22nd – 24th Feb. 2013

- Technische Universität Berlin, Campus El-Gouna, Egypt
- Zentrum Technik und Gesellschaft (ZTG), Bereich Mobilität und Raum
- West Asia North Africa Cooperation Unit (WANACU)

[Urban Mobility and Integrated Transportation Planning - Transfer of Results of Megacities Research]

Proceedings of the International Symposium "Urban Mobility and Integrated Transportation" continues the series of academic events that take place at Campus El Gouna of Technische Universität Berlin besides the Master's Degree Programs that started in October 2012. The Symposium is part of the transfer and dissemination activities of the Megacities Research Program of the German Federal Ministry of Education and Research (BMBF).

Contents

1 About the Symposium

1.1 General Information

The international symposium "Urban Mobility and Integrated Transportation" continues the series of academic events that take place at Campus El-Gouna of Technische Universität Berlin besides the Master's Degree Programs that started in October 2012[1]. The symposium is a part of the transfer and dissemination activities of the Megacities Research Program of the German Federal Ministry of Education and Research (BMBF)[2]. The event is organized by TU Berlin's ZTG[3] in cooperation with West Asia North Africa Cooperation Unit (WANACU)[4].

1.2 Objectives

The main objectives of the symposium are:

- The interrelation between land use, settlement structure and growth of traffic performance will be discussed,
- Experiences in several projects should show how to solve traffic problems based on this interrelation,
- Integrated transport approaches will be presented as well as project experiences and results from other research programs for urban development and mobility,
- First ideas for research projects in Egypt will be discussed.

1.3 Topics

The international symposium "Urban Mobility and Integrated Transportation" brings together the following key topics:

Transport performance is increasing and 20 % up to 35% of GHG emission based on transport processes. In residential areas transport is the major GHG emission source with a share of around 50%.

Several societal trends lead to a traffic performance growth. Besides the growth of population and urbanization car-oriented settlement structure, increasing incomes and new production methods as well as distance intensive trade relations are key drivers for transport demand. Furthermore population growth and car use have a progressive correlation. The main cause for transport demand growth is the interrelation between transport system and long-term adaption of settlement structure. Capacities and velocity in transportation systems were expanded to try to solve short-term traffic problems. The high average traffic speed makes longer travel distances possible. But this supports a development of mono-structural land-use and a low population density. At the same time transportation means to consume more resources such as

[1] http://www.campus-elgouna.tu-berlin.de/menue/master_s_degree_programs/
[2] http://www.youngcities.org/& http://www.tu-berlin.de/ztg/mobilitaet
[3] http://www.tu-berlin.de/ztg
[4] http://www.wanacu.tu-berlin.de

materials, energy or land use. In result an expansion of the transportation system, in particular of road networks, improves the traffic performance in a short term but it increases the resource consumption and traffic impacts such as GHG emissions in the long run.

The **first day** of the symposium will give presentations of a number of international projects and experiences.

The **second day** continues in workshops with the thematic fields:

- Settlement structures and traffic
- Public transport and paratransit
- Mobility management

1.4 Participants

The symposium aims to reach:

- Transportation/urban planners, consultants, politicians, transport industries, and transportation researchers
- Students of Egyptian universities and of the master courses at Campus El Gouna
- Citizens, representatives of organizations, companies and other institutions which are interested in, responsible for or involved in the development of the community of El Gouna and the regional neighborhood.

The event will be carried out in English language. Further information including a program is available on the website:

http://www.wanacu.tuberlin.de/news_content/urban_mobility_and_integrated_transportation_planning/

2 Program

Day 1, Friday, 22nd February

TIME	AGENDA ITEM	SPEAKER
7.00 p.m.	Registration and Opening Dinner at Campus	

Day 2, Saturday, 23rd February

TIME	AGENDA ITEM	SPEAKER
9:00 a.m.	**Welcoming Introduction**	Prof. Rudolf Schäfer
	Introduction BMBF Future Megacities Projects statement local partner, discussion	
9.15 a.m.	Young-Cities – Integrated Transport and Urban Planning	Dr.-Ing. Wulf-Holger Arndt Technische Universität Berlin (Germany)
	Attitude and Sense of Place in New Towns in Iran – Experience of Hashtgerd New Town	Dr. Elham Amini (Iran) via skype
10.00 a.m.	Gauteng – Energy Modeling of Transport Systems	Thomas Haasz Universität Stuttgart (Germany)
10.45 a.m.	Coffee break	
11.00 a.m.	Ho Chi Minh City – Promotion Public Transport and slow modes	Prof. Dr. Günter Emberger Technische Universität Wien (Austria)
	River transport in Mekong delta and the adverse effects of Climate Change	Prof. Dr. Nguyen Ba Hoang
	Transport in Ho Chi Minh: Past, Present and Future	Dr. HienQuoc Nguyen
11.45 a.m.	Hyderabad – Public Transport Improvement	Prof. Dr. CSRK Prasad National Institute of Warangal (India)
12.30 p.m.	**Lunch**	
1.30 p.m.	Hefei – Traffic Management	Alexander Sohr German Aerospace Center (DLR) (Germany)
	Hefei – Traffic Management	Prof. Tingjian Fang
	Metrasys – Transport in Megacities of Tomorrow	Mr. Li Zhenyu
2.15 p.m.	Discussion	
	Input Megacities Research Programs from other foundations	
3:00 p.m.	Santiago de Chile – Transport Szenarios 2030 (HGF Research Initiative)	Dr.-Ing. Dirk Heinrichs German Aerospace Center (DLR) (Germany)
	Density, land-use and travel patterns in Urban Age cities (Herrhausen MC program)	Duncan Smith London School of Economy(UK)

TIME	AGENDA ITEM	SPEAKER
3.45 p.m.	Coffee break	
	Lesson for interrelations between traffic and settlement structure	
4.00 p.m.	Mobility in Megacities: Transport Typologies and Their Meanings	Prof. Jeffrey Kenworthy via skype Goethe-Universität (Germany)
	Curitiba – Transit Oriented Development	Prof. Fábio Duarte via skype Pontificial Catholic University of Parana (Brazil)
	Urban Transport Issues in Egypt	Prof. El-Araby - Ain Shams University (Egypt)
5.15 – 6.00 p.m.	**Discussion of planning approaches**	

Day 3, Sunday, 24th February

TIME	AGENDA ITEM	SPEAKER
9.00a.m.	**Workshops (in parallel) for deepening discussions with local project partners (in every workshop):** • Identification of implementation problems and solutions • Transferability of solutions • Future topics in „Megacities and Mobility“ **In parallel:** WS 1: Settlements structure and traffic, walkable city, biking WS 2: Public Transport and Paratransit WS 3: Mobility management, travel behaviour, public awareness (coffee break in between around 10:30 a.m.)	
12.00 - 1.00 p.m.	**Summary (Lessons learned), open research questions, ideas for follow-up of the Future Megacities program**	
1.00 p.m.	Lunch	
2.00 p.m.	**Excursion El-Gouna**	
	Farewell Dinner	

3 The Symposium's Presentations

3.1 YoungCities – Integrated Transport and Urban Planning | Wulf-Holger Arndt

3.1.1 Abstract

One of the strategies for solving the problems of population growth is to build New Towns. These New Towns should firstly discharge the large agglomerations. A secondary goal is the restructuring and de-concentration of the population in the metropolitan areas. Based on this, New Towns will be planned and built in Iran. The Iranian leading partners in our research project are the "Building and Housing Research Center" (BHRC) and the "New Towns Development Corporation" (NTDC). The main objective of the YoungCities project is to find out, whether the development of New Towns is a reasonable strategy to level off the population growth in urban agglomerations.

The biggest of the 30 planned Iranian New Towns is Hashtgerd, situated 65km northwest of the Megacity Tehran and 30km west of the Megacity Karaj. The research project outlines the development of the planned New Town Hashtgerd in the agglomeration Tehran/Karaj and implements research results in form of pilot projects within the New Town.

The implementation of a sustainable transportation system in growing cities is a big challenge. In many emerging and developing counties, where the rates of motorization are increasing rapidly, the main coping strategy for the upcoming problems is to enlarge the street infrastructure. By the research of the dimension "Transport and Mobility" in the YoungCities project, alternative strategies for a CO2-reduced transportation system will be developed and the efforts of the local authorities to reduce motorized traffic and associated negative side effects of traffic will be supported.

To implement the goals, different strategies and actions are conceived:

- CO2-emissions and the energy consumption for mobility should be reduced through:
  - Traffic reduction (optimization of land use and optimal use of the capacity of the existing road network),
  - Traffic relocation (development and implementation of a public transport system on the local and the regional scale, support of non-motorized modes of transport),
- Improvement of road safety through:
  - Speed-reducing street layout,
  - Prioritizing non-motorized traffic,
  - Public relations/ awareness rising.

The research of the Dimension "Transport and Mobility" is focusing on different contextual and spatial scales:

- On a 35ha pilot area in the New Town Hashtgerd, an innovative housing concept and traffic reducing mixed use areas is developed and built in cooperation with the Dimensions “Urban Planning and Design”, “Architecture and Design”, “Landscape Planning” und “Climatology”.
- A draft of a flexible and staggered public transport network for whole Hashtgerd is developed, which is intended to be adaptive to the stages of urban growth.
- Accompanying “soft-policies” and soft actions like mobility management and, in particular, consultations of new residents are taken. The aim is to stimulate sustainable mobility behavior by providing information (mobility package).

Different Tools and instruments was used or developed for the applied transportation research:

- Models and databases developed with ArcGis

  Basic data sets were developed for Hashtgerd and can be adapted for different issues such as the accessibility of public transport.

- Transportation Model using the software VISEVA+/ VISUM

  It will for the first time also be used to calculate a traffic optimized settlement structure as a secondary output. These results may be of use for a further traffic minimizing spatial development of Hashtgerd New Town. The integration of so called Paratransit services (e.g. different taxis types) was a special adaption for using this model in Iran.

- CO2 Calculation and Evaluation Model (TEECT)

  This calculation is based on the integration of information from ArcGis, VISEA+/VISUM and the German Handbook of Emission Factors (HBEFA 3.1). Through considering the Iranian car fleet and the combinations of traffic situations and vehicle-sub-segments by the German Handbook of Emission Factors, emission factors (g CO2/km) for every vehicle in every traffic situation for Iranian standards was calculated. On this basis models traffic volumes and modal split were calculated to forecast the specific emission for different scenario.

3.1.2 Presentation

Dr.-Ing. Wulf-Holger Arndt

International Symposium "Mobility and Urban Structure"

Urban Mobility and Integrated Transportation Planning – Transfer of Results of Megacities Research

22.-24. February 2013 in El Gouna / Egypt

Future Megacities
Megastädte von morgen

Cross-linked network "Megacities and Mobility" (MC Mob)

young cities | METRASYS | EnerKey | SUSTAINABLE HYDERABAD PROJECT | HCMC

Dr.-Ing. Wulf-Holger Arndt

Symposium Information

Information

- Welcome package with booklet (CVs, abstracts,...)
- Program ...
- new: Dr. Hashem Pour (Iran): Sustainable development of urban transportation in Iran

Results

- MC Mob-Homepage http://future-megacities.org/index.php?id=119
- Proceeding publication: CV, abstracts, articles

Organisational remarks

- Safe all invoices!
- Safe the bottom for catering
- Any help: Yaman Hebbo and Nermeen Si Hanan
- Gastwissenschafter contracts
- Excursion info:

Dr.-Ing. Wulf-Holger Arndt

Workshops

Workshops (in parallel) for deepening discussions with local project partners (in every workshop):

- Identification of implementation problems and solutions
- Transferability of solutions
- Future topics in „Megacities and Mobility"

WS 1: Settlements structure and traffic, walkable city, biking (Arndt)

WS 2: Public Transport and Paratransit (Emberger)

WS 3: Mobility management, travel behaviour, public awareness (Fang)

young cities

Developing Urban Energy Efficiency
Tehrān-Karaj

Research for Sustainable Megacities of Tomorrow
Energy- and Climate-efficient Structures in Urban Growth Centers

Research Progress and Perspectives Dimension 'Transportation & Mobility'

Dr.-Ing. Wulf-Holger Arndt
Dipl.-Geo. Norman Döge
Dipl.-Geo. René Kämpfer

Technical University Berlin
Center for Technology and Society
Research Area "Mobility and Space"

Federal Ministry of Education and Research | p2mberlin | nexus | Fraunhofer FIRST | Universität der Künste Berlin | Freie Universität Berlin | inter3

Outline

Dr.-Ing. Wulf-Holger Arndt

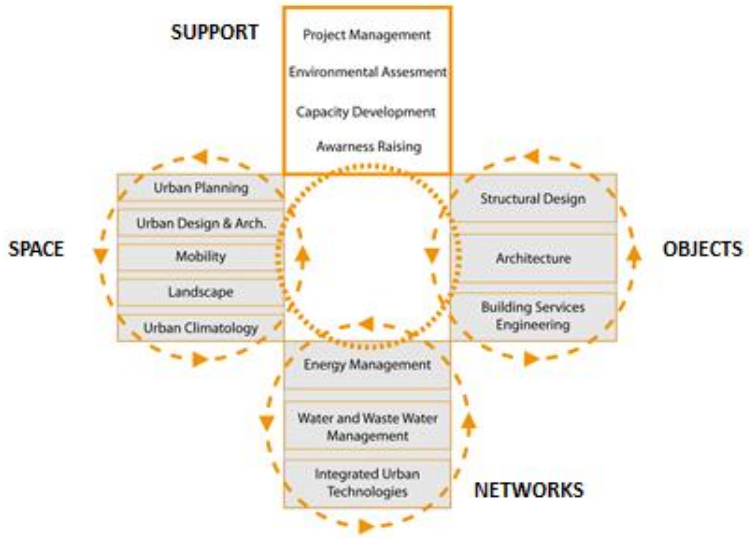
1. YoungCities project
2. Transportation concept 35ha Pilot Project
3. Public Transport approach whole Hashtgerd
4. Transportation Planning and Research Instruments

Location

Dr.-Ing. Wulf-Holger Arndt

Integrated Project Approach

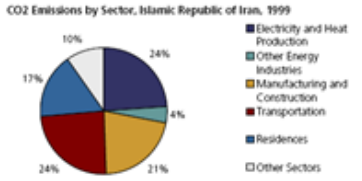
Dr.-Ing. Wulf-Holger Arndt



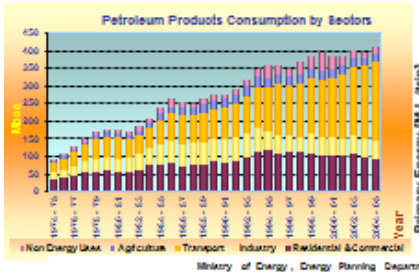
Team 1

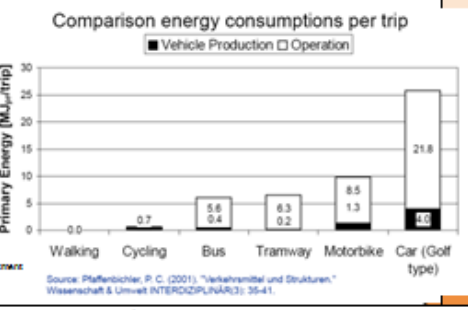
Dr.-Ing. Wulf-Holger Arndt

Traffic impacts



- 70% of CO2 emission in residential areas based on traffic! [EEA 2008]
- Traffic CO2 emission increasing absolutely!
- Strong relation CO2 emission and energy consumption





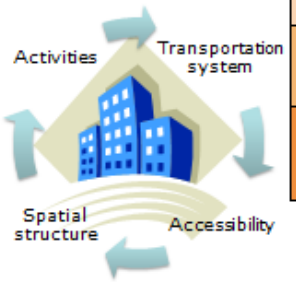
Major Transport Planning Criteria

Goals: Sustainability, Climate protection by energy efficiency reduced CO2 emission

➔ According to Urban Design Criteria

➔ "Reducing traffic and increasing mobility" (Sudarskis)

- Support of the mixed land use approach through adequate mobility systems
- Accessibility (social and area related)
- Integration of all traffic modes in Transport and Urban Planning
- Coequality for all modes of transport but filtered permeability of spaces
- Support to environmental traffic (slow modes, public transport)
- Flexible and adaptable Transport and Mobility Planning approach
- Avoidance of extraneous traffic through residential areas
- Increasing traffic safety



- *Participation of all stakeholders in planning process*
- *following the topography*
- *with attention to disaster management*

Integrated Transport Planning Approach

→ Possible instruments for implementing the chosen leitmotif

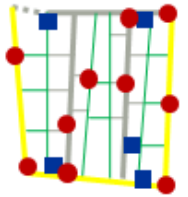
• Limitation of Parking Space • Exaltation of MT trip costs through road design measures (e.g. speed humps, bottlenecks) • Access limitations through street widths layout (one way systems) • Filtered permeability of spaces	• Usage based apportionment of external costs (eco-fueltax) • exaltation of MT trip costs through access limitations, speed limitations • city / highway toll ?	PUSH
Integrated measures		measures
• Pedestrian / PT priveleging road way and path design (e.g wide footpaths and –ways, high number of crossings, barrierfreedom) • high densed foot path and PT network • high density of PT-stops	• mobility management • mobility package • information on transport infrastructure • campaigns	PULL
HARD POLICIES	SOFT POLICIES	

Concept Essentials

Mobility Management
Main Approach: Changing routines through awareness raising
Soft policies
→ **Different solutions for different target groups (new inhabitants, economy, residents)**
- Central items: Mobility Package for new inhabitants
- Continuously assistance
- Information network

Hard policies
Streets hierarchy follow usage:
- Surrounded roads: Main roads, collector roads
- Inner area roads: access roads/ways, food paths
- Avoidance extraneous traffic by
  - traffic calmed zone (30 km/h)
  - speed humps
  - road design (green belt, pedestrian facilities,...)

Public transport: LRT/BRT and city bus in surrounded roads
- Minibus line thru area with short catchment area (≤ 250 m)
- Demand responsive transport service shared-ride mode between pick-up and drop-off locations according to passengers need
- Car sharing services



Reduced parking space: parking lots factor 0,2
- Only at surrounded roads and in some sub-neighbourhoods
- Inner area visitor parking lots and for disable people and car sharing
- Distance equability living space to parking lots and stops of PT

Support of eco-mobility: Mobility Management

Support sustainable traffic use routines (public awareness ↑)

Change of residence → to Hashtgerd as a "sustainable city"

↓

Choice of traffic mode set → promote a set for use public transport and slow modes ("environmentally traffic")

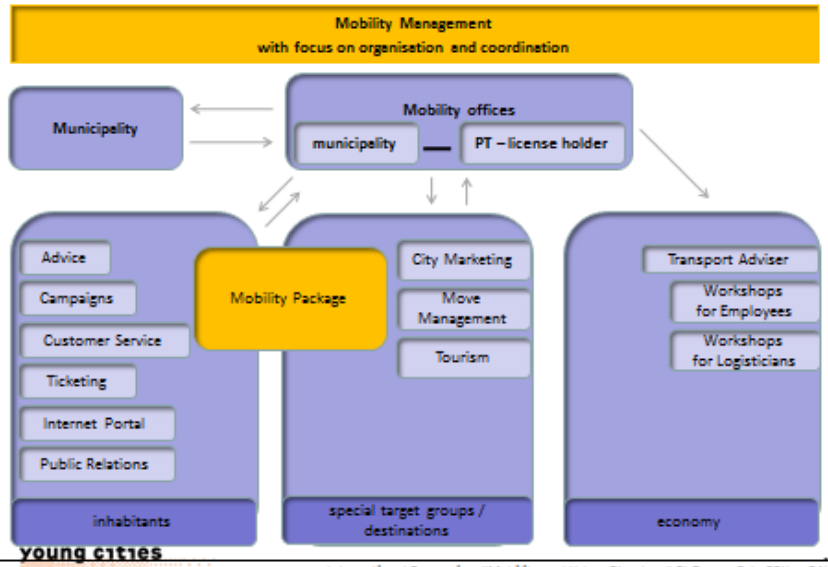
↓

Realized traffic use → restriction of car use ↓
promote environmentally transport system ↑

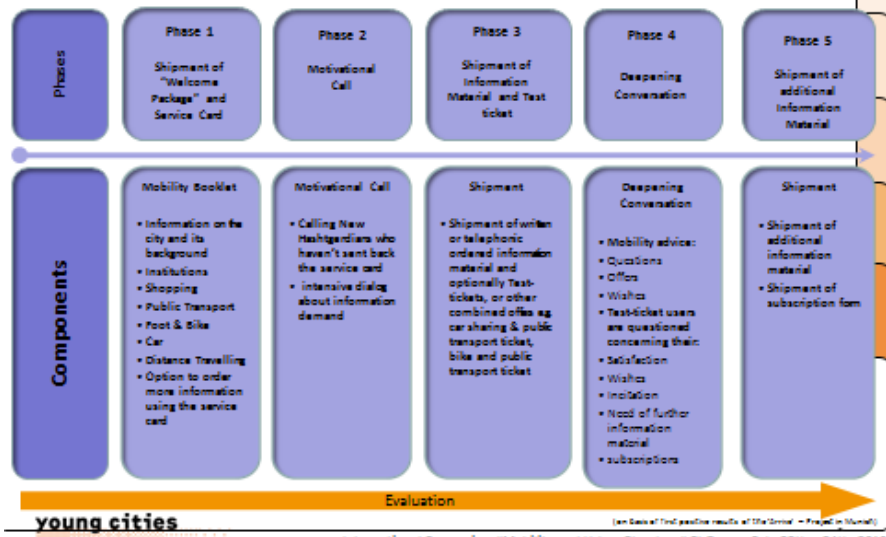
Measurement: mix of "hard- and soft-policies"

- Traffic reduced spatial structure → mixed-use
- Enhance attractiveness of public transport an slow modes →
  high service quality, dense network, mobility management
- Restriction to car traffic → e.g. permeability of space, reduced parking lot factor

Mobility Management



Mobility Package for New Inhabitants



First Promising Results in Germany

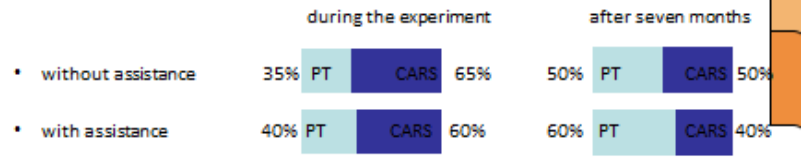
→ Good experiences in Examples:

Rostock

- free ticket for one month & additional information
- after test phase 42% more PT-users

Bochum

- free ticket "Schnupperticket" for one month and additional information/services
- intention was to rise the share of public transport (PT)
- two different experiments, with and without assistance:

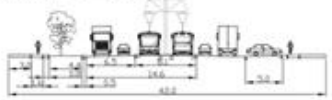


→ positive effect as a result of self reflection

Results: Lack of information and habitual mobility sets are often the main reasons for not using the public transport!

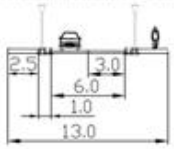
Road Designs

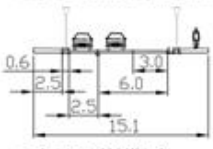
Main Road



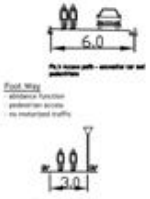
Main Collector Road

Access Road





Minor Categories



Urban Connection – shared space

Innovation: Urban Connection as an example for the shared use of traffic space

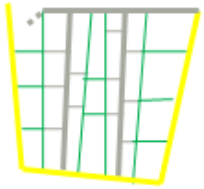
Spatial Extend: 35ha Pilot Area

- east west connection providing barrier free accessibility of central facilities
- connects planned BRT/LRT station (west), central facilities, and green space (east)
- shared traffic space between pedestrians, bicyclists and public transport (minibus)
- lowers cutting effect and reduces space consumption for transportation purposes

Accessibility Concept Roads

➔Avoidance of through-going traffic: traffic calmed zone (30 km/h), speed humps, road design (green belt, pedestrian facilities,...)

➔Filtered permeability of spaces



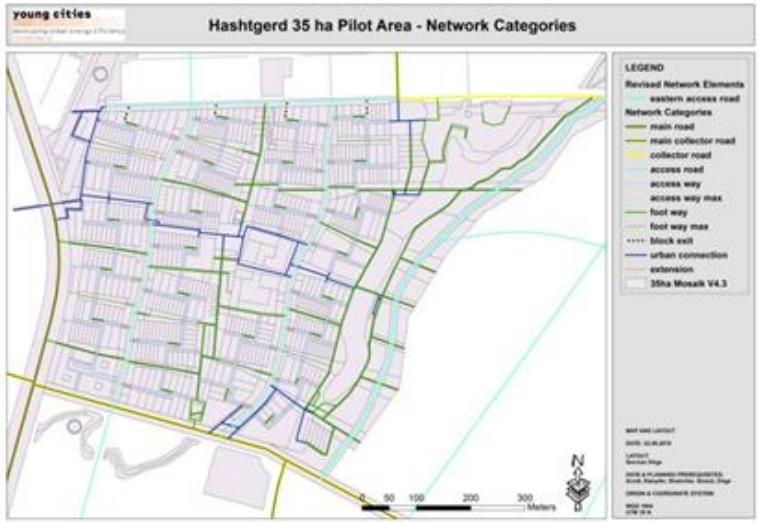
Surrounding roads

- **Main roads:**
  Mainly connection function, 50 km/h,
  capacity 800 up to 2,600 cars/h,
  use for bus and trams possible.
- **Collector roads:**
  Mainly access function, 50 km/h, capacity 400 up to 1,000 cars/h, use for bus possible

Inner area roads

- **Access roads:**
  Mainly access function, 30 km/h, capacity < 400 cars/h, use for Midi- and Minibus possible
- **Access ways:**
  Access and amenity function, slow speed, low capacity for car traffic
- **Foot path:**
  Mainly amenity function, slow speed, no car traffic
- **Urban Connection:**
  Mainly amenity function, pedestrians, bicyclists and mini - buses

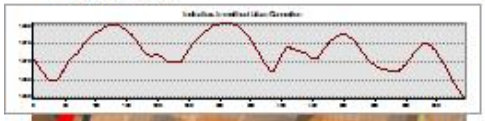
Accessibility Concept Roads

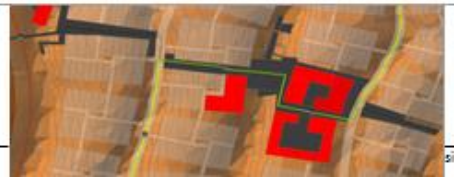


Urban Connection – shared space

Innovative Qualities

- Minimization of inclinations and barriers
- Accessibility and usability for persons with disabilities
- Shared use of public and traffic (public transport) space (amenity and transport function)
- Minimization of sealed soil
- Introduction of surface designs which are ascertainable for blind persons too (ripple marks)
- Liveliness



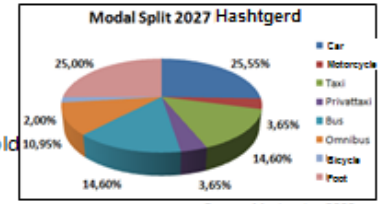


Shared use of public transport (LRT) and pedestrian space in Berlin, Alexanderplatz (white ripple marks in the lower left corner do provide an orientation help for blind persons)

Parking Concept

Input parameter

- 8 000 inhabitants
- Density of households: 4 persons / household
- *How many cars = parking lots/ household ?*



Source: Masterplan 2008

Car Ownership

- Germany: 541 cars/1 000 inh.
- Berlin: 324 cars/1 000 inh. (32.4%), ~50% HH car owned [Amt für Statistik Berlin-Brandenburg 2009]
- Teheran: 91 cars/1 000 inh. (11 inh./car [Shahr 2005: 28]) = 9.1% cars/cap.

