REPUBLIC OF KENYA

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

TRANSPORT SECTOR
CLIMATE CHANGE
ANNUAL REPORT

2019
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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

Kenya has been investing billions of shillings in transport infrastructure every year as part of its efforts to improve connectivity within the country and the networks with the neighboring countries. However, the climate change crisis continues to threaten these investments. Effects associated with the climate change crisis such as extreme flooding damage transport infrastructure and disrupt transport services.

The State Department for Transport continues to implement, monitor and report on mitigation and adaptation measures in line with the Climate Change Act (2016) requirements. The Act supports the implementation of the Paris Agreement requirements as highlighted in the country's Nationally Determined Contributions (NDCs).

It is critical to put policy measures in place to support the implementation of the climate change agenda. The State Department for Transport reviewed the Integrated National Transport Policy (INTP) in 2019 to include climate change issues. Several initiatives are ongoing at the subsector level as captured in this annual report. Documented information is on institutional arrangements for climate change, the sectoral greenhouse gas profile, the status of various mitigation and adaptation actions as outlined in the National Climate Change Action Plan 2018-2022 as well as ongoing initiatives.

The 2019/2020 annual report has been prepared by the State Department for Transport Climate Change Unit as the lead, with support under the Advancing Transport Climate Strategies "TraCS" Project funded by the Deutsche Gesellschaft OrInternational Zusammenarbeit (GIZ).

The year 2020 is important for Kenya's future climate change action for two main reasons. First, the country is updating its NOC which will lay out the target for different sectors for the next five years. Second, the sector has been adversely affected by the global pandemic of COVID-19 thereby reducing revenues and investments.

That notwithstanding, transport sector continues to be a key sector in terms of contribution to Kenya's emissions reduction. Hence the sector requires support that includes enhancing the capacity of the sector to fully mainstream climate change for sustainable development as well as formulate policies and frameworks to enhance uptake of clean mobility technologies.

I therefore invite all stakeholders including Development Partners and the private sector to join the efforts towards achieving the transport sector climate change ambitions.

Solomon Kitungu
Principal Secretary
State Department for Transport

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
KAA	Kenya Airport Authority
KCAA	Kenya Civil Aviation Authority
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
$MtCO_2e$	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

Contents


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1 Sector Profile

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

1.1 Institutional arrangements for climate change

During the previous financial year (2018-2019), it was reported that the State Department for Transport (SDOT) formed a transport sector climate change team with focal points to represent the different modes of transport. The team is still operational and has been working towards establishing a data sharing framework for the transport sector. The transport sector was supported to develop a data collection template to facilitate the amalgamation of inputs of greenhouse gas inventory, as well as data on progress implementation of mitigation and adaptation actions to support climate change reporting. These data templates have been used to collect data for this annual report. The data collection templates are open and can be adapted by other sectors.

At the sub-sector level, Kenya Maritime Authority (KMA) has environment section that deals with climate change issues on top of other environment issues.

At Kenya National Highways Authority (KeNHA), the climate change component is anchored in the directorate of highway planning and design within the department of environment and social safeguards. Climate change is mainstreamed during the assessment of project feasibility and the design process. Cooperation is done with other development partners such as the World Bank, Agence Française de Développement (AFD), etc. who incorporate climate change in designs. Climate change is incorporated because climate change effects are being experienced. Hence, the traditional way of designing is no longer the only option.

For the road agencies, Performance Based Contractors are engaged to support climate change proofing. They are contracted by the agencies and given sections of the road network to maintain. They are always on site to deal with arising issues

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:	Road, rail, aviation and maritime sub-sectors
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, Nairobi Metropolitan Area Transport Authority
Reporting time-frame:	July 2019 – June 2020 (2010 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 LAPSSET; 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.

