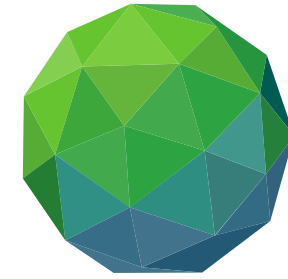


MITIGATING TRANSPORT EMISSIONS



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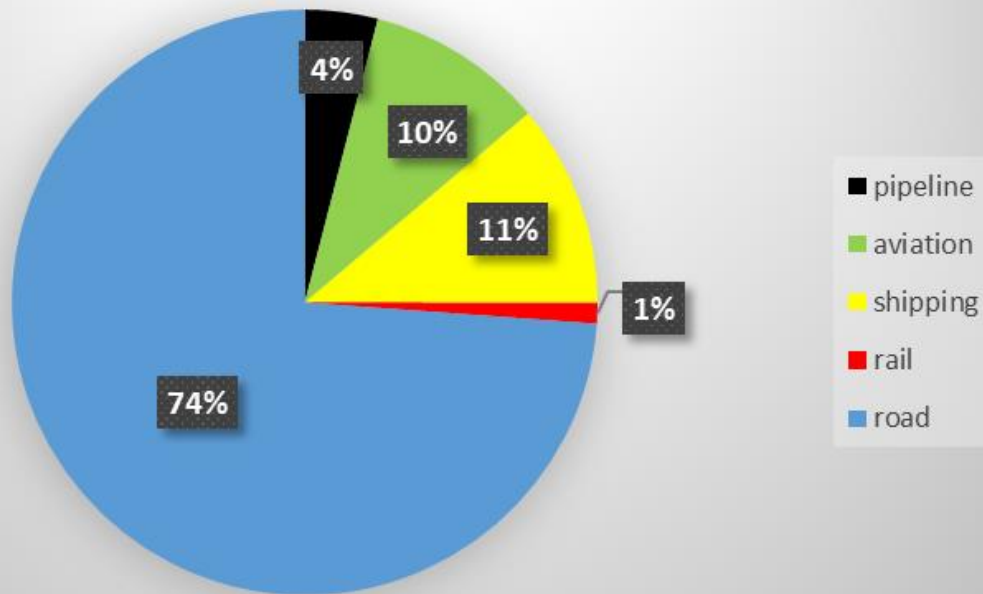
Jurg Grutter | iTAP
Kigali, March 2024

