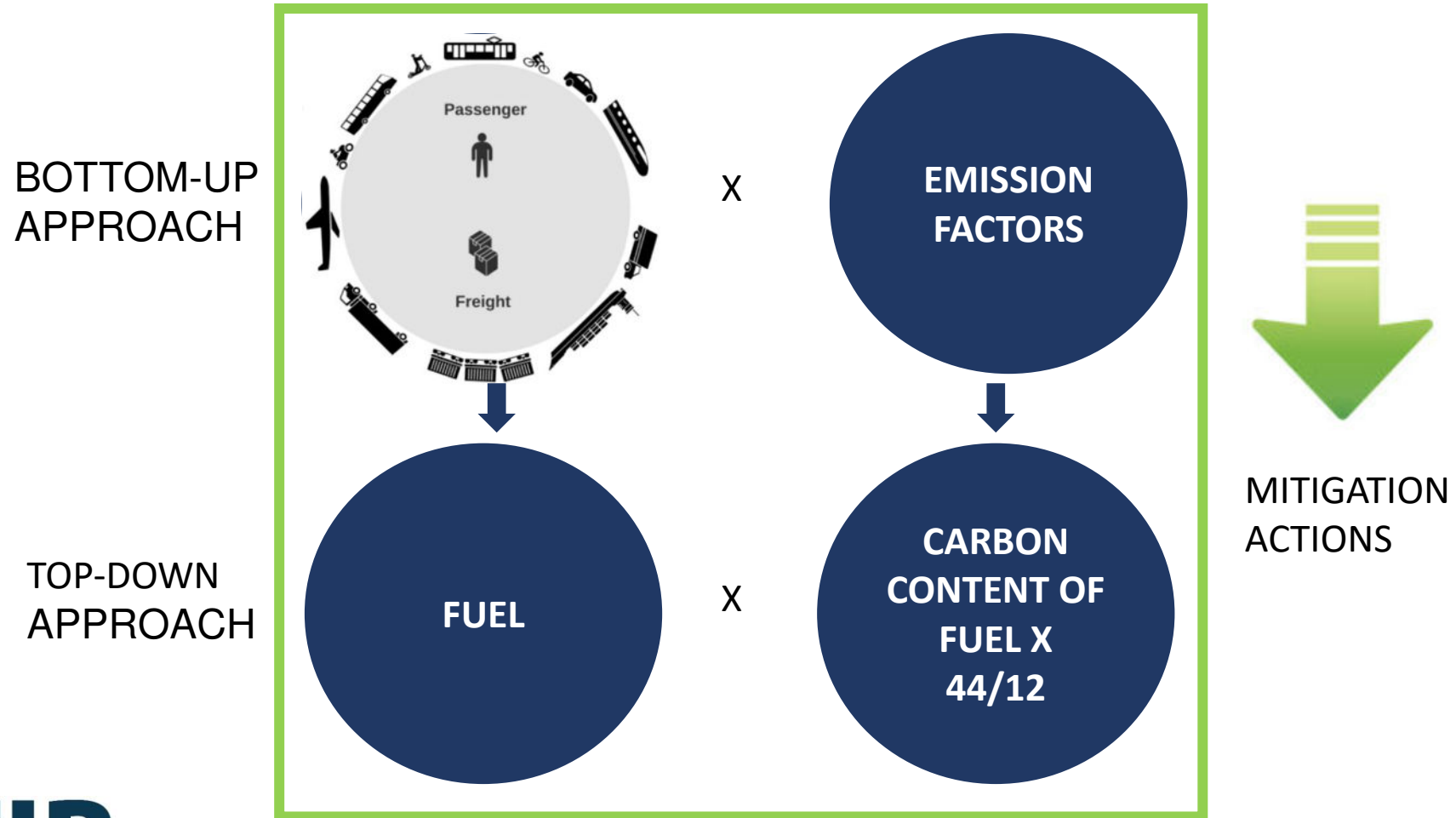


Data for Mitigation Potential Analysis in the Transport Sector (A Case of Uganda)

