Transport Data: From MRV to Action

Meet & Greet with **Dr. Mónica Espinosa** on MRV for the E-Bus Project and Colombia's NDC

19 July 2023

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Supported by:

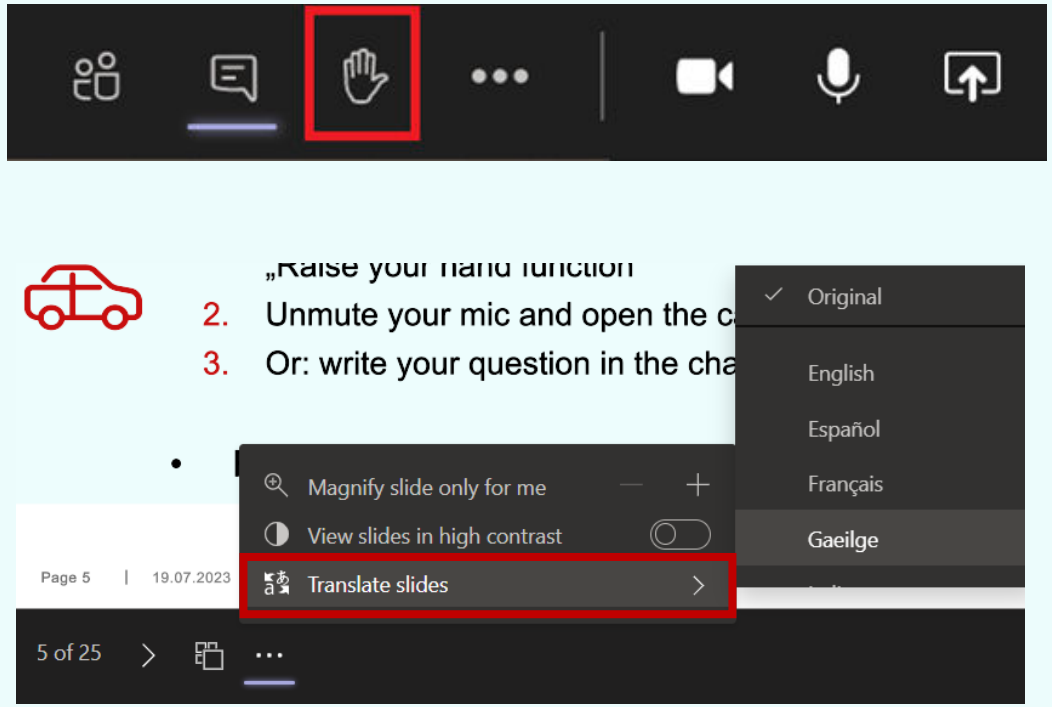
Federal Ministry for Economic Affairs and Climate Action

IKI INTERNATIONAL CLIMATE INITIATIVE

on the basis of a decision by the German Bundestag

House keeping

- The first part of the Meet & Greet will be recorded – but **not** the Q&A part
- Please mute yourself and close your camera during the first part
- Share comments and questions in the chat – we are curious to hear from you!
- **During the Question & Answer session:**
  1. Write your name in the chat or use the „Raise your hand function“
  2. Unmute your mic and open the camera
  3. Or: write your question in the chat
- For further support turn on translate slides