CONTENTS

1. Options for reducing GHG emissions
2. Main areas of interest for the GCF
3. Assessing GHG transport projects at iTAP

1A. CURRENT STATUS OF TRANSPORT EMISSIONS

Global Transport CO₂ Emissions 2022



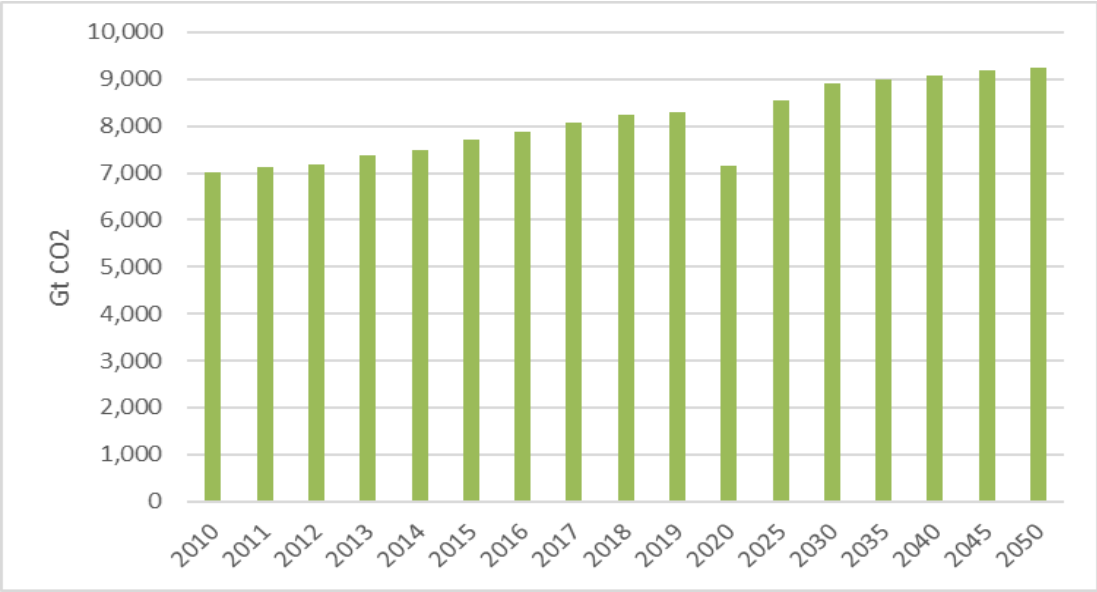
Source: IEA

- Total emissions transport sector in 2022: 8 GtCO₂
- The transport sector accounts for around 1/4 of worldwide GHG emissions
- Annual growth rate of transport emissions from 1990-2022: 1.7% (together with industry highest growth rate of all sectors)
- Developing countries have higher growth rates than other countries and a very large increase of private vehicles is expected
- 60% of road transport emissions are due to passenger transport and 40% due to freight

Source: IEA and UN

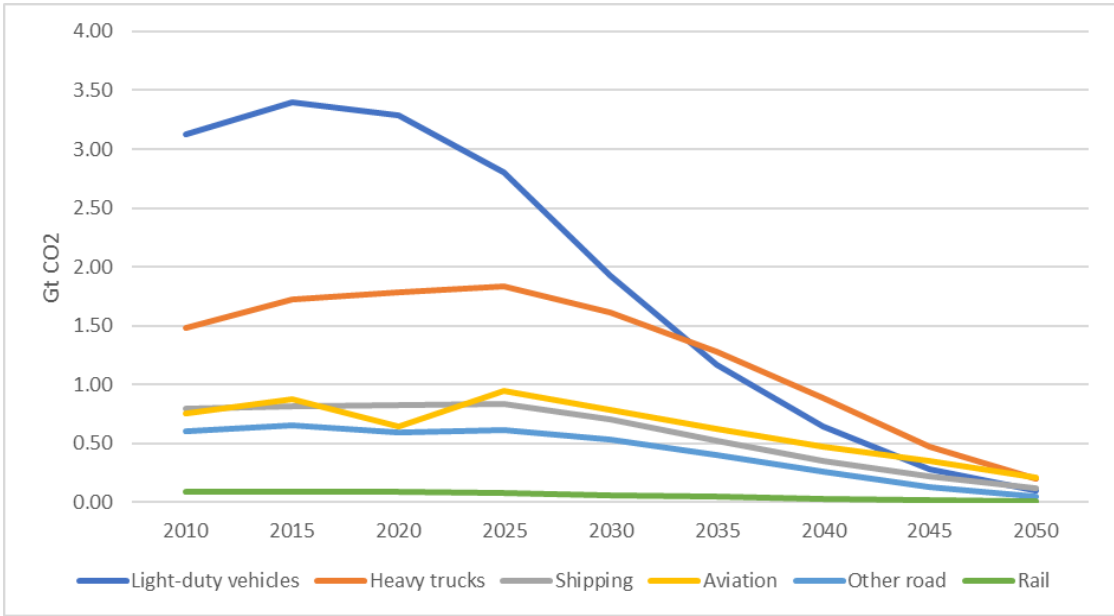
1B. TRENDS OF TRANSPORT EMISSIONS

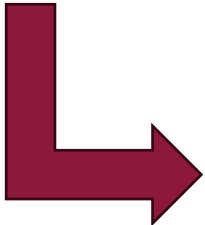
Projected world transport emissions under Stated Policy Scenario of IEA