Grace Mukunzi

GHG MODEL- DATA COMPONENTS

- RECALL: GHG EMISSION MODEL



DATA SOURCES

- SECONDARY DATA

Sector	Entity	Relevance
Roads	Uganda National Roads Authority (UNRA)	All relevant data/statistics on National roads (i.e. the current and projected future traffic volumes, load factors, road conditions, and capacity, and future development plans) including fuel economy data from the UNRA fleet management system
	Uganda Road Fund (URF)	Relevant data on District, Urban, and Community Access Roads (DUCAR)
	MoWT-Transport Licensing Boards (TLB)	In-use vehicle fleet information especially the Buses for public vehicles
	Uganda Revenue Authority	New registrations by year, origin, vehicle type, fuel type, engine capacity, and vehicle age
	Insurance Regulatory Authority	In-use vehicle fleet information
Railways	Uganda Railways Corporation (URC)	All relevant data on the Railways and marine subsectors
	Standard Gauge Railways (SGR) Project Office	All relevant data on the Standard Gauge Railway
Water-borne navigation	Kalangala Infrastructure Services	Relevant data on the KIS ferries operated on Lake Victoria
	Uganda National Roads Authority (UNRA)	All relevant data on UNRA ferries
Aviation	Uganda Civil Aviation Authority (UCAA)	All relevant data on the aviation subsector
Others/General	Ministry of Works and Transport (MoWT)	Future development plans within the transport sector
	MoWT-Environment Liaison Office	Ongoing and planned mitigation actions/climate strategies
	Kampala City Council Authority (KCCA)	All relevant data within the GKMA including Future development plans
	Uganda Bureau of Statistics	All National Transport Statistics
	Private Sector players (e.g. TOTAL, VIVO, Bollere Logistics)	Data on fuel economy from fuel card data

- PRIMARY DATA

Stakeholder interviews

- ✓ Fill gaps in secondary data

- ✓ vehicle ownership/usage growth rates assumptions

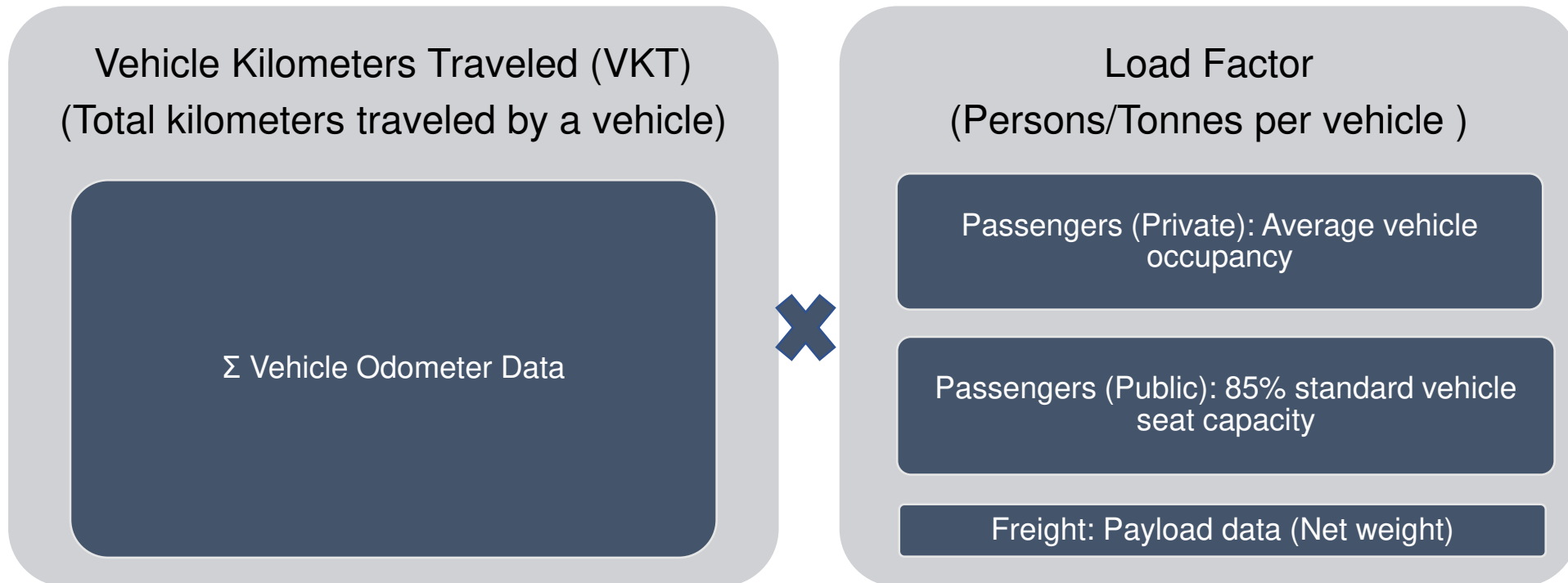
- ✓ expected changes in the vehicle fleet characteristics