Your hosts for today‘s session

Kirsten Orschulok
Moderation

Marleen Spellenberg
Chat support

Anna Eikenberg
Technical support

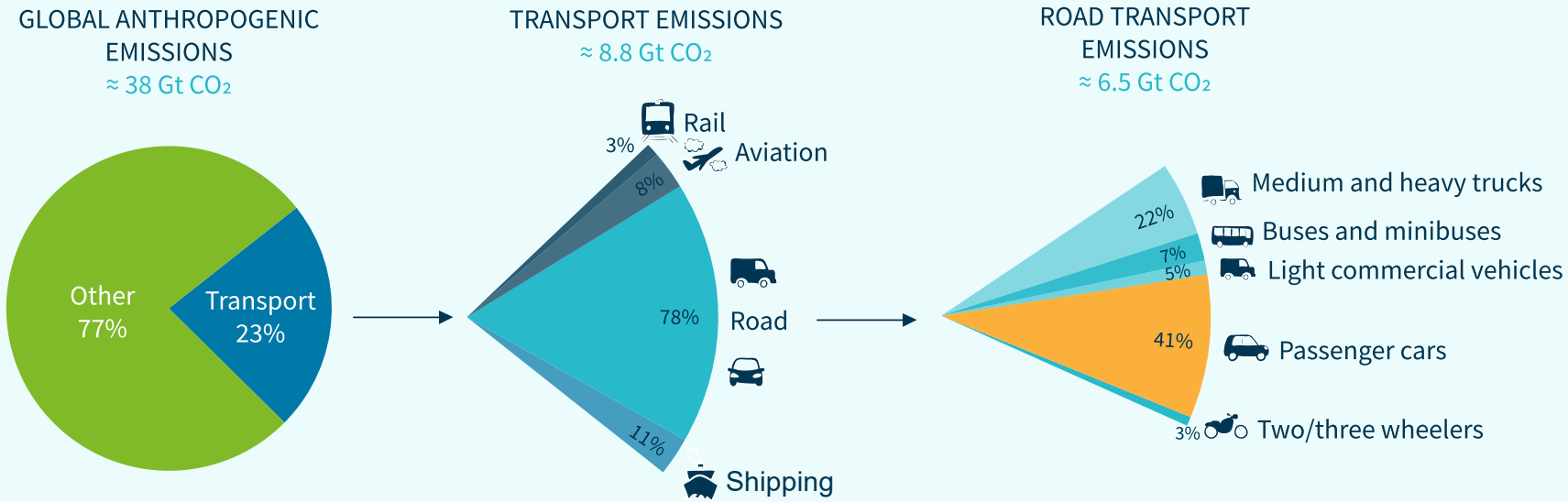
WHY a MRV for transport course?

Nearly **one-quarter** of the world's CO2 emissions come from transport

To keep global warming below 1.5°C, governments need to take action on different levels:

- Take stock of the status quo of emissions and global warming;
- define abatement targets and associated measures for attaining them;
- monitor the progress achieved.

Countries need a robust **Measurement, Reporting and Verification (MRV)** system



HOW? The Transport Data: From MRV to Action course

- ✓ **Self-paced** learning course on atingi
- ✓ Designed for **officials in transport**
- ✓ **Open for everyone**
- ✓ With **14 case studies and 6 lectures from experts**
- ✓ **Meet & Greets** with experts
- ✓ **Practical Exercises**
- ✓ **Certificates**
- ✓ Guided by **Ms. Taraji Noor** and **Mr. Tuan Đặng**

ONLINE NOW!

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WHAT will you learn?

Module 1:

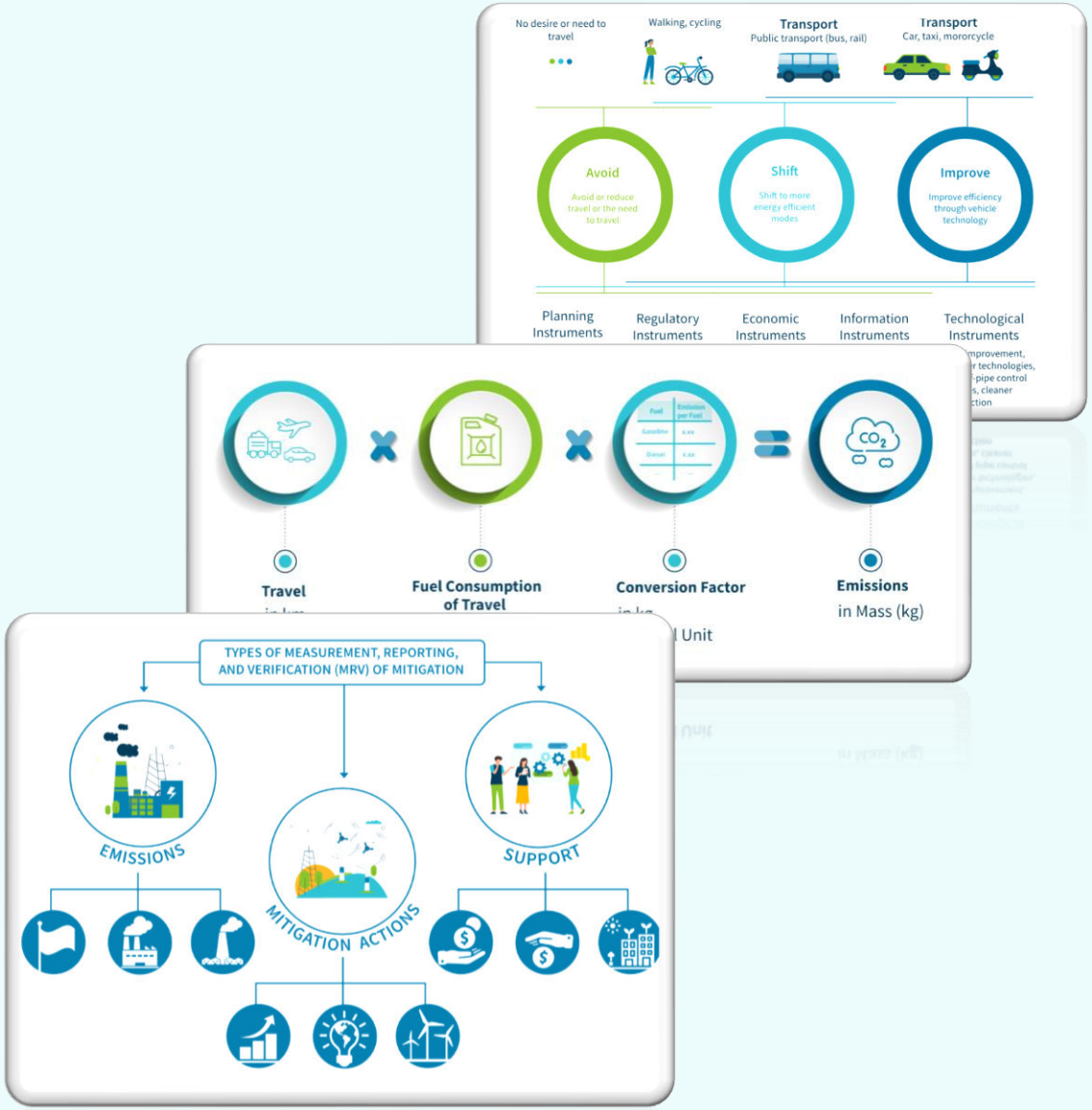
Introduction to Transport and Climate Change

Module 2:

Basic Approaches for Calculating Transport Emissions

Module 3:

Mitigation and Modeling Emissions from transport



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Overview Module 1

Module 1:

Introduction to Transport and Climate Change

- Basics of **transport** and **climate change**
- **International conventions** and frameworks against climate change
- **Enhanced Transparency Frameworks** against climate change

