Development of a toolkit for the evaluation of ecological impacts derived from sustainable transport strategies

M. Sc. Montserrat Miramontes
Chair of Urban Structure and Transport Planning, TUM

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Bericht des Weltklimarats

Die Hälfte des CO2-Budgets ist verbraucht

Wissenschaft Freitag, 27. September, 11:53 19

Der Anstieg des Meeresspiegels wird die Inseln im Pazifischen Ozean besonders hart treffen. *(Bild: Reuters)*

LESERTREND

GELESEN EMPFOHLEN KOMMENTIERT

Die Ära der Internet-Imperien
Data Heute, 15:41

Ueli Maurer eckt an

«Sind Sie auch eine Hure?»

Zeuge beschuldigt Amanda Knox

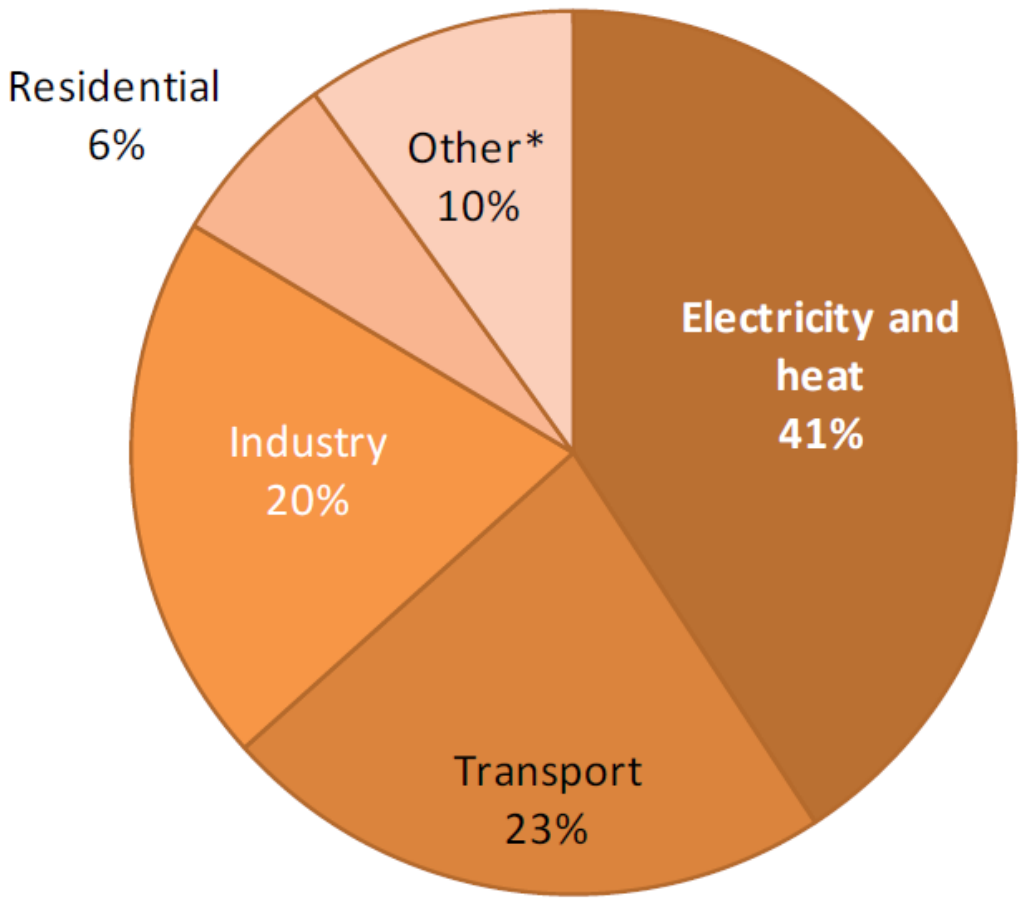
Uhren schmuggeln ist nicht so einfach

▼ Mehr anzeigen

The world is falling apart

We want to save the world

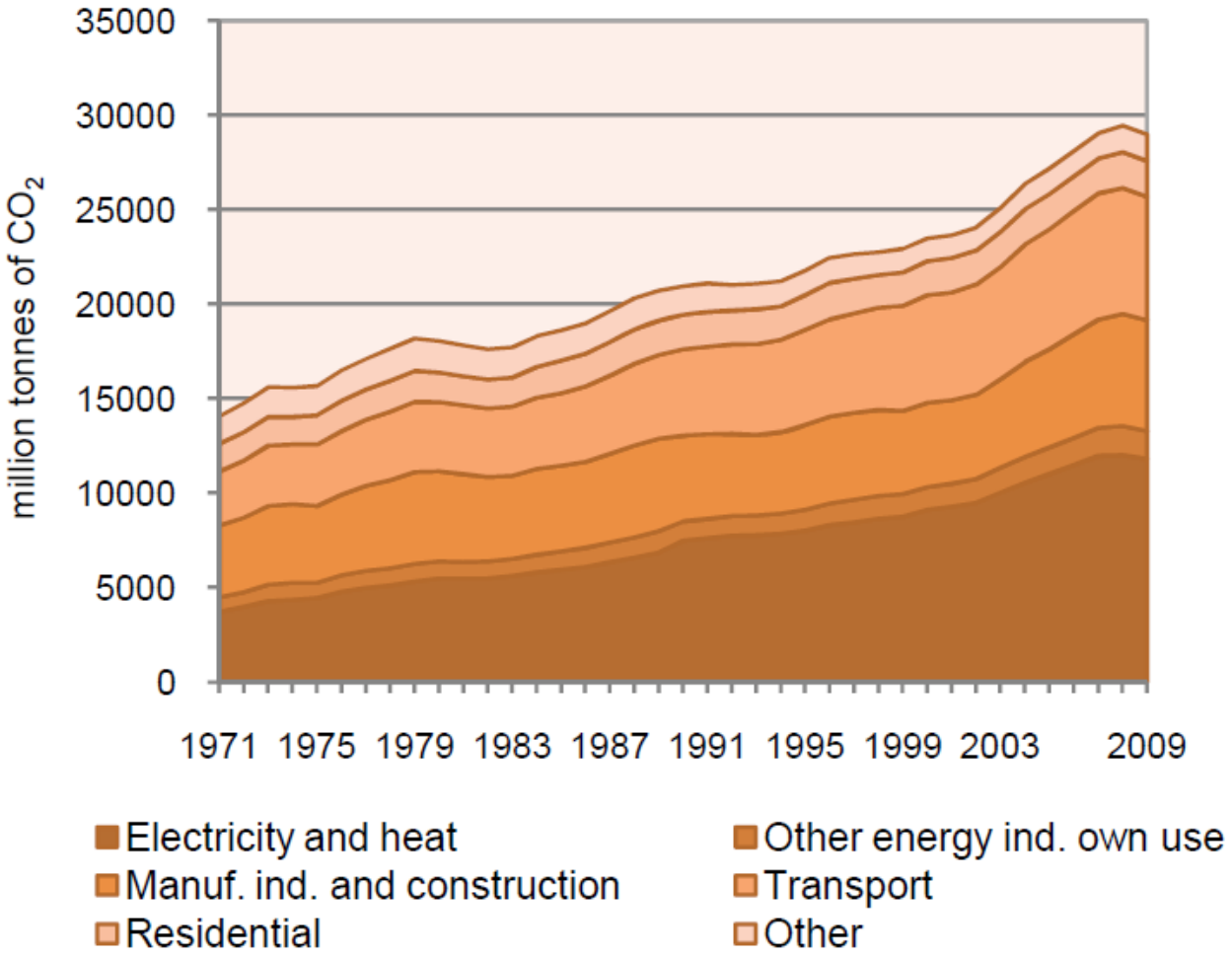
Contribution of transport to global GHG emissions



World total GHG emissions: 29 Gton

Source: International Energy Agency, CO2 EMISSIONS FROM FUEL COMBUSTION *Highlights* (2011 Edition)

World CO_2 emissions by sector



Source: International Energy Agency, CO2 EMISSIONS FROM FUEL COMBUSTION *Highlights* (2011 Edition)