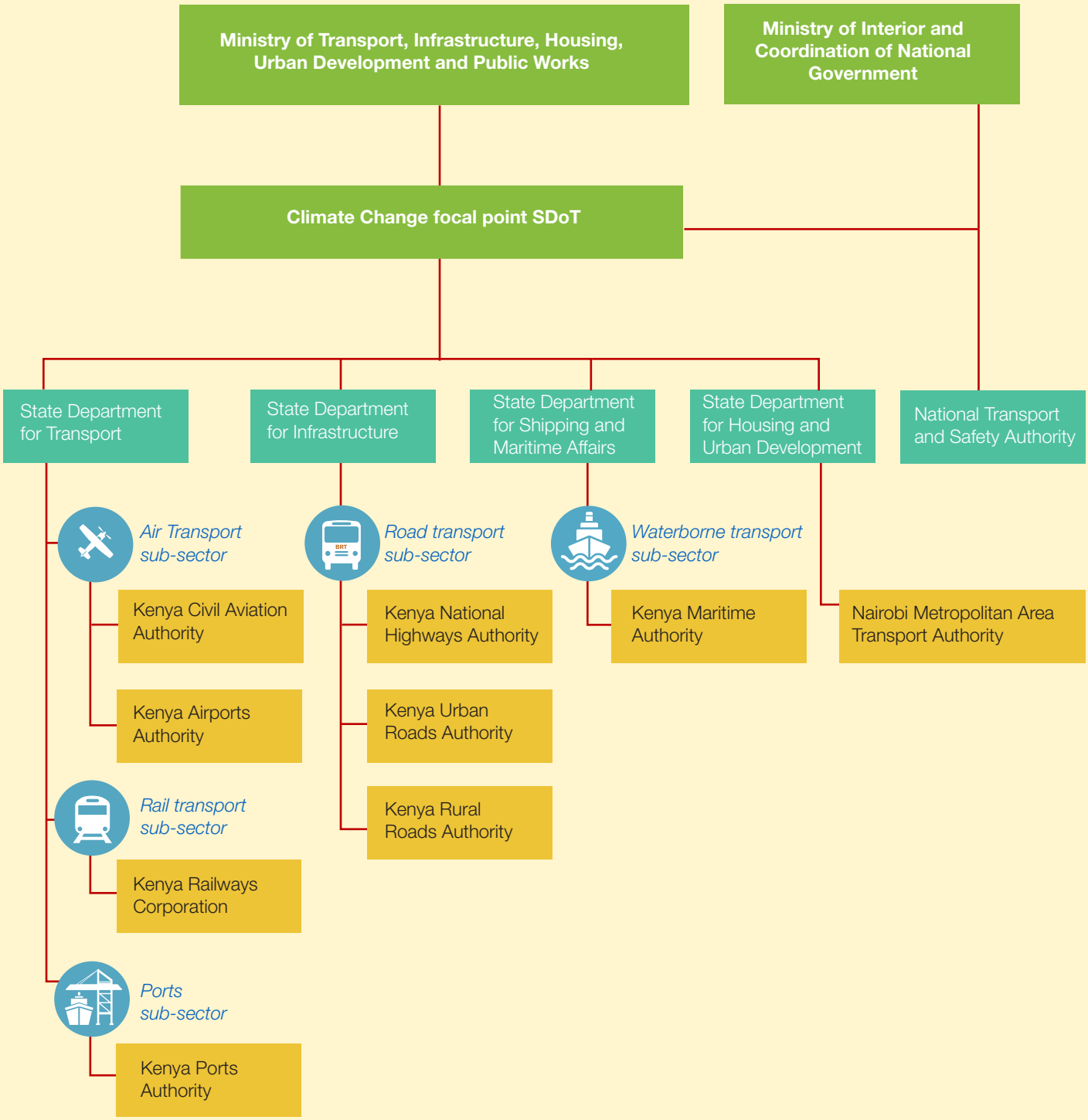

Figure 1: Transport sector climate change coordination team


EAT GREEN
BREATHE CLEAN
GreenSpoon powered by Drive Electric
www.greenspoon.co.ke
the ONLINE
FOOD STORE
FOR PEOPLE WHO CARE
ABOUT WHAT THEY EAT
www.greenspoon.co.ke
www.drivelectric.co.ke
KCM
531 J
Eat Green, Breathe Clean.
GreenSpoon powered by Drive Electric
greenspoon
greenspoon
Drivelectric

Photo: J. Ochweri

2 Sectoral Greenhouse Gas Emission Profile

This section outlines the transport sector's greenhouse gas (GHG) emissions profile for the years 2010 to 2019. It highlights the results of a top-down GHG inventory approach based on data from official national statistics. This is the second 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 CO_2e for three transport sub-sectors, i.e. road, rail and air.

2.1 Institutional arrangements

As per the Climate Change Act, 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. Information for the inventory has been gathered through the coordination of the Climate Change Unit focal points.

2.2 Data source and methodology used

A 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 covers the years 2010-2019. The emissions reported are in carbon dioxide equivalent which covers methane, carbon dioxide and nitrous oxide.

The primary sources of data are the economic surveys from the Kenya National Bureau Statistics that include a report on sector-specific data, which in this case is top-down fuel sales statistics per consumer category.

The report relied on fuel sales statistics to come up with emission estimates for the sector and on the use of default emission factors and conversion factor values from the IPCC. However, fuel demand data reported in the annual economic survey is not disaggregated to the level of detail that would support ease of compliance with the reporting requirement. More efforts and assumptions were therefore needed to be able to clearly allocate shares of fuel consumed in the road, aviation and maritime subcategories. SDoT is therefore engaging the KNBS for further disaggregation of data. In particular, this would mean:

- Breakdown of "Road transport (and retail outlets) totals" consumer categories by fuel type (i.e. diesel and petrol)
- Breakdown of "marine" consumer categories by fuel type
- Breakdown of "Aviation" consumer categories by fuel type (i.e. jet gasoline and jet kerosene)

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

GHG emissions = Activity data (AD) x Emission factors (EF)

For a more detailed bottom-up approach to calculating GHG-emissions from road transport, data on the characteristics of 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, would be needed. This is however not yet regularly reported in the official national statistics reports. There is also a lack of a distinction between fuel use in domestic aviation and shipping, vs. international aviation and shipping in the economic surveys. This information is needed to be gathered from other sources. It was however difficult to estimate emissions from the shipping and maritime sub-sector as there was no basis for developing a reasonable estimate of fuel consumption in the sub-sector.