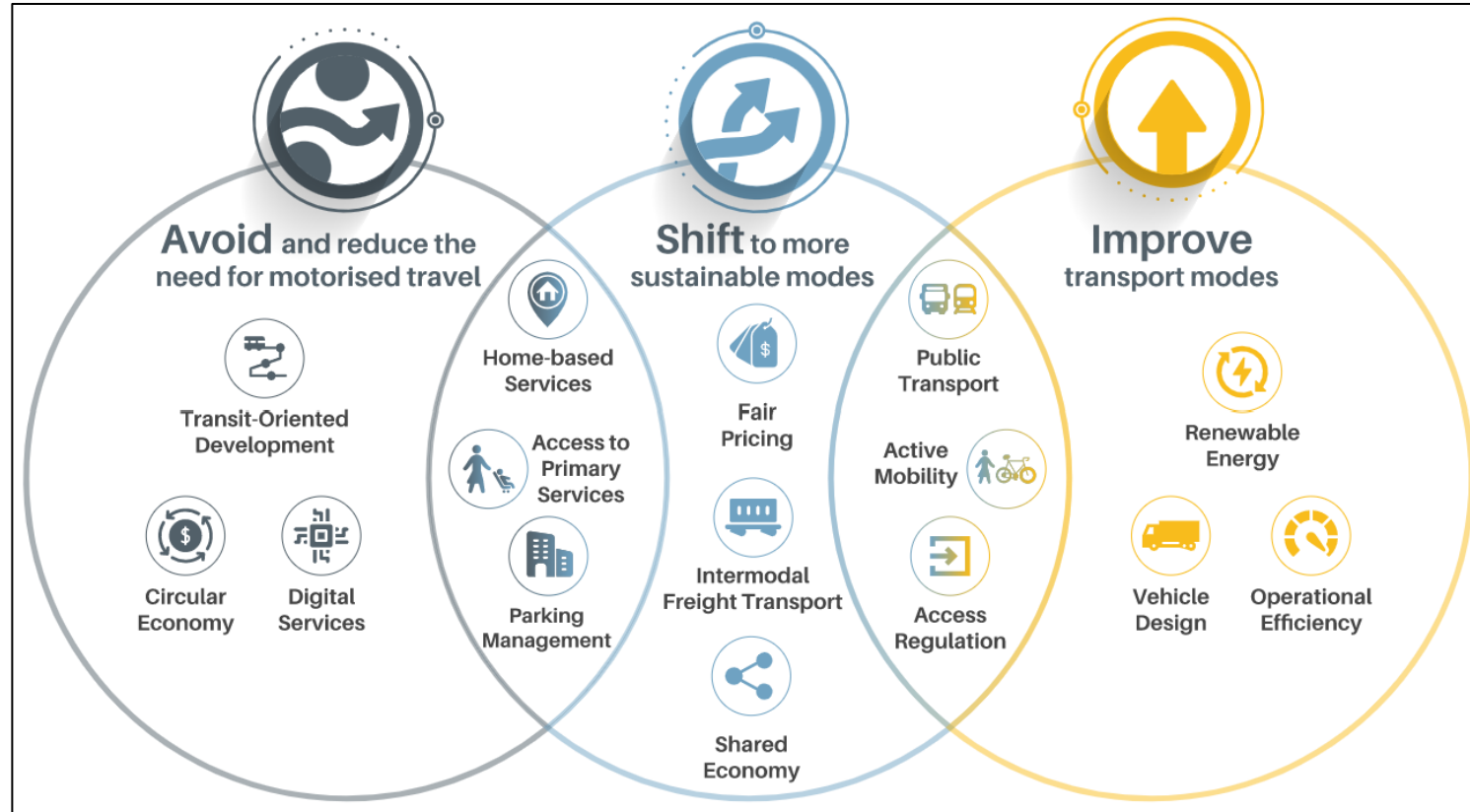
- BAU projections 2050: 13 GtCO₂ (+65% compared with 2022; 1.9% growth p.a.)
- Source: World Data Lab