Hashtgerd now (ref. Masterplan):

- Car in 48.5% of households (same as Berlin) → 11.8% motorisation rate/capita
- Assumption 2027: 125 cars /1 000 inh.? → 12.5% motorisation rate/capita = 50% households car owner (by 4 persons/households, realistic for 2027?)
- For CO2 reduction → decreasing of car ownership: 20% household car owner as a goal

young cities

Feasibility Analysis – Scenarios

scenario	parking lot factor	restrictions
1n	0,1	- no street parking on Access Road-East and West
1s	0,1	- 90% of residential parking in sub terrain garages
2n	0,2	- no street parking on Access Road-East and West
2s	0,2	- 90% of residential parking in sub terrain garages
3l	0,5	- street parking lengthwise on Access Road-East and West
3b	0,5	- street parking bevel (60gon) on Access Road-East and West
3n	0,5	- no street parking on Access Road-East and West
3s	0,5	- 90% of residential parking in sub terrain garages
4l	1,0	- street parking lengthwise on Access Road-East and West
4b	1,0	- street parking bevel (60gon) on Access Road-East and West
4n	1,0	- no street parking on Access Road-East and West
4s	1,0	- 90% of residential parking in sub terrain garages

Scenario	1n	1s	2n	2s	3l	3b	3n	3s	4l	4b	4n	4s
parking lot factor	0,1	0,1	0,2	0,2	0,5	0,5	0,5	0,5	1,0	1,0	1,0	1,0
residents	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
households	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
demand												
residential parking	200	200	400	400	1000	1000	1000	1000	2000	2000	2000	2000
visitor/costumer parking	192	192	192	192	192	192	192	192	192	192	192	192
total demand	392	392	592	592	1192	1192	1192	1192	2192	2192	2192	2192
supply street parking												
parking lots max	233	212	233	232	245	258	233	258	245	258	233	258
supply sub terrain parking												
parking lots needed	159	180	359	360	947	934	959	934	1947	1934	1959	1934
land consumption in % of 35ha pilotarea (without access lanes !)	1.4 %			2.1 %	4.3 % (~7%)				7.8 % (12 - 16%)			

preferred scenario regarding the predicted motorization rate and the aim of CO2-reduction

Possible innerarea street parking lots

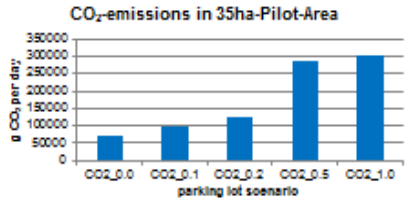
young cities

Parking space needed

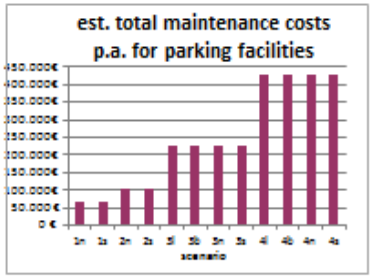
- factor 1,0 parking lots per household
- Only surface parking

Master Plan

Parking Concept - CO2 emission and cost analysis



- If the parking-lot factor rises from 0.2 to 0.5 the CO2 emissions > double
- A parking-lot factor > 0.5 overruns the car-ownership in Iran



Public Transport

The elaboration of the public transport approach for the 35ha Pilot Area is directly connected to the approach for whole Hashtgerd

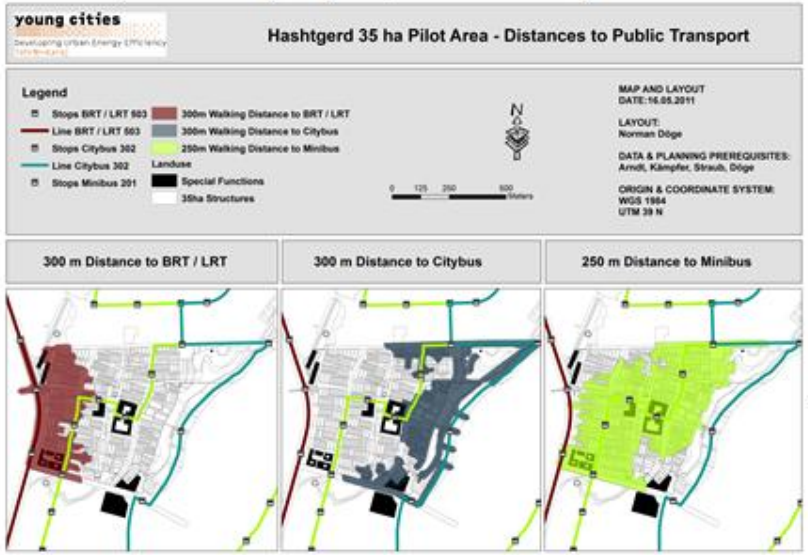
Three Levels

1. **BRT/LRT** main connections
2. **City-Bus** connection betweens quarters and centre
3. **Local Bus** Minibus
4. **Taxi/car sharing**
   - Route taxi
   - Call taxi
   - Normal taxi

Catchment areas:

- BRT/LRT: 300 m
- City-Bus: 250-300 m
- Minibus: 250 m

Accessibility considering height information using ArcGIS Network



Approach integrating all constructional aspects

Public Transport Concept

→ Decisive criteria is the spatial-horizontal integration

Levels/Parameters

1. **BRT / LRT:**
   for main inner city connection (centre, railway station, industry areas,...)
   (2 000 – 30 000 Passengers/h)

2. **City-Buses:**
   connection betweens quarters and centre
   (1 000 – 4 000 Passengers/h)

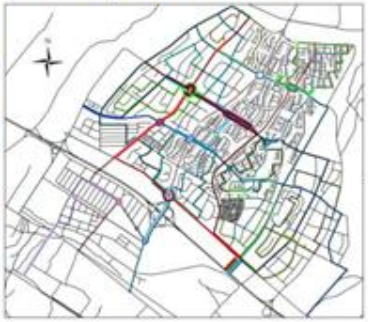
3. **Local quarter buses:**
   inner area access
   temporally demand responsive service and flexible stops
   (Midi/Minibus)

4. **Taxi/car sharing**
   - Route taxi
   - Call taxi
   - Normal taxi

Regional commuter traffic
- Interaction to Karaj and Tehran by train
- Regional busses

Catchment areas:
- Minibus: 250 m
- City-Bus: 250-300 m
- BRT/LRT: 300m

Network principle scheme



First Network Approach

Transportation Planning and Research Instruments

In applied research different instruments are needed to evaluate impacts certain planning measures would have.

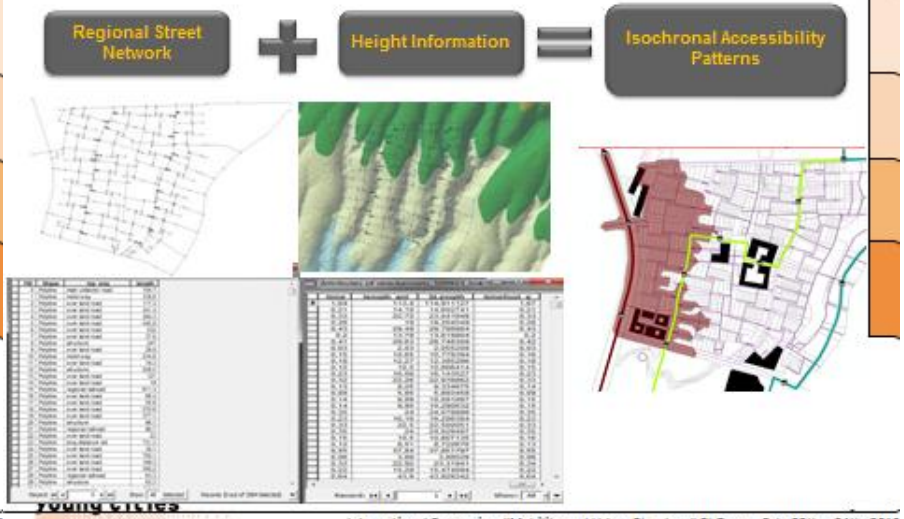
Focussing the Transportation Research these instruments are:

1. Models and Databases developed with ArcGIS
2. Transportation Model using the software VISEVA+ / VISUM in cooperation with TU - Dresden
3. CO2 Calculation and Evaluation Model integrating results from VISEVA+ / VISUM and the German Handbook of Emission Factors in ArcGIS (TEECT)

Modular configuration → Integration of all instrument

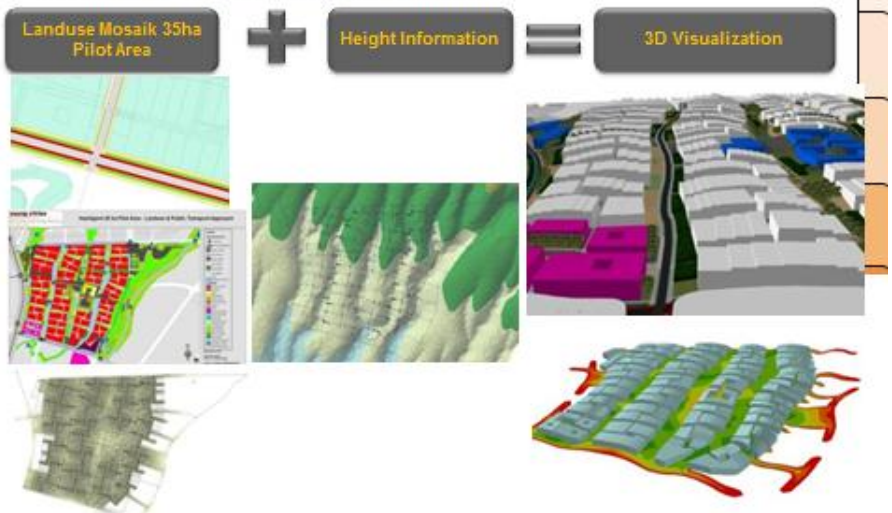
Basic Data – Further Development

→Example: Accessibility (ArcGis Network Analyst)



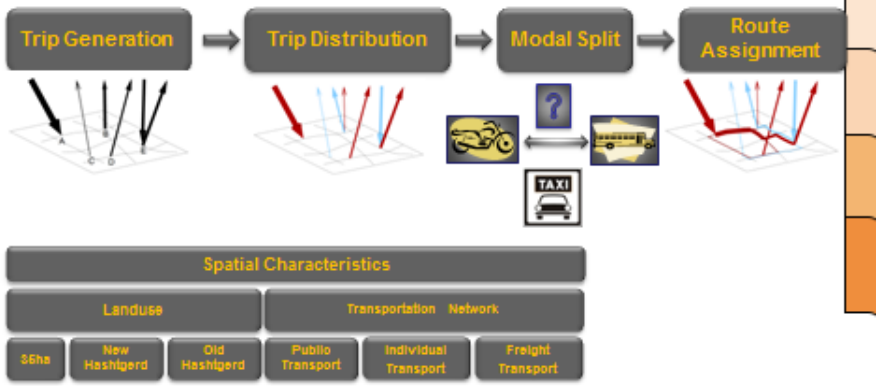
Basic Data – Further Development

→Example: 3D – Visualization (ArcGis 3D Analyst)



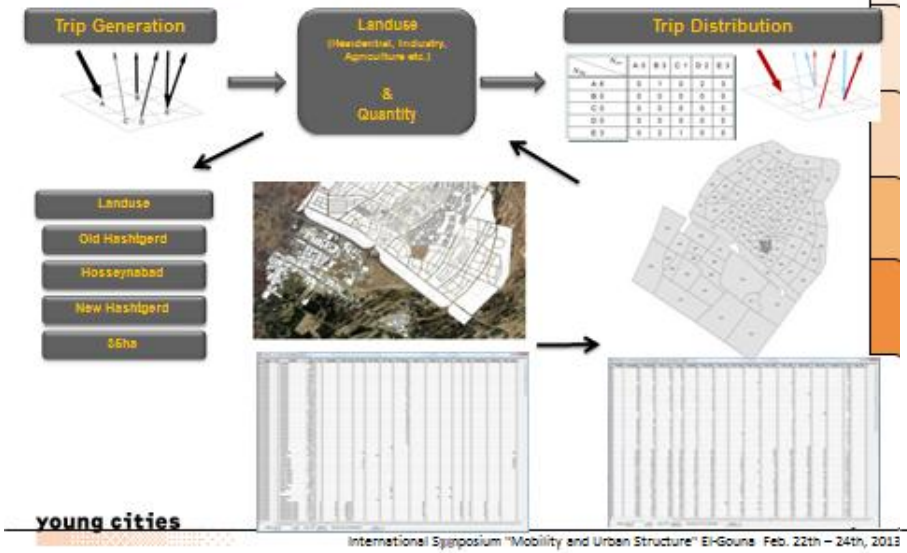
Transportation Model using VISEVA+ / VISUM

→Integration of GIS and VISEVA+/VISUM

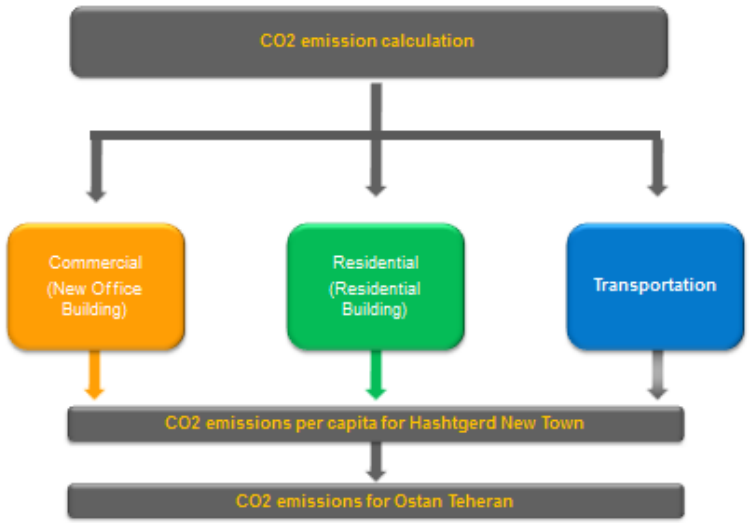


Transportation Model using VISEVA+ / VISUM

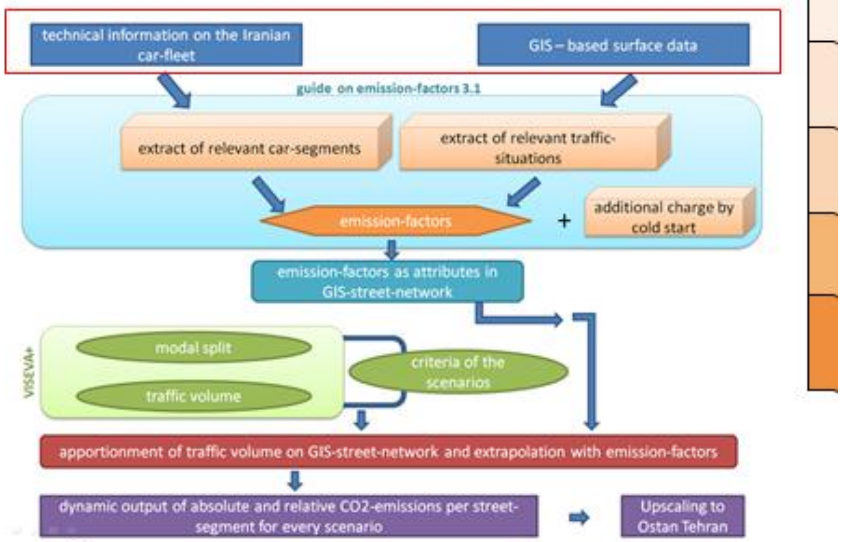
→Calculation Basis are different Traffic Cells



C02 Emission Calculation



C02 Emission Calculation in Transportation



Transformation – vehicle-data to HBEFA (Handbook of Emission Factors [trans.])

vehicle-categories by „Handbuch der Emissionsfaktoren 3.1“ (HBEFA)

Category	HBEFA_Subsegm	HBEFA_Subsegment
Passenger Cars/Taxi	111120	2010 PKW Benzin <1,4L Euro-2
	111220	2010 PKW Benzin 1,4-<2L Euro-2
	111220/192620	2010 PKW Benzin 1,4-<2L Euro-2/PKW CNG/Benzin Euro-2
Mini Bus/trucks	222510	LNF Diesel N1-III Euro-1
	222500	LNF Diesel N1-III conv< 1986
City Bus	727120	LBus Midi <=15t Euro-I
	757160	LBus Midi <15t CNG EEV
Motorbikes	939100	Moped <=50cc pruEuro
	919600	KR 4T <=150cc pruEuro

brand	type	company	fuel	ccm	EURO
Peugeot	405	KCD	gasoline	1600	2
	206	KCD	gasoline	<1400	2
	Pars	KCD	gasoline/CNG	1600	2
	Roa	KCD	gasoline/CNG	1600	2
Renault	Logan/Tondar90	KCD	gasoline/CNG	1600	2
Samand		KCD	gasoline/CNG	1600	2
Kia	Pride/NASIM	Saipa	gasoline	<1400	2
	Pride 141	Saipa	gasoline	<1400	2
	Pride 132	Saipa	gasoline	<1400	2
	Rio	Saipa	gasoline	1500	2
Citroen	Xsantia	Saipa	gasoline	1600	2

→ Result: 9 vehicle-categories equivalent to HBEFA 3.1

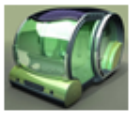
CO2 Calculation Scenarios

0

"BAU 2008"
- current vehicle-fleet
- public transport offer as planned in Masterplan 2008
  Basic bus service on main tracks only

1st

"BAU 2027"
- future vehicle-fleet
- public transport offer as planned in Masterplan 2008
  Basic bus service on main tracks only

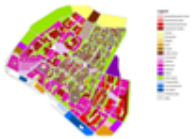


2nd

"Basic 2027"
new concept of public transport with
- BRT/LRT, mini-bus, city-bus etc.
- higher share of bicycles

3rd

"Optimum 2027"
new concept of public transport with
- BRT/LRT, mini-bus, city-bus etc.
- higher share of bicycles
- soft policies (mobility management)
- traffic optimized settlement pattern



Future steps

- Traffic model and land use optimization
- Revision line concept public transport
- CO2 simulation
- Participation workshop urban planning and transportation
- Traffic safety concept
- Commercial transport concept?

Thank you for your attention!

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3.2 Identity and Sense of Place in the New Cities | Rahim Hashempour

3.2.1 Abstract

Considering Urbanism Principles with regard to the originality, identity and traditions can play an effective role in cities' future also-called "New Towns". Fantasy's Cities or New Towns are thoughtfully designed with pre-arrange plan and new policies.

Different cultures and traditions in one side and Urban Design and Modern Planning on the other side is today biggest concern. The Harshness of the cultures in New Towns has made a harder city management and twisted up the relationship between citizens.

Due to the vast cultural and traditional varieties, adding an uncommon Architecture and Urban Planning and Designing into towns is the beginning of the difficulties of cities' futures. Whether the main problem is the way of designing and planning or the policy of increasing the population, what New Towns today mainly suffer is the lack of identity and the differentiation between other cities, which mean to put a specific uniform on the city and the regularity, wide technology authority and senseless man-made rules which has compelled the city.

3.2.2 Introduction

With the incrassation of the population in New Towns, many of the problems are being solved by the authorities such as construction of urban facilities and services and creating cultural spaces. However, understanding the emotional needs of residents, which in the long run will become one of the major problems, only in the form of identity - identity and identity of humans, may be possible. Verifying the identity of people living in cities helps us to become more responsible citizens and live in a lively atmosphere.

3.2.3 Experiences in New Towns in the World

New Towns in the world are planned communities produced in response to a predetermined objective. In fact, this part of the country is balancing policies in land preparation.

"Land use planning which has a political nature, offers a worldview issue that economic is only one aspect of that. (De Montricher, 1995:9). New Town is a community with a self-reliance population and a specific area, certain distance from the metropolis, predetermined plan, set goals and have all the necessary facilities for an independent environment. New Towns are mainly designed for physical, economic and social decentralization in the area of urban cities. Cities and the growth pole of regional development policies in order to achieve the account. These Cities are responsible for controlling the population, organizing metropolis and urban areas, improving the work environment and the healthy social life. Creating New Towns during the industrial revolution was considered as a transition from a traditional society to the industrial society. Therefore, along with the creation of the industrial units in the cities, New Towns were the solution of problems related to the settlement of the population.

During the last two centuries, most of the cities were created near mineral resources and big industrial units in order to fulfill the developmental side of the regional development policy.

Following this, these cities needed an operation in order to get welfare for the population needs. Plans to create New Cities, has a long history. In the twentieth century, the former Soviet Union and Britain were among the leading in the new industrial towns and creating residential cities. These things have spread out during World War II in the United States, France and Eastern Europe and the creation of New Cities started to increase. In the twentieth century, New England was one of the first countries that have been studying New Towns. "Sir Christopher Wren" and "John Allyn" were people who did the first step in constructing cities through planned stages. One of the most famous cities built in the late 18th century as an independent set of plans, was Washington DC City, the capital of the United States. Most of New Cities have been created in the UK after that the establishment of the plan was accepted. City such as "Reins" in the eighteenth centuries in France and the City "New Delhi" in India after the First World War.

Figure 1: Prospect of Hashtgerd New Town's entrance

3.2.4 Aims to create new cities

New Towns are policies related to the needs and demands of each country. First world nations began to create new cities towards decentralization. The principles of report of Barlow raised and emphasized by Aber grammy in London in 1944. In his plan for the Decentralization, he proposed to build ten new towns around London to be as well as to control the growth of the

city of London should not be in any way industrial plants on the outskirts of London and also allow the dense construction data in the adjacent external spaces.

Nowadays Generic City rose for the first time by Rem Koolhaas, has developed urban infrastructure issues such as identity, recognition and related characteristics (Panahi - Khiavi Karimi, 1391).

New Towns are generally founded on three hypotheses.

- Attracting population in major cities

- Decentralization

- Overcome the shortage of housing

To make an overall look to the motivation of creating new cities in developed countries and in developing new towns, we'll take a look to year and the reason they were founded.

Row	Country	Year of foundation	Basic goals
1	Australia	1950	a) decentralization of metropolitan b) housing for rent and buy c) motivate the developed areas
2	the United States	1950	profitability by increasing land prices and constructed spaces
3	Eastern Europe	1952	a) reducing concentration Myvplha b) motivating underdeveloped areas c) Creating Agricultural area
4	centers	1950	a) social housing objectives
	Nordic		b) getting experience in the case of a high quality urban design and architecture c) provide space for future growth and expansion of cities
5	UK	1946	a) fixing the problem of lack of housing in metropolitans b) satisfying all industrial housing construction
6	Scotland	1947	a) resolving housing problems in major cities b) restoring areas back to life c) land reclamation d) preventing depletion of the rural population
7	Egypt	1905-1981	a) avoiding the flow of immigrants to the metropolitan area of Cairo b)conducting unwanted and unplanned process of urbanization in the country towards a balanced system of urban settlements

8	India	1940-1950	a) providing housing for industrial workers b) assign priorities to locate projects in underdeveloped areas of the public sector c) providing welfare services in absence or deficiency
9	Iran	1979-1975	a) preventing uncontrolled development of cities and large towns, b) transferring industries disturbing the metropolitan cities c) creating employment in New Towns d) prevent land speculation in the metropolis e) metropolitan refinement f) reducing the cost of transportation to the centers around metropolitan cities g) avoiding marginalization in the metropolitan cities, h) reducing metropolitan urban traffic I) Placing locations near new cities and work places j) preventing the destruction of agricultural land on the outskirts of large cities k) housing l) reducing the cost of infrastructure development in metropolitan cities m) releasing metropolitan land of urban by transferring industries to New Cities n) preventing pollution from metropolitan cities(approved by Cabinet in 1975)

Table of dates and causes of establishment of new towns around the world.

According to the table above common motives in creating new towns between these countries can be observed. But something in this political and economic thinking-or better say in the Government's decision is a forgotten cultural position and identity of this cone urban obviously the identity is created over time but the basic structure and spaces created played an important role in the development of the formation of the identity. If you want a comparison between these towns and cities, we must admit that the General was in the towns of new spaces, such as spaces, "No place" and lack of identity and a sense of their location while in the towns, identity and sense of place have the first word.

3.2.5 Beliefs, Mindsets and No Place

In the past, the structure of life was based on beliefs and convictions while today this is happening on a natural stream or natural ultraviolet happening. Due to population growth in the last few decades villagers immigrated to the cities and in some cases in big cities, it was led new towns without regard to the beliefs, traditions and human's beliefs. In the event and the produce of machine, naturally the quantity became more important rather than the quality of their data and created a Cartesian between man and nature which the traditional concept of man has been missing.

Figure 2: Main sample of urban block

The spaces that were created in the city leaded to loss of human truth and man disposal and lost in a "No Place" lives. In some cases, not only it hasn't bring a bright future ahead, but also bring human destruction and devastating as well. People of this community, as Sartre says, looks like a group who are waiting for a bus on the side of the street and think at one topic at same moment (Panahi-Karimi kheiavi, 2012).