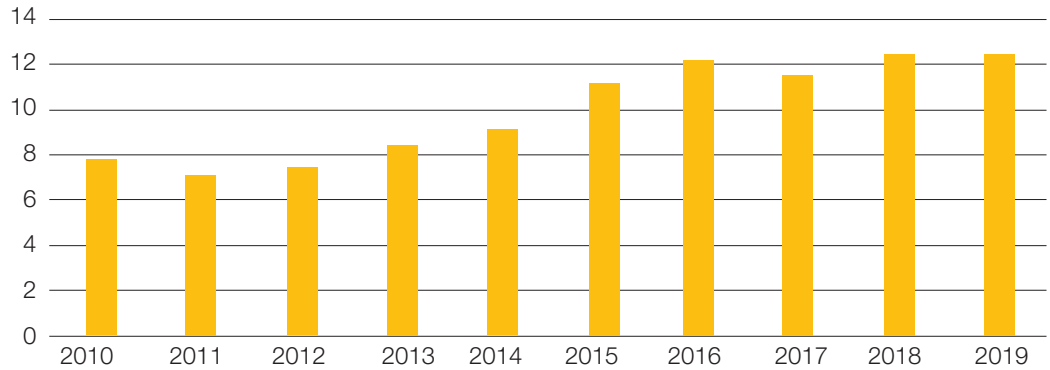

Figure 2: Trend of transport sector emissions, excluding waterborne navigation.
Source: based on data from the KNBS

2.3 Trends in transport sector's GHG emissions

The figure below shows the overall trend in the transport sector GHG emissions in the country. As mentioned, this is based 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 has not factored in 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 2019 total domestic transport sector emissions in Kenya amounted to 12.343 $MtCO_2e$ (not including emissions from waterborne navigation), an increase of about 4.6 million tonnes from 2010. Considering the sectoral emissions target of 3.46 $MtCO_2e$ in 2030 against a 21 $MtCO_2e$ baseline, annual emissions in 2030 should not exceed 17.54 $MtCO_2e$.

2.3.1 Road sub-sector

The emissions reported for the road sub-sector cover the year 2019, 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 Kenya energy sector GHG team.

The road sub-sector, as shown in figure 3 below, was responsible for 12.09 $MtCO_2e$ in the year 2019. The graph below shows this growing trend of emissions since 2010. A spike in 2016 is noticed, which may have been driven by increased fuel consumption during the election's campaigns.

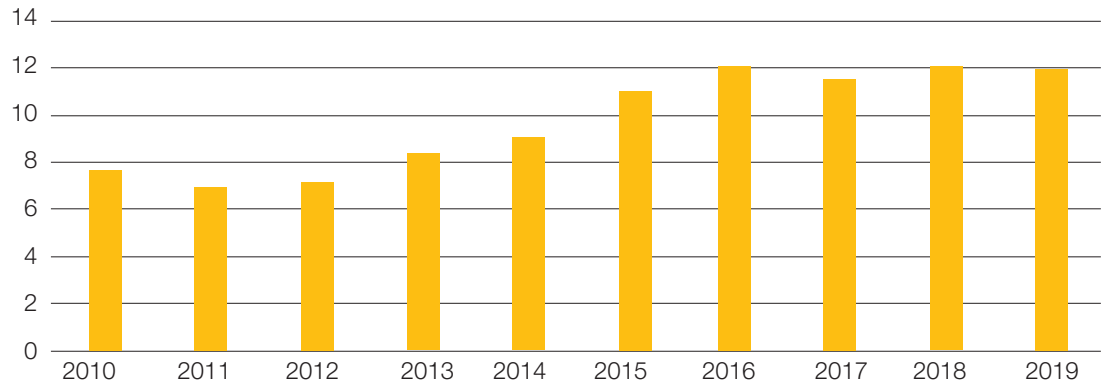

Figure 3: Trend of road transport emissions ($MtCO_2e$).
Source: based on data from KNBS economic survey.

2.3.2 Rail sub-sector

The rail sub-sector was responsible for 0.062 $MtCO_2e$ emissions in the year 2019. In 2015, a high value of 0.120 $MtCO_2e$ is recorded which is assumed to have been driven by increased activity during construction of the Standard Gauge Railway (SGR). 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, which had recorded a value of 8.5 thousand tonnes of fuel. 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 (e.g. Tata chemical Magadi) was not recorded for 2010.