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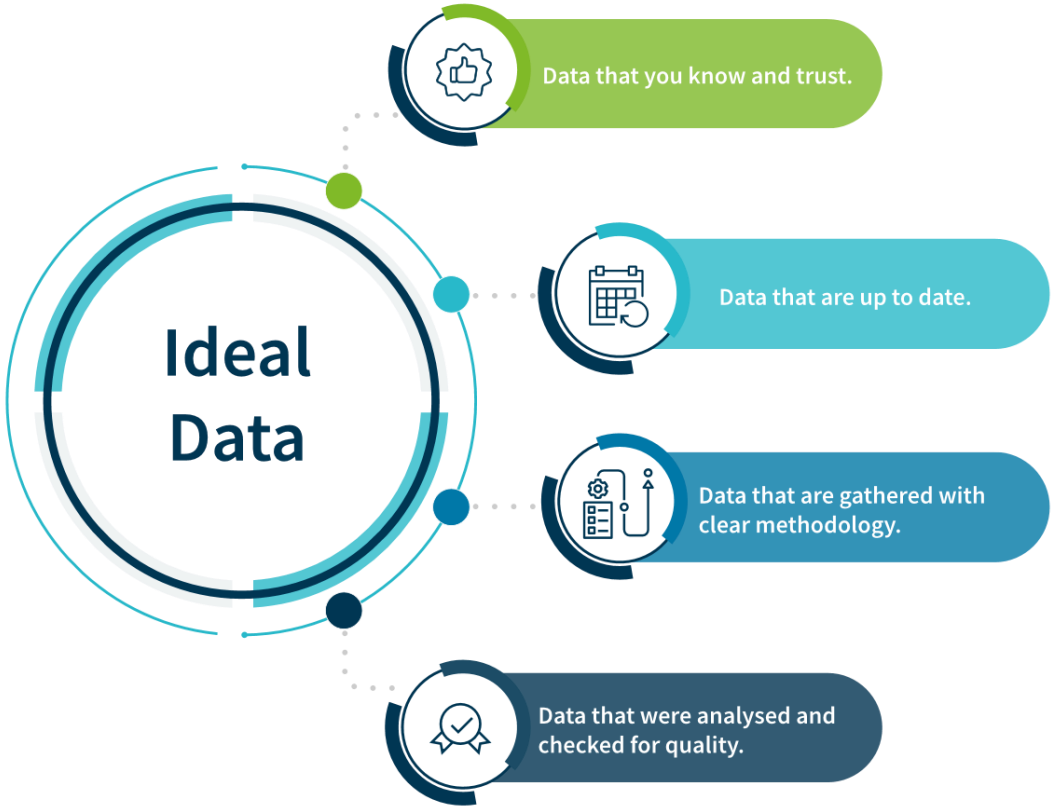
WHAT? Overview Module 2

Module 2:

Basic Approaches for Calculating Transport Emissions

- Basic principles of GHG emissions calculation
- Data management

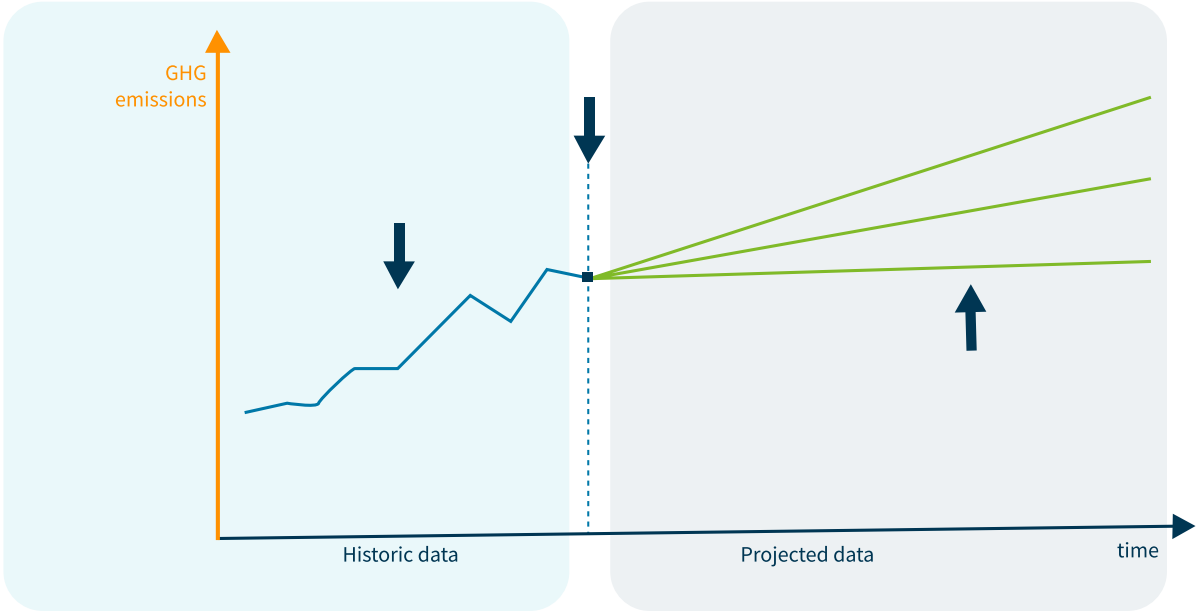


WHAT? Overview Module 3

Module 3:

Mitigation and Modeling Emissions

- Basics of scenario development
- Deep dive into scenario development
- Nationally Determined Contributions (NDCs)
- Deep dive into ex-post calculation and monitoring