One of the biggest bugs in this city is that the truth and the essence of human nature is transformed into a reality because the converting technology which in a specific period of time will end the human history. Louise Mumford called these projects from the perspective of urban, anti-human design and use the so-called word "anti-build" or "ruining design". (Bahraini, 1378, 75)

According to Pierre Merlin new towns hypothesis is ambiguous. New Towns have been there all the time, from the Old Testament (like Naples called Niapolice). However, regardless of the new cities of the ancient, medieval, or last, it is in the twentieth century that the growing trend of new cities has been emphasized and universal. The origin of this phenomenon was the "Tomorrow, a peaceful path to Real Reform"'s book by Ebenezer Howard in 1898. This book is that the collective origin of the garden city created in England (1899), and then at a global scale (1913). Creating two latch Garden City Wires (1930) and The Welwyn (1919) were other initiatives of him. Of course author and historian Colin Ward believes that these two cities are

Figure 3: Spending free time in nature

failing to achieve their objectives (new cities, 63: 1383).The policy of new cities in many countries, with government initiatives (America, Britain, France, Russia, etc.), and sometimes in local cooperatives (especially Sweden and Holland), to private developers (America) has been successful. However, the so-called "new towns" was not exactly specified and a lot of measures out of the principles of the new city planning announced themselves as new cities.

City centers or Capital designs can be included as one of the construction of new towns in the past century. like Versailles in France, Washington in America, Canberra in Australia, New Delhi in India, , Brasilia in Brazil, Islamabad in Pakistan, Punjab and Chandigarh in India and, Abuja in Nigeria . The main reason of creating a new capital city was to create a political balance between areas of land preparation concerns and to take away the power of crowded cities. These capitals were often assigned to an architect - urban planner, best known for planning and their construction (Enfant Washington) or both (Le Corbusier in Chandigarh, Costa Meyer and Neumann in Brasilia).

3.2.6 Paradoxes in New Cities

Lloyd says Radvyn Lioyd Rodwin Architecture in the nascent cities, "the cities are lacking in warmth, something to feel happy, to play or to bring surprises. Few attempts have been taken in this regard, except for probably one or two which looks good, have not had much success, the ugliness of this cities such as bad as an ugly painting comes immediately to the eye. In this

context J.Richards one of the editors of the prestigious magazines named Architectural Review writes: In a study of nascent cities and towns, if someone wants to compare his expectations with the reality, he will become upset and frustrated after studying the architecture and urban development of these cities.Residents of nascent towns rather than feeling comfortable and having fun in an environment find themselves in a soulless desert road that it is full of green grass (emboss, 1381, 263). Today in towns, on the contrary, esthetic, loss of identity, pose, imitating, individualism, consumption, corrosion, try resemblance to the alien, distinction concerns of homogeneous stress, pollution, ugliness, lack of friends and family, nostalgia and a lot of shortcomings which are necessary for human life, has made the field so narrowed to everyone which human longing and desire to displacement mountains and deserts. (Naghizadeh, 1387, 92). If you want a clear expression of this we must confess that the atmosphere is composed of more than one object, or a set of activities is urban furniture. In fact it brings people with different social and culture together. Finally the city is a community or a set up with the political basis and known as a place of gathering of religious and political family. For the city in the past was considered as a location of community, life and people's temple (Roncayolo, 2005: 29).

Figure 4: Changing the identity of public spaces volume

3.2.7 History of New Towns in Iran

Population growth and increasing demand for housing use and expansion of cities on the other hand, led planners in the country attempting to adopt a strategic policy in order to solve the problems of the housing sector during the past year. The policy of making new towns since 1989 (1979 ad) and to seek approval of the Board of the new municipalities of the established civil administration about Iranian companies on the agenda of the Ministry of housing and urban development was the way these questionnaires of this section was adopted in order to meet one of the most important concerns of the people.

Creating New Towns in the last decade was a response to the rapid urbanization in Tehran metropolitan area in the past three decades which increased the population of the 5/1 million people to about 6 million people. This rapid urbanization development restriction attached which result in limitation and the resulting socio-economic issues, as well as housing a wide segment of the population, especially the low income and middle class in Tehran, had put the authorities, in 1976, the Twenty-five-year-old in range of creating New Towns. (Trust, 1373: 307). Now 22 New Towns are under the construction phase, the Department of Housing and Urban Development expects to be more than four million and 700 thousand in the New Towns. Most modern cities in Iran are as follows: Pardis, Hashtgerd, Eshtehard, Andisheh, and Parand in Tehran, Foulad City, Majlesi and Baharestan in Isfahan, Mohaajeran in Arak , Sadra of Shiraz, Sahand in Tabriz, Gulbahar and Binalud in Mashhad, Ramin in Ahvaz, Alavi in Bandare_Abbas, Tis in Chabahar, Latyan in Karaj, Ramshad in Zahedan and Alyshahr in Bushehr.

3.2.8 Classification of residents in the new towns

One of the basic principles in the design of housing is the access to information on people who are living in it. This information includes the pyramid age, job, interests and emotional needs. The survey reports and field studies in these areas - especially in new areas of capital cities - most residents of the new towns can be defined in four categories:

- **People:** People have been residing in these New Towns who because of the economically low land prices and the good services, which have been resident in the form of rent or as landlords.
- **Members of cooperative housing:** mostly related to offices and public institutions are parts of this group with the first batch in a new town resident, also with the aim of contributing investment and purchasing residential units.
- **Occupational groups:** for example, part of the new residential areas in the town of Parand is assigned to airport staff.
- **Investor groups:** this section is relative to the construction or the purchasing of residential units with the aim of supplying more prices. This group as well as the use of leisure time in the town has a different look at the number of units available in the bungalow in the Pardis City.

3.2.9 Identity of the Residents in New Towns

The crisis of human identity and the city can be discussed as the most important issue to be reviewed in a new city which is far less investigated. Unlike the material needs, such as nutrition, traffic and service spaces that in a short time his side returned to pick up the subject of human spiritual needs, due to the complexity and breadth of it, it will manifests itself in the long run effect therefore it need to have an exploration into the deepened. It looks like the subject identity by maintaining the generalities of the subject, other projects also can be extensible such as City Garden's of the country.

Therefore, understanding the strengths and weaknesses of the above projects in order to improve the conditions of life and work in these spaces will help.

Short term stay is the most common of all the bands new accommodation in the city. In a convenient economic and job opportunities their location change. In fact, none of the above bands is not considered as optional citizen and eventually seek for macroeconomic objectives.

Studies show that scheduling groups in the short-term (5-year) and medium term (10 years), and none of these groups have accepted the New Town as his hometown.

The question is with a combined population above and beside the building and constructions massively in such cities, how do we build a city that needs to respond to the emotions of the residents, in other words how to amplify the identity of the city and the citizens?

Figure 5: Preserving the identity of new towns

3.2.10 Tradition in New Town

In the continuing search for new cities we reach to the observation of the tradition of identity. One thing which is clearly among the citizens of the new cities is the heterogeneity in the observance of religious traditions.

Mourning ceremonies or festivals like Muharram, mourning the different styles reflect the lack of a tradition or community-based approach in New Towns. In the cities, everyone does their job and does not bother each other. Of course in most cities in Iran there is this variation, but defined at the level of a neighborhood, but here in the country this separation takes place. For

example, in the time of Muharram in a town of about 40,000 people, a new city of Hashtgerd (Alborz province) we saw over 14 staff of mourning that the number of participants in each of these hyatha goes up to more than 40 or 50 people: but its independence in conducting the ceremony is a sort of security and respect for the their identity. In some cases, in these times the town became haunted and almost half the city comes in as a holiday and it's because that the presence in their original hometown create identities for them.

Figure 6: Keeping the tradition in New Year

3.2.11 Physical Identity

Another factor that fueled the new towns identity is the issue of urban landscape and the city. Creation of uniform buildings and excessive attention to transport and access networks and at the same time the too much importance of the decision of the user and per capita density cause mental fatigue and soulless urban spaces.

In Iran, such as the New England towns were assigned to cooperatives and from around the country the factories and offices applied for various land and build housing. Rules and regulations necessary for building facades such as brick and cement (especially in New Account), make the city a major garrison. This is one of the reasons for the failure or lack of satisfaction led to the absence of people in new cities.

For designing an environment a series of relationships between objects and objects, between humans and humans and between humans and objects must be defined. The relationship between a system and its skeletal and any combination of two things happened, and the promise of an "Assemblage" is not accidental. Objects and humans, in varying degrees of separation (separation) exist in space and all related by space. (Etesami, 1372: 351).
In the design, four elements are formed or in other words "regulation" must be derived from these four elements:

- Space or the spatial organization: planning and design from regional scale to a small room. It should be noted that the order is in the social, religious and ethnic rather than a geometric principles.

- Time or Time Organization: future orientation versus past orientation, dealing with time will affect our behavior and decisions and effective through the design of environments.

- Communication or Communicational Organization: the relationship between the human-human communication, whether it is verbal or non-verbal. This relationship, under what conditions, how, when, where and in what cases and in what position is created and connect “communication" and "built environment”.

- Meaning or Semantic Structure: the meaning of the human relationship with the environment while "communication" means relationship between people. Often by means of signs, materials, colors, forms, sizes, decorations, outdoor it is expressed. In some books "semantic structure" is known as "a combination of semi-fixed" .Semi fixed elements consist of a very wide range such as curtains, furniture and clothing, street furniture, advertising signs, shop windows, and ornamental plants, vegetation and urban elements. Unlike the fixed combination, these elements can change quickly and they are also very important elements because people cannot change the fixed elements.

3.2.12 Sense of place

A sense of place in each place applies and if you do not see or understand it , it became useless. The sense of place is not something that only for critics is desirable, even ordinary people familiar with the history; mostly feel discomfort because of the loss of identity of. Within The lack of a sense of place ownership does not mean anything therefore the sense of place is lost. Jon Lang Urban elsewhere in the Design book says: Most of architecture creates shock. As the jewel of Nehru said about the work of Le Corbusier in Chandigarh, it makes us sit and think. He probably thought it would be for the benefit of the people of India if they get along with changes. Undoubtedly office suite - Chandigarh political identity is unique. Architects and public in the city have applied the Le Corbusier model to the buildings architecture in order to create "Chandigarh Architecture". The term "sense of place" has two aspects, sociological and psychological. The first one is a sense of place of a person or sense of a social person in a larger unit community, and the second is related to the sense of belonging to a region or an area related to culture.

3.2.13 Conclusion

The phenomenon of new cities, including cities in the world is inevitable. The question is not need or lack of need for new cities but how we function and its impact on human life. New Towns have the technology but the emptiness of space in the new cities sense of space is nicely observed. As mentioned in the article humans fear can be take away by respecting the relation between objects or between objects and humans or between objects and humans. Ignoring this could have endangered the future of the new cities of the future, not only it will stay away from

your goals but also will have negative growth ** (Development Corporation, 1385). Another fear in lack of identity and sense of place is the problems of crime and absurdity of being in a stranger space. In soulless spaces which the spirit of cooperation and unity doesn't exist, violence, invasion or rebellion shall be replaced. Therefore substantial planning in the creation of new cities is essential.

3.2.14 Sources

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* One of the papers that are presented in this article about the "new cities in search of identity" - written doctor Mohammad Mehdi Azizi and Arbab Parsa - in newspapers, information from the Site sun, juin 2010.

** According to the New Towns Development Corporation, Hashtgerd New Town population census in 1383 was 42,000 people, while in 1385 Census population declared 15,900 persons. In fact, from 1383 to 1385 a decreasing growth happened in the town.

3.3 Perspectives of the Transport Sector of Gauteng for GHG Mitigation | Jan Tomaschek, Thomas Haasz

3.3.1 Abstract

Gauteng province is the smallest of all nine South African provinces with less than 2% of the total land area of the country. However, the Province generates about a third of the national GDP and about one fifth of the national population lives in Gauteng which is currently about 11 million people. Moreover, Gauteng's population is expected to grow at a high rate, even faster than other parts of the country due to high immigration rates and in 2040 a population of about 20 million people seems to be reasonable. This economic dominance is a major driver of transport activity and transport related energy consumption as well as greenhouse gas (GHG) emissions. In consequence, Gauteng was responsible for about 29% (about 770 PJ) of the total final energy consumption (FEC) of the country in 2007. The transport sector accounts for about 35% of the total final energy demand in Gauteng. GHG emissions corresponding to the energy consumed in Gauteng were about 122 Mt CO2eq (in 2007).Taking into account the life-cycle emissions of energy provision about 25% of total GHG emissions can be allocated to the transport sector. The high dominance of the transport sector in Gauteng and related GHG emissions in conjunction with the probability for future growth have been identified by the local bodies of government which are now looking for GHG mitigation options for the transport sector. To quantify transport energy use and transport related energy emissions and moreover to quantitatively evaluate promising measures for mitigation transport and transport related GHG emissions two transport models (i.e. TEMT and TIMES-GEECO) were developed as part the EnerKey project. Using TIMES-GEECO, we conducted a scenario analysis to identify robust measures to reach provincial targets at minimum cost. A scenario framework was developed for the period from 2007 to 2040 to evaluate the implications of different prospective future development pathways.

The results of the scenario analysis show that in the reference scenario the energy demand and GHG emissions in Gauteng are likely to increase significantly until the year 2040, by almost 80% to almost 240 Mt CO2eq in 2040. This is mainly caused by the expected increase in population and GDP, and the demographic shift as well as an increase in personal wealth. Moreover, under the conditions of the implemented policies scenario the energy supply will still be largely based on coal and fossil fuels. GHG emissions through fuel combustion in the transport sector increase from about 16.1 Mt CO2eq to about 22.7 Mt CO2eq under the conditions of the implemented policies scenario which equals an increase of more than 40%. To counter this development policy makers can intervene. In the mitigation scenarios the share of alternative power trains in the transport sector increases. Additionally, changes in the fuel supply can be identified which do not require alternative vehicle power trains like the substitution of fossil synthetic fuels with ones from biomass (i.e. BTL) and biodiesel from waste cooking oil. In consequence GHG emissions in the transport sector are reduced by 4.4 Mt CO2eq (-20%) in 2040 in comparison to the implemented polices scenario. Total GHG emissions which are attributable to Gauteng decrease by 156.6 Mt CO2eq (-68%) which is mainly based on changing the means of electricity provision but also due to the changes in transport energy supply.

3.3.2 Presentation

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Institut für Energiewirtschaft und Rationelle Energieanwendung IER

GHG mitigation strategies for Gauteng - Integrated Analysis of the Transport Sector

EnerKey

Jan Tomaschek, Thomas Haasz
International Symposium Mobility and Urban Structure
El Gouna, Egypt
February 2013

Universität Stuttgart
Institut für Energiewirtschaft und Rationelle Energieanwendung IER

Overview

- Background information
- TIMES and TIMES-GEECO
- Scenario results
  - Implemented policies scenario
  - GHG mitigation scenarios

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Institut für Energiewirtschaft und Rationelle Energieanwendung IER

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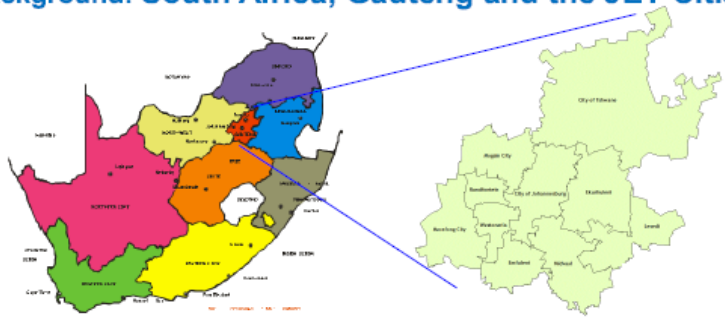
Background: South Africa, Gauteng and the JET Cities



- Population of 11.2 Mio. (about 22 % of total SA population) with highest density in SA (659/km²) and high population growth at 4.5 % per anno,
- Smallest province in SA with ~18.000 km²
- About 30 % of national GDP
- Lack in energy supply security, frequent black-outs
- Three metros Johannesburg, Ekurhuleni and Tshwane (JET-cities) grow together to a megacity and compete for a global city region (GCR)

Source: http://www.southafrica.info

EnerKey: A concept for efficient energy and climate protection structures

Socio-demographic determinants

Scenario analysis and policy recommendations

Long term perspective development

Training, capacity building and technology transfer

- Buildings and settlements
- Transport and mobility
- Energy supply technologies
- Industry and Commerce

Energy and GHG emissions balance for Gauteng

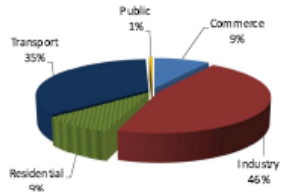
	Final energy consumption in Gauteng [PJ]
2007	774
2008	753
2009	765

	GHG emissions in [Mt CO_2eq]	
	territorial	accountable
2007	40.0	123.0
2008	40.1	123.1
2009	43.5	126.4

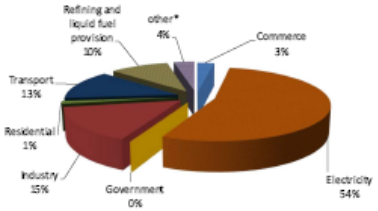
The decreasing effects of the global financial crisis compensate for the increasing energy demand in the residential and the transport sector. However, continuously growing coal use causes increasing emissions

Sources: Tomaschek et al. (2012)

Total final energy demand by sector 2007 [774 PJ]



Total accountable GHG emissions by sector 2007 [123.0 Mt CO_2eq]



*other = Primary energy supply and energy conversion w/o electricity

Accounting for non-territorial GHG emissions: South African Power Plants and Oil Refineries

Source: Eskom

Generation capacity South Africa: 43 GW
thereof Gauteng: 1.2 GW

Source: Platts 2008

Source: Sapia Annual Report 2009

Capacity South Africa: 692,000 bbl/day
thereof Synfuels: 195,000 bbl/day
thereof Gauteng: 0 bbl/day

Source: Sapia Annual Report 2009

Climate protection concept: Mitigation options

Change energy carrier mix, e.g.

- From coal to natural gas or wood
- From petrol/diesel to LPG/CNG or SNG
- From fossil synthetic fuels (CTL, GTL) to petroleum fuels or biofuels
- Direct Renewable energy (wood, solar thermal (SWH), solar cooling)
- Indirect renewables (electricity generation by solar CSP/PV, Wood, Wind; Biofuels for transport, SNG)
- Nuclear energy

Increase Energy Efficiency

- Efficient light bulbs (CFL, LED)
- Efficient Water Heating Systems (e.g. LPG)
- Efficient Heat Generation (e.g. Heat Pumps, CHP)
- Alternative Powertrains (e.g. Hybrid Vehicles, Electric Mobility)
- BRT, Gautrain

Carbon Capture and Storage

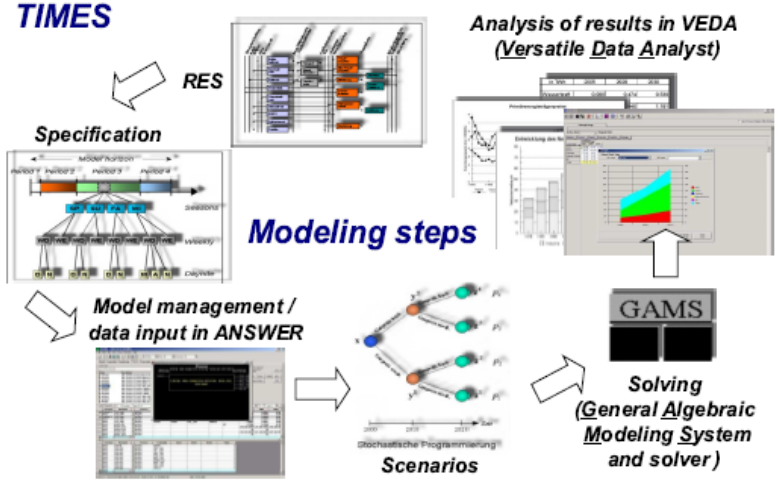
All technologies/options differ in term of their: costs, availability, potential, efficiency, etc.

Modelling tool needed!

Overview

- Background information
- **TIMES and TIMES-GEECO**
- Scenario results
  - Implemented policies scenario
  - GHG mitigation scenarios

TIMES



Development
- **By ETSAP**
- **Implementation in GAMS**

Applications of the model
- **IER:**
  - **Ostfildern, Ludwigsburg (local)**
  - **Baden-Württemberg**
  - **Bavaria**
  - **Saxonia**
  - **Hessen**
  - **Germany (TIMES-D)**
  - **Europe (TIMES-PanEU)**
  - **European electricity and gas sector model (TIMES-EG)**
  - **Global model (TIAM-IER)**
  - **Gauteng (GEECO)**
- **Other places:**
  - **Finland (VTT, Helsinki)**
  - **Belgium (KUL, Leuven)**
  - **Italy (Turin)**
  - **South Africa model, Village model (ERC, Cape Town)**
  - **EU-NEEDS project**
  - **Global models (EFDA, ETSAP-TIAM)**

Methodology
- **Bottom-up Model**
- **Perfect competition**
- **Perfect foresight (or myopic)**
- **Optimization (LP/MIP/NLP)**

Min/Max Objective function
s.t.
Equations, Constraints
Decision Variables <=> Solution
Input parameters

TIMES
(The Integrated MARKAL EFOM System)

Advanced Features/Variants
- **Multi-regional**
- **Inter-temporal**
- **Elastic demands**
- **Endogeneous learning**
- **Discrete capacity expansion**
- **Macroeconomic linkage**
- **Climate extension**
- **Stochastic programming**
- **Alternative objective functions**
- **Multi-criteria optimization**

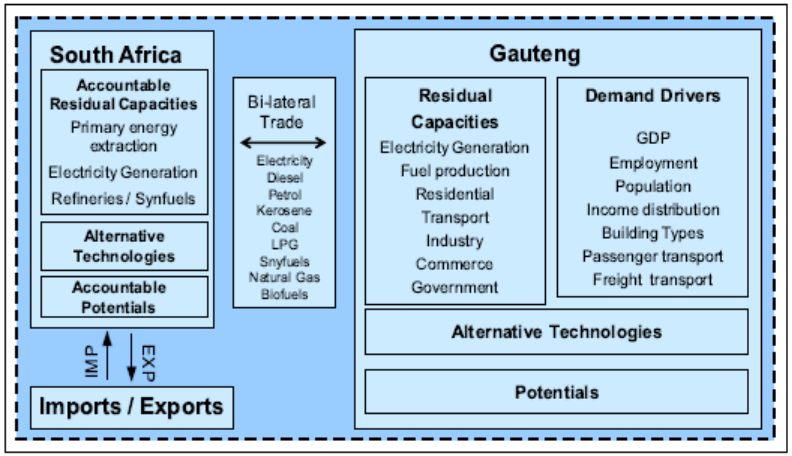
TIMES-GEECO
(Gauteng Energy and Emissions Cost Optimisation Model)

Integrated Analysis using TIMES to show the sectoral development with respect to the development in the total energy system

- Start from scratch
- Including Sectors: Residential, Transport, Industry, Commerce, Public Buildings, Electricity Generation, Fuel Supply, Primary Energy Supply
- Currently, focus on sectors (Transport, Residential, Industry, Energy Supply)
- Integration into South African energy System where important linkages exist: e.g. fuels chains, refineries, electricity conversion, RE potentials
- 3 Regions (Gauteng, South Africa, Import&Export)
- GHG emissions and Pollutants
- Including mitigation options in terms of alternative technologies for all sectors in focus
- Time horizon 2007 - 2040
- 42 Time-Slices (7 daily, 2 weekly, 3 seasonal)

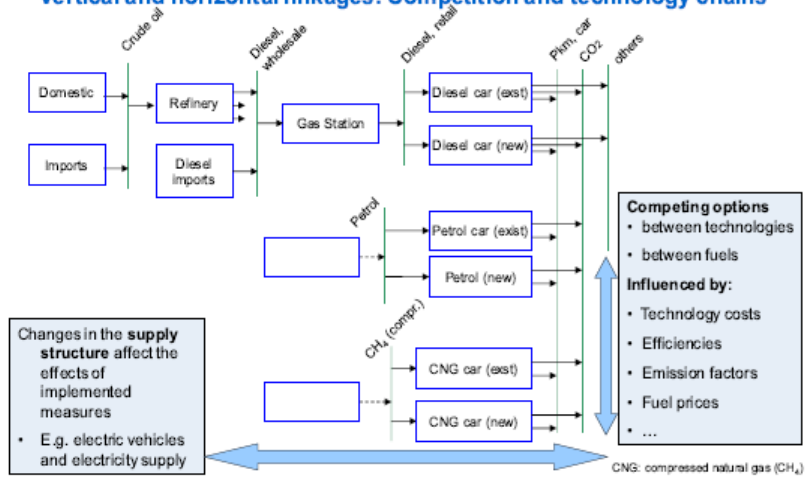
TIMES GEECO

System boundaries



TIMES-GEECO

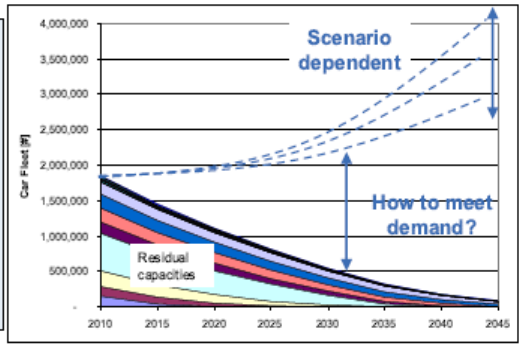
Vertical and horizontal linkages: Competition and technology chains

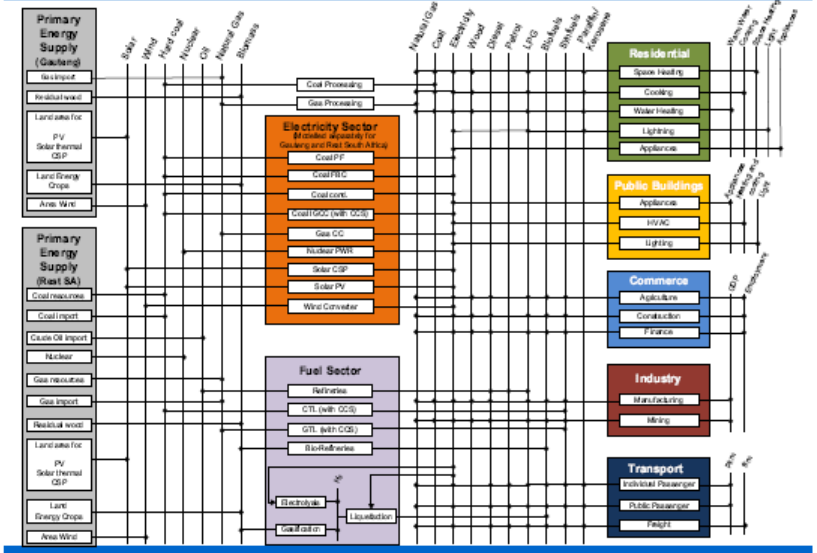


The TIMES Model

Intertemporal Aspects

- Aging capacity has to be replaced
- Investment characterised by long lifetime and high upfront capital demand
- Decisions have to take into account long time horizon with uncertain conditions:
  - Long-term energy prices?
  - Demographic development?
  - Economic development?
  - Market conditions?
  - Climate policies?