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

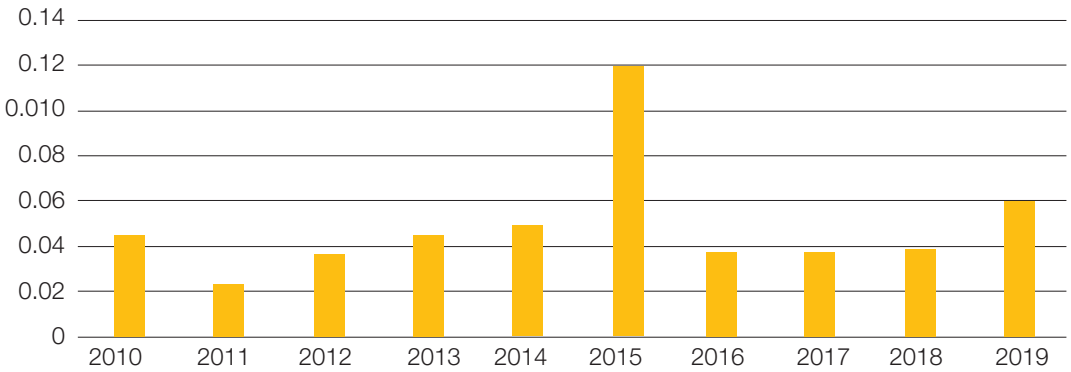

Figure 4: Trend of rail transport emissions (MtCO2e). Source: based on data from KNBS economic survey and KRC

2.3.3 Aviation sub-sector

The aviation sub-sector was responsible for 0.188 $MtCO_2e$ emissions in the year 2019. Calculating 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 assumptions, it was estimated 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 traffic. However as from 2018 going forward, a domestic allocation of 7% for jet kerosene is assumed based on the outputs of a feasibility study supported by International Civil Aviation Organisation.

The figure below shows the trend of the domestic emissions based on the fuel consumption for the given periods.

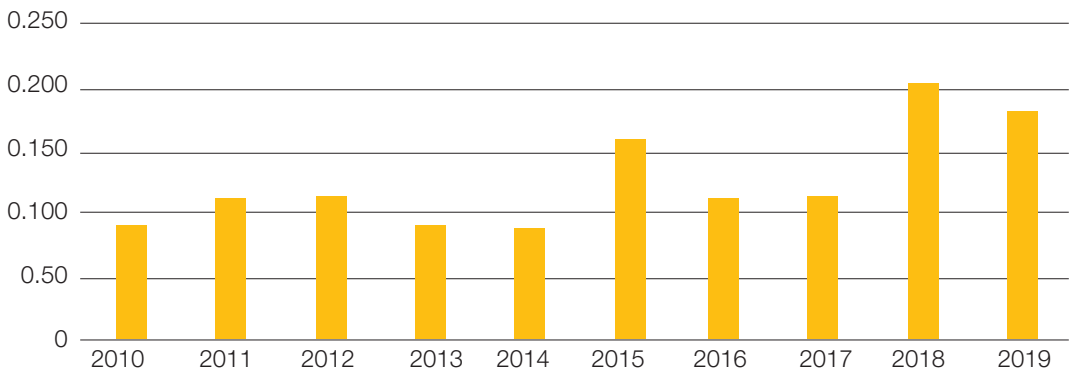

Figure 5: Trend of domestic aviation sub sector emissions (MtCO2e). Source: Based on data from KNBS

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 to ensure international requirements by the International Civil Aviation Organisation (ICAO) are abided to with regards to international aviation emissions.

2.3.4 Waterborne Navigation

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.


EMBRAER 190
SKYTEAM
Kenya Airways
DAF
YP

Photo: J. Ochweri

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 $MtCO_2e$ against the baseline in 2030. These actions are included in the National Climate Change Action Plan (NCCAP, 2018-2022), the Mitigation Technical Analysis Report to the NCCAP (MTAR).

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

Expected outputs	Supporting policies/ measures	Key Performance Indicators	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)**	- 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	Length of BRT system installed and operational **(NCCAP main document)** Passenger-km travelled by the BRT **(NCCAP main document)**	- Feasibility studies have been conducted for various BRT lines - Line 2 plans for implementation are being discussed - BRT Line 1: Construction of BRT infrastructure included within the Nairobi expressway project under KeNHA - BRT Line 2: construction underway for 20km dedicated lane with passenger transfer facilities and park and ride facilities - BRT Line 3: Design review ongoing; funding proposal for infrastructure development and rolling stock acquisition - BRT Line 5: Designs ready and funding agreement signed	MOTIHUD NaMATA KeNHA KURA Development partners – GIZ, EIB, AFD, EU, World Bank, JICA, Korean Exim Bank	- BRT development will be done by NAMATA in collaboration with KeNHA and KURA
 Construction of 150km non-motorised transport facilities to complement BRT **(NCCAP main document)**	- 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	MOTIHUD NAMATA NTSA KENHA KURA Motorists Association of Kenya (MAK)	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	Completed and was launched in October 2019.	MOTIHUD KR	KR – implementing entity, determining and surveying the land required for the project China Road and Bridge Corporation (CRBC) – contractor
 Upgrade Nairobi commuter rail system **(MTAR)**	Nairobi Railway Masterplan is in place	No specific KPIs listed in the NCCAP	- Construction of commuter stations is substantially complete. Ongoing track rehabilitation works at approximately 30% completion.	MOTIHUD KR	KR overseeing the implementation