Environmental Effects of Transport

Land Consumption

Air Pollution

Noise

External Accident Costs

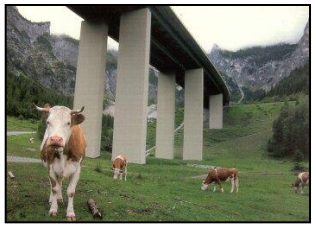
Additional Costs in Urban Areas

External Effects

External Costs

Infrastructure

Nature and Landscape



Climate Change

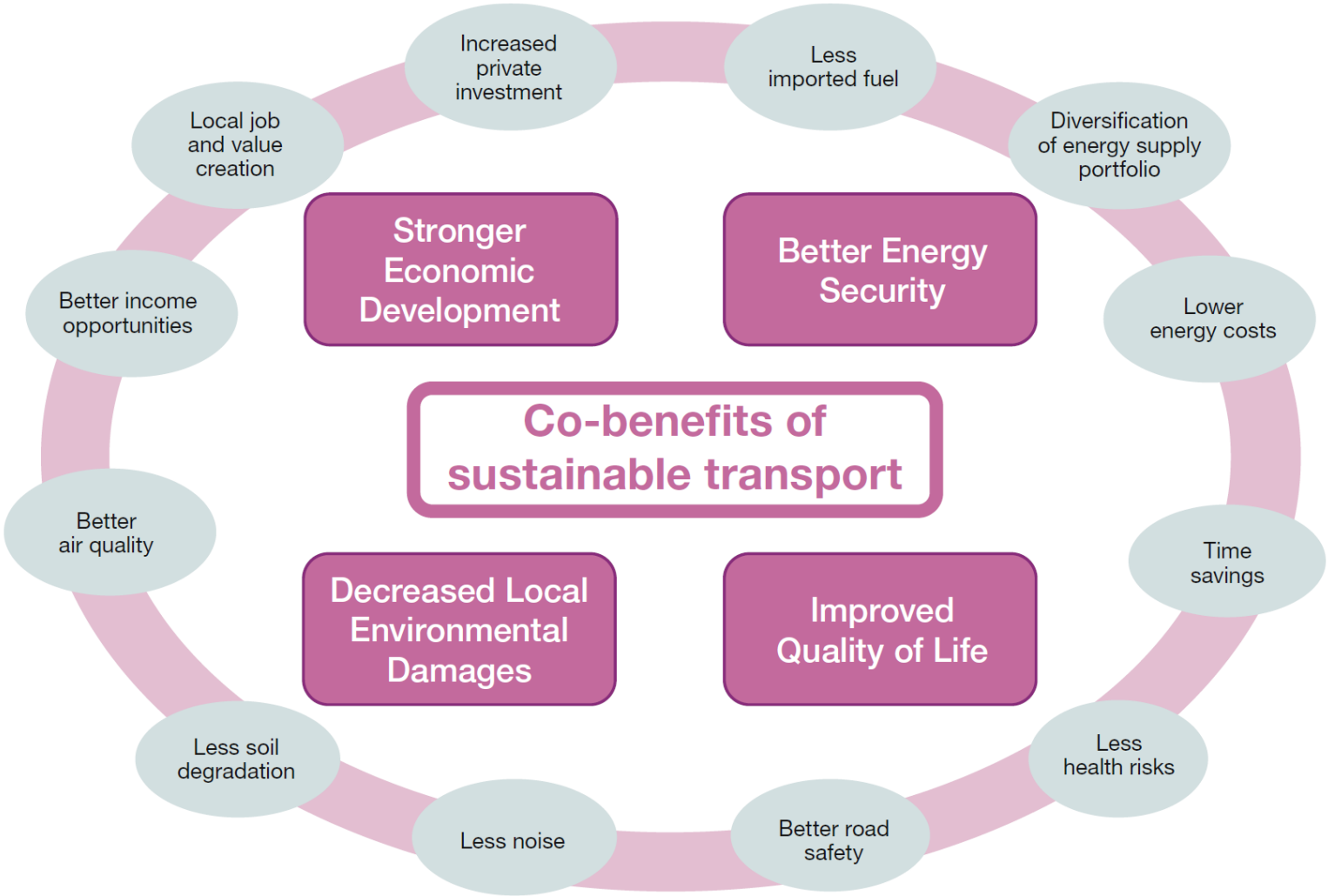
Up- and Downstream Processes, Energy

Slide: Regine Gerike, Friederike Hülsmann

Sustainable transport strategies…

have impacts not only in emission reduction, but also economic and social benefits.