Projected world transport emissions per mode with a Net Zero Emission Target by 2050



versus 

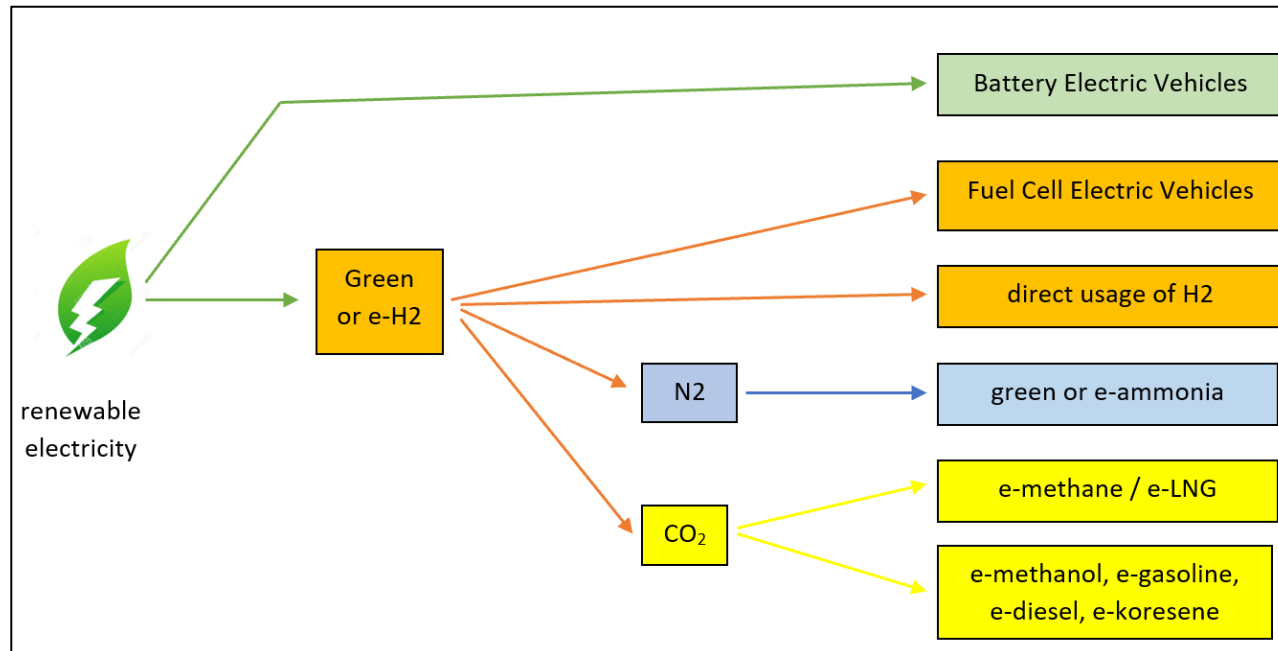
1C. OVERVIEW OF REDUCTION MEASURES



Source: Lee Shipper, adopted by slocat

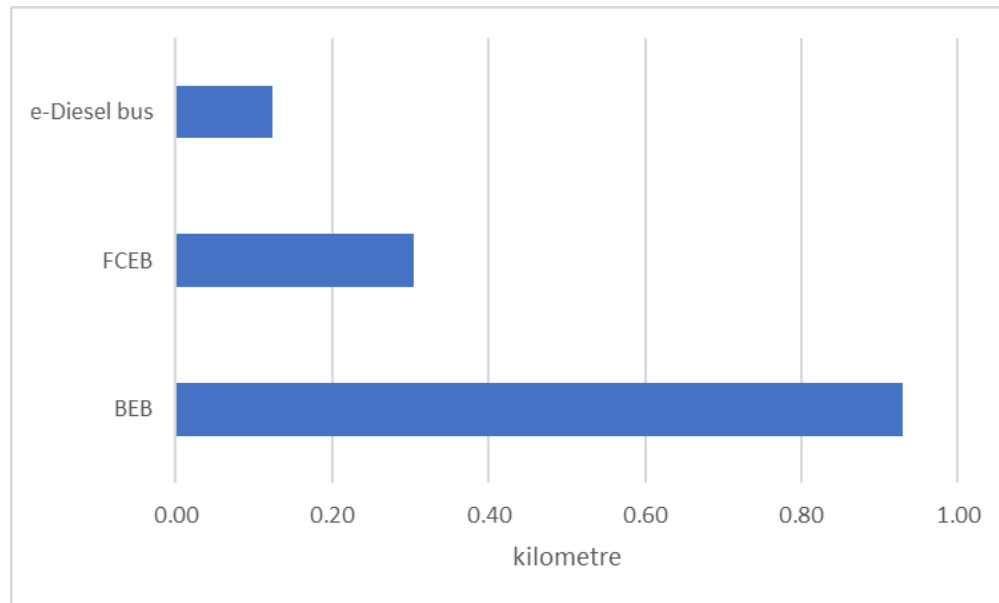
1D. ALTERNATIVE FUELS

- **Biomass/waste/oils based biofuels:** problems with food competition, biodiversity loss, displacement of input materials for other usage, land-use change emissions: **potentially worse than fossil fuels**
- **Recycled carbon fuels:** they are based primarily on the bacterial fermentation of carbon monoxide in industrial off-gases and liquid fuels from plastic waste or synthetic rubber; major concern is the displacement of existing energy recovery and that emissions would otherwise be semi-permanently sequestered (in case of plastics deposited in landfills) thus not resulting in a net climate benefit
- **Electricity in battery-electric vehicles and e-fuels based on green hydrogen**



1E. DIRECT ELECTRICITY VERSUS H₂ AND E-FUELS

Driving Distance Range of Battery Electric, Hydrogen and e-Diesel Standard Urban 12m Bus with 1 kWh Electricity



FCEB: Fuel cell electric bus

BEB: Battery electric bus

E-diesel made out of green H₂ and CO₂ direct air capture

Source: Grutter Consulting for ADB

- Direct usage of electricity in BEVs requires 2-4x less renewable energy than using hydrogen vehicles or e-fuels
- H₂ for road vehicles makes - with very few exceptions - no sense
