAA wrote on 18 th January Airlines requested to nominate focal persons for CO ₂ monitoring reporting on emission reduction data - Draft 2019 regulation on CORSIA developed	KCAA	KCAA overseeing the implementation
NCCAP M5 (Listed in MTAR): Adoption of electric modes of transport to improve air quality					
 Import and pilot the use of 150 electric hybrid vehicles (buses, GoK cars) by 2019 and provide appropriate incentives for their use by 2022 (MTAR)	Standards for importing of electric motor vehicles are in place	No specific KPIs listed in the NCCAP	Planned	MOTIHUD NTSA KEBS KRA	MOTIHUD
 Pilot the use of electric 2- and 3-wheeler vehicles in at least two counties by 2020 (MTAR)	Standards for importing of electric motor vehicles are in place	No specific KPIs listed in the NCCAP	UN Environment is implementing “Integrating electric 2 & 3 wheelers into existing urban transport modes in developing and transitional countries” project. Currently, a pilot program in Nairobi and Kisumu is planned.	MOTIHUD NTSA KEBS KRA	UN Environment County Government of Kisumu Kenya Power



Expected outputs	Supporting policies/ measures	KPIs	Progress	Relevant institutions	Responsibilities
 Develop and implement Standards for electric/ hybrid vehicles in Kenya by 2019 (MTAR)	Draft standards for importing electric motor vehicles in Kenya are in place	No specific KPIs listed in the NCCAP	20 out of 24 standards have been developed and gazetted	MOTIHUD KEBS KRA	Kenya Bureau of Statistics
NCCAP M6 (Listed in MTAR) : Transit-oriented development					
 Update and implement planning and building control regulations to encourage compact development, mixed-use, and reduced provision of parking near MRT stations (MTAR)	Big 4 affordable housing program Rezoning initiatives for local areas in the Nairobi Metropolitan Area Integrated Urban Development Plan for Nairobi	No specific KPIs listed in the NCCAP	Planned	MOTIHUD County governments, National Construction Authority (NCA) NAMATA	MOTIHUD
 Review and implement the Integrated National Transport Policy 2021 (MTAR)		No specific KPIs listed in the NCCAP	Reviewed Integrated National Transport Policy is in place	MOTIHUD	SDOT oversaw the reviewing process







4 Vulnerability and adaptation to climate change of the transport sector

The transport sector is vulnerable to the impacts of climate change. Kenya's transport sector is frequently affected by floods and impacts are expected to increase with increasing variability and extremity of climate events. At the moment, there is no framework for sectoral adaptation planning in transport in place yet.

The sector is yet to assess risks caused by climate change and develop targeted adaptation actions. Nevertheless, below is a summary of adaptation actions for the sector as proposed in the NCCAP 2018 - 2022.





Table 5: Transport sector adaptation actions

Expected output	KPIs	Supporting policy/measure	Progress	Relevant institutions	Responsibilities
NCCAP A1 (main NCCAP document): Climate-proof transport infrastructure					
 At least 4000 km of roads climate-proofed roads being systematically constructed to harvest water and reduce floods	- Number of kilometers of roads that are climate proofed - Kilometers of roads systematically constructed to harvest water and reduce floods	At KURA level, there is a policy on environment, safety and health which requires review to integrate climate adaptation and mitigation	Performance-based road maintenance works which include both periodic and routine is being carried out by KURA	KURA MOTIHUD KeRRA KeNHA County governments	KURA is overseeing this process
 Feasibility of designing and constructing roads to systematically harvest water during floods determined	Feasibility study of road construction to harvest and mitigate floods	At KURA level reference is made to the road construction manuals and annual road inventory condition survey development, rehabilitation and maintenance.	Nairobi regeneration programme has been put up as part of the government's efforts of achieving the Big 4 agenda. The roads to be rehabilitated will put into consideration the aspect of preventing road damage due to flooding. Topographical surveys and installation of road drainage infrastructure is part of road design and construction requirements. In terms of water harvesting collaborating with Water Resources Authority will be pursued to establish the harvesting of flood waters.	KURA MOTIHUD KeRRA KeNHA County governments	KURA is overseeing this process
 Integrated National Transport Policy, with Climate change adaptation mainstreamed, is being implemented	Climate change adaptation mainstreamed into the Integrated National Transport Policy	The Integrated National Transport Policy has been reviewed.	The Integrated National Transport Policy has been reviewed. State Department for Transport coordinated the process of Integrated National Transport Policy to include adaptation	KURA MOTIHUD KeRRA KeNHA County governments	State Department for Transport coordinated the revision process while consulting relevant transport sector stakeholders
 Climate change adaptation mainstreamed in the Blue Economy Strategy and Maritime Service and implemented	The climate change adaptation mainstreamed Blue Economy Strategy and Maritime Service is in place	Climate change Act	Climate Change Desks/officers, Chapter on Climate Change mainstreaming in the Blue Economy Strategy	KURA MOTIHUD KeRRA KeNHA County governments	Ministry of Environment and Forestry MOTIHUD