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Meet our experts

19 July 2023
Environmental Specialist and Transport Expert **Dr. Mónica Espinosa** (Hill Consulting) on MRV for the E-Bus Project and Colombia's NDC

2 August 2023
Transportation/Project Engineer **Grace Mukunzi** (Meier Consulting) on Data Collection in Uganda

16 August 2023
Urban and Regional Development Advisor **Gemma Burhanudin** (GIZ Indonesia) on Bus Rapid Transit and Mitigation in Indonesia

30 August 2023

Technical Advisor **Papondhanai Nanthachatchavankul** (GIZ Thailand) and Program Officer **Marlan Pillay** (UNFCCC) on the Role of MRV for NDCs in Transport

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Meet & Greet with Dr. Mónica Espinosa

on MRV for the E-Bus Project and Colombia's NDC

Dr. Mónica Espinosa is responsible for the technical analysis of local and global pollution emission reduction scenarios, the analysis of marginal abatement costs, the definition of monitoring and reporting schemes, and the quantification of co-benefits of mitigation scenarios. She is an environmental engineer and has a PhD in Engineering, with particular expertise in modelling the environmental externalities of transport. She is also a member of the Bogotá Citizen Technical Committee on Air Quality.

Meet & Greet Session

on MRV for the E-Bus Project and Colombia's NDC

Mónica Espinosa

July 19th, 2023

Picture: Alcaldía de Bogotá.

Technical and institutional factors for designing an MRV system

What we have learned... Some general guidelines for this technical definition of the system´s limits at the MRV design stage are the following:

Define the ideal MRV system and be aware of what is possible. The MRV might be something in between.

Define what is strategic to include at this stage.

- Concentrate on a few indicators. Identify which indicators are fundamental and which are ideal to have. Focus on the leading indicators at the beginning. Each additional indicator costs.
- Employ different types of indicators (v.g., results and implementation).
- Consider co-benefits within the indicators. Local needs are fundamental.
- Consider the reporting needs related to international funding.
- Consider different ways to build the indicators. Using different sources and diverse data quality for an indicator is possible.
- Identify benefits for gathering the data beyond GHG accounting.

Keep consistency between the MRV scheme and the national GHG emission monitoring guidelines (Methodologies, emission factors, timeline, etc).

Be aware of the trade-off between gathering lots of data and the associated costs. And the trade-off between gathering data with excellent quality (lower uncertainty) and the costs to obtain them. Try to find a balance.

Participation of different actors during the MRV design

- During the project: workshops + surveys + bilateral meetings:
  - Representatives from the local public transport systems.
  - Ministry of Transport, Ministry of Environment and Sustainable Development, National Planning Department.
- In terms of the methodology proposed:
  - Identification of local capacities: technical resources, data monitoring practices in place.
  - Stakeholder feedback on the MRV proposal.

Different readiness levels

Recognizing there are different starting points within the bus operators allows us to plan a progressive improvement of the system, supported
by the creation of technical and financial capacities.

And in the technical aspects: we proposed a scheme where the equations are the same, but different levels of data quality are possible. We proposed three levels according to the data.

Different readiness levels

Integrated Mass Transportation Systems - SITM

Cities: >600,000 inhabitants

Strategic Public Transport Systems - SETP

Cities: 250,000 -600,000 inhabitants

15 public transport systems

- **~10%** did not have protocols to collect and report data.
- **~ 30%** have some types of protocols to collect data.
- **~ 40%** have automatic systems to collect data, and protocols to collect and report data.

Different types of scenarios

Ex-ante

- Baseline scenario
- Mitigation scenario

- Before the mitigation action is implemented
- Based on projections/assumptions

Ex-post

- Baseline scenario
- Mitigation scenario

- When the mitigation action is implemented
- Build with real data
- Some assumptions are needed (v.g,. How would it be without the mitigation action)

Scope of the guidelines proposed for the E-bus program in Colombia

Effects identification

Mapping the causal chain

- GHG effects
- Non-GHG effects – Benefits on air quality
- Definition of the boundaries

Effects estimation

Standardization of the estimations

- Calculation of the baseline scenario GHG emissions
- Calculation of the mitigation scenario GHG emissions
- Calculation of the exante mitigation potential