Transport fuel supply

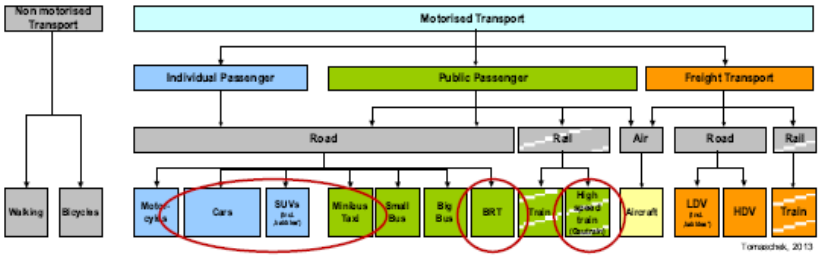
Input	Process	Output						
		Petrol 1)	Diesel 1)	Kerosene	LPG	CNG/SNG	Hydrogen	Electricity
Crude Oil	Refining	✓	✓	✓	✓			
Coal	Gasification, FT	✓	✓					
Coal	Gasification, FT, CCS	✓	✓					
Coal	Gasification					✓	✓	
Coal	Power Plants							✓
Coal	Power Plants, CCS							✓
Natural Gas	Compression					✓		
Natural Gas	Reforming						✓	
Natural Gas	Reforming, FT	✓	✓					
Natural Gas	Reforming, FT, CCS	✓	✓					
Rape Seeds	Extraction, Esterification		✓					
Soybeans	Extraction, Esterification		✓					
Sunflower Seeds	Extraction, Esterification		✓					
Sugar Beet	Fermentation, Distillation	✓						
Sugar Cane	Fermentation, Distillation	✓						✓
Waste cooking oil	Preparation, Esterification		✓					
Waste (organic)	Anaerobic Digestion, Upgrading					✓		
Waste (organic)	Anaerobic Digestion, Gas Turbine							✓
Waste (solid)	Gasification, FT	✓	✓					
Wood	Gasification, FT	✓	✓					
Wood	Gasification, Upgrading					✓	✓	
Wood	Hydrolysis, fermentation, distillation	✓						
Solar radiation	Power Plants (CSP, PV)							✓
Wind	Power Plants							✓
Diesel	Power Plants							✓
Gas	Power Plants							✓
Hydropower	Power Plants							✓
Nuclear	Power Plants							✓
Electricity	Electrolysis						✓	

Implementation of several Gauteng and South Africa specific fuel options in terms of costs and emissions

1) Including substitutes (Ethanol, Biodiesel, FT- Gasoline, FT-Diesel)

Tomaschek, 2013

Transport sector: modes considered



Integration of Gauteng specific transport modes: e.g. minibuses, BRT and Gautrain




Transport vehicle technologies included

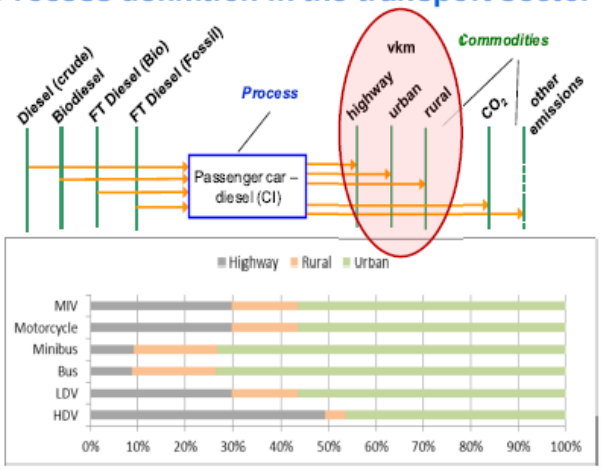
Fuels	Petrol 1)				Diesel 2)				Gas		Elec-tricity		Bio-fuel		H_2		Kerosene
Vehicle technology/ powertrain	Conv. SI	Mild Hybrid SI	Full Hybrid SI	PHEV SI	Conv. CI	Mild Hybrid CI	Full Hybrid CI	PHEV CI	LPG - SI	CNG/SNG - SI	BEV	Trolley/Grid	E85 - ICE SI	B100 - ICE CI	H_2 - ICE SI	FC HEV	Jet turbine
Motorcycle	✓										✓		✓	✓	✓	✓	
Car (small)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Car big (SUV)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Minibus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Bus (small)	✓3)				✓	✓	✓	✓		✓	✓			✓	✓	✓	
Bus (big)	✓3)				✓	✓	✓	✓		✓				✓	✓	✓	
BRT					✓	✓	✓	✓		✓		✓		✓	✓	✓	
Train (passenger)					✓							✓					
Light rail (Gautrain)												✓					
LDV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Truck	✓3)				✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Train (freight)					✓							✓					
Aviation																	✓

1) can be blended with ethanol (bio) and FT-gasoline
2) can be blended with biodiesel, fossil FT-diesel and biomass FT-diesel
3) Petrol implemented only for residual vehicles

ICE: Internal combustion engine
SI: Spark ignition / CI: compressed ignition
PHEV: plug-in hybrid electric vehicle
FCHEV: fuel-cell hybrid electric vehicle
BEV: Battery electric vehicle
E85 / B100: adapted biofuel vehicle

Tomaschek, 2013

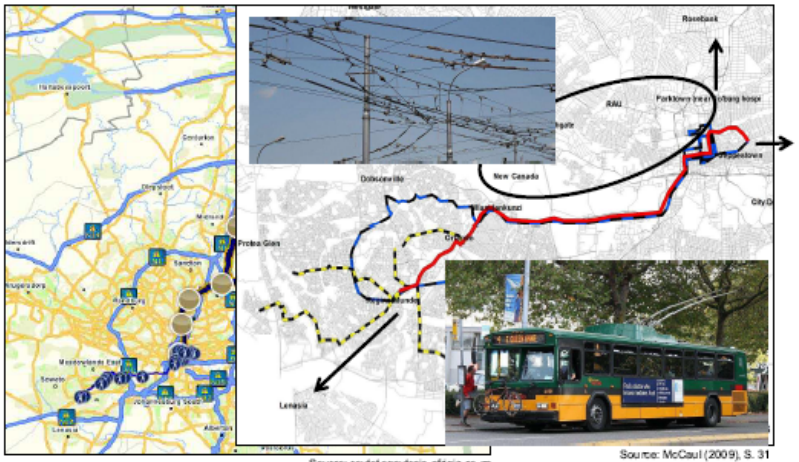
Process definition in the transport sector



distinct commodity outputs for the street type's
- **highway**,
- **urban** and
- **rural**

Include technology characteristics depending on the driving profile (e.g. best energy efficiency for electric vehicles in urban driving conditions).

Infrastructure expansion: BRT and Gautrain



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Scenario Umbrella

EnerKey Scenarios for Gauteng

Socio-Economic Framework

Population · Employment · Poverty and Equity · Income Distribution · GDP

145 USD_{2010}/bbl

World Oil Prices

Series of Energy Scenarios

Reference	Low Carbon Province	
Imple-mented Policies IPO	GIES CO_2 Targets	CO_2 Emission as required by science (LTMS)
	Least Cost LGL	Solar Province LGS
		LRS

Framework assumptions 2007-2040:

Population: +83%

Households: +115%

GDP: +277%

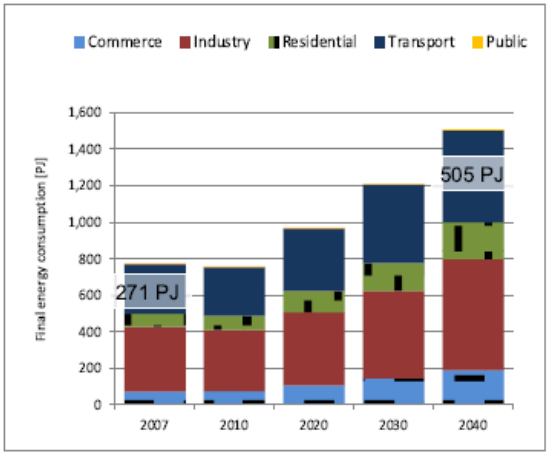
Employment: +82%

Gini coef.: -0.07

The reference scenario (IPO) is based on current implemented policies.

The reference scenario: IPO

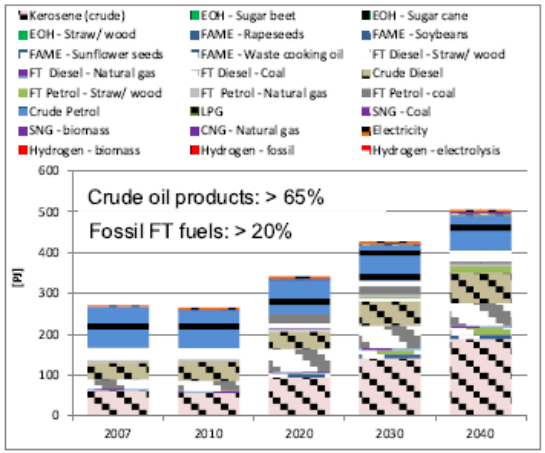
Final energy demand by sector



- With current policies: final energy cons. will increase by 95% in 2040
- Highest increase in residential (+179%) and commerce sector (+163%)
- also high increases in industry (+71%) and transport sector (+87%)

The reference scenario: IPO

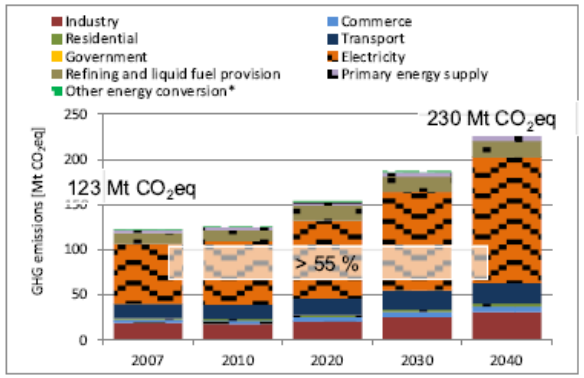
FEC in transport by energy carrier



- the expected continuing dependence on fossil energy carriers becomes obvious
- the quantity of fossil synthetic fuels is expected to remain significant in transport fuel consumption
- CNG, LPG, biodiesel and BTL reaches a total FEC of 52 PJ (~10%) in 2040 (mainly used in trucks and busses)

The reference scenario: IPO

GHG emissions by sector

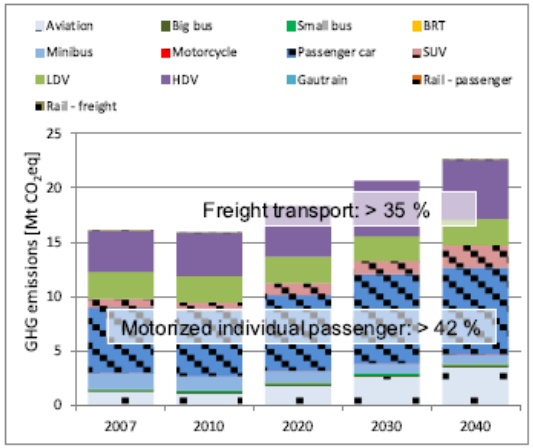


- With current policies: GHG emissions significantly increase till 2040 (+86%)
- High share of GHG emissions due to electricity generation

IPO:
The reference scenario (IPO) is based on current implemented policies.

The reference scenario: IPO

TTW greenhouse gas emissions by mode



- TTW GHG emissions are expected to increase from 16.1 Mt CO_2eq in 2007 to 22.6 Mt CO_2eq in 2040 (+40%).
- Major contributor is private transport (displayed hatched in the figure) with 10.0 Mt CO_2eq in 2040.
- Most of this figure is due to passenger cars transport

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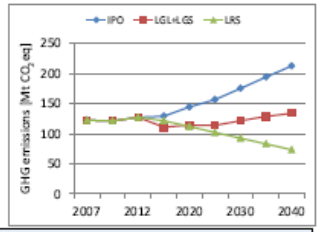


Series of Energy Scenarios

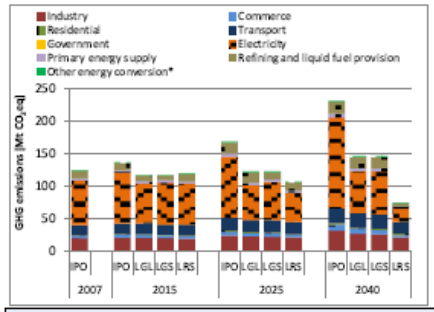
Reference	Low Carbon Province		
Implemented Policies	GIES CO_2 Targets		CO_2 Emission as required by science (LTMS)
	Least Cost	Solar Province	
IPO	LGL	LGS	LRS

The Low Carbon Province scenarios are more stringent with respect to CO_2 Mitigation and are closely linked to existing South African scenario and policy processes (e.g. the Gauteng Integrated Energy Strategy (GIES) or the national CO_2 mitigation strategy (LTMS)).

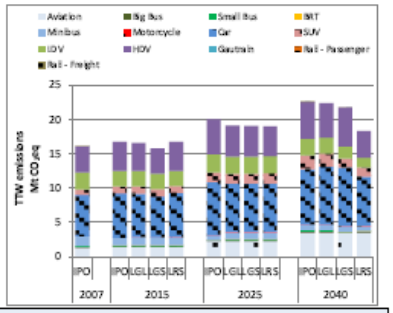
Low carbon province

Total GHG emissions and transport TTW GHG emissions

GHG emissions by sector



Transport TTW GHG emissions

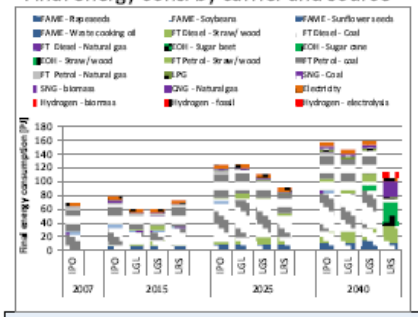


- Reductions in GHG emissions mainly in electricity provision
- IPO: electricity generation mainly based on coal
- LGL: nuclear energy replaces coal capacities; in LGS: Concentrated Solar Power
- LRS: CCS needed to reach target

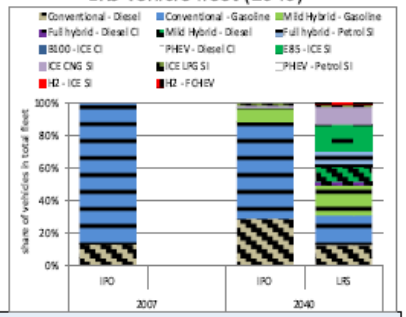
Low carbon province

Vehicles and fuels used in the transport sector

Final energy cons. by carrier and source



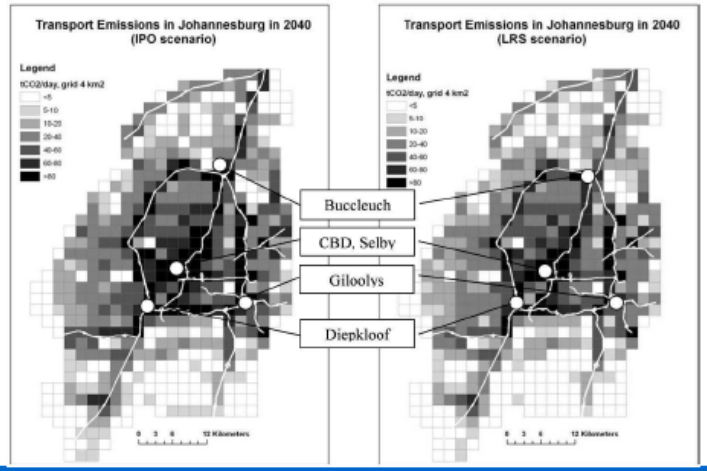
LRS vehicle fleet (2040)



- IPO: Final energy consumption in transport increases from 272 PJ in 2007 to 505 PJ in 2040
- Alternative scenarios: Reduction of FEC up to 22 PJ (LRS)
- Share of alternative fuels increases. No fossil FT-fuels in LRS in 2040.
- Biofuels (e.g. BTL from solid biomass (straw/wood), biodiesel from waste cooking oil and ethanol from sugar cane).
- Organic biomass (sewage, landfill) is used for electricity generation.
- Share of high efficient vehicles (hybrids) increases. Especially for urban travel (e.g. scheduled busses, minibuses)

Low carbon province

Spatial representation of transport emissions in Johannesburg



The EnerKey Liliesleaf Action Plan

Residential

- Building standards differentiated by income groups
- CFL and LED Lighting
- SWH for medium and high income households
- Biomass for poor and low income

Transport

- Higher vehicle efficiency (hybrids), especially for busses, BRT, trucks
- Increased use of biofuels
  - Biodiesel from waste cooking oil
  - BTL from solid biomass

Industry & Commerce

- Solar Cooling and Heat Pumps
- Efficient Compressed Air Systems (CAS)
- Variable speed drives
- Retrofit of steel production technologies (best practice)

Energy supply

- Concentrated Solar Power (CSP): Parabolic Trough with storage
- Organic biomass (landfill, sewage) for electricity generation
- Carbon Capture and Storage (CCS) for power plants and synthetic fuels
- Nuclear energy (if considered)

With many thanks to all our colleagues, students and partners !!

Thank you for your attention

3.4 Ho Chi Minh City – Promotion Public Transport and Slow Modes | Prof. Dr. Günter Emberger

3.4.1 Abstract

The presentation starts with an introduction of Ho Chi Minh City (Vietnam) and comprises socio-demographic and socio-economic data such as population, GDP per head, growth rates etc. and some indicators to describe the present mobility behavior in HCMC, such as modal split, car ownership rates and the corresponding trends and growth rates. Then the HCMC Transport Master Plan (HCMC TPM) will be introduced and the in the TPM listed objectives and transport policy measures will be discussed. In a third step simulation results, calculated with MARS (Metropolitan Activity Relocation Simulator), an integrated land use and transport model developed at Vienna University of Technology, will be shown and compared against the objectives laid out in the HCMC TPM. The presentation ends with a summarizing statement regarding the goal achievement capabilities of the in the TPM HCMC suggested policy measures and form so a basis for further discussion.

3.4.2 Presentation

WP 5 – Urban Transport

Prof. Dr. Günter Emberger
Dr. Paul Pfaffenbichler

Vienna University of Technology
Institute for Transport
Planning and Traffic Engineering
Vienna Austria

Urban Flooding | Urban Climate | Urban Energy | **Urban Transport**

Public transport in HCMC has potential for improvements.

Urban Transport in HCMC

HCMC	Number	Mode share
Motorbikes (2004)	~3 million	60%-70%
Motorbikes (2011)	~5 million	70%-80%
Public Transport		6-10%

Motorised vehicle ownership (per 1,000 residents)

City	Motorcycles	Cars	Total
Vienna	42	417	459
HCMC (2004)	465	30	495
HCMC (2011)	625 +35%	63 +110%	688 +39%

Most traffic related impacts on the environment derive from private passenger traffic.

(Sources: Magistratsabteilung 66 - Statistisches Amt 2002; TDSI 2004)

TU Vienna – Institut for Transport Planning and Traffic Enginering

TU Vienna – founded 1815

- 21 Bachelorstudies and 41 Masterstudies, 5 Lectorship-studies, 8 faculties, 230 partner universities
- 17.579 students; 151 Professors, 2400 Research Staff, 3500 total staff; approx. 155 Mio. EUR budget plus approx. 45 Mio. EUR projects

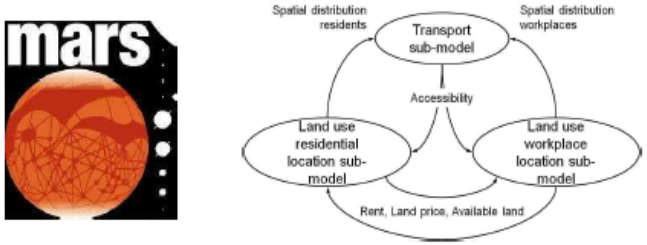
Institute for Transport Planning and Traffic Engineering

- founded 1960ies, 14 staff, 4 professors, involvement in >30 international projects
- Main activities: teaching, research, planning, training

Objectives of WP5 Urban Transport

- The objective of work package 5 Urban Transport is to **assess** the potential of **land use** and **transport strategies** to improve the effectiveness of the urban transport system and to **reduce** its **greenhouse gas** emissions.

The strategic dynamic land use and transport interaction model MARS (Metropolitan Activity Relocation Simulator)



www.ivv.tuwien.ac.at/forschung/mars-metropolitan-activity-relocation-simulator.html

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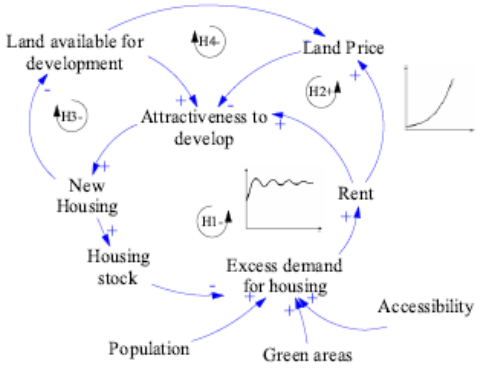
Integrative Urban and Environmental Planning Framework
Adaptation to Global Climate Change

MARS cause–effect relations

The land use part



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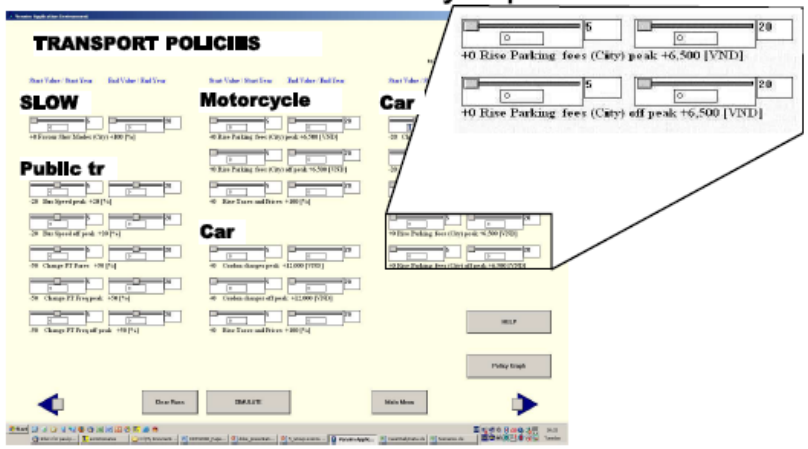
MARS Policy input



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Adaptation to Global Climate Change

TMP HCMC

Vision:"Ensure mobility and accessibility to needed urban services for its People and Society, through **public transport-based urban transport** system with safety, amenity and equity"

A. Promotion of social understanding on present and future urban transport
B. Management of sustainable urban growth and development
C. Promotion and development of Attractive Public TransportC. Promotion and development of Attractive Public Transport
D. Effective management of traffic and demand
E. Comprehensive development of transport spaces and environment
F. Enhancement of traffic safety
G: Strengthening of transport sector administration and management capacity

The HCMC TPM comprises 7 objectives, 35 strategies and 105 actions!

Introduction HCMC Transport Masterplan

Master Plan Transport Network 2020

Source: The Study on Urban Transport Master Plan and Feasibility Study in Ho Chi Minh Metropolitan Area, Houtrans, June 2004

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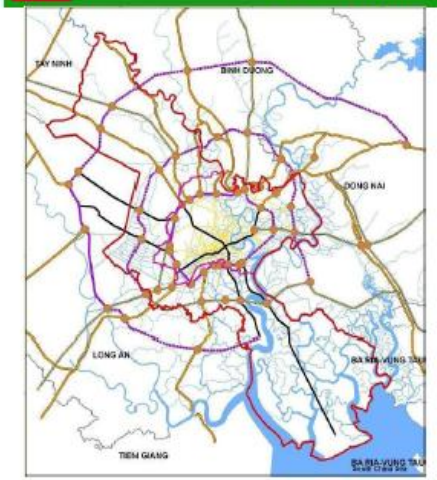
Adaptation to Global Climate Change

TMP – roads



Source: HCMC Adaption to Climate Change Study Report – Volume 2: Main Report, ICEM- International Centre for Environmental Management, 2009

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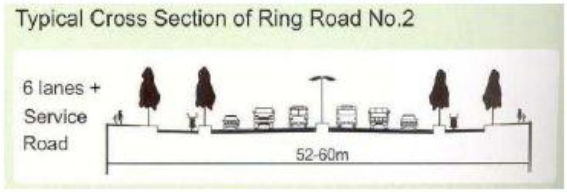
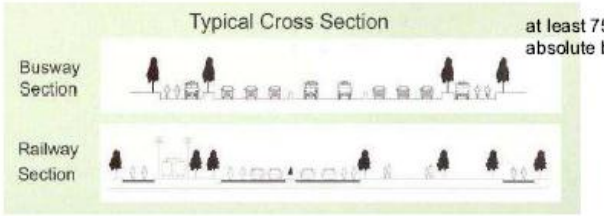
Integrative Urban and Environmental Planning Framework
Adaptation to Global Climate Change

Street layout !!!