Expected output	KPIs	Supporting policy/measure	Progress	Relevant institutions	Responsibilities
 Standard guidelines for design and climate-proofing of transport and other infrastructure (both existing and new) developed and implemented	Document in place with standard guidelines for design and climate-proofing of transport and other infrastructure (both existing and new).	Road design manuals specify standards for drainage infrastructure.	Consultative discussions between the National government, county government, and relevant agencies such as KURA agreed to collaboratively implement road projects under the Nairobi roads regeneration programme. the collaboration involves sharing technical and financial obligations	KURA MOTIHUD KeRRA KeNHA County governments	KURA is overseeing this process
 National and county infrastructure projects (especially for water, energy, transport and ICT) are climate-proofed	Number of national and county infrastructure projects (especially for water, energy, transport and ICT) climate-proofed	KURA works with the county governments to strengthen their capacity. MoUs with different counties to facilitate this are in place	KURA collaborates and partners with county governments in construction of roads in towns/within county headquarters such as Chuka town, Garissa town, Lodwar town, Maua town, Machakos town, Nairobi City County, Mombasa County. There are plans to include climate proofing of infrastructure	KURA MOTIHUD KeRRA KeNHA County governments	KURA is overseeing this process
 Capacity of counties strengthened to plan, contract and supervise implementation of climate-proofed infrastructure	Number of counties with strengthened capacity to plan, contract and supervise implementation of climate-proofed infrastructure	KURA gives technical support in the planning and implementation of road projects, e.g., preparation of tender documents, designs and construction supervision, e.g., in Turkana County.		KURA MOTIHUD KeRRA KeNHA County governments	KURA is overseeing this process





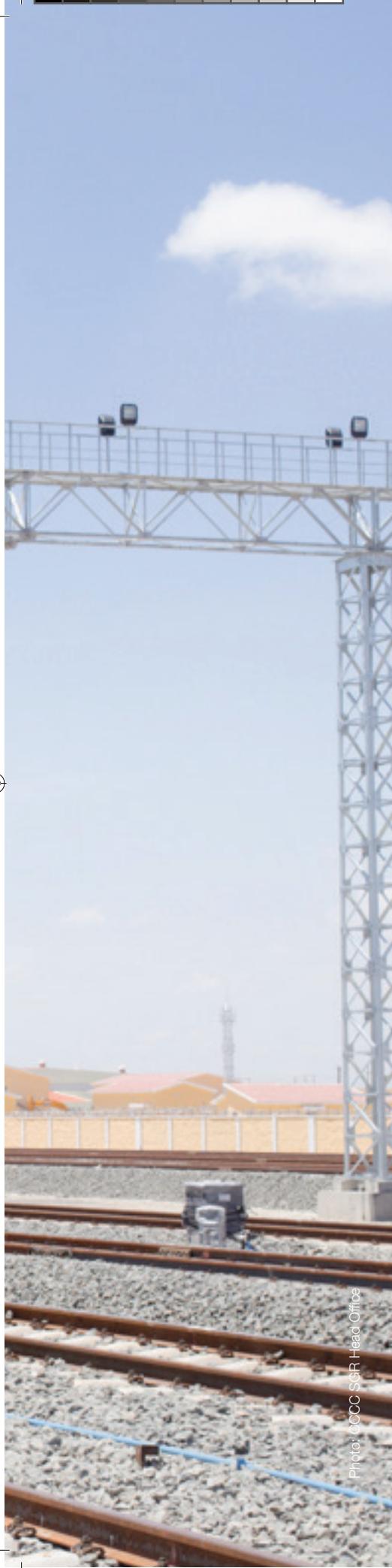


Photo: CCCU SCR Head Office

5 Ongoing sectoral initiatives towards mainstreaming climate change

This section provides an outline of the ongoing sectoral activities around sustainability and climate change within the transport sector.