Monitoring of the program

Indicators to monitor the program

- Identification of the indicators - implementation and impact indicators
- Calculation of the indicators for the baseline year
- Database and recommendation of default values

Monitoring based on indicators - Examples

	Type	Indicator	Description	Units
GHG (Cobenefits)	**Monitoring**	Annual CO_{2e} emission reduction	Reduction of CO_{2e} emissions generated by the buses of the SITM and SETP in comparison with the baseline scenario.	$\frac{tonnes\ CO_{2e}}{year}$
	Monitoring	Annual BC emission reduction	Reduction of BC emissions generated by the buses of the SITM and SETP in comparison with the baseline scenario.	$\frac{kg\ BC}{year}$
Program management	**Implementation**	Number of electric buses in the program	The total number of electric buses in the SITM and SETP systems linked to the Program.	$\frac{No.\ electric\ buses}{year}$
	Implementation	Annual resources leveraged by international climate change funds	Percentage of investment obtained from CC international funding, from the total investment.	Percentage of international resources - climate change funding.
Cobenefits	**Monitoring**	Annual $PM_{2.5}$ emission reduction	Reduction of $PM_{2.5}$ emissions generated by the buses of the SITM and SETP in comparison with the baseline scenario.	$\frac{kg\ PM_{2.5}}{year}$
	Monitoring	Annual PM ambient air concentration ($PM_{2.5}$ / PM_{10})	Annual ambient air concentration of PM according to the air quality network of each city.	$\frac{\mu g\ PM_{2.5}}{m^3}$; $\frac{\mu g\ PM_{10}}{m^3}$

Data collection - Examples

To monitor more frequently (v.g., annual)

To monitor less frequently (v.g., 3 years)

Indicator	Monitoring variables	Data sources	Other data required*
Annual CO_{2e} emission reduction	• **Annual fleet quantity by type.** • **Annual fleet activity.** • **Annual fuel consumption.** • **Fuel efficiency factors.**	Operators	• GHG fuel emission factors according to FECOC • Emission factors for energy production/generation/distribution/transport • GHG electricity emission factor (national grid) • HFC emission factors
Annual BC emission reduction	• Annual fleet quantity by type. • Annual fleet activity.	Operators	• Local emission factors • Electricity generation mix • Emission factors for electricity generation
Number of electric buses in the program	• Number of electric buses operating by year.	Operators	
Annual resources leveraged by international climate change funds	• Resources financed by CC funds to purchase the electric buses and the charging infrastructure. • Net resources to purchase the electric buses and charging infrastructure.	Program leader	
Annual $PM_{2.5}$ emission reduction	• Annual fleet quantity by type. • Annual fleet activity.	Operators	• Local emission factors
Annual PM ambient air concentration ($PM_{2.5}$ / PM_{10})	• Annual PM ambient air concentration by air monitoring station.	Institute of Hydrology, Meteorology and Environmental Studies -IDEAM.	

Tools for monitoring GHG reduction from the electric buses in Colombia

1) Guidelines	– Set of indicators to monitor the program (implementation, operation, GHG effects and BC). – Technical guidelines to collect data and do the estimations. – Guidelines to report at the National Registry for the Reduction of GHG (RENARE). – Guidelines with the minimum set indicators required to apply to international funding (v.g., CGF).
2) Databases	– Characterization of the fleet and its operation by city. – Fuel consumption values by type of bus. – Emission factors by type of fuel (CO_2e, CH_4, N_2O, $PM_{2.5}$, and BC). – Emission factors by type of bus (HFCs).
3) Calculation sheet and estimations	– Emissions for the baseline scenario and mitigation scenarios by type of pollutant, life cycle stage, and city. – Indicators estimated for the baseline year. – Ready to use calculation Excel sheets to estimate the indicators.
4) Templates	– Templates to collect monitoring data by city and to compile data the national level.

This presentation is based on the study:

GIZ, Hill, 2020. Design of the GHG Mitigation Monitoring, Reporting, and Verification (MRV) system for the replacement of bus fleets for public transport by electric vehicle technologies in Colombia. Final Report.