Co-benefits of Sustainable Transport

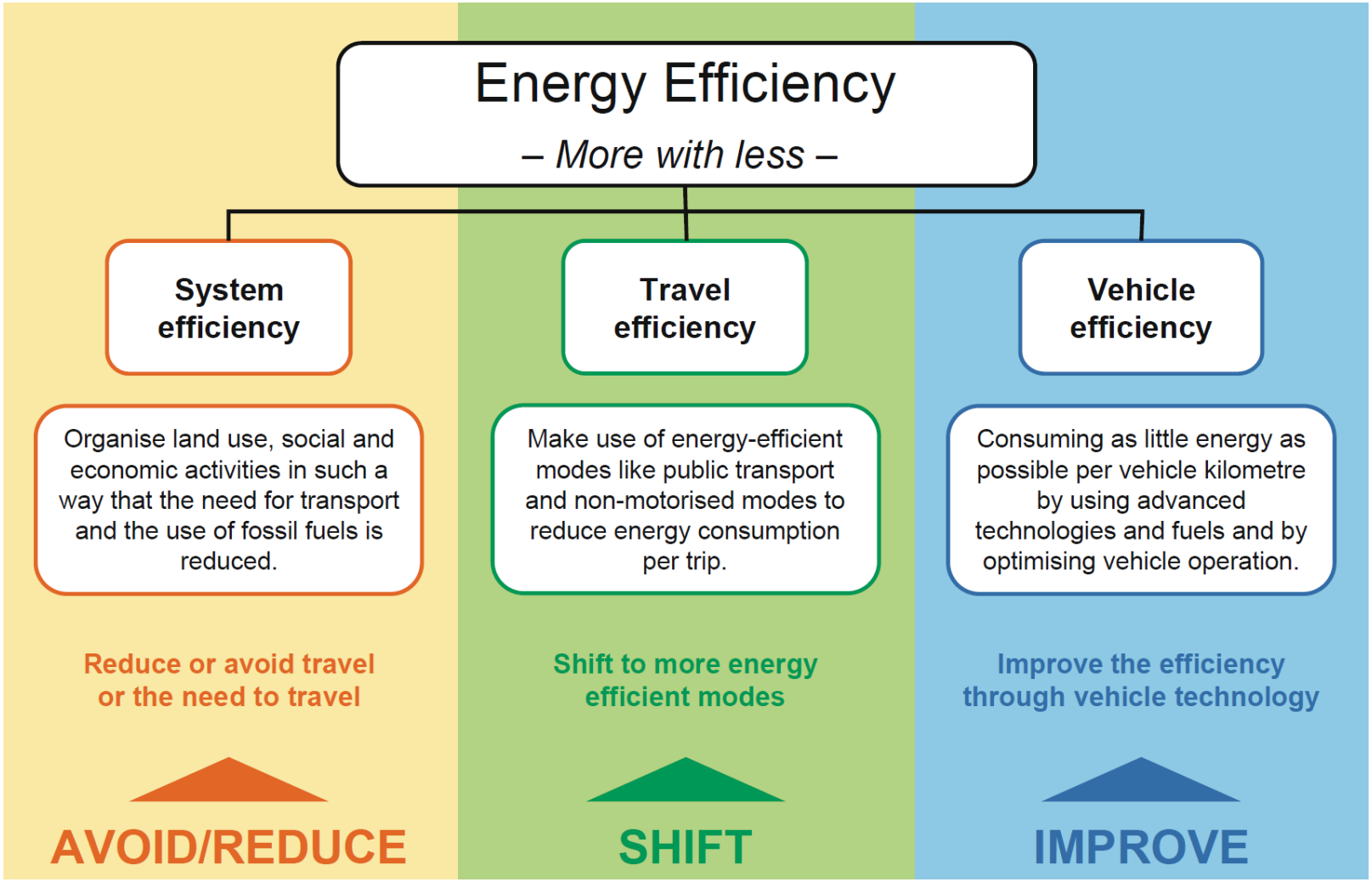


GIZ, 2012. Navigating Transport NAMAs. Practical Handbook for the design and implementation of Nationally Appropriate Mitigation Actions (NAMAs) in the transport sector

Sustainable transport strategies…

are being promoted worldwide by public agencies (i.e. GIZ) in order to reduce energy consumption and greenhouse gas emissions (among others)

Sustainable transport strategies



Source: GIZ,2012: Urban Transport and Energy Efficiency. Module 5h. Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities. Deutsche Gesellschaft für Internationale Zusammenarbeit on Behalf of the German Federal Ministry for Economic Cooperation and Development

Nowadays some people know or have an idea…

- …what are sustainable transport strategies
  - Technical solutions are there
  - Policies towards a more efficient transport are fairly known

So what it is missing?

- Cultural attachment to private cars