Typical Cross Section of Ring Road No.2



Typical Cross Section



at least 75 m width!!!!
absolute barrier for pedestrians

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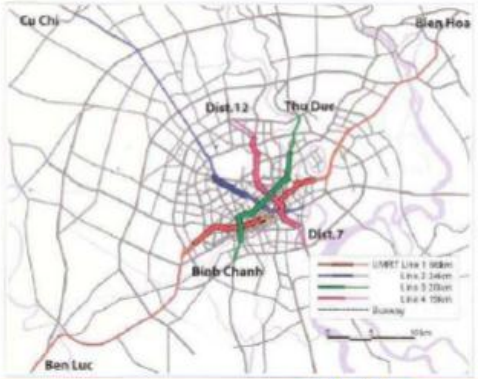
Integrative Urban and Environmental Planning Framework
Adaptation to Global Climate Change

Urban Mass Rapid Transit

Urban Mass Rapid Transit (UMRT) 138km



Source: The Study on Urban Transport Master Plan and Feasibility Study in Ho Chi Minh Metropolitan Area, Houtrans, June 2004

Introduction HCMC Transport Masterplan

Source: The Study on Urban Transport Master Plan and Feasibility Study in Ho Chi Minh Metropolitan Area, Houtrans, June 2004

Megacity Research Project TP. Ho Chi Minh
Integrative Urban and Environmental Planning Framework
Adaptation to Global Climate Change

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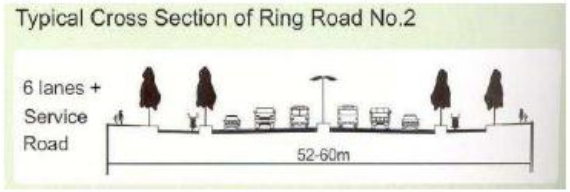
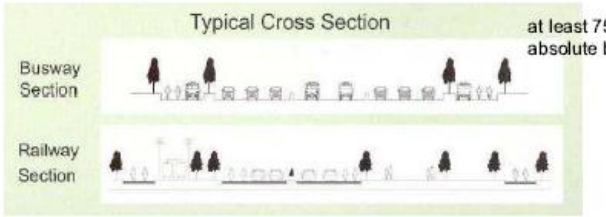
Megacity Research Project TP. Ho Chi Minh
Integrative Urban and Environmental Planning Framework
Adaptation to Global Climate Change

Street layout !!!





at least 75 m width!!!!
absolute barrier for pedestrians

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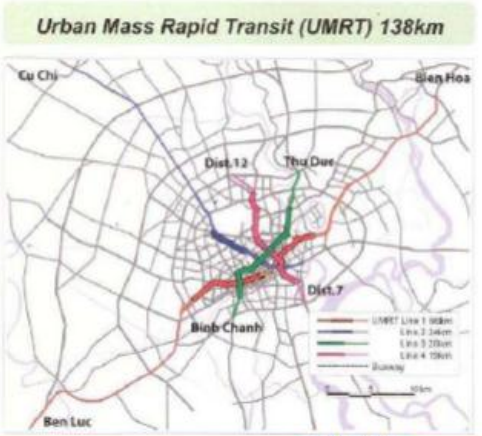
Integrative Urban and Environmental Planning Framework
Adaptation to Global Climate Change

Urban Mass Rapid Transit



Source: The Study on Urban Transport Master Plan and Feasibility Study in Ho Chi Minh Metropolitan Area, Houtrans, June 2004

Mars Scenarios

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Integrative Urban and Environmental Planning Framework
Adaptation to Global Climate Change

MARS Scenarios

In the report "Preparing the HCMC City metro Rail System" (MVA Asia Limited et al., 2010) it was stated that

HCMC plans to have a MODAL SPLIT share for public transport of

- **22-26%** in the year 2010 to **2015**,
- **47-50**% by **2020**.

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MARS Scenarios

- Business as Usual – base run
- Policy rail 2015
- Policy rail_2015+parking fees
- Policy rail_2015+ppl reduction -20%
- Policy rail_2015+ppl reduction -40%
- Policy rail_2015+BRT inner districts

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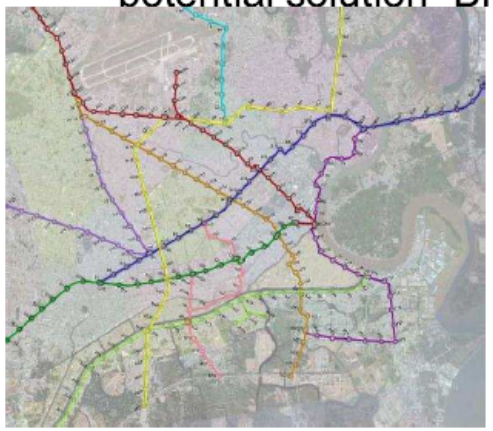
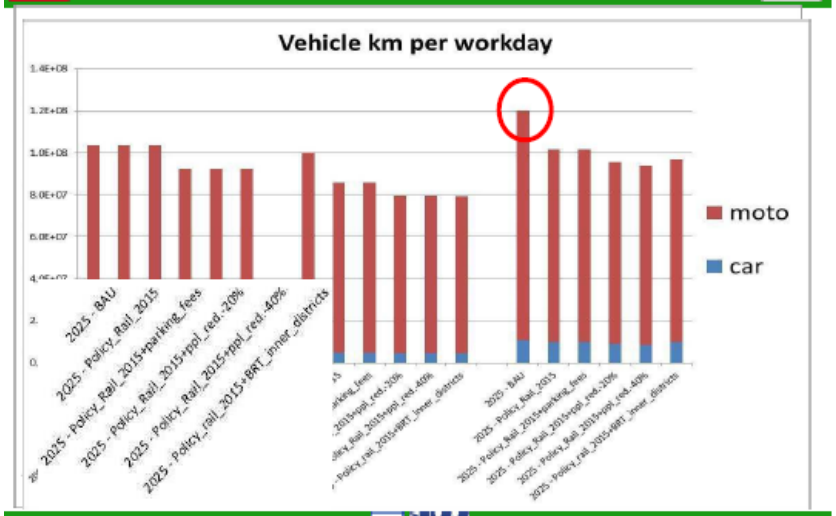
potential solution -BRT System

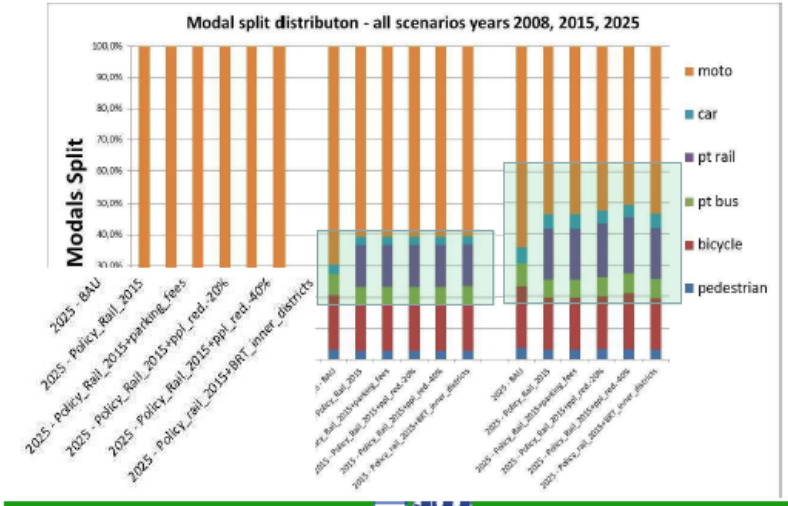


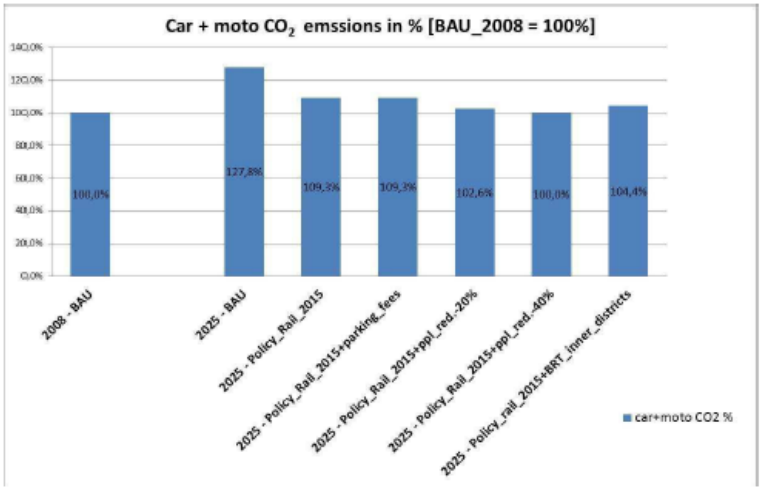
Details:
Length ~ 120 km
Costs 2,5 Mio US$ per km = 300 Mio US$
252 Stations (~every 500 m)
285 Busses
3 minutes peak interval
10 minutes off peak interval
mode shift:
~366.000 trips peak
~ 622.000 trips off peak

compared to 138km subway for 3.500 US$!!!!!!

Source:
Sustainable Urban Transportation Development: Prioritizing public transport – BRT in HCMC, Nguyen Anh Dung, 2008







Conclusions

- If HCMC implements the suggested TMP, then they will not reach their goals regarding modals split, GHG emissions, etc…
- In contrary they will follow the way all other cities went in the past !!

Some reasons:

- inadequate infrastructure (too expensive, wrong order, wrong pt system) more congestion, more fossil fuel dependency, more emissions, less quality of life

Thanks for your attention!

Prof. Dr. Günter Emberger

guenter.emberger@tuwien.ac.at

Vienna University of Technology
Institute for Transport
Planning and Traffic Engineering
Vienna Austria

3.5 River Transport in Mekong River Delta and Climate Change | Prof. Dr. Nguyen Ba Hoang

3.5.1 Abstract

The Mekong is one of the world's major rivers. It starts in the Tibetan Plateau and the river runs through China's Yunnan province, Burma, Laos, Thailand, Cambodia and Vietnam. Mekong river delta is the biggest river delta in Vietnam with main characteristics: a river system with rich of types and number of rivers, the volume of transport in the zone reach 14-16 millions tone and more than 90 million passengers every year, the natural river and man-made canal form a diversified river transport system, 2 big branch of Mekong river locate in this delta. Mobility in the Mekong river delta is one big problem, which could enhance the economy development of Ho Chi Minh City and many provinces in south Vietnam. The delta has 3 sides facing to the sea that mean 3 sides facing to the Sea Level Rise (SLR). The climate change will have serious effects on the river transport.

According to the calculation of Vietnam Ministry of Natural Resource and Environment (MONRE) the (SLR) could reach to 1m by year 2100. In Vietnam especially in Mekong river delta in South Vietnam, an area with many rivers and river valleys will be affected much from climate change. One meter SLR in Vietnam would lead to flooding of up to 20,000 km2 of the Mekong River delta and 5,000 km2 of the Red River delta (in North Vietnam, according to International Panel for Climate Change -IPCC 2007).

In our research, we do the survey on 7 main river transport routes in Mekong river delta. The survey cover of geographical data, the capacity of transport of good and people, the bed of river, velocity of water, the hydrographical data from gauging-stations, the river water level in last years and the infrastructure such as bridge, port, dyke… along the river. We also invest in temperature change, rain fall volume and the transport capacities of each river in the river system. A hydraulics model with boundary conditions was created which provide as result the level of water in every location of the 7 rivers by year 2020, 2030, 2040, 2050, 2100. Based on the result of this model (mainly the water level of the river) we will create the Geographical Information System (GIS) with many database layers for geographical data of rivers. The layer include infrastructure such as bridges, ports and a layer for water level. Water-level-change leads to smaller clearance under the bridges. Many small ports also cannot be used if water will rise. The research also indicated the mitigation solution and adaptation methods for infrastructure, for planning, for management, for changing to the technical specification and long term such as environmental and preservation problems.

3.5.2 Presentation

HoChiMinh University of Transport

RIVER TRANSPORT IN MEKONG RIVER DELTA AND THE ADVERSE EFFECT OF CLIMATE CHANGE

Prof. Dr. Nguyen Ba Hoang

El Gouna, February 23, 2013

Contents

1- The Mekong and Mekong delta

- The Mekong is the world's 12th-longest river and the 7th-longest in Asia. Its estimated length is 4,350 km (2,703 mi),and it drains an area of 795,000 km2 (307,000 sq mi), discharging 475 km3 (114 cu mi) of water annually. (*source: Mekong river commission, state of the Basin Report, 2010"*)
- From the Tibetan Plateau this river runs through China's Yunnan province, Burma (Myanmar), Laos, Thailand, Cambodia and Vietnam.
- In 1995, Laos, Thailand, Cambodia and Vietnam established the River Commission's resources. In 1996 China and Burma (Myanmar) became "dialogue partners" of the MRC and the six countries now work together within a cooperative framework.

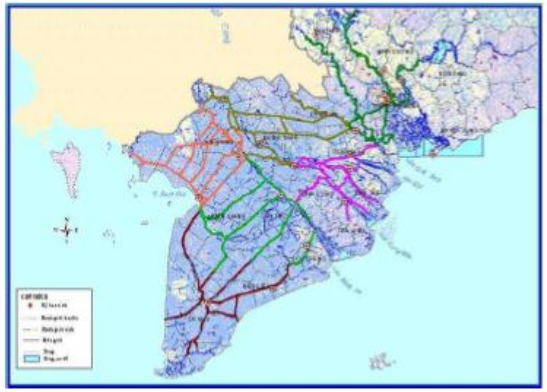
1- The Mekong and Mekong delta

Table 1: Basic data on country share of basin territory and water flows

	China	Myanmar	Lao PDR	Thailand	Cambodia	Vietnam	Total
Area in Basin ($km,^2$)	165,000	24,000	202,000	184,000	155,000	65,000	795,000
catchments % of MRB	21	3	25	23	20	8	100
Flows % of MRB	16	2	35	18	18	11	100

1- The Mekong and Mekong delta

1- The Mekong and Mekong delta



2- The current river transport in Mekong delta and tendency of development

Saigon Port

2- The current river transport in Mekong delta and tendency of development

Small ports, markets

2- The current river transport in Mekong delta and tendency of development

River Transport volume of Vietnam B.03

Hạng mục	Unit		2005		2010 and forecast for 2020 2010	2020
Transport volume						
1. Good	10^6Ton		14		90	190-210
2. passenger	10^6 peoples		90		240	530-540

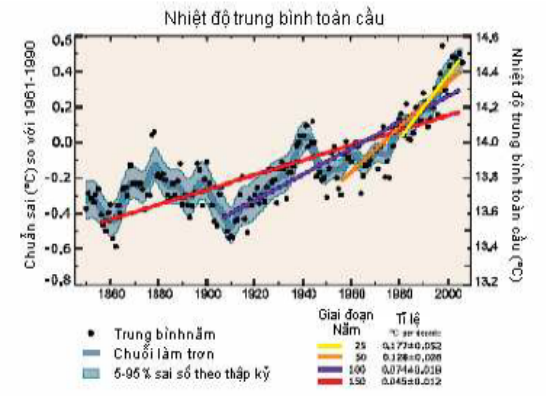
Source: "Toàn cảnh Giao thông VT Việt nam", tr.123-125

2- The current river transport in Mekong delta and tendency of development

Ports capacity in Mekong Delta (current 2010 and plan 2020)

TT	Port name	Unit	Capacity 2010	Capacity 2020	Port type
1	Vĩnh Long Port	10^3 Tone	700	950	Mix
2	Cao Lãnh Port	"	700	1.150	"
3	Long Xuyên Port	"	850	1.400	"
4	Cà Mâu Port	"	390	470	"
5	HCM city Port	"	1.500	2.400	"
6	Cần Thơ Port	"	1.200	1.700	"
7	HCM New Ports group	"	2.000	3.000	"

3 - Climate change and the adverse effects to the river transport in Mekong del ta



According to IPCC (2007): average temperature increase by 0,74°C in 1906 – 2005

Last 50 years it increased double in compared with 1906-1955

3 - Climate change and the adverse effects to the river transport in Mekong del ta

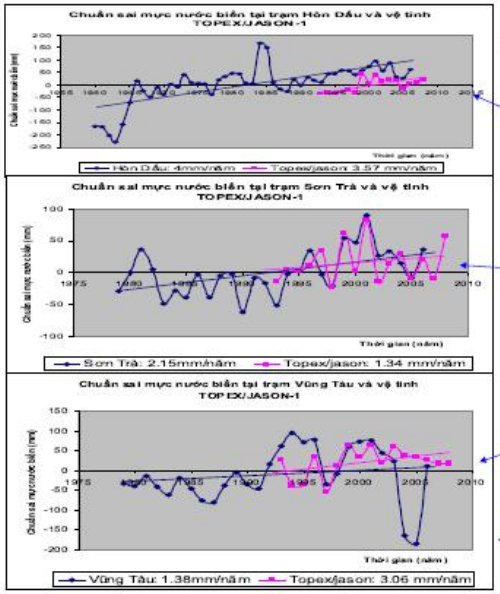
ViệtNam is 1 of 5 countries most effected by GCC and Mekong river Delta is on e of 3 river deltas which most effected

3 - Climate change and the adverse effects to the river transport in Mekong del ta

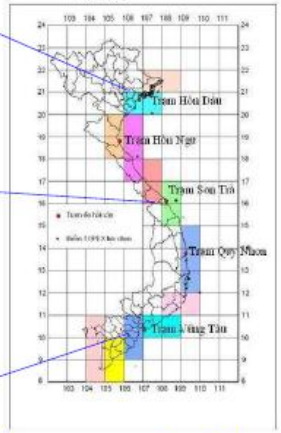
Flooded in HàTĩnh province , ViệtNam

3 - Climate change and the adverse effects to the river transport in Mekong del ta

- Number of hot sunny days in 1991 - 2000 increasing, in Middle and South VN
- Rain in out of season, heavy rain is more often in region



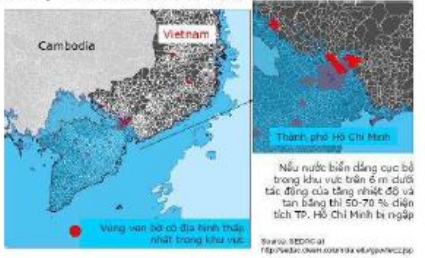
Data of satellite and in several observing station is differ



Average sea level rise in VN 3mm/year

Effect to coastal areas and river sides

- Mekong river, Hồng river and main rivers in Middle of VN
- If the water level rise by 6m most area of Mekong delta is flooded, 50-70% of HoChiMinh city is under the water level.
- Mekong river delta have 34.300 km2 area, if the SLR by 0.2-0.6m we will lose 5% land area, affect more than 10 million people, if SLR by 2m will will lose 50% land.



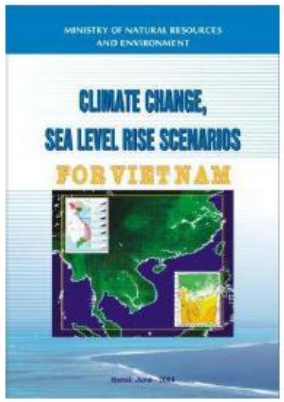
Source: First national report

4- Hydraulic model for river transport in Mekong delta

MODELING AND FORCAST OF WATER LEVEL ON MAIN RIVER IN MEKONG DELTA

- Investment in 7 main rivers in Mekong delta
- Forecast river water level based on sea water level (Ministry of Natural Resources and Environment-MONRE sea level rise scenario) in rain season and in dry season

Climate change, Sea Level rise Scenarios for Vietnam of MONRE



Main Contents of Climate change, Sea Level rise Scenarios of MONRE:
According to the world industry development situation, temperature, methodology and tendencies of development,
The sea level rise will modeled with 3 scenarios:
sea level rise
sea level rise
sea level rise
Time: (2010 -2100).

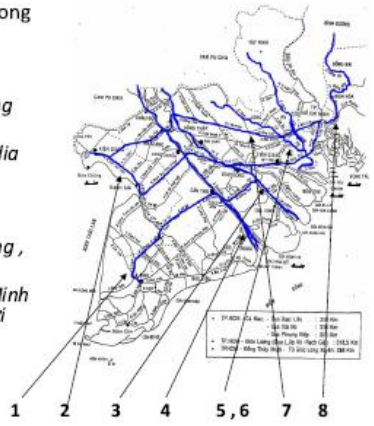
Scenarios

- Normal B2:
- In the middle century 21 the rise of sea level 25-30cm.
- In the end of century 21 the rise is 62-82cm compare with 2000.
- **For Mekong delta:**

Sea level rise scenarios	Century 21								
	2020	2030	2040	**2050**	2060	2070	2080	2090	**2100**
Low (B1)	7-10	10-15	14-21	**18-28**	22-36	26-45	30-54	33-63	**35-72**
Normal (B2)	9-10	13-15	19-22	**25-30**	32-39	39-49	47-59	55-70	**62-82**
High (A1FI)	9-10	14-15	20-23	**28-32**	38-57	48-57	60-72	72-88	**85-105**

The Main Rivers in Research

- The main water transport lines in Mekong Delta: (rivers and river valleys):
- *+ River 1: Hồ Chí Minh city - Cà Mau province*
- *+ River 2: Hồ Chí Minh city - Kiên Lương (Hà Tiên province)*
- *+ River 3: Tiền river: Cửa Tiểu- Cambodia border*
- *+ River 4: Hậu river: Cửa Định An- Cambodia border*
- *+ River 5,6: Vàm Cỏ rivers: Vàm Cỏ Đông , Vàm Cỏ Tây*
- *+ River 7: National waterway Hồ Chí Minh city - Hà Tiên through Đồng Tháp Mười*
- *+ River 8: Saigon-Bien Hoa - HieuLiem*

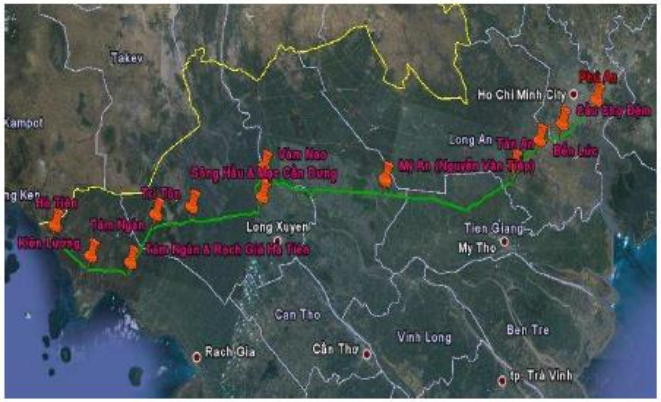


Effect on Infrastructure for River Transport

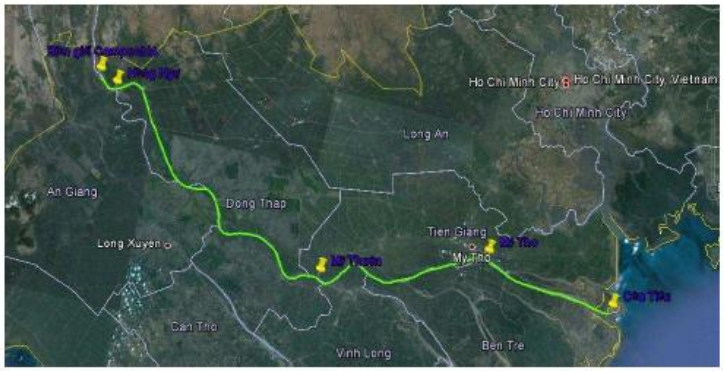
- Bridges
- Ports
- Break waters
- Dykes
- Embankments
- Dams
- Infrastructure of valleys, irrigation canals

River 1: HCM city- Cà Mau route

River 2: HCM city - Kiên Lương route

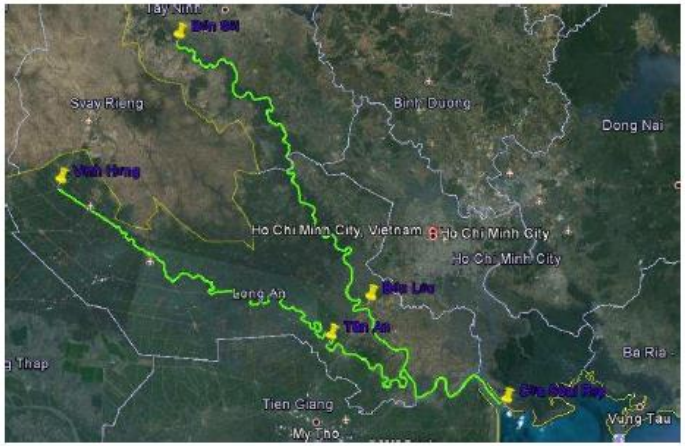


River 3: Tiền river

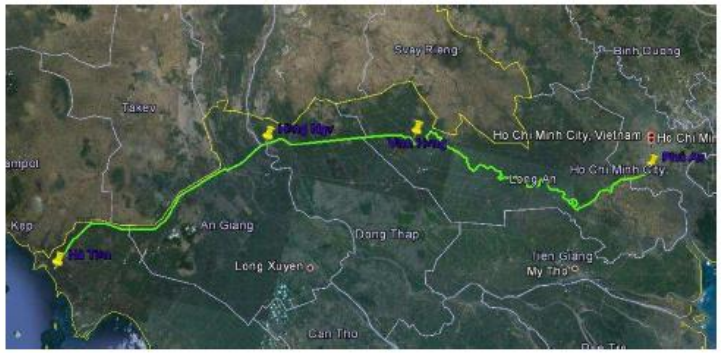


River 4: Hậu river

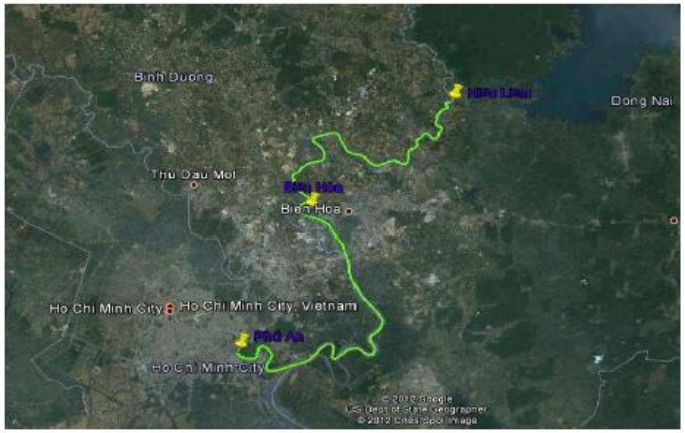
River 5, 6: Vàm Cỏ East & West river



River 7: HCM city - Hà Tiên route



TUYẾN 8: TP HCM - Biên Hòa - Hiếu Liêm



Water level calculation

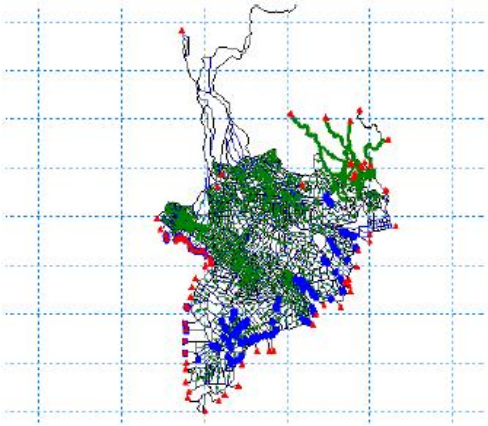
Software:

- MIKE 11 (1D)
- MIKE 21 (2D)

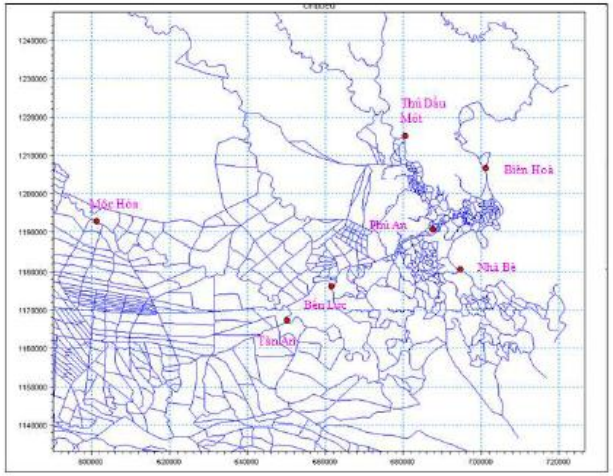
Steps:

- Information gathering
- Model establish
- Model calibration
- River water level calculation fore 3 scenarios

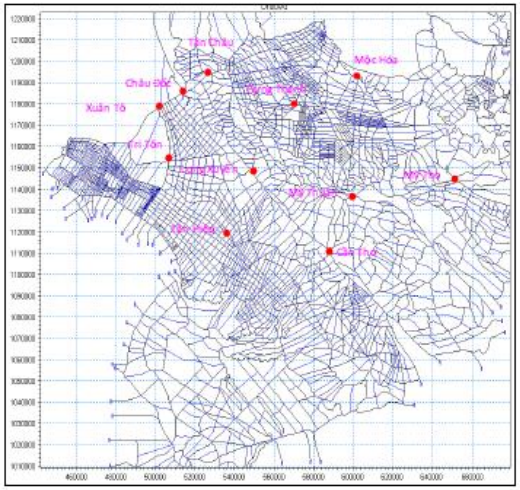
Model establish



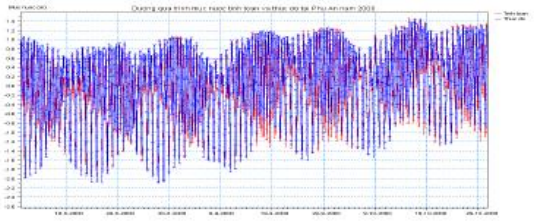
Station for Calibration

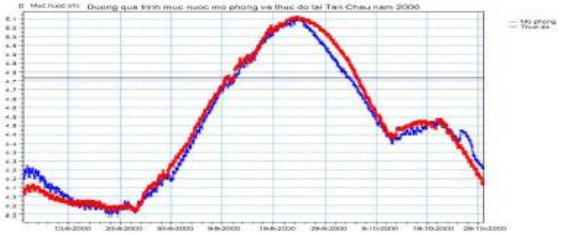


Calibration

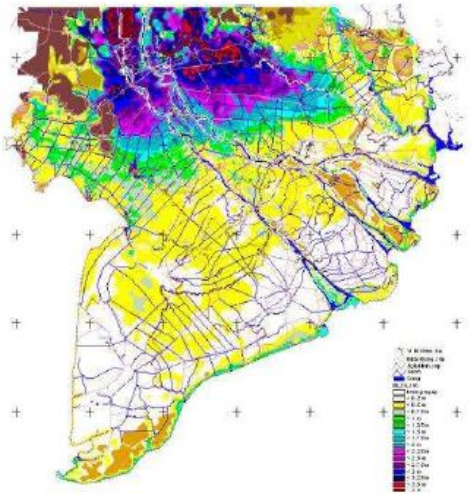


Calibration results

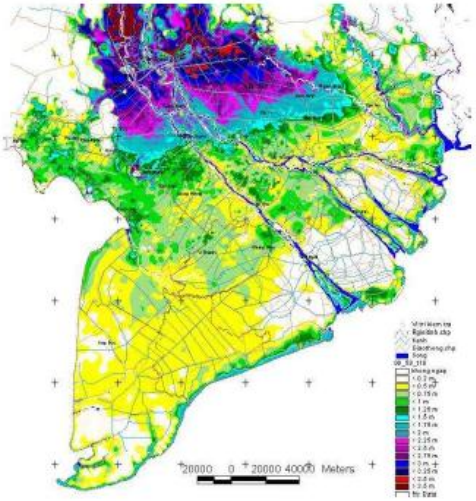




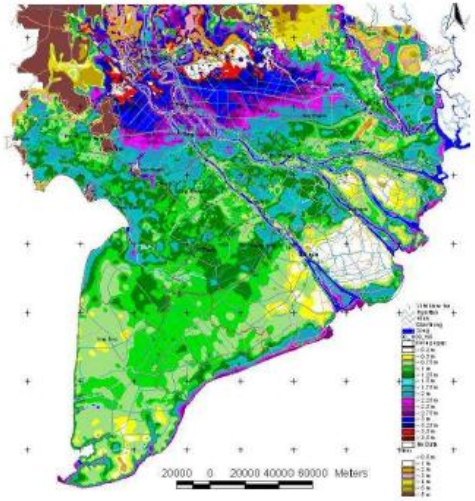
Flood map



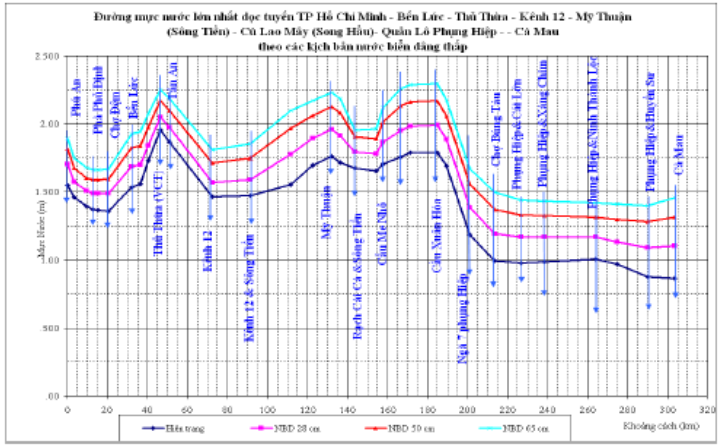
Flood map



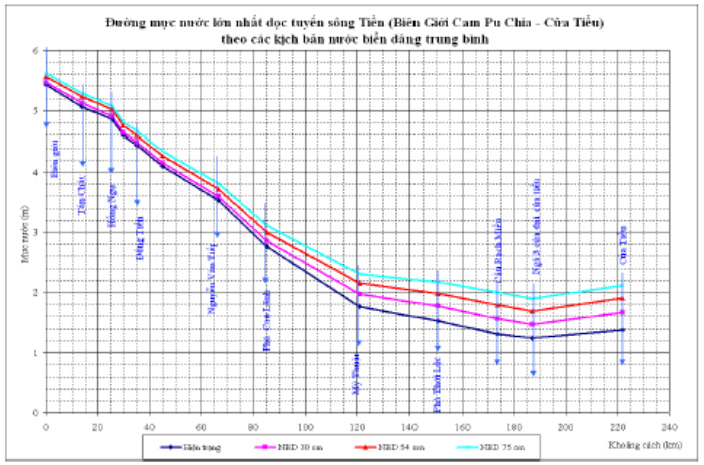
Flood map



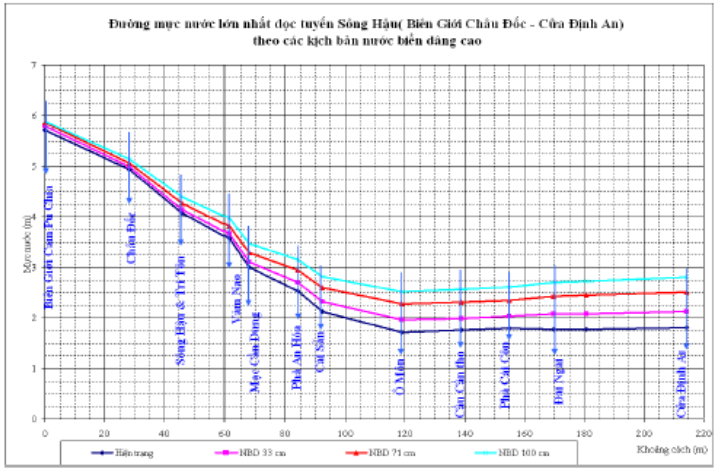
Water level on the river 1



Water level on the river 3



Water level on the river 4



5- GIS application

- Software Client/Server, ArcGIS 9.x of ESRI company
- **Database** GIS with layer:
  + Admistration & topography
  + Infrastructure of river transport system
  + Affected infrastructure (bridges, ports, embankments, dams)
  + Water level

GIS FUNCTIONS:

- *System management function: allow the user to use the program with multi-users*
- *Information management functions: management the information such as administration, topography, river system, hydrology, water level, infrastructure such as bridges, ports, dams…*
- *Information Searching function*
- *Analysis function*

45

Result of forecast for infrastructure in River 1

- Bridge: 100% bridges not affected
- Clearance: among 17 bridge 11 not satisfied with 7.0m high of clearance
- Ports: 109 ports are affected

Result of forecast for infrastructure in River 2

- Bridges: 100% Bridges are good again river water level rise
- Clearance: High 7,0m: 11 of 13 bridges good
- Port: 227 affected

Result of forecast for infrastructure in River 3

- Bridges: All not affected
- Bridge Clearance: Not affected
- Ports: 17% - 39% affected

Result of forecast for infrastructure in River 4

- Bridge: All bridge not affected
- Bridge Clearance: all enough clearance
- Ports: 10% of 32 ports are affected.

Result of forecast for infrastructure in River 5

- Bridges: All bridge is not affected
- Clearance: All 5 bridges is good
- Ports: All ports is not affected

Result of forecast for infrastructure in River 6

- Ports: About 13% is affected
- Clearance: All bridge are not affected
- Ports: 7% - 22% of 66 are affected

Result of forecast for infrastructure in River 7

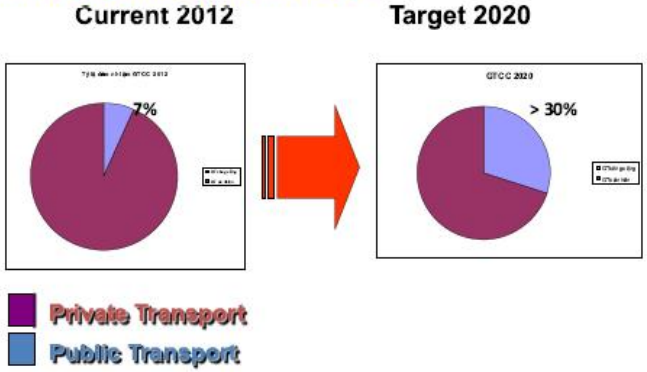
- Bridge: 26% - 28% will be affected by 2100
- Bridge clearance: 98 bridges on the route, only 6% satisfy with the planning transport river class
- Ports: About 16% - 31% ports will be affected.

Result of forecast for infrastructure in River 8

- Bridges: 100% not affected
- Bridge Clearance: Dong Nai Bridge was effected, not enough clearance.
- Ports: not affected

Promotion of public transport of HoChiMinh city and other cities in Mekong delta

Encouraging Public Transport Usage



6.Conclussion

1) Vietnam have an CO2 emission amount of about 151 millions tone in 2005 and will be rise to 224 millions tone in 2020 (25% of them come from transport sector-road transport more than 20% and river transport about 2-3%), so public transport is the good choice not only from the point of view of traffic jam reduction but also from the point of energy, CO2 emission.
2) Global Climate Change have many advice impacts to river transport in Mekong delta
3) The result of modeling and calculating for water level of the river and affected infrastructure will help to planning both public river transport and infrastructure for railways, for roads, for planning of public transports

Thank you for your attention!

3.6 Transport in Ho Chi Minh city: Past, Present and Future | Dr. Hien Quoc Nguyen

3.6.1 Abstract

Ho Chi Minh City is the largest metropolitan area in Vietnam. Over the past nearly forty years after the war, transport of this city has changed significantly with the pace of transformation in politic, society and economy. Now, transport characteristics here are very much different from the rest of the world with approximately 90% of motorcycle in traffic streams. Traffic congestion has been arising and quickly becomes a serious problem.

This presentation narrates a story of transport revolution in Ho Chi Minh City from bicycle dependent to motorcycle dependent, and possibly, car dependent in the near future. These changes in transport will be analyzed in comparison with that of urban planning, urbanization strategies and land use integration of the city. The paper also presents an ambitious master plan of the Government to obtain from 40% to 50% public transport modal share in 2020. Outcomes of this master plan will be discussed and possibility to achieve that target will also be assessed.

3.6.2 Presentation

HO CHI MINH CITY
UNIVERSITY OF TRANSPORT

Transport in Ho Chi Minh City

Past, Present and Future

Dr Nguyen, Quoc Hien
Dean, Faculty of Transport Engineering
Ho Chi Minh City University of Transport

hien.nguyen@hcmutrans.edu.vn

El Gouna, 23-24/02/2013

HCMC – An Overview

- Population: 7.2mil (7.5% of Vietnam)
- Area: 2,100 km²

2

HCMC – A History

HCMC – A Growing City

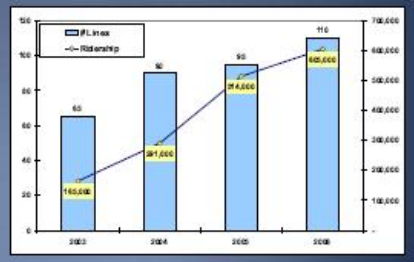
- Urbanization rapidly in the last 20 years
- GDP growth of 8.5% on average
- Population growth of 3.5% on average

Year	1997	2000	2001	2002	2003	2004	2005	2009
Population	4,853	5,175	5,285	5,659	5,867	6,063	6,240	7,123
Growth		2.2%	2.1%	7.1%	3.7%	3.3%	2.9%	3.3%

4

HCMC – Traffic and Transport

- Road and rail networks:
  - 4,000 km of roads
  - Only a national rail line
- Bus network:
  - Currently 120 bus lines
  - Bus fleet: 3000 vehicles
  - Bus ridership: 1.1m per day



5

HCMC – Traffic and Transport

- Car ownership: 10%
- PT mode split: 7%
- Very high motorcycle ownership

6

HCMC – Traffic and Transport

- Number of cars: 0.5 million
- Number of motorcycles: 4.5 million
- Daily trips: 18 million

7

HCMC – Traffic and Transport

- Car registration: +12% p.a.
- Motorcycle registration: +10% p.a.
- Traffic congestion is one of the six issues of "top priority"

8

Future Road Networks

- Four ring roads
- A number of radius highways and expressway
- Four elevated highway routes
- New international airport

9

Future Rail Networks

•The master plan contains 9 MRT lines (6 metro lines, two monorails and one tramway) and a commuter rail.

• As completion, the MRT system will be **165km** long and become one of the biggest MRT system in the region.

10

HCMC vs. other cities

City	Pop. (millions)	PT modal share	System	
			Lines	Km
HCMC – 2016 LH	9.1	16%	3	71
HCMC 2016 MP		27%	4	87
HCMC – 2025 LH	13.8	22%	6	134
HCMC 2025 MP		44%	8	165
Hong Kong	7.1	80%	6	91
Singapore	4.3	60%	3	109
Bangkok	11.5	46%	3	44
Manila	11.0	80%	3	46
KL (LRT)	1.8	20%	2	56
Delhi	14.0	60%	3	65
Shenzhen	8.0	N/A	2	22
Guangzhou	9.6	41%	3	61
Beijing	10.7	N/A	4	113
Shanghai	14.5	N/A	5	145

11

Future Bus Network

• Replaced by air conditioned buses

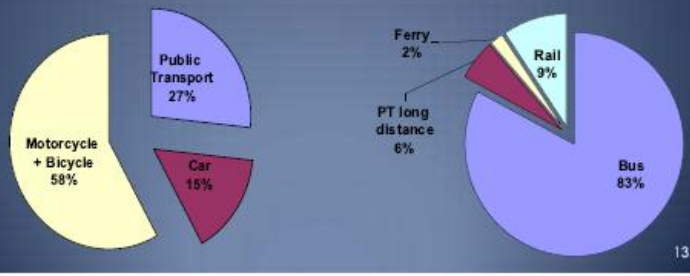
• Increased bus lines and bus fleet

• Restructured to feed the MRT lines

• A couple of BRT lines will be installed

2020 Master Plan

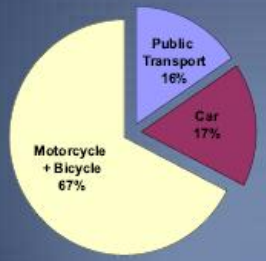
- Two metro lines and two monorails will be completed
- Public transport modal share: 25%
- Bus split: 80% of PT

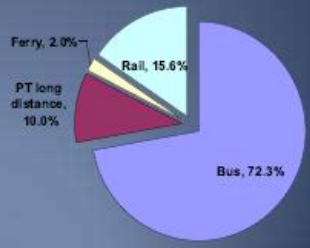


13

2020 likelihood

- One metro line, two monorails will be completed
- Public transport modal share: 15%
- Bus split: 70% of PT

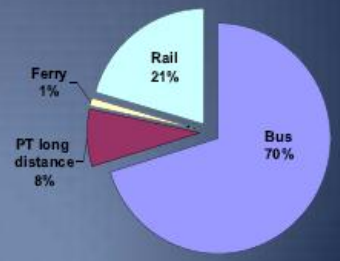




14

2025 masterplan

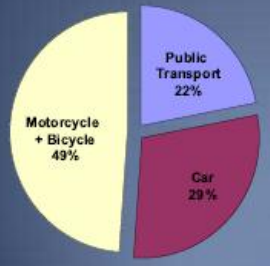
- All 9 MRT lines will be completed
- Public transport modal share: 40% - 50%
- Bus split: 70% of PT

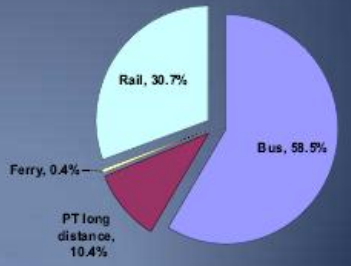


15

2025 likelihood

- Four metro lines, two monorails will be completed
- Public transport modal share: 22%
- Bus split: 60% of PT





16

How do you think traffic in HCMC look like in the future?

Singapore,
Seoul,
Shanghai,
Tokyo,
Beijing,
Bangkok ?

17

Thank you

18

3.7 Hyderabad – Public Transport Improvement | Prof. Dr. CSRK Prasad

3.7.1 Abstract

Transport problems of fast growing cities often get evident along major road corridors connecting suburbs and central city areas. Historically grown road links often cannot cope with continuously growing travel demand hence congestions and sinking average travel speeds occur. As a consequence, neighborhoods of major corridors are exposed to massive noise and air pollution; non-motorized traffic modes are repressed and usually very unattractive. With reference to sustainable development extensions of such corridors mainly focused on increasing capacity for motorized private transport modes – as it often happens - are not desirable. On the contrary: solutions for densely populated areas that are viable for the future require a consistent support for public transport and non-motorized modes. Main factor for heightening the attractiveness of public transport modes is an increase of their average travel speeds. For congested corridors, which are not suitable for rail based mass transport systems, upgrading of existing bus systems is the only possibility to enlarge the overall transport capacity. And while improving public transport, attractive and safe access of pedestrians to the stations or stops needs to be considered as well, to strengthen the acceptance of the improvement action. Main objectives of the road corridor study are therefore the identification of measures to improve road based public transport operations in a selected corridor and subsequently the quantification of potentials to mitigate climate change (CC). This case study is part of the pilot project "Integration of energy-efficiency and climate change aspects into the strategic transport planning process by the means of a strategic transport planning tool (STPT).

Improvement of Public Transport, to reduce the growth of individual motorized traffic is one of the highlighted measures when it comes to reduction of negative impacts of traffic and the improvement of the energy-efficiency of a transport system. Hence the National Urban Transport Policy of India and the Climate Change Action Plan likewise stress this measure (MOUD, 2006). Which is right since the existence of an attractive public transport system is a prerequisite to keep people from using cars or motorcycles. It is a difficult task to design an optimal public transport network especially under conditions of rapid growth and change as it is the case in Hyderabad. Currently the PT system in Hyderabad is mainly Bus based. The aim of this case study is to setup a user friendly state of the art planning tool, which supports especially the major PT provider in Hyderabad – APSRTC:

- To identify potentials to improve its actual network, but also
- To design a bus network with regard to future urban development and future extensions of the metropolitan rail network.

The integration of assessment aspects into the planning tool does increase the usability of the tool, because the planners can easily and quickly compare impacts of different options. This case study is part of the pilot project "Integration of energy-efficiency and climate change aspects into the strategic transport planning process by the means of a strategic transport planning tool".

3.7.2 Presentation

PTV GROUP
the mind of movement

SUSTAINABLE HYDERABAD

NIT Warangal

HYDERABAD – PUBLIC TRANSPORT IMPROVEMENT

CSRK Prasad, NIT Warangal, India
Tanja Schafer, PTV Group, Germany
Markus Sator, PTV Group, Germany
Jurgen Reith, PTV Group, Germany

International Symposium "Mobility and Urban Structure"
22.-24. February 2013
TU Berlin Campus El Gouna / Egypt

www.ptvgroup.com

Federal Ministry of Education and Research

PROJECT FRAMEWORK

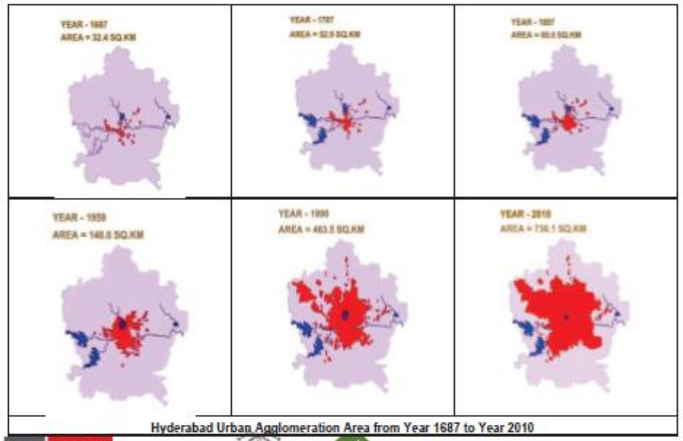
Research Programme of German Ministry for Research and Education:

- Topic: Research for Sustainable Development of the Megacities of Tomorrow
- Focus: „Energy- and climate-efficient structures in urban growth centres"
- Altogether 9 cities worldwide choosen for research

Project in Hyderabad

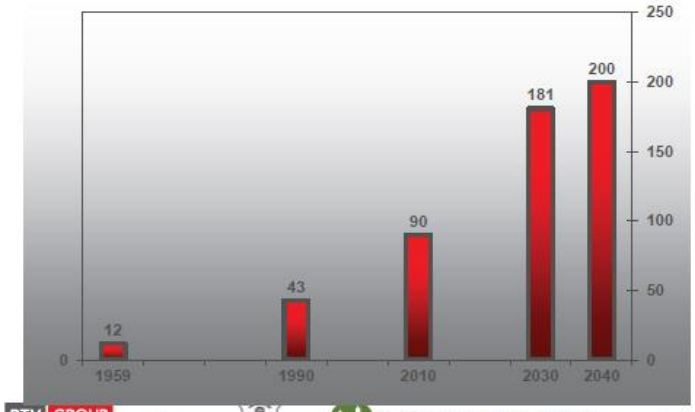
- Hyderabad - Climate and Energy in a Complex Transition Process towards Sustainable Hyderabad
- www.sustainable-hyderabad.de
- Coordinator: Humboldt-University Berlin
- Duration: June 2013
- Sub-projects: water, health, energy supply and **transport**

GROWTH OF HYDERABAD



Hyderabad Urban Agglomeration Area from Year 1687 to Year 2010

HMA POPULATION GROWTH IN LAKHS



OVERALL OBJECTIVE OF SUB-PROJECT TRANSPORT

To develop methods, tools, and know-how that help desicion-makers to answer the follwing questions:

- What potentials for energy-efficiency and reduction of greenhouse-gas emissions do different transport measures have? = Mitigation
- How can infrastructure be adopted to extreme climatic events most efficiently? = Adaptation
- **To help to develop a sustainable & „climate proofed“ transport sytem**

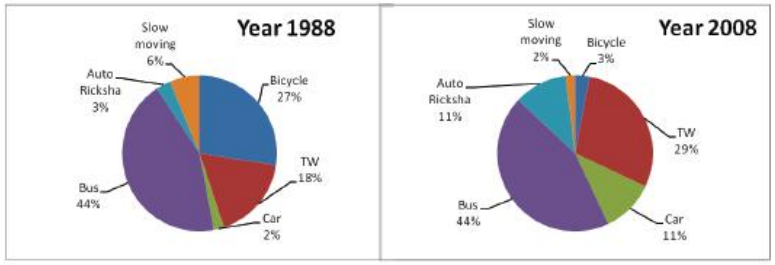
BACKGROUND?