5.1 Transport sector's top priorities for 2018-2019

For the year ahead, and in view of the NDC target of reducing 3.46 MtCO₂e emissions by 2030 against the business as usual scenario, the sector has prioritised the following actions as the primary mitigation actions for the sector. These have been further defined in chapter 3 and 4 (in figure 8 below).

5.2 Performance Appraisal

Awaiting recruitment of staff to the Climate Change Coordination Unit at SDoT, the climate change focal point is handling climate change coordination responsibilities as part of her performance targets. The goal is to scale this up and agitate the representatives of different state agencies in the CCCU to include climate change duties as part of their targets as well, such as ensuring data provision and reporting. This would be in accordance with the outlined responsibilities of public sector players under section 15 of the Climate Change Act of 2016 and in support of the efforts towards effective implementation of the Paris agreement requirements.

5.3 Policy Framework

SDoT is currently reviewing the Integrated National Transport Policy (INTP) to include climate change and other sustainability elements in the revised policy report. A Climate change action plan for the transport sector is also being planned for. This will integrate climate change activities from all sub-sectors and provide more detail than what is captured in the National Climate Change Action Plan (NCCAP 2018-2022). The document is meant to guide climate change related activities in Kenya's transport sector.

The Ministerial Strategic Plan 2018-2022 currently under review has also included a component on climate change and environmental sustainability.





Figure 8: Top sectoral priorities for the year



> 01

To develop a BRT for Nairobi metropolitan area

Objectives: To reduce congestion and provide improved mobility services

Implementation level: Line 2 tender process in progress. The process is being led by KeNHA



> 02

To extend SGR from Nairobi to Naivasha

Objectives: To reduce travel time and shift from road to rail

Implementation level: Construction ongoing at 90%



> 03

30% freight from Mombasa to Nairobi shifted from road to rail

Objectives: To reduce congestion and shorten the time for cargo transportation

Implementation level: Ongoing



> 04

NMT construction across different urban areas

Objectives: To enhance mobility for short trips

Implementation level: Ongoing. KURA is incorporating NMT in all upcoming roads



> 05

Priority: Finalization of CORSIA regulations for the aviation sector

Objectives: To enhance compliance of international aviation with ICAO carbon offsetting standards.

Implementation level: Ongoing. Draft regulations are in place



At the subsector level, roads and aviation have guiding frameworks for their climate change response developed, these include:

a. **Kenya's action plan for the reduction of CO₂ emissions in the aviation sector**

Document owner: Kenya Civil Aviation Authority

Mitigation objectives: Through the implementation of the action plan's mitigation measures, the aviation sector has set a target to achieve an annual average fuel efficiency improvement of 2 percent until 2030 and an aspirational fuel efficiency improvement rate of 2 per cent per annum from 2031 to 2050, calculated on the basis of volume of fuel consumed per Revenue Tonne Kilometre (RTK). This is equivalent to cumulative emission reductions of 2.86 MtCO₂e against the baseline until 2030.

KCAA has also formed a working group on aviation emissions to oversee Kenya's Action Plan for reduction of CO₂ emissions in the sub-sector. This working group meets quarterly to monitor progress towards achieving Kenya's fuel efficiency target. Annual reports are prepared to summarize progress of action plan activities. Annual reports include:

- A quantitative description of achievements
- Fuel efficiency improvements
- List of companies reporting
- Quantitative and qualitative description of action taken by all working group members

b. **Environmental sustainability action plans**

Document owner: KURA

Mitigation objectives: Decongestion programmes and junction improvements. Intelligent Transport System (ITS) to count the number of vehicles in a certain section of the road to inform decisions to allow improved traffic flows.

Adaptation objectives: Addressing issues of adequate drainage infrastructure.

For the maritime sub-sector there are ongoing initiatives to reduce GHG emissions. Baseline studies are currently being undertaken to inform the process of developing action plans for the sub-sector.







6 Needs and support received towards climate change

This section builds on the support gaps identified through the National Climate Change Action Plan development process; the gaps range from financial, to capacity, to technical. The sector is yet to identify ways to fill this gap. However, budgetary allocations from the ex-chequer are being sought alongside ongoing development partner support.