- Dependence on private cars
- Lack of political will
- Lack of financing / funding

LACK OF INFORMATION

Convince „them“ by demonstrating the benefits of ST!

There is a need for local actors of a toolkit that allows them to estimate the benefits and costs of sustainable transport strategies.

GOAL:

Create such a toolkit.

First questions

- Which methodologies are already available?
- Which toolkits are already available?
- What has to be improved?
- What works and what does not work?
- What data do I need?
- Where do I get data from?

Methodology

1. Literature research to cover the state of the art regarding:
   - methodologies for emission estimation
   - emission reduction strategies applied in different cities/countries and their estimated/observed impacts
   - databases of transport related data

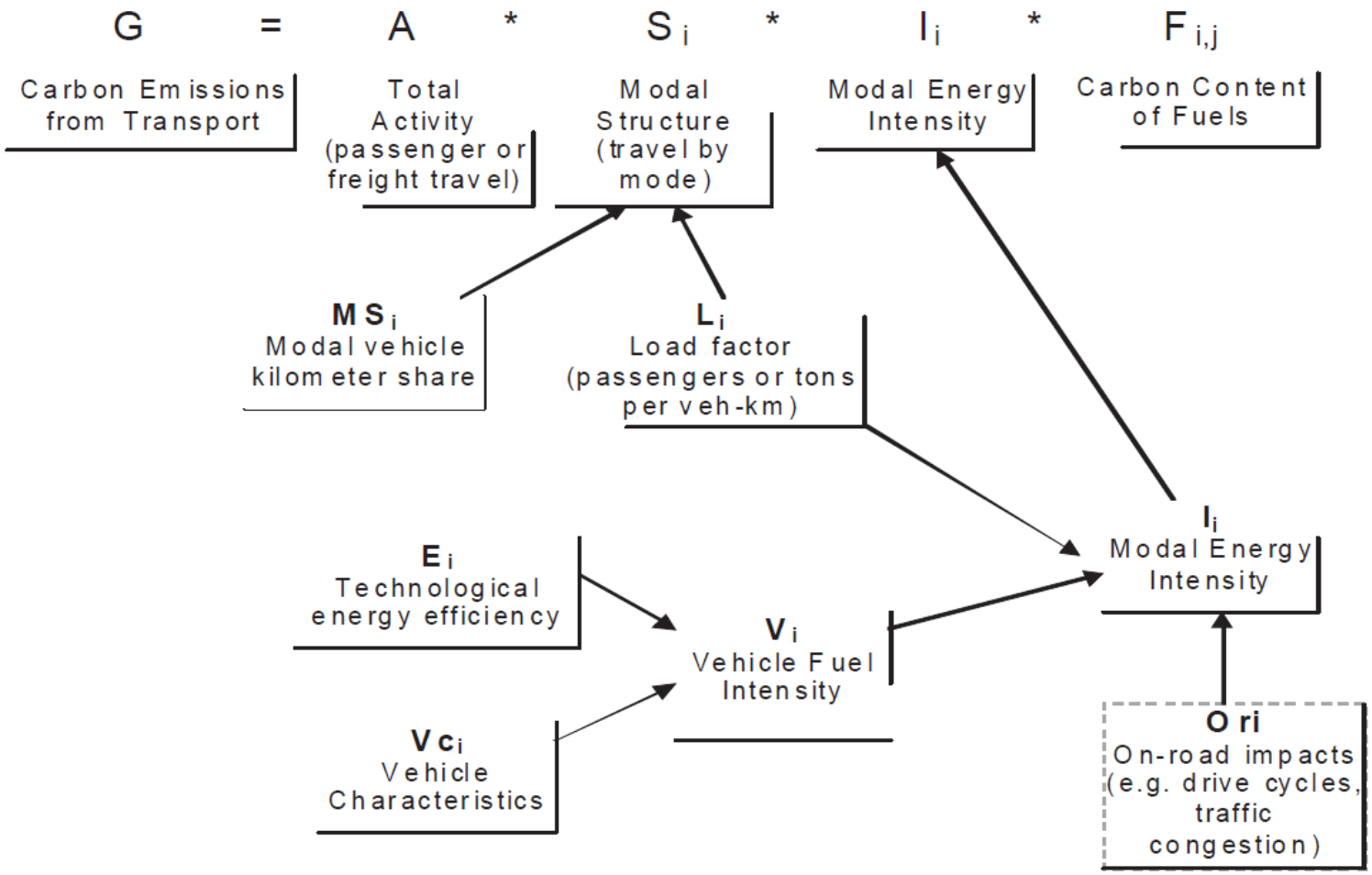
2. Experts interviews
   - Real needs for a toolkit?
   - Problems encountered with existing toolkits