- Green H₂ should be used to substitute current grey/black H₂ applications in industry
- In medium and long haul shipping green ammonia, e-methanol, e-LNG and e-LPG are a solution but compete with on-site CCS, biofuels and with nuclear propulsion
- In aviation e-fuels make sense but compete with biofuels (application of limited available clean biofuels would make most sense in aviation)

2. MAIN TYPES OF PROJECT OF INTEREST FOR GCF



- ❑ Fostering public and non-motorized transport
 - ▶ needs to go beyond conventional mass transit system
 - ▶ multi-modal integration; Non Motorized Transport; improved resilience
 - ▶ must be based on vehicles with no combustion emissions
 - ▶ Rail-based mass transit means in general are beyond the financial means of

- ❑ E-mobility and eventually for justified cases green hydrogen, and e-fuels as well as biogas
 - ▶ no fossil fuels
 - ▶ no liquid biofuels

- ❑ Innovative freight and passenger transport projects which go beyond business as usual or e.g. a city project with policies and measures to achieve zero emissions

3. GCF ASSESSMENT CRITERIA

1. Impact
2. Paradigm shift
3. Sustainable development criteria
4. Country ownership
5. Country needs
6. Efficiency and effectiveness

3A. IMPACT

- It's good to have a large impact... but,
- Be conservative in areas such as:
 - Data values used
 - Improvement rates
 - Projections concerning deployment

Comparison base is NOT the current fleet or vehicle
but new business as usual fleets or vehicles