First Pilot Project Study 2008: Comparision Study of Travel Pattern Changes

Situation in HYD:
- Expontial increase in personalised motorised traffic like two-wheelers and cars
- Drastic reduction in NMT like bicycles
- Not much improvement in Public Transport (Busses) as a mode of travel

Impact:
- Increase in congestion,
- Air-pollution, traffic noise and accidents,
- Increasing consumption of non-renewable energy resources and greenhouse-gas emissions,

CHANGE IN TRAVEL PATTERN



GOI INITIATIVES IN URBAN TRANSPORT

- NUTP-2006
- Comprehensive Mobility Plan – toolkit issued in 2008
- National Sustainable Habitat Mission (NSHM)
- 12th Five Year Plan- Short Term Plan
- National Transport Development Policy Committee (NTDPC) - Long Term Vision Plan
- Service Level Benchmarks and Others

STUDY GROUP ON ALTERNATIVE SYSTEMS OF URBAN TRANSPORT

City Size in millions	Recommended Share of Mass Transit
>0.5 & <1.0	30%
1.0	35%+
1.5	40%+
3.0	50%+
6.0	70%+
9.0 & above	75%+

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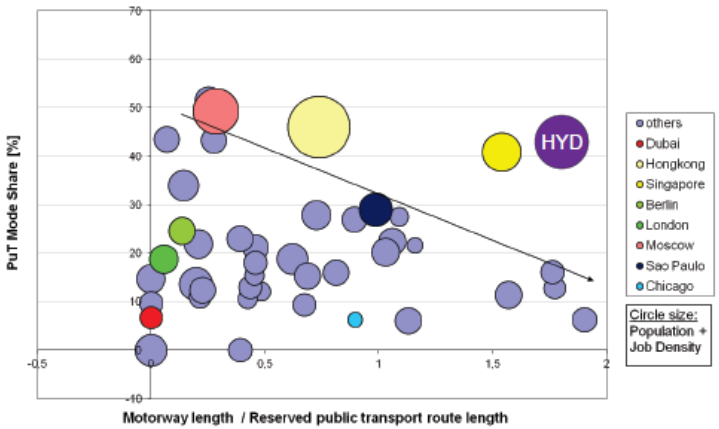
UITP BENCHMARK – highway length / reserved PuT route length



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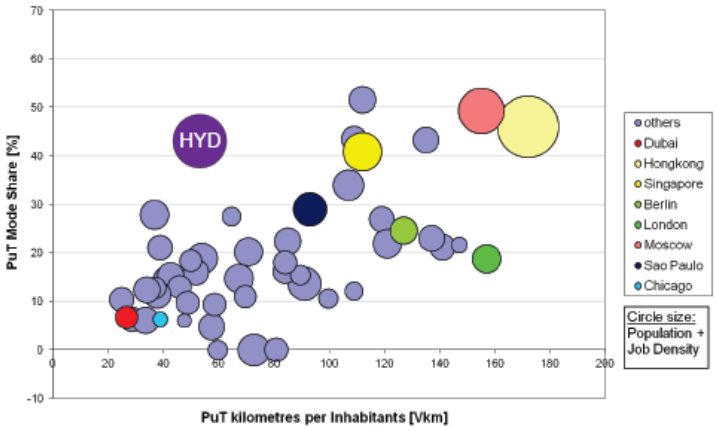
UITP BENCHMARK – PuT kilometres per inhabitants



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PILOT-PROJECT 2

Integration of Energy-Efficiency and Climate Change Aspects into the Strategic Transport Planning Process by the means of a Strategic Transport Planning Tool

Objective of PP:
Provision of Tools and Methodology to answer the following questions within the strategic planning process:
1. *How can the transport infrastructure be adopted to extreme climatic events most efficiently?*
2. What potentials for reduction of energy-consumption, GHG- emissions and air pollution can be expected by certain measures in the transport sector?

Case Studies:
1. Options to improve Public Transport in Hyderabad
2. Options to improve Road Corridor in Hyderabad

Up-scaling on city/ strategic level

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CASE STUDY I:
OPTIONS TO IMPROVE PUBLIC TRANSPORT IN HYDERABAD

AIM OF THE STUDY

ఆంధ్రప్రదేశ్ రాష్ట్ర రోడ్డు రవాణా సంస్థ
Andhra Pradesh State Road Transport Corporation

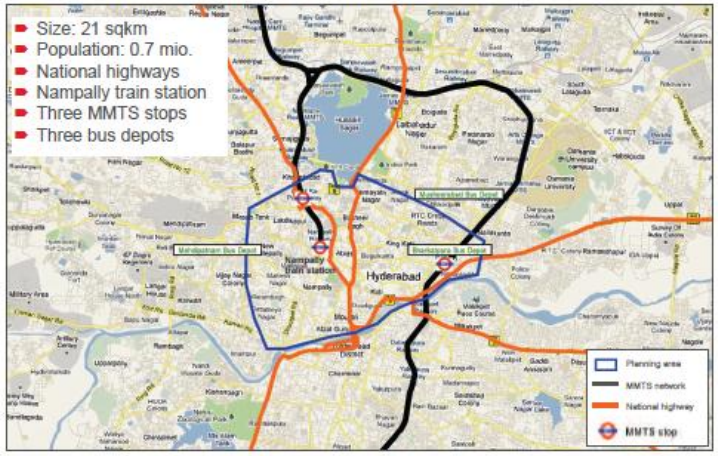
State-of-the-art planning tool

- Strategic development of the bus network
- Additional passengers
- Cost savings
- Consider future urban development
- Consider future extensions of MMTS

Strategic planning process

SELECTION OF THE PLANNING AREA

- Size: 21 sqkm
- Population: 0.7 mio.
- National highways
- Nampally train station
- Three MMTS stops
- Three bus depots



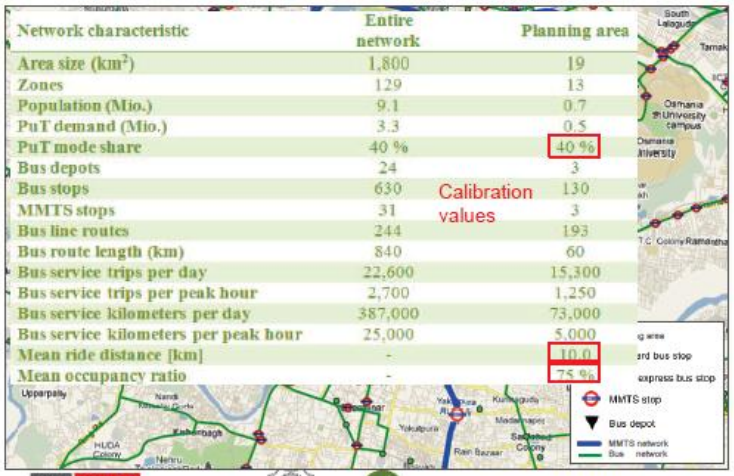
CREATION OF THE TRANSPORTATION MODEL

- Public Transport supply
  - Integrating 53 stop points from the survey
  - Integrating 24 bus depots
  - Rerouting 143 existing line routes
  - Integrating 70 missing line routes
  - Specifying run times: standard bus 20 km/h, metro express 30 km/h
  - Creating time table / headway
- Network
  - Revision of connectors between zones and stop points
- Public Transport demand
  - Four-step demand model
  - Distance based fare model

CREATION OF THE TRANSPORTATION MODEL

Network characteristic	Entire network	Planning area
Area size (km²)	1,800	19
Zones	129	13
Population (Mio.)	9.1	0.7
PuT demand (Mio.)	3.3	0.5
PuT mode share	40 %	40 %
Bus depots	24	3
Bus stops	630	130
MMTS stops	31	3
Bus line routes	244	193
Bus route length (km)	840	60
Bus service trips per day	22,600	15,300
Bus service trips per peak hour	2,700	1,250
Bus service kilometers per day	387,000	73,000
Bus service kilometers per peak hour	25,000	5,000
Mean ride distance [km]	-	10.0
Mean occupancy ratio	-	75 %

Calibration values

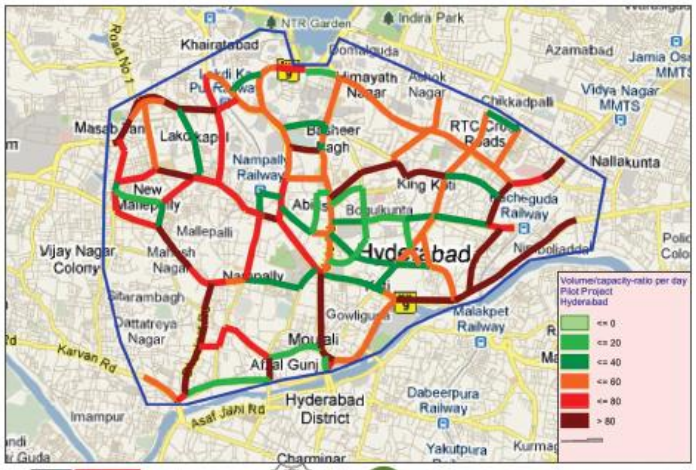


ANALYSIS – number of service trips

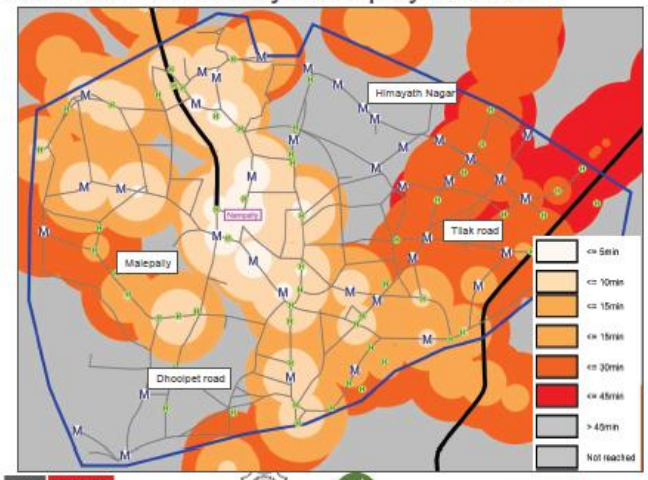
ANALYSIS – area coverage

ANALYSIS – passenger volumes

ANALYSIS – volume/capacity-ratio



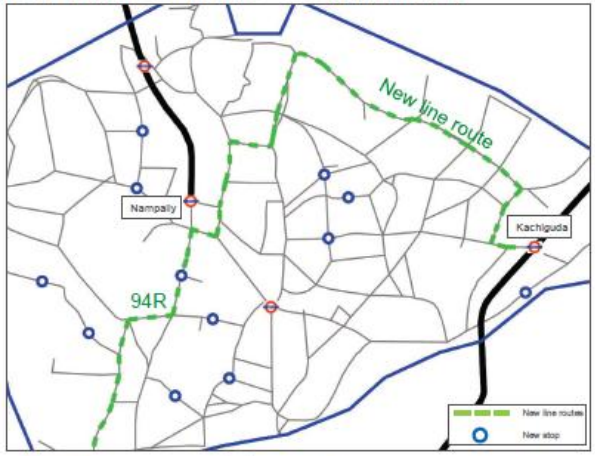
ANALYSIS – accessibility to Nampally train station



SCENARIOS

- Short-term scenario:
  - Current network
- Mid-term scenario 1:
  - Network restructuring towards MRTS implementation
  - Preferential bus-system
- Mid-term scenario 2:
  - Enhanced MMTS integration
- Long-term scenario:
  - MRTS implementation phase 1
  - Restructuring of the bus network

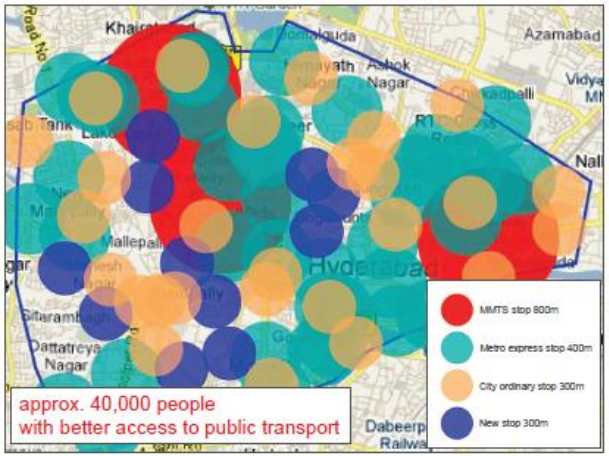
SHORT-TERM SCENARIO - existing network



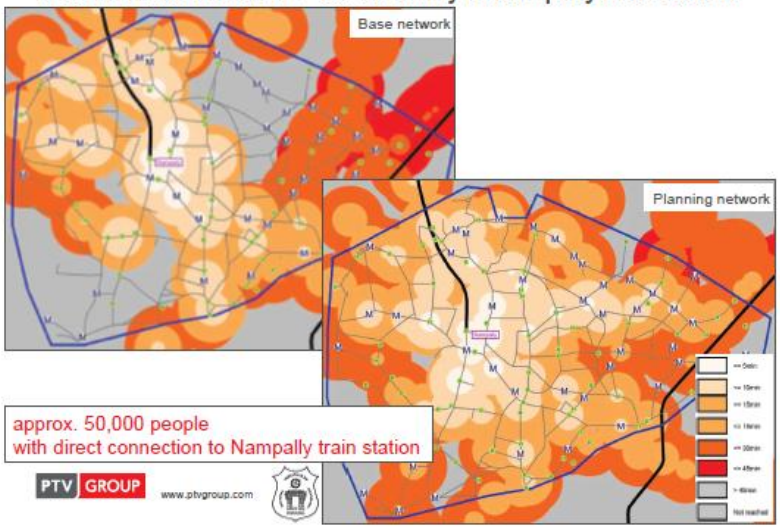
SHORT-TERM SCENARIO - existing network

Single distance	Number of vehicles	Headway	Operating kilometers per year	GHG-Emissions per year [t]	Costs per year [lakh rupies]
6.0 km	3	30 min	119,000	110	38

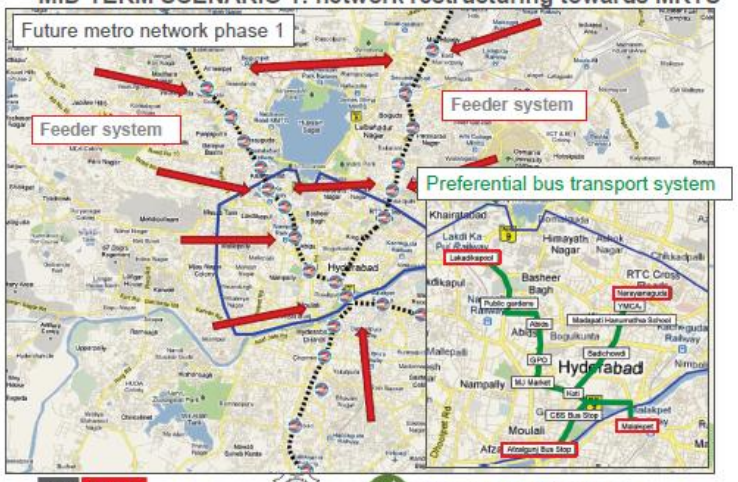
SHORT-TERM IMPACTS – area coverage



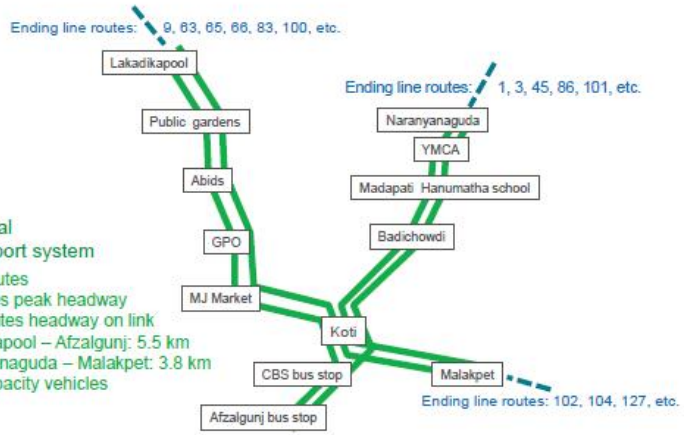
SHORT-TERM IMPACTS – accessibility to Nampally train station



MID-TERM SCENARIO 1: network restructuring towards MRTS



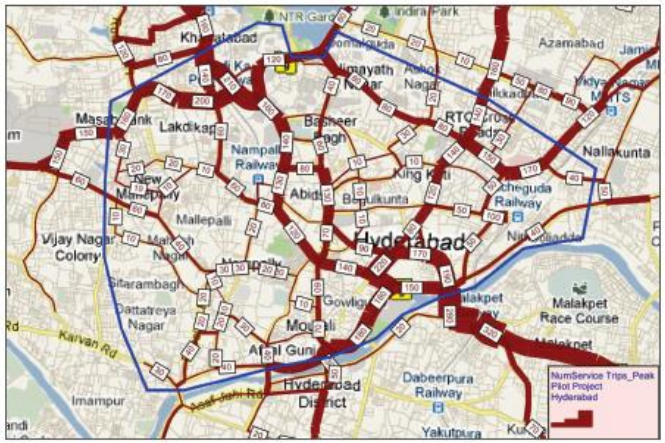
MID-TERM SCENARIO 1: network restructuring towards MRTS



Preferential
bus transport system

- 4 line routes
- 5 minutes peak headway
- 2,5 minutes headway on link
- Lakadikapool – Afzalgunj: 5.5 km
- Naranyanaguda – Malakpet: 3.8 km
- High-capacity vehicles

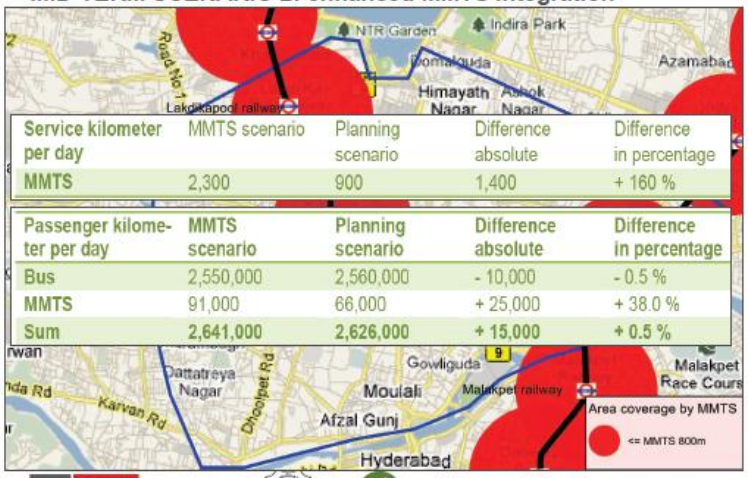
MID-TERM IMPACTS: preferential bus system



MID-TERM IMPACTS – preferential bus system

Difference Basis scenario – scenario preferential bus system	Operating kilometers per day	Number of vehicles	GHG-Emissions per day [t] -only direct effect	Costs per year [lakh rupies]
City ordinary, suburban, metro express	- 22,600	- 63	- 15.5	- 2,400
Articulated	+ 5,900	+ 16	+ 6.7	+ 800
Sum	- 16,700	- 47	- 8.8	- 1,600

MID-TERM SCENARIO 2: enhanced MMTS integration



Service kilometer per day	MMTS scenario	Planning scenario	Difference absolute	Difference in percentage
MMTS	2,300	900	1,400	+ 160 %

Passenger kilometer per day	MMTS scenario	Planning scenario	Difference absolute	Difference in percentage
Bus	2,550,000	2,560,000	- 10,000	- 0.5 %
MMTS	91,000	66,000	+ 25,000	+ 38.0 %
Sum	2,641,000	2,626,000	+ 15,000	+ 0.5 %

LONG -TERM SCENARIO: MRTS phase 1 – impacts on bus network

LONG-TERM IMPACTS – MRTS integration

Difference Basis scenario –scenario MRTS integration	Operating kilometers per day	Number of vehicles	GHG-Emissions per day	Costs per year [lakh rupies]
City ordinary, suburban, metro express	- 33,500	- 112	- 23.00	- 3,500

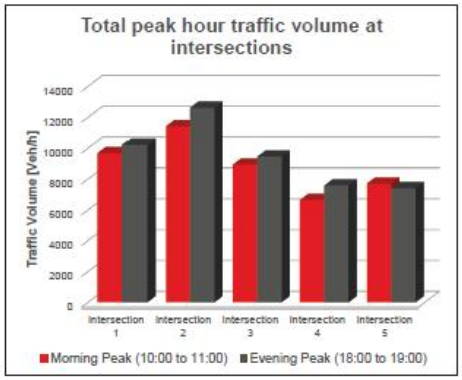
CASE STUDY II
OPTIONS FOR IMPROVEMENT OF A ROAD CORRIDOR IN HYDERABAD

STUDY AREA

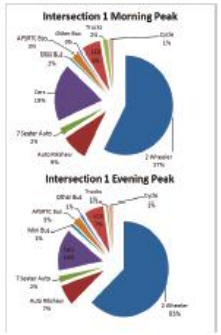
Corridor Key Figures

- Part of important connection between sub-centers Kukatpally and Secunderabad
- East section of corridor is part of classified National Highway NH7
- Corridor is used by approximately 40 different bus lines
- Total length of corridor: 6.3 km
- 5 main intersections of which 4 are controlled by traffic signals
- Cross sections: dual carriageway
- Carriageway width usually 2 x 8–10 m
- Some bottlenecks with carriageway withs around 5 m are located between intersections 3 and 4

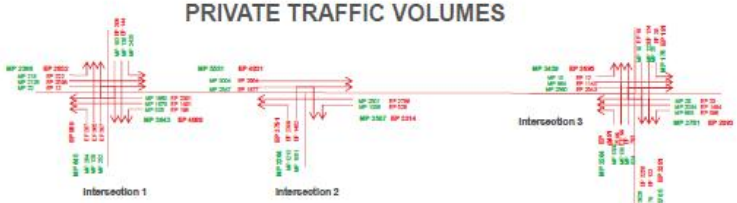
PRIVATE TRAFFIC VOLUMES



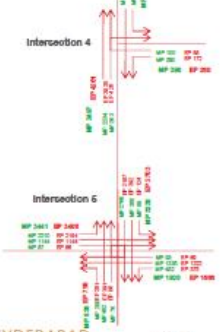
Traffic Compositions



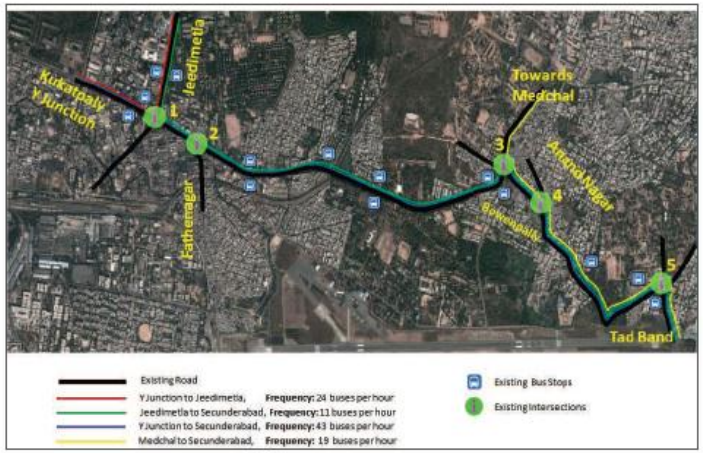
PRIVATE TRAFFIC VOLUMES



Locations with high turning volumes

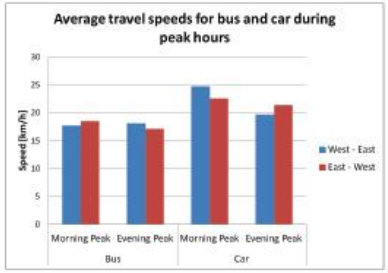


PUBLIC TRANSPORT

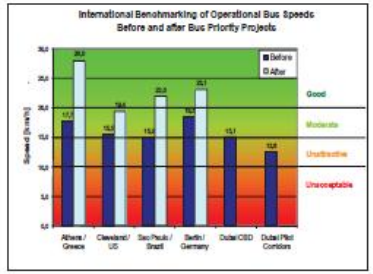


TRAVEL SPEED SURVEY

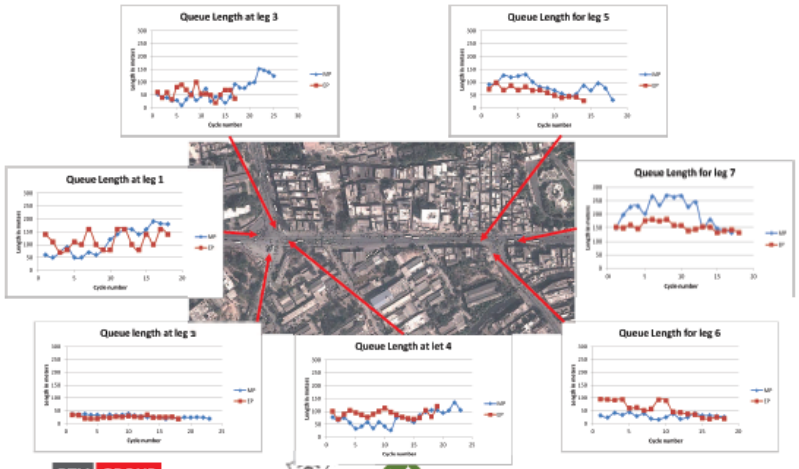
Field Measurements on Corridor



International Benchmarking



QUEUE LENGTH SURVEY



DEFFICIENCY OF CURRENT SITUATION

- Although the corridor has important network functions, the corridor is not recognizable as such
  - No clear alignment
  - Multiple sharp curves for main traffic directions
  - No uniform standards for cross sections
- Poor pedestrian facilities
  - Only short passages are equipped with footpaths
  - When existing, footpaths often are encroached for other purposes (parking, shopkeepers ...)
  - No crossing facilities
- Unattractive conditions for use of Public Transport
  - Bus travel speeds are significant lower compared to cars/ 2-wheelers
  - Bus stop locations are not visible and not easy accessible
  - Missing information on bus routes / timetables

DEFFICIENCY OF CURRENT SITUATION

- Private Motorised Traffic
  - Insufficient parking facilities in commercial areas
  - No extraordinary queues and waiting times at intersection (except intersection no. 2)
  - Average Speeds and LOS for private motorised traffic currently is at an acceptable level

WHAT ARE THE AIMS OF URBAN CORRIDOR IMPROVEMENT PROJECTS ?