Next activities:

Meet and Greet on Data Collection in Uganda

2 August 2023

Grace Mukunzi, is currently a PhD student at Lund University in Sweden. A former Transportation Engineer at MEIR Research & Engineering, she assisted with data collection to assess the climate change mitigation potential of Uganda's transport sector.

Signing up for Transport Data: From MRV to Action course

Send us feedback: Kirsten.Orschulok@giz.de and Marleen.Spellenberg@giz.de

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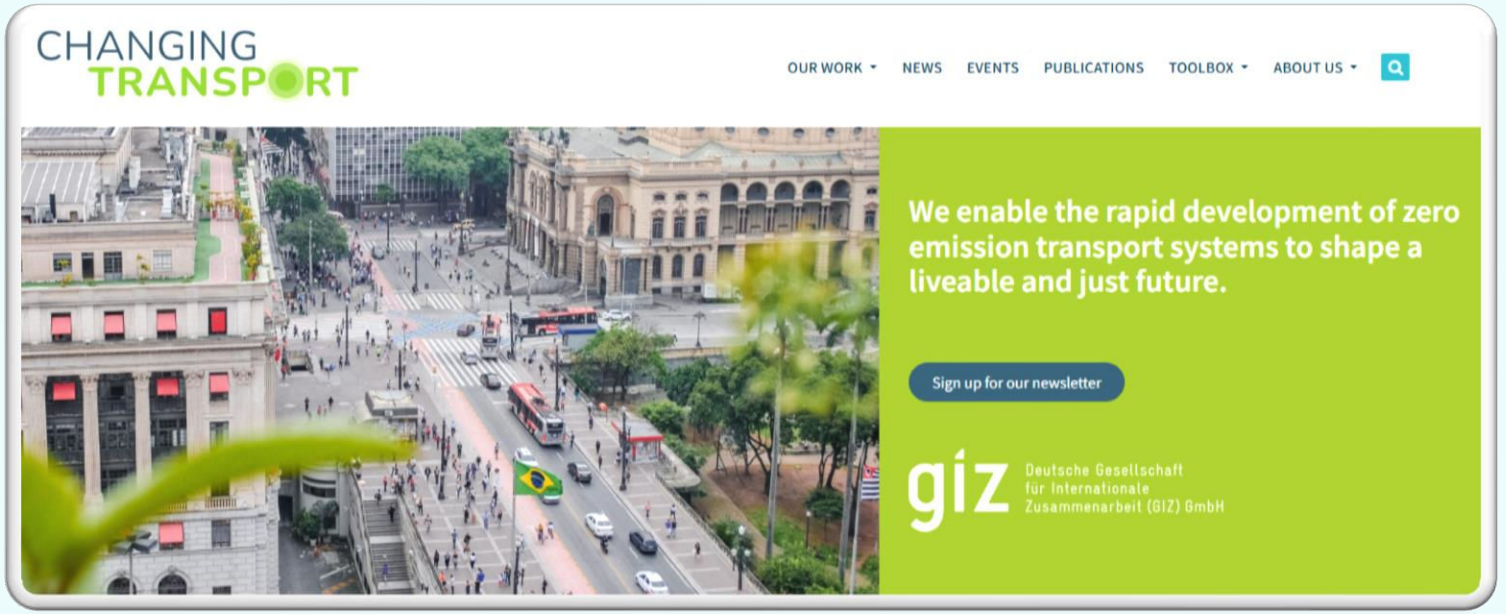

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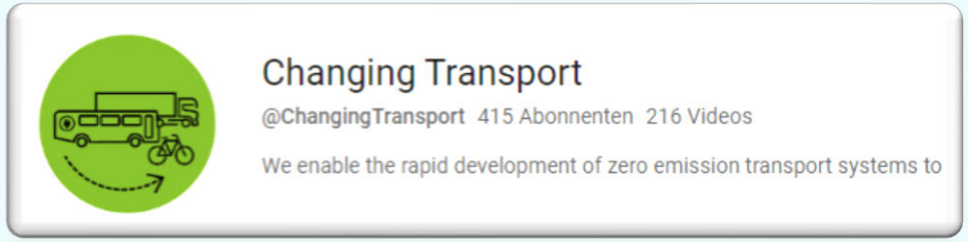

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