Emission estimation

$$E_i = VKT \times EF_i$$

VKT: Vehicle kilometers traveled
EFi: Emission factor of pollutant i

ASIF Approach



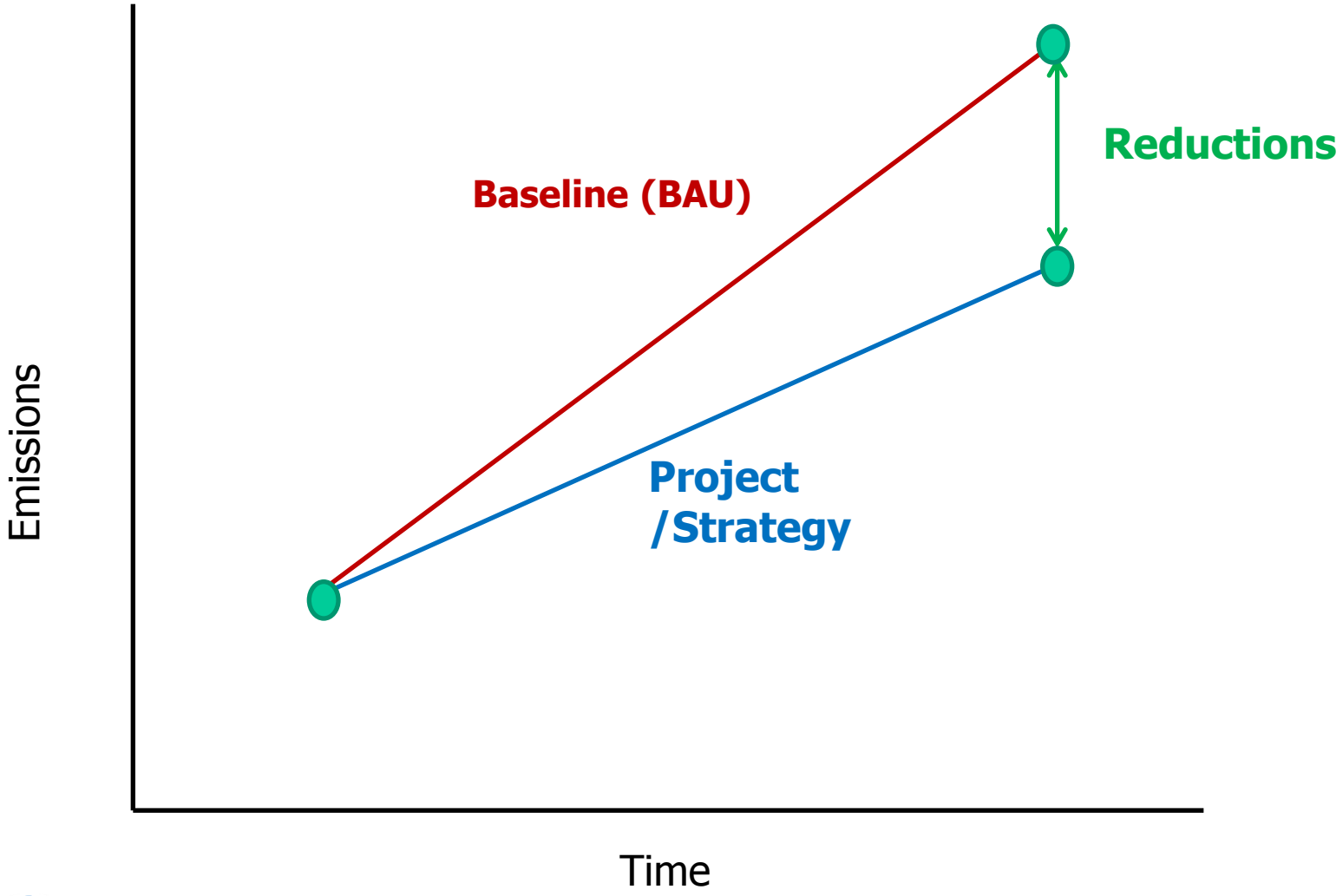
Schipper et al. (2007)