Expected outputs	Supporting policies/ measures	Key Performance Indicators	Progress	Relevant institutions	Responsibilities
 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	1.6 million passengers were transported in the year.	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	Current shift from road to rail at 12% from 4% in 2017	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)	Pending	MOTIHUD Kenya Transporters Association	
 Develop and start the implementation of a roadmap for the improvement of heavy-duty truck efficiency **(MTAR)**		No specific KPIs listed in the NCCAP	Pending	MOTIHUD	To be determined

Expected outputs	Supporting policies/ measures	Key Performance Indicators	Progress	Relevant institutions	Responsibilities
 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	- The Search and Rescue (SAR) system was installed, tested and commissioned. - -The installation of Uninterruptible Power Supply (UPS) systems was completed in Mombasa and JKIA Radar Stations. - Solar System installed at the Malindi ANS Station during the year. - The Authority achieved an availability of Air Navigation Services equipment of 98.4% during the year - The Authority completed the development and published the Visual Flight Rule (VFR) routes in Nairobi Control Zone (Access to Wilson Airport) in AIRAC AIP Supplement 12/2020 and distributed to the users. - The Authority developed the RNAV (GNSS) RWY14 Standard Instrument Departure procedure for Wilson Airport and published in the AIRAC AIP Supplement 10/2020 and distributed to the users. - The VFR Helicopter routes within Nairobi Control Zone was completed and published in the AIRAC AIP supplement 11/2020 and distributed to users - The Authority developed the procedures associated with the Control Zone in Lokichoggio Airport and implemented them. This was published on 12th March 2020 in the AIP Supplement SUP 09/2020.	Kenya Civil Aviation Authority (KCAA)	- KCAA is overseeing these activities - KCAA will equip the centre once construction is done

Expected outputs	Supporting policies/ measures	Key Performance Indicators	Progress	Relevant institutions	Responsibilities
			- The conceptual design for Standard Instrument Departures (SIDS) in Eldoret International Airport Terminal Area (TMA) was completed by 18th June 2020 and published in the AIRAC AIP Supplement. - Construction of the new area control centre is ongoing and expected to be completed by 30th September 2020	Kenya Civil Aviation Authority (KCAA)	- KCAA is overseeing these activities - KCAA will equip the centre 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)**	A contractor is being procured to do the installation of the shore power infrastructure	MOTIHUD KPA Kenya Maritime Authority Kenya Ferry Services Kenya Power	MOTIHUD KPA
 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	KMA is doing a national legislation to domesticate MARPOL Annex VI. This is slotted in the current FY workplan and is budgeted for. The legislation will give provision for prevention of air pollution in Kenya jurisdiction.	KPA KMA MOTIHUD IMO NEMA Maritime industry stakeholders	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

Expected outputs	Supporting policies/ measures	Key Performance Indicators	Progress	Relevant institutions	Responsibilities
 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 18th January 2019 for implementation of the roadmap for the development of sustainable aviation fuels in Kenya. -Currently searching for an investor and necessary approval to progress the study further.	MOTIHUD KCAA Kenya Airport Authority and other relevant agencies	KCAA is overseeing the implementation
 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	- Implementation of Solar at the Gate Project and supply of electrification system (GPU&PCA) at Moi International Airport in Mombasa, Kenya for Reduction of CO2 emission both for international and domestic flights - connected to the grid and now operational - Was commissioned in June 2019 - 1,300 tCO2 reduction annually (avoided) because of use of the solar annually. - Power generated is 507KWp - Energy produced per year 819.4MWh - 1,560 Panels installed - The solar system installed at the Airside The total cost was 1.3million Euros or ksh 140million	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 Kenya Civil Aviation Action plan Draft regulations 2019	No specific KPIs listed in the NCCAP	- Aeronautical Information Circular on CORSIA issued to all airlines on 19th Nov 2018 - KCAA wrote on 18th January Airlines requested to nominate focal persons for CO_2 monitoring reporting on emission reduction data - Draft 2020 regulation on CORSIA developed and presented to stakeholders and parliamentary group and later submitted to the Ministry. - KCAA approved the EMP for conducting international aviation e.g KQ, Astral ect	KCAA	KCAA overseeing the implementation

Expected outputs	Supporting policies/ measures	Key Performance Indicators	Progress	Relevant institutions	Responsibilities
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	Pending	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
 Develop and implement Standards for electric/ hybrid vehicles in Kenya by 2019 **(MTAR)**	Final standards for importing electric motor vehicles in Kenya are in place and can be purchased from KEBS	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	Pending	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 awaiting validation	MOTIHUD	SDOT oversaw the reviewing process


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Photo: Shutterstock

4 Vulnerability and adaptation to climate change of the transport sector

Every year Kenya invests a lot in infrastructure projects. In recent years, the transport sector has been particularly vulnerable to climate change impacts, especially from flooding. This has led to losses and damages. Consequently, climate proofing transport infrastructure is essential.