6.1 Summary of needs identified by the sector

Overarching needs within sectors include:

- **Capacity building across all sub-sectors:** Continuous capacity enhancement around climate change is a recurrent need within the sector. Part of the activities envisioned include participation in the national climate change planning and budgeting course at the Kenya School of Government as well as capacity support from ongoing projects such as the GIZ supported Advancing Transport Climate Strategies (financed by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety).
- **Establishment of a data sharing framework and procedures:** There is a need for a framework for data sharing and a data sharing policy within the sector. This will institutionalise data collection and reporting to build up a regularly maintained transport database and ensure the provision of data for annual reporting on sectoral greenhouse gas emissions, which is quite data intensive. This includes activation of a data centre that has been set up at the Ministry of Transport. Development of such a framework and procedures is currently supported through the Advancing Transport Climate Strategies project, but additional resources may become necessary to ensure implementation and regular data maintenance.
- **Climate risk and vulnerability assessment of transport infrastructure:** A vulnerability analysis of transport infrastructure would help to identify infrastructure at risk and consider risks in new project designs. It would also help to identify adaptation options to climate-proof Kenya's transport infrastructure.





Photo: Olivia Kibui

At subsector level, identified needs per sub-sector include:

- a. **Road sub-sector:**
 - Provision of equipment, particularly emission testing equipment
 - Digitalization of vehicle registration records
- b. **Rail Sub sector**
 - Comprehensive engagement of the private sector to promote the shift of cargo from road to rail
- c. **Aviation sub-sector**
 - Support to install solar systems as a renewable energy source to promote low carbon technology for other major airports like JKIA similar to the one installed in Moi International Airport.
 - Training in carbon offsetting criteria
- d. **Maritime sub-sector**
 - Financing of Maritime Technology Corporation Centre project after the 3-year period lapses
 - Comprehensive data base for maritime transport activities
 - Sensitization of stakeholders on the importance of climate change considerations
 - Identification of adaptation measures

6.2 Support for climate action

To respond to the above challenges, several initiatives primarily geared around technical assistance have kicked off. The support is around capacity enhancement and data development.

Below is a list of climate change initiatives that are directly associated with the State Department for Transport:

Ongoing activities/initiatives include:

- a. **The Advancing Transport Climate Strategies Project:** A Technical assistance project being implemented by GIZ with a focus on institutionalising climate change functions within the State Department for Transport. The project is funded by the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety's International Climate Initiative (IKI).

Project duration: 04.2017 – 04.2021

Financial allocation: 900,000 Euros



- b. **Integrating Electric 2&3 Wheelers into Existing Urban Transport Modes in Developing and Transitional Countries:** An electric mobility project implemented by the UN Environment with a focus on advancing uptake of electric mobility. The project is funded by the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety's International Climate Initiative (IKI).

Project duration: 03.2017 – 02.2021

Financial allocation: 3,333,500 Euros (covering 6 countries)

- c. **Growing smarter; Sustainable mobility in East Africa:** An urban mobility project implemented by ITDP in partnership with UN-HABITAT with a focus on the promotion of low carbon urban mobility projects. The project is funded by the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety's International Climate Initiative (IKI).

Project duration: 09.2018 – 08.2023

Financial allocation: 500, 000 Euros

- d. **KURA environmental sustainability initiatives:** These are ongoing initiatives around environmental sustainability that are implemented by the Kenya Urban Roads Authority. Expected project duration: Annual

Financial allocation: 15,000,000 KES

- e. **Capacity Building Initiative for Transparency:** The project has a transparency and accountability focus providing relevant tools, training, and assistance towards meeting transparency requirements of the Paris Agreement. The project is offering support to all key sectors in Kenya including transport and energy

Project duration: 01.2018-10.2019

Financial allocation: 1,000,000 USD

Proposed activities/initiatives include:

- f. **Roadmap for sustainable mobility in Kenya:** The project is yet to start. It will be implemented by the AfD with a focus on the preparation of a detailed low carbon development strategy in the transport sector.

Expected project duration: N/A

Financial allocation: N/A

- g. **NAMA facility support:** The project is yet to start. It is a NAMA support project targeted at the implementation of a 21km BRT line in Nairobi.

Expected project duration: up to 2021 (indicative timeline)

Financial allocation: 20 Million Euros

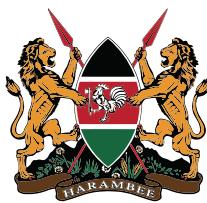




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