Verkehrsökologische Tautologie (Udo Becker)

$\frac{CO2}{day}$ = Persons X $\frac{Trips}{Person - Day}$ X $\frac{Person\text{-}km}{Trip}$ X $\frac{Veh\text{-}km}{Person\text{-}km}$ X $\frac{CO2}{veh\text{-}km}$

Fossil fuel powered vehicles: $\frac{Carbon}{Liter}$ X $\frac{Liter}{km}$

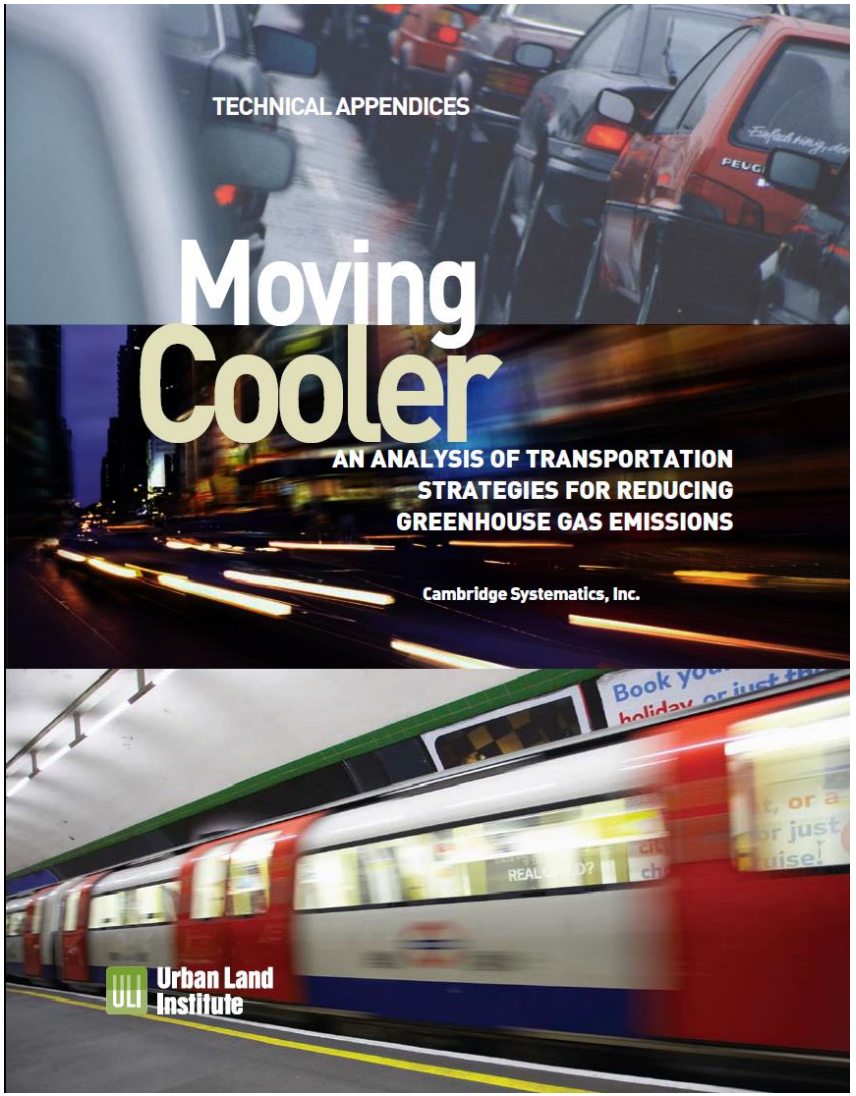
Electric vehicles: $\frac{Carbon}{kWh}$ X $\frac{kWh}{km}$


Emissions
Baseline (BAU)
Reductions
Project
/Strategy
Time

United States - Moving Cooler

- Assessement of the potential effectiveness of transportation strategies to reduce GHG.

- Peer reviewed study, cosponsored by 13 organizations representing government, industry, nongovernmental organizations, foundations, and the transportation community.



CO2 Emission reduction in transport in Germany

Possible measures and their reduction potential

A status report from the German Environmental Agency

Umwelt Bundes Amt
Für Mensch und Umwelt

Methodology (cont)

3. Creation of a “City Database” with relevant figures:
   - Population development
   - GDP
   - motorization rates
   - VKT/person
   - Modal split
   - Fuel sales / consumption
   - Energy consumption

4. Development of a toolkit
   - Based on Excel (?)
   - Other (?)

5. Test toolkit with data from the city database

Goals

- To deliver a common evaluation framework for sustainable transport strategies.
- To provide a toolkit supported by observed data and a transparent methodology that allows public authorities to build emission scenarios and estimate the impacts of sustainable transport strategies.
- To support decision makers to prioritize measures or bundles of measures in an integrated strategy.