Project bus



Current bus



Comparison
bus

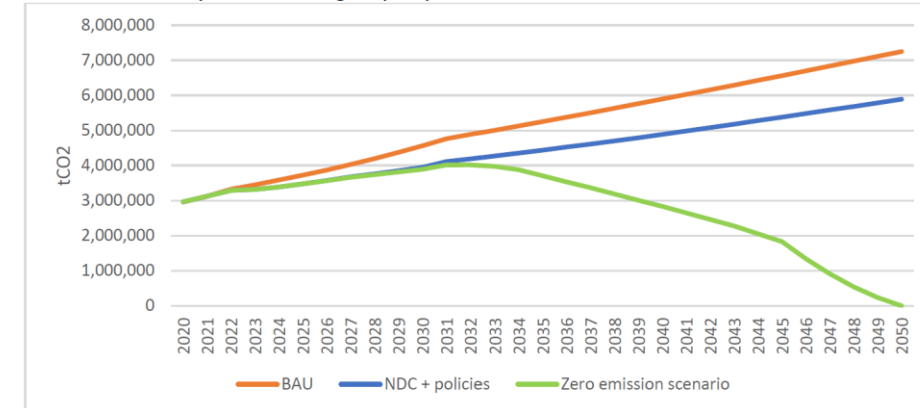
3A. IMPACT – 2ND PART

- Proposal should be aligned with country objectives – see NDC conditional targets
- Use as far as possible approved and published international methodological approaches e.g. for carbon credit projects (CDM, VCS, GS)
- If the project is also included in the NDC modelling then check calculation approach with NDC modelling approach
- Include a monitoring and reporting approach: This should be aligned with national approaches – however, in general, national monitoring of GHG emissions is based on top-down. If the project is included in the NDC then a monitoring approach might also have been developed for this area

3B. PARADIGM SHIFT

- Does the project have the potential to change BAU trajectory?
- In the case of public transport, ideally includes transit demand measures
- Establishment of modern transport facilities with integrated NMT in areas where low quality systems are operating
- Shifting towards electric mobility in all vehicle categories
- What does the project do beyond the one-time investment to catalyze a paradigm shift?

GHG Scenarios Transport Sector Mongolia (tCO₂)



Source: Grutter Consulting, 2023, Vision 2050: Decarbonizing transport emissions of Mongolia, ADB report

You might have a project with a large impact but limited paradigm shift or vice versa: both are OK

3C. SUSTAINABLE DEVELOPMENT

- Typically a large positive impact of urban public transport projects and of e-mobility concerning air quality
- Often only positive effects are listed – be critical and include how you intend to manage critical parts
- In the area of jobs, make an assessment of net benefits and not just project employees e.g. if you employ bus drivers but tuktuk drivers serving the population currently loose their job then you cannot claim job creation

3D. NEEDS & COUNTRY OWNERSHIP

- Country level and involved / affected stakeholders
- Indirect assessment for “country needs”: how popular is this measure already in the country? e.g. are EVs common practice...? if yes, GCF might be crowding out other actors
- Indirect assessment for “ownership” : how much national finance is involved?

3E. EFFICIENCY AND EFFECTIVENESS

- Transport projects are, in general, more expensive in terms of USD per tCO₂ avoided than other project types but have more sustainable development benefits
- The sector is harder to abate than others
- It is not an issue if costs per ton are high or even very high if there exists a good potential for paradigm shift
- The indicator as used currently by the GCF (USD invested by GCF per ton CO₂) is of limited value as it's not a marginal abatement cost, nor is it based on grant equivalent
- The co-finance share is relevant as this means additional capital flowing into this area and not only the GCF as finance source

DREAM PROJECT

Make a CITY project



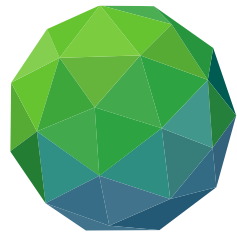
Many cities put net zero targets

Cities have many instruments with which they can reduce GHG emissions

Project / activity based stand-alone measures like building a BRT are potentially not very effective ► the synergy of multiple measures are critical in the transport sector



Monitoring measures exist today to measure directly CO₂ with satellite-based technology and thus monitor the total impact thus also monitoring achievement of CO₂ targets



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