- ✓ expected developments

ACTIVITY

❑ PASSENGER /TONNE KILOMETRES TRAVELED (PKM/TKM)

The cumulative sum of distances traveled by passengers or freight



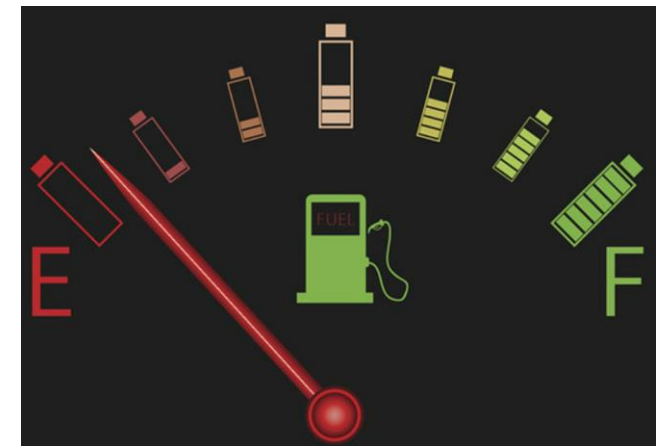
ACTIVITY DATA-SOURCES

DATA POINT	ROADS	OTHER (RAIL,AIR,WATERWAYS)
Vehicle kilometers traveled (VKT)	<p>Household surveys</p> <p>Annual Vehicle Inspection</p> <p><u>Estimation</u></p> <p>Mode Share (MCC) X Total Travel Demand Estimate (VKT) from past studies</p> <p>Vehicle factor X Total fuel sale volume X and fuel consumption rate</p> <p>(Jayasekera, D.A.S., 2015)</p>	<p>Vehicle Oedometer data from respective Service Operating Companies</p> <ul style="list-style-type: none"> ✓ Train Operating Companies (Uganda Railways Corporation) ✓ Airlines (Civil Aviation Authority)
Load factors	<p>Vehicle Occupancy Surveys e.g., Windshield method, Carousel method, Video Surveillance, etc.</p> <p>Previous vehicle occupancy studies: NITMP 2021-2040, JICA (2012) The Project for Rural Road Network Development in Acholi Sub-region in Northern Uganda. Final Report Vol.2: Main Report</p>	<ul style="list-style-type: none"> ✓ Maritime Service companies (Kalangala Infrastructure Services)

FUEL ECONOMY

- ❑ DISTANCE PER UNIT VOLUME OF FUEL Liters/Kilometers, US: Miles per gallon, Europe: Liters/100km

APPROACH	DATA POINT	ROADS	OTHER (RAIL,AIR,WATERWAYS)
BOTTOM-UP	Distance per unit volume of fuel (by vehicle & fuel type)	Household surveys	Estimates from accounts offices, Fleet management
TOP-DOWN	Share by fuel type of fuel statistics	Downstream Petroleum Companies e.g., Total, Vivo Energy	Accounts offices, Fleet management



FUEL ECONOMY (continued)

- ❑ Estimation of fuel economy –Road Subsector

Distribution of national vehicle fleet by engine CC

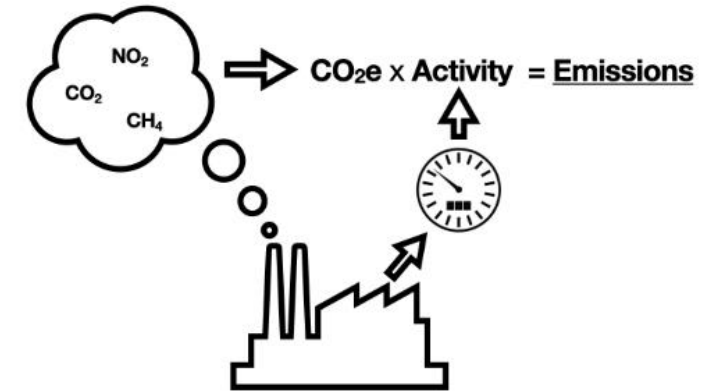
- ❑ Car Import Statistics from Uganda Revenue Authority/Uganda Bureau of Statistics, Transport Licensing Board
- ❑ Private Insurance Companies, Insurance Regulatory Authorities,
- ❑ Annual vehicle inspection reports