Constraints

- a lot of material to review: reports, methodologies, approaches, etc.
- Limited time to review all of them

„strategies“ used so far…

- Teaching on this topic → learning a lot and faster on the go

- Training students on emission modelling → who later might write their own Master Thesis on which I can build upon my dissertation (?)

Master thesis under supervision:

Basically about the CO_2 emission reduction potential

More general

- Rappler: Bike sharing systems
- Nawai: Car Sharing Systems
- Mohsen: Congestion Charging in Teheran, Iran
- Gerhardt: Airport regions
- Bürgmeier: Levers and policies for ST in Helsinki

More specific

- Kreuzer: Commuting patterns and suburbanization, Munich
- Löhr: Electric mobility in rural areas, Garmisch Parten Kirchen

Questions to you:

- Other methodologies/toolkits?
- Studies / experiences on emission reduction?
- How to get data?
- How to set further limits?
  - Only for developing contries/developed countries?
  - Only some measures/strategies?

THANK YOU FOR YOUR ATTENTION!

mobil.TUM 2014

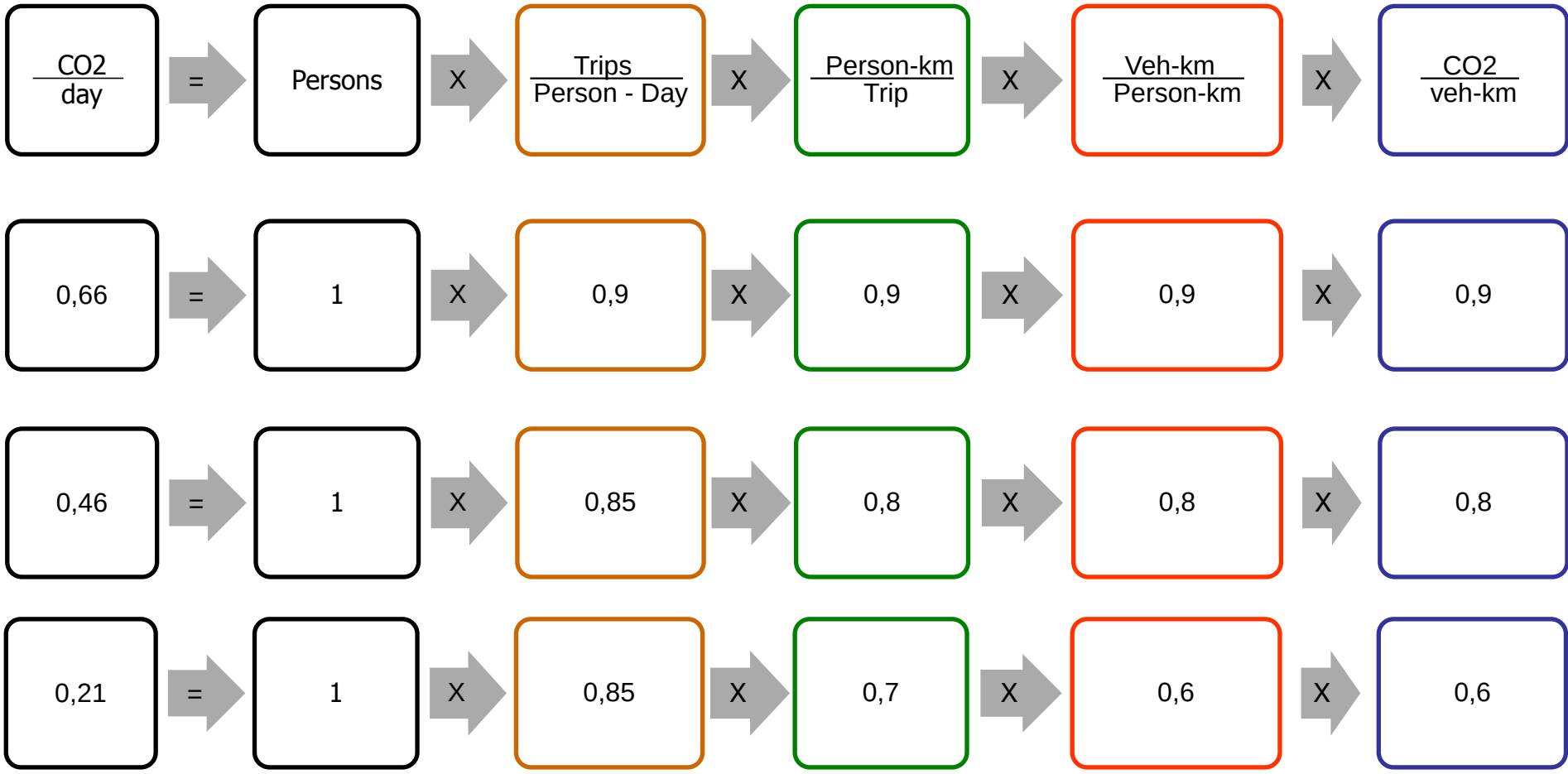
International Scientific Conference on Mobility and Transport