Transport sector recognizes climate change as a risk and at sub sector level specifically in KURA and KeNHA climate change is incorporated during planning for new projects. Generally, the sector is yet to assess risks caused by climate change and develop targeted adaptation actions due to lack of capacity. The sector will undertake climate risk vulnerability training in the last quarter of 2020 as a first step to bridge the capacity gap. The training is targeted at infrastructure planning officers and sectoral climate change focal points. The objective of the training will be to create overall awareness on climate proofing of infrastructure i.e. to consider climate change into every step of the investment cycle from policy level, planning, operation and maintenance of infrastructure projects.

During the reporting period, KeNHA did vulnerability assessment of one of the largest road infrastructure projects in Kenya: the Horn of Africa Gateway Development Project (HOAGDP). The project is about the construction of a road of 740km length connecting the towns of Isiolo to Mandera." The study guided the integration of climate change adaptation and risk management in project processing, design and implementation. The report is available, and implementation of the project has started. However, more capacity is still needed especially on collecting the data needed to inform climate risk assessment process for other infrastructure projects which are planned or ongoing.

KMA is undertaking restoration of degraded mangrove ecosystems through planting seedlings to support fishermen to undertake activities within the reefs sustainably. Increasing sea levels do not allow them to do deep sea fishing. The ongoing rehabilitation will help artisanal fishing.

Below is a summary of adaptation actions for the sector as proposed in the NCCAP 2018 – 2022.

Table 3: Transport sector adaptation actions

NCCAP A1 (main NCCAP document) Climate-proof transport infrastructure					
Expected output	**KPIs**	**Supporting policy/ measure**	**Progress**	**Relevant institutions**	**Responsibilities**
 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 Contract by KENHA	Performance-based road maintenance works which include both periodic and routine is being carried out by KURA and KeNHA 2019-2020 KENHA – a total of 1570.4kms of roads were climate proofed. (See annex for the details on roads)	KURA MOTIHUD KeRRA KeNHA County governments	
 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 and KeNHA level reference is made to the road construction manuals and annual road inventory condition survey development, rehabilitation and maintenance. Ministry of Transport and Infrastructure Environmental Guidelines (2010)	Ongoing	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	Pending		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


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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 2020-2021

For the year ahead, and in view of the NDC target of reducing 3.46 $MtCO_2e$ emissions by 2030 against the business as usual scenario, the sector has prioritised the following actions as the primary mitigation actions for the sector.

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 climate change team 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 reviewed the Integrated National Transport Policy (INTP) to include climate change and other sustainability elements in the revised policy report. The review process was finalized, and the policy document is awaiting stakeholder validation. A transport sector climate change implementation matrix for the transport sector has been compiled. This is an inventory of all climate change activities from all sub-sectors beyond what is captured in the National Climate Change Action Plan (NCCAP 2018-2022). The document is meant to keep track of all climate change related activities in Kenya's transport sector.

Figure 6: Top sectoral priorities for the year

Infographic: Ecomedia/C. Mudibo

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

a. Kenya's action plan for the reduction of CO_2 emissions in the aviation sector

Document owner: Kenya Civil Aviation Authority

In December 2015, Kenya Civil Aviation Authority and other aviation stakeholders prepared the Kenya's Action Plan for The Reduction of CO_2 Emissions in Aviation as a tool that was to be used to showcase and communicate both at the national and international level, Kenya's efforts to address Carbon dioxide (CO_2) emissions from aircraft operating national and international air navigation.

The Action plan 2015-2020 has achieved an implementation level of 91.7% whereby 33 out of 36 mitigation measures mentioned in the action plan have been completed within the timeframe up to June 2020. The completed measures have been able to reduce 252,302 tCo_2 per year. The action plan had set out mitigation measures to be implemented within five years and is due for review in 2020.The action plan is undergoing review and key transport stakeholders have been consulted to provide input to facilitate updating of the plan which will be implemented in the next 5 years. The new Action Plan will run from June 2020 to July 2025.

In preparation for the review of the Kenya's Action Plan for The Reduction of CO_2 Emissions in Aviation sector, KCAA intends to organize a stocktaking meeting on aviation sector CO_2 reductions and gauge the level of implementation of the mitigation measures outlined in the Action Plan.