Engine CC	2011 (Diesel)	2011 (Petrol)	2014 (Diesel)	2014 (Petrol)
500-1200	9	6.2	5.6	6.1
1201-1500	7.1	7.6	7.3	7.6
1501-2000	8.1	8.4	8	8.3
2001-2500	8.4	9.7	8.5	9.4
2501-3000	9.7	10.9	9.5	10.6
3001-3500	10.4	13.7	11.2	13.8
3501-4000	12.6	18.3	12.8	15.6
4001-5000	14.5	26.9	13.5	25.9
>5000	31.6	16.9	30.2	19.7

Mutenyo et al. (2015) Baseline Survey on Uganda's National Average Automotive Fuel Economy

EMISSION FACTOR

- ❑ Rate at which an activity produces GHG (or any other pollutant releases) to the atmosphere
 - ✓ CO₂eq (grams)/kilometer by vehicle type (Bottom-up)
 - ✓ The carbon content of fuel X 44/12 (Top-down)



- ❑ Sources of data

- ✓ Default IPCC (2006) emission factors

[EFDB - Basic Search \(iges.or.jp\)](http://iges.or.jp)





- ✓ Mutenyo et al. (2015) Baseline survey on Uganda's National Average Automotive Fuel Economy

[africa_vehicle-fuel-economy-baseline-for-uganda.pdf \(globalfueleconomy.org\)](http://globalfueleconomy.org/africa_vehicle-fuel-economy-baseline-for-uganda.pdf)

Source: Planning and Policy Documents, Stakeholder interviews

4. MITIGATION ACTIONS DATA

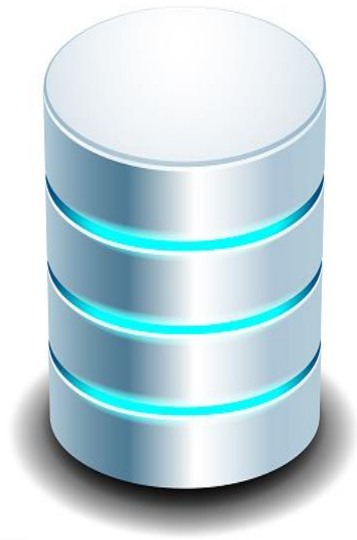
ASIF Framework (Schipper et al 2000)

Measure category	Measure description	Effect of measure		Examples of projects
A – Avoid	Avoiding journeys where possible		Reduction in total vehicle kilometres travelled (VKM)	✓ Transit-Oriented Development (Bujjuko Housing Project)
S – Shift	Modal shift to lower-carbon transport systems		Shift of VKM from higher to lower emission modes	<ul style="list-style-type: none"> ✓ Non-motorized Transport Corridors for GKMA ✓ GKMA-BRT system ✓ Redevelopment and extension/expansion of GKMA passenger service ✓ Development of the LRT system Development of GKMA Metro infrastructure
I – Improve	Improving the energy intensity of travel		Increase in fuel economy (distance travelled per litre of fuel)	✓ Uganda’s Vehicle Fuel Efficiency NAMA (Application Page (unfccc.int))
F – Fuel	Reducing carbon intensity of fuel consumed		Reducing carbon intensity of fuels, so lowering emissions per litre of fuel consumed	✓ Electrified Railway

TRANSPORTATION DATA MANAGEMENT

❑ CHALLENGES

- ✓ Decentralisation of data
- ✓ Fuel economy and Emission data is not available (Climate mitigation is not prioritized)



❑ RECOMMENDATIONS

- ✓ Multi-sectoral transportation database (Open Source)
- ✓ Mandatory periodic vehicle inspection
- ✓ Traditional infrastructure-based data sources along all transport networks e.g., pneumatic loops, traffic surveillance
- ✓ Legislation supporting innovative ways for the continuous data collection on both passenger and freight vehicles
 - Mandatory capturing of vehicle mileage data whenever paying for annual third-party insurance
 - vehicles individual identifiers that are captured/registered at every gas re-fill



Thankyou