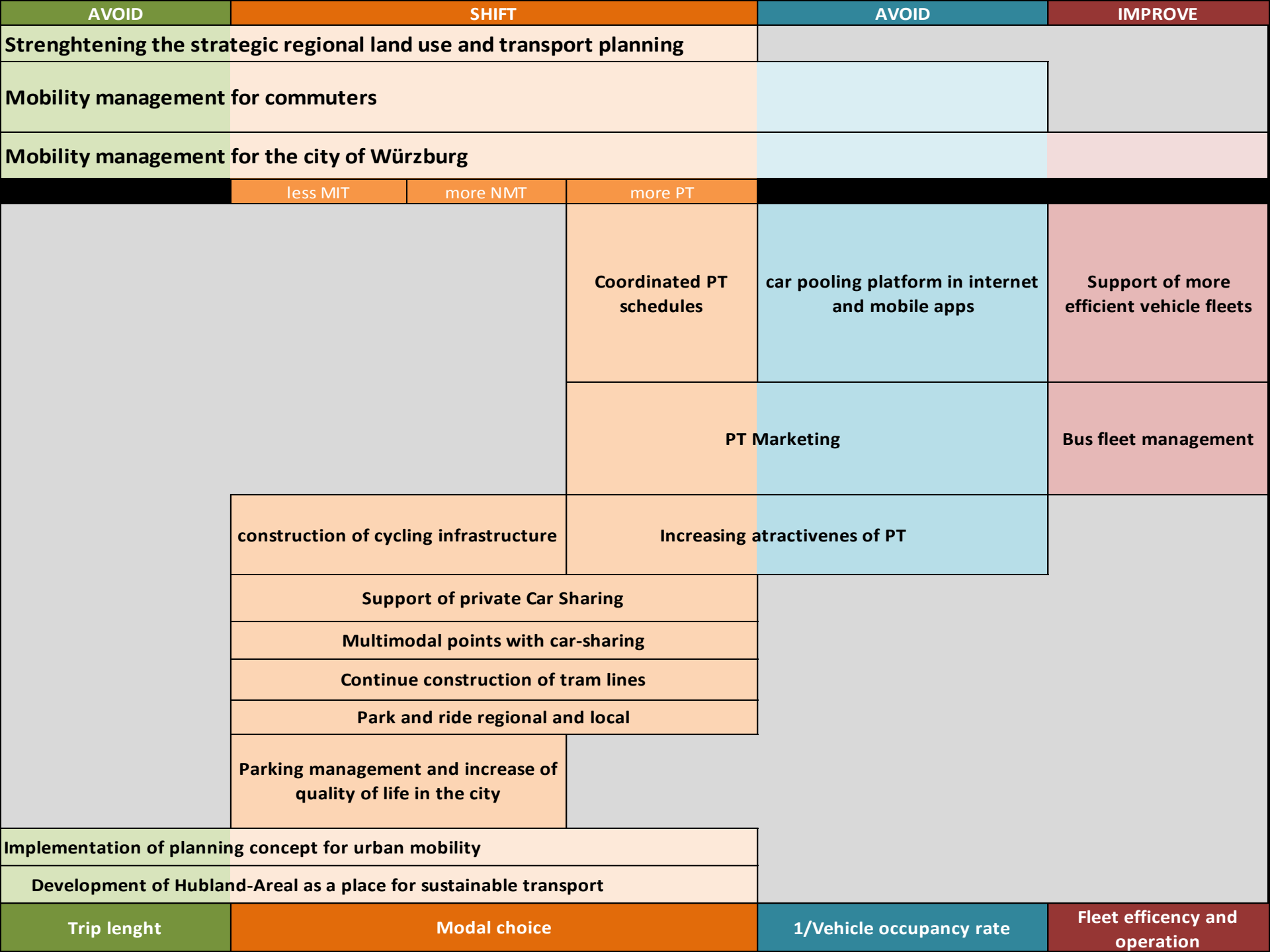
Sustainable Mobility in Metropolitan Regions
Call for papers

May 19 - 20, 2014

Oskar von Miller Forum, Munich, Germany

How much can we reduce?




AVOID
SHIFT
AVOID
IMPROVE
Strenghtening the strategic regional land use and transport planning
Mobility management for commuters
Mobility management for the city of Würzburg
less MIT
more NMT
more PT
Coordinated PT schedules
car pooling platform in internet and mobile apps
Support of more efficient vehicle fleets
PT Marketing
Bus fleet management
construction of cycling infrastructure
Increasing atractivenes of PT
Support of private Car Sharing
Multimodal points with car-sharing
Continue construction of tram lines
Park and ride regional and local
Parking management and increase of quality of life in the city
Implementation of planning concept for urban mobility
Development of Hubland-Areal as a place for sustainable transport
Trip lenght
Modal choice
1/Vehicle occupancy rate
Fleet efficency and operation