The solar pilot project which was one of the actions in the Action Plan was installed on 12th December 2018 at Moi International Airport in Mombasa. It consisted of a ground-mounted 507kW solar power generation facility and mobile airport gate electric equipment and has continued to operate efficiently. As of 30th June 2020, the system had managed to generate 915,663.906kwh since installation/commission and the GPU & PCA consumption was 11,133.018 KWh since commissioning that has been used to power the aircraft directly in steady of using diesel powered GPU.

Photo: KCAA

Solar Farm Site – Installation Inspection at the Moi International Airport, Mombasa

The KCAA Focal Points for CORSIA participated in the ACT CORSIA Buddy programme where they provided capacity building training on CORSIA to Seychelles on 25 - 28 November at Seychelles Civil Aviation Authority.

Photo: KCAA

Training on CORSIA in Seychelles on 25 - 28 November, 2019 at the Seychelles Civil Aviation Authority

Photo: KCAA

KCAA Trainer and Seychelles stakeholders.

Further the KCAA expert provided online training on ACT-CORSIA Phase III for Uganda and Seychelles from 23 and 24 July 2020 since face-to-face meeting was not possible due to the COVID-19 pandemic.

On 13 March 2020 the Council of the ICAO approved Kenya's nomination to the committee on Aviation Environment Protection (CAEP) that develops materials and environment on behalf of the Council. The CAEP committee undertakes specific studies, as approved by the Council, related to control of aircraft noise and emissions from aircraft engines and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Kenya is actively participating in the Current CAEP work on ICAO CAEP Long-Term Aspirational Goal Task Group (LTAG-TG). As of May 2020, CAEP is composed of 29 Members from all regions of the world and 20 Observers. More than 600 internationally-renowned experts are involved in CAEP activities and working groups. The CAEP Committee take into account the following:

a) Effectiveness and reliability of certification schemes from the viewpoint of technical feasibility, economic reasonableness and environmental benefit to be achieved;

b) Developments in other associated fields, e.g. land use planning, noise abatement operating procedures, emission control through operational practices, etc.;

c) International and national programmes of research into control of aircraft noise and emissions from aircraft engines;

d) The potential interdependence of measures taken to control noise and to control engine emissions;

e) With regards to CORSIA, the Committee shall address technical issues relating to the implementation of CORSIA.

The KCAA Focal Point on environment action plan and CORSIA participated in the following seminars during the year.

a) The African Civil Aviation commission (AFCAC) from Preparatory committee meeting on preparation of environment working papers for the 40th ICAO assembly from 14th to 20th July 2019 in Dakar Senegal.

b) The Committee of Aviation Environmental Protection (CAEP) steering group meeting (CAEP 12) held at South Africa aha Kopanong Hotel, from 1st – 6th December 2019.

c) The twenty fifth (25) conference of Parties (COP25) to the United Nations Framework Convention on climate change (UNFCCC) that was held in Madrid Spain from 2nd to 13th December 2019 where Kenya presented brief on the current status of environment and usage of solar at the gate in Mombasa. Kenya was represented by 65 delegates in this meeting from different agencies.

d) The Training of trainers session on ACT-CORSIA on CORSIA Central Registry (CCR) from 27 to 28 February 2020 in Montreal Canada

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. Actions undertaken include; Construction of footbridges. Improvement of Pedestrian crossing points in Nairobi City County. Intelligent Transport System within Nairobi Western Ring roads. Tree planting, landscaping and beautification. Construction of walkways.

Adaptation objectives: Addressing issues of adequate drainage infrastructure.

Actions undertaken include; Improvement of junctions in Nairobi City County. Undertaking environmental and social impact assessment of Road projects. Undertaking traffic surveys.

c. Strategic Plan

Document owner: KMA

The strategic plan has a goal on a clean marine environment. It sets out activities which include air pollution prevention. Alternative shore power fuels instead of burning diesel, sulphur use the grid which is from renewable source (large mix). At exploratory level feasibility discussions such as hydrogen at international level are taking place and Kenya takes part through participation in meetings.

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.


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Photo: J. Ochweri

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 exchequer 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 a second round of participation in the national climate change planning and budgeting course at the Kenya School of Governance as well as capacity support from ongoing projects such as the GIZ supported Advancing Transport and Climate Strategies (financed by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety).
- **Adopting a single data sharing framework and procedures:** The process of establishing a data sharing framework has commenced through the support of the Advancing Transport Climate Strategies project. So far data collection templates have been developed. Additional support is required to build up and maintain a database. To enhance this adoption of a single data sharing framework needs to be adopted within the transport sector from the national to county level.
- **Climate risk and vulnerability assessment of transport infrastructure:** Transport sector has targets to climate proof transport infrastructure as outlined in the NCCAP 2018-2022. Detailed vulnerability assessment is needed to support the transport sector to incorporate climate change as a risk in the entire infrastructure development cycle.

- **Enhancing the sector's readiness towards technologies:** Kenya has made advances towards technological advances such as electric mobility. With Kenya's energy sector thriving with renewable energy which include solar, wind, geothermal and potentially hydrogen, this will have a ripple effect to other sectors such as the transport sector. To seize this opportunity to decarbonize the transport sector, there is a need for sectoral readiness which includes development of strategies and sectoral plans that facilitate transition towards clean transport.

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

Road sub-sector:

- Training/capacity building/awareness for counterparts' departments to know more on climate change as a risk during project implementation, data collection to inform the vulnerability assessment for road agencies such as KENHA. There is also a need to support the newly established SDOI CCU unit to implement climate change duties

Rail Sub sector

- Comprehensive engagement of the private sector to promote the shift of cargo from road to rail

Aviation sub-sector

- Support to install solar systems as a renewable energy source to promote low carbon technology for other major airports like JKIA to upscale the one installed in Moi international airport.
- Training in carbon offsetting criteria and climate change.

Maritime sub-sector

- Emission assessments
- Capacity building for the sector to be able to conduct emission assessments independently for annual reporting

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

a. **The Advancing Transport and 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

Proposed activities/initiatives

a. **NAMA facility support:** The project proposal is under development. The NAMA support project will target the implementation of a 21km BRT line 3 in Nairobi.

Expected project duration: to be determined
Financial allocation: 20 Million Euros

b **Technology application: Electric mobility**

World Bank: The project is set to begin in 2021. A Component of the project will support development of an electric mobility strategy for the transport sector.

c. **International Maritime Organization (IMO) voyage 2050 project** - KMA/IMO to put measures for reduction of air pollution from shipping

Expected project duration to be determined
Financial allocation - to be determined

d. **KENHA and World Bank** commissioned a study on climate resilient infrastructure. Out of the study the future infrastructure designs will advise on how to design incorporating climate change.

Financial allocation: 81 billion Mandera to Isiolo

e. **AFD** - Incorporated climate change by use of HDM4 design models to predict reduction of emissions when implementing the projects. Demand modelling and emissions to be reduced when a certain project is done

f. **"Roads for Water" water harvesting pilot project**. - Kibwezi Kitui road. Harvesting of runoff water to be used in scarcity times. Supported by Metameta NGO to be scaled up to other projects

Currently developing water harvesting guidelines together with KRB

Funding: Department for International Development, Water Services Trust Fund, Kenya Roads Board, United States Agency for International Development.

Appendices

1 Benefits associated with the Installation of 0.5 MW of solar power plant at Moi International Airport by 2018 as per the NCCAP

1. Powering the GPU on Boarding Bridges and mobile electrical GPU & pre-conditioned air (PCA)
2. Powering passenger terminal indoor lighting
3. Powering other airport equipment e.g Boarding Bridge, conveyors belt, lift and elevators.
4. Enhanced network with industry especially the solar PV system industry
6. Enhanced Teamwork in the aviation industry during project implementation
7. Reduction of CO2 emissions from international civil aviation of 1,300 tonnes of CO2 per year.
8. Elimination of aviation fuel at the gate
9. Provision of renewable energy
10. Reduction of Nox thus improving the local air quality as a co-benefit
11. Strong commitment and continuous engagement of all stakeholders
12. Staff training during project implementation for sustainability of the project

2 Table 5: List of climate proofed roads by KENHA 2019-2020

	Project Name	km
1.	Eldoret Town Bypass	32
2.	Kitale-Endebess-Suam	45
3.	Kisumu-Kakamega	52
4.	Kakamega-Webuye	40
5.	Kisumu Boys-Mamboleo	4.5
6.	Loichangamatak–Lokichar	50
7.	Loichangamatak–Lodwar (A1)	80
8.	Lodwar-Lokitaung Junction	80
9.	Lokitaung Junction-Kalobeiyei River	80
10.	Kalobeiyei River-Nadapal/Nakodok	88
11.	James Gichuru-Rironi (A104) Road	26
12.	Kibwezi-Mutomo-Kitui	180
13.	Ahero-Kisii	87
14.	Kisii-Isebania	87
15.	Mombasa-Kwa Jomvu	11
16.	Nairobi Western Bypass	17
17.	Uplands Githuguri-Ruiru	47
18.	Magongo Road	8
19.	Miritini-Mwache-Kipevu	10.9
20.	Mwache-Mteza	9
21.	Mteza-Kibundani	7
22.	Iten-Nyaru	40
23.	Oljorok-Ndundori	33
24.	Chiakariga-Meru	55
25.	Mau Narok-Kisiriri	34
26.	Narok-Sekenani	82
27.	Garsen-Witu-Lamu	135
28.	Ugunja-Ukwala-Ruambwa	11
29.	Chebilat-Ikonge-Chabera	38
30.	Naibor-Posta (Maralal) Road	65
31.	Busia-Malaba Road	16
32.	Athi River-Machakos turn off	20
Total		1570.4

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