- Maintaining or increasing of transport capacity on important urban connections (Transport capacity in terms of Persons / hour)
- Reduction of costs for transport
  - Vehicle operation costs
  - Travel time costs
- Reduction of negative environmental impacts of traffic
  - Air pollution
  - Noise pollution
  - Separation effects / road safety risks
  - Land use for road infrastructure
- Hierarchical structuring of urban road networks
  - Concentrating of transit on designated links
  - Traffic relief for residential areas

POTENTIAL FIELDS FOR IMPROVEMENT OF URBAN CORRRIDORS

	Private Transport	Public Transport
Infras-tructure based	Introduction of new Bypass Roads Road Widening Parking Management Junction improvements Traffic Cirulation (Turning restrictions, Oneway streets)	Improvement of pedestrian facilities Rail based Mass Transit (Metro, LRT) Optimisation of bus stop locations Exclusive Bus Lanes Full BRT - System
Tech-nology based	Access Control Traffic Signal Coordination	Improvement of bus stop facilities Signal Priority for PuT

OPTIONS FOR FUTURE DEVEOLOPMENT

Option 1 Restricted development in existing ROW	Option 2 Development including substantial expansions of corridor
• Bus priority measures mainly on existing road space, land acquisition only in exceptions • Reorganization of bus stops and bus passenger accessibility • Reduction of paratransit parallel to bus corridor • Acceptance of capacity reductions for private transport	• Implementation of an efficient bus corridor, extension or ROW and built up of road sections • Reorganization of bus stops and bus passenger accessibility • Dimensioning of bus infrastructure for bigger vehicle types (articulated buses) • Ensuring of sufficient capacity for private transport • Reduction of paratransit parallel to bus corridor • Improvement of public space supporting commercial and residential uses

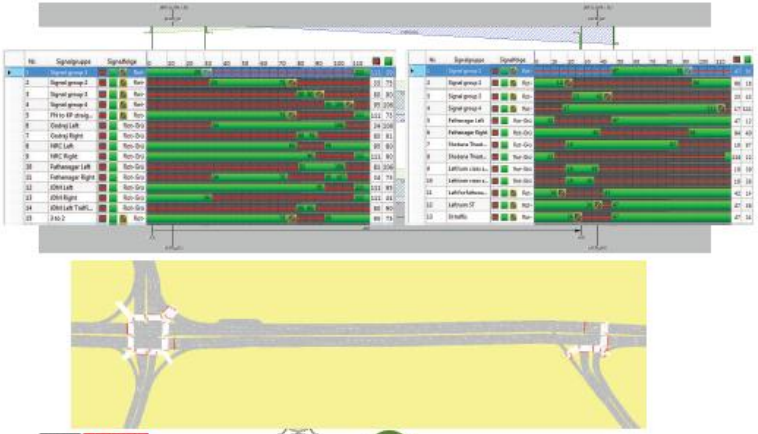
SET OF MEASURES FOR OPTION 1

OPTION 1

Optimisation of traffic signal control

- Introduction of signal coordination (green wave) for major traffic flows at closely matched intersections (intersection 1and 2, 3 and 4)
- Limiting of signal cycle times to maximum of 120 s at all intersections
- Optimisation of signal phasing
- Optimisation of green time distributions according actual traffic volume ratios
- Equipment of all interactions with pedestrian crossing facilities

OPTION 1 - TRAFFIC SIGNAL COORDINATION



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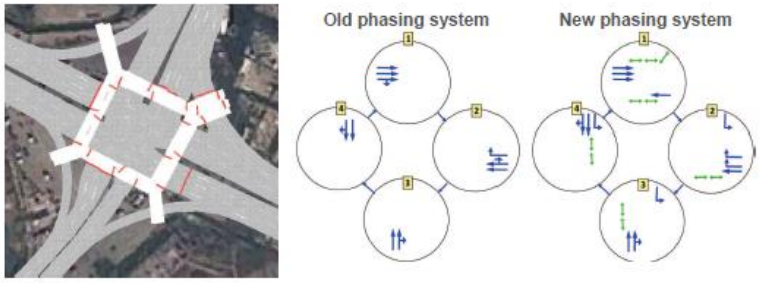
OPTION 1 - MODIFICATIONS AT INTERSECTION 1

- Introduction of signalized pedestrian crossings at all arms of the intersection
- Exclusion of right-turning movement coming from West
  -> advantages for signal phasing



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SET OF MEASURES FOR OPTION 2

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OPTION 2 – INTERSECTIONS FOR NEW BYPASS ROAD

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OPTION 2 –MEDIAN BUS LANES AND BUS STOP

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OPTION 2 – MEDIAN BUS LANES

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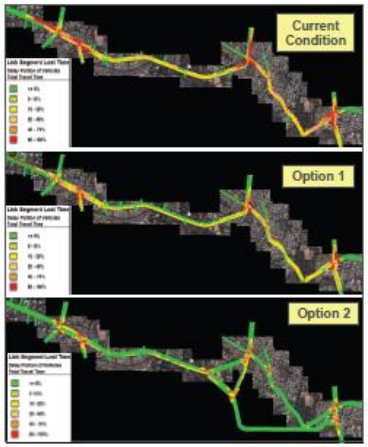
IMPACT ANALYSIS – LINK SEGMENT LOSS TIME



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IMPACT ANALYSIS – BUS OPERATING HOURS

	Unit	Present condition	Option 1	Option 2
Average Bus Speeds	[km/h]	18	23	26
Total operating hours for bus services in peak hours	[bus*h]	42	34	28
Total operating hours for bus services per day	[bus*h]	666	537	447
Total operating hours for bus services per year	[bus*h]	219.912	177.140	147.465

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IMPACT ANALYSIS – TOTAL TRAVEL TIME AND FUEL CONSUMPTION

Total travel time in study area during peak hour	Unit	Present condition	Option 1	Option 2
- bus	[veh*h]	42	34	28
- car	[veh*h]	659	625	536
- 2-wheeler	[veh*h]	1.494	1.341	1.185
- 3-wheeler	[veh*h]	511	480	433
- HGV	[veh*h]	38	36	30
All vehicles	**[veh*h]**	**2.744**	**2.516**	**2.212**

Fuel consumption savings compared to present conditions		Unit	Option 1	Option 2
	per peak hour	[lites/hour]	-92	-223
	per year	[t/year]	-365	-885

Summary & Conclusions

POLICY RECOMMENDATIONS BASED ON RESULTS OF CASE STUDIES

- Improvement of Public Transport, by adopting
  - Exclusive bus lanes
  - Prioritisation at taffic signals
  - Better acess to transit
- Multi-Modal Integration
  - Bus. MMTS and MRTS
- Improving Infrastructure facilities like road widening to accomodate exclusive bus lanes

Summary & Conclusions

What does the development objectives of the proposed strategy achieve along with the co-benefit of adaptation and mitigation of CC?

- Better plannig leads to better (more integrated) PuT-System and NMT-Facilities, which results in
- better accessibility
- conservation of energy
- improved traffic flow
  - -> travel time savings +
  - -> savings in VOC,
  - -> less air pollution/improved health

THANK YOU FOR YOUR ATTENTION!

3.8 METRASYS – Sustainable Mobility for MegaCities | Alexander Sohr

3.8.1 Abstract

The City of Hefei is on the verge of passing the threshold towards becoming a mega city within the next decade and is at the stage of rapid development, these change leads also to an important reform of the urban traffic framework. METRASYS aims to provide decision-makers with the means to effectively implement and to efficiently guide sustainable transport in the city of Hefei. The approach devised in the project addresses both planning and operational aspects of the transport sector, supported by the deployment of a sophisticated geographic information system (GIS) and an advanced traffic management system. This system also facilitates environmental evaluations and analyses with an emission and pollution dispersion model developed in this project. This in turn provides a valuable feedback to the transport and urban planning process. Furthermore, the results are used to explore the opportunities in climate finance, which provides additional incentives for sustainable transport development. As indicated above, the project works in four main research areas, all related to energy efficient future mega cities:

Traffic management Tools are a vital element of the Metrasys project. Beside an overview on the whole project, the presentation willfocus on this tools.

One main part is the development and implementation of an up-to-date traffic management system including traffic data collection and broadcast of traffic information for traffic operators, travelers and drivers. The used Floating Car Data (FCD) System enables the user to qualify and visualize the traffic flows and traffic situation. The resulting traffic services are distributed to road users through Digital Multimedia Broadcasting (DMB) using TPEG (Transport Protocol Experts Group), a coding standard for detailed traffic and journey information.

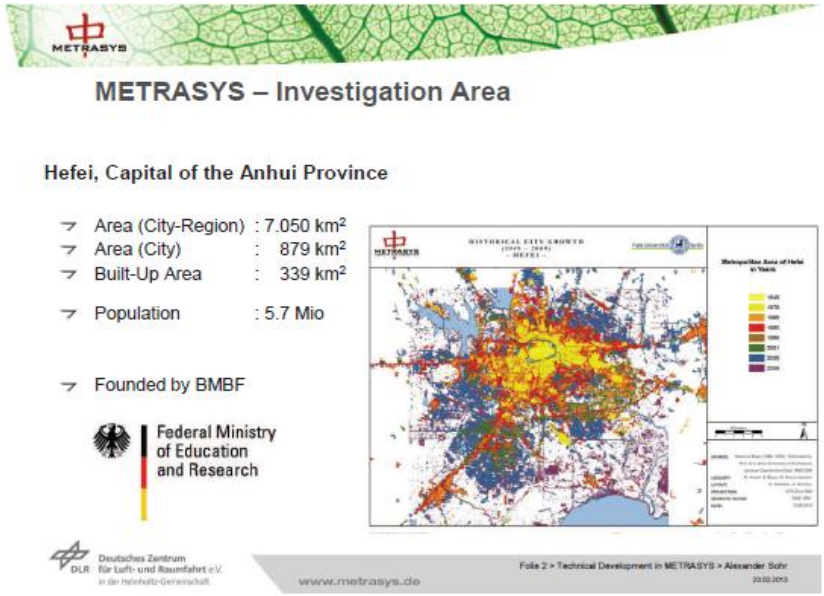
One other part is the detailed monitoring of the complete traffic of an intersection in Hefei. This is necessary because of the rising traffic demand and high percentage of bikes. The Aim is to analyze an intersection and collect traffic related data over a long term period to study the behavior of the different means of transport.

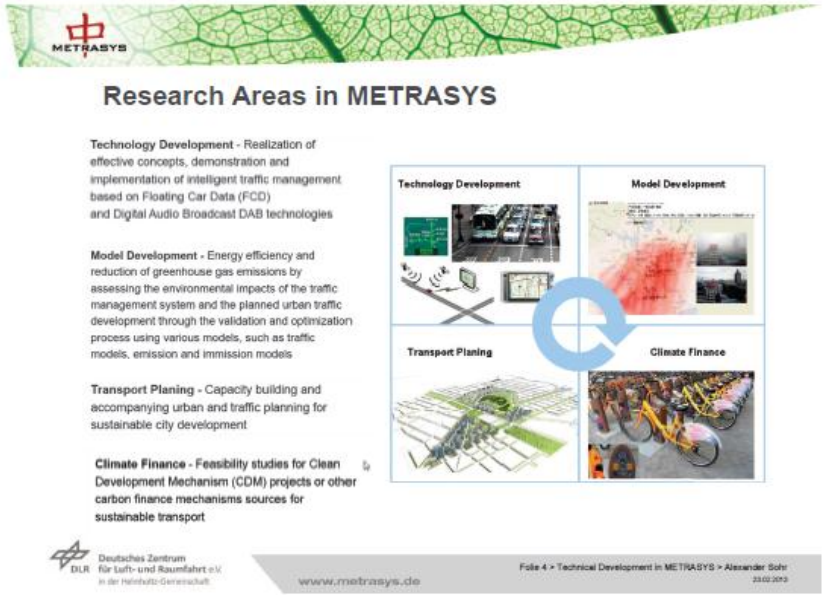
This includes the following tasks:

- Preoperative (during-) and postoperative exams of building activities at intersection
- Different behavior of traffic participants and outside traffic participants (pedestrians and cyclists)
- Creation of trajectories
- Detection and analysis of incidents
- Turn dependent traffic flows

With the intersection monitoring traffic demand and traffic movements can be handled in a more efficient and secure way.

3.8.2 Presentation

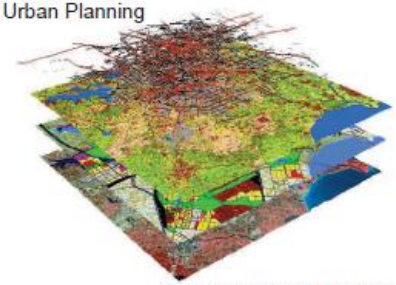




Geographic Information System (GIS)

- Reliable, robust database as basis for FCD, Emission model, …
- Data collection and update for
  - Intelligent Transport Systems
  - Land Use and Sustainable Urban Planning
  - Emissions Modeling

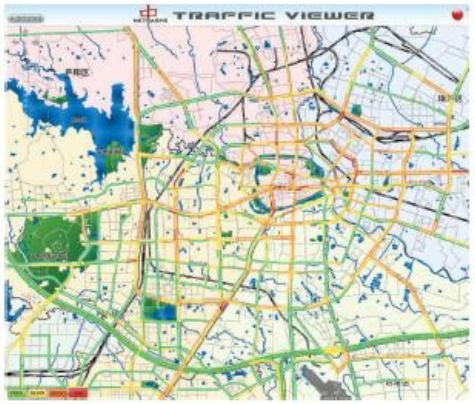
RoadNetwork 2009 → 2011



Source: Freie Universität Berlin (TEAS)

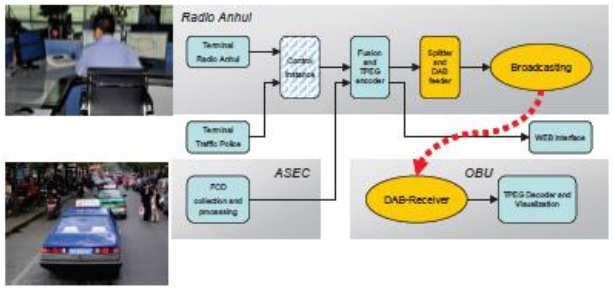
Floating Car Data (FCD) - Technology

- GPS Positions with timestamp
  - Match to roadnetwork
  - Calculate driven speeds
  - Area-wide trafficconditions



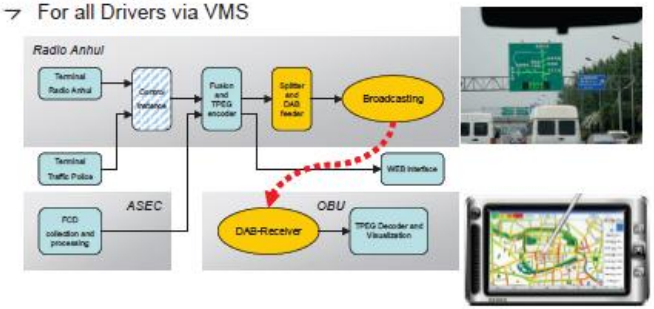
Data Collection

- Taxi – FCD, Loopdata and Videodetection
- Datafusion and Prediction

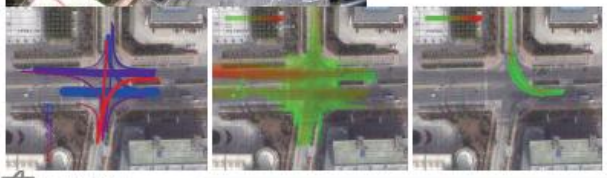


Information Distribution

- Traffic Information Distribution using TPEG via DAB
  - For OBUs
  - For the Police
  - For all Drivers via VMS



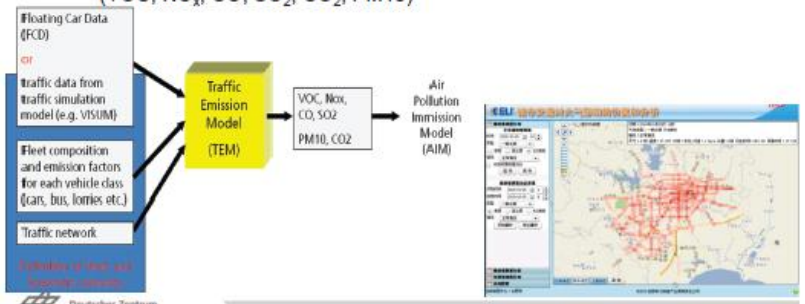
Intersection Monitoring



- preoperative (during-) and postoperative exams of building activities at intersection
- different behavior of traffic participants and outside traffic participants
- creation of trajectories
- detection and analysis of incidents
- turn dependent traffic flows
- combination / data fusion of different detection methods
- redlight violations

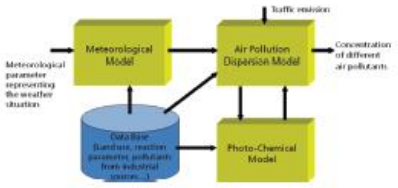
Traffic Emission Model (TEM)

- Traffic Flow from FCD (or Model)
- Fleet Compositionm, Road Network
- TEM calculates the different chemicals polluted by the vehicles (VOC, NO_x, CO, SO_2, CO_2, PM10)



Air pollution Immission Model (AIM)

- Distribution and chemical Transformation of air pullants (NO_x, CO, SO_2, PM10)
- Calculate Immissions for the Scenarios in 2030 (BAU & Alternatives)

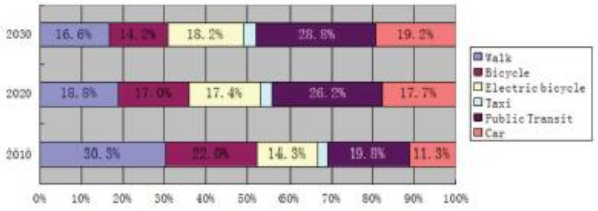


Traffic Model Hefei
Business as Usual (BAU) Scenario

- Based on Hefeis Masterplan
- Horrible traffic conditions even in 2020

Traffic Model Hefei - Modal Share
Business as Usual (BAU) Scenario

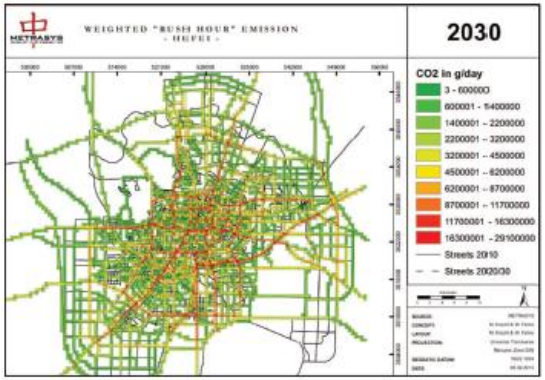
- Public Transport is strenghtened
- Walking and Biking lose



Modal share projections for Hefei (2010-2030), Source: Metrasys 2012

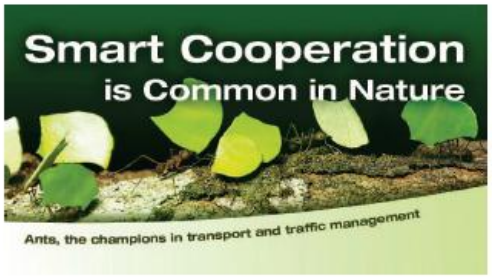
Model-based Environmental Impacts Analysis
Business as Usual (BAU) Scenario

- CO
- CO2
- NOx
- SO2
- VOC



Thank You Very Much for Your Kind Attention!
Contact

- German Aerospace Center
  Institute of Transportation Systems
  Alexander.sohr@dlr.de
  www.metrasys.de



3.9 Hefei-Traffic Management | Prof. Tingjian Fang

3.9.1 Abstract

Hefei- the capital of Anhui Province, locates in middle of China and close to Yangzi River Delta area. Recently the scale of the city continues to growing. In 2010 the city area: 7050 km2, population of the city: 5.7 million, central urban district area: 879 km2, constructed area: 339 km2, population of the central urban district area: 335 million. Since July of 2011 Chao Lake City has been removed, the urban area and Lujiang County affiliated to Chao Lake City was merged to Hefei. Now the city area becomes 11433 km2 and population 745.7 million. The planned structure of the city changed from 1-4-1 to 1-3-3-1.

To cope with rapid urbanization large scale of road network reconstruction is in progress from improving single roads to perfect the whole network. Beside to build several elevated roads No.1 subway is under construction since last June as well as No. 2 subway will be initialized this year. The mode of road network from one centre-multi radiation transferred to multi centre-grid transit.

Meanwhile, in order to increase the efficiency of traffic management, ITS concept, technology and equipments are introduced through municipality's funding and cooperated with domestic or foreign partners such as the Metrasys project. One core module of ITS is traffic information collection which is based on DLR's FCD technology combined with loop, radar and camera fusion data. Traffic signal controllers are installed at 818 junctions that reached 65% of constructed junctions of the city, among them 370 controllers were connected to the network and formed a 3 layers' control scheme. There are 557 reinforcement equipments are mounted which included 482 cameras for recording illegal driving behaviors and 31 radar for over-speed detection. The traffic management situation still has big challenge as that the number of vehicle has been twice compared with 5 years ago. It causes severe traffic congestion in rush hours and air pollution. A so called "one kilometer engineering" was started this year. The aim is to transfer the traffic information service to the hand of each residence in more real time, convenient and reliable.

On 1st ring way the municipality will invest more than 80 million to install ITS equipments, such as wireless magnetic sensor, video camera, traffic message board and signal controller in order to smooth road traffic in central city.

For realization the concept of "Green Transportation", 600 new buses will be added each year until getting the target of 15buses/10.000 residences. "Rental public bicycle" project will be applied zone by zone. More and more electric cars and buses should be expected to run at Hefei streets much popular.

3.9.2 Presentation

International Symposium
Mobility and Urban Structure

Hefei-Traffic Management

Prof. Tingjian Fang
The Research Centre for Software Eng. Technology
of Anhui Province (ASEC), China
23rd, Feb.2013
El Gouna, Egypt

1, The Progress of Hefei Urbanization

Location of Hefei

Before city reunion (Before July 2011)

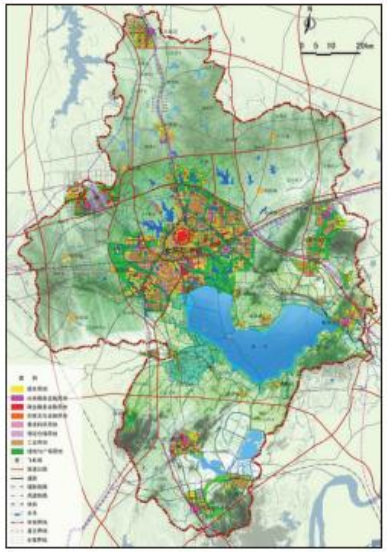
Urban area 7,029Km²

Urban Population 5.70M

After city reunion (After July 2011)

Urban area 11,433Km²

Urban population 7.45M

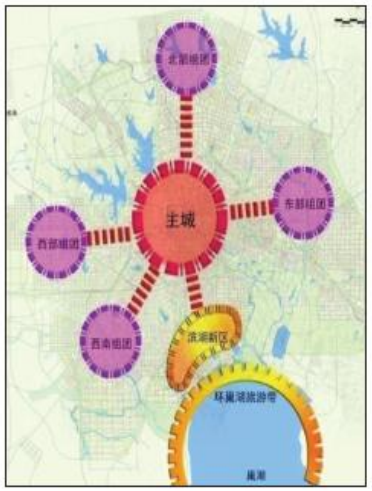


Space structure before reunion

"141" space structure

- 1 central city
- 4 peripheral groups
- 1 New Lakeshore region

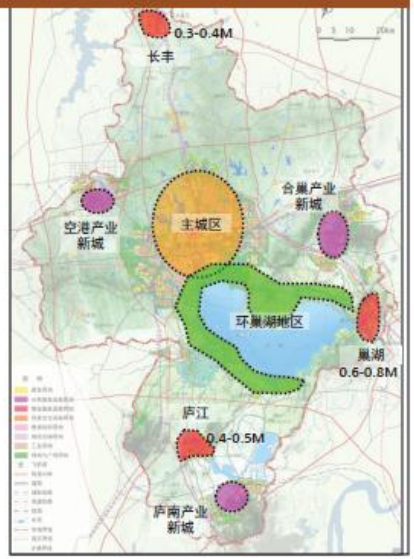
South-West group
West group
North group
East group



New space structure

"1331" space structure

- 1-mian city, ie. "141"
- 3 associate cities
- 3 New industrial Zone
- 1 pan- Chao Lake area



Layout of urban rail system

By 2020 six rail lines will be built

Total length 181.5km
there are 15 hubs for interchange

2 rail lines under construction

No.1 subway from north to south
length: 28.75km，station:23，
started in June 2012
No.2 subway from east to west
length:27.20km，station:23，
startes this year.

Trunk roads network

BRT Network Layout

- 15 lines
- Total length 336km
- Ring+Radical structure

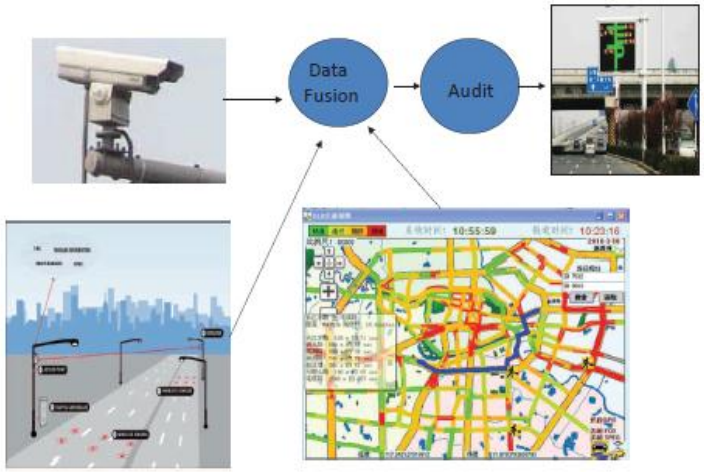
2, Traffic Management of Hefei

Road Traffic information collection (Metrasys)

Road traffic information collection by FCD(600 taxies,2800 buses and 2200 heavy trucks)

265 video cameras to detect traffic flow and events

Traffic information data fusion (Metrasys)



Traffic signal controller

818 junctions had signal controllers(65 % of completed junctions), among them 370 are connected to network.

Reinforcement devices

To detect red light, over-speed or other prohibited drive behavior by video camera or radar.

64 other reinforcement devices

462 red light cameras

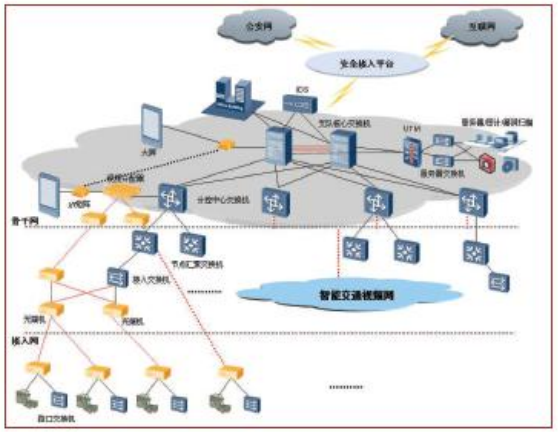
31 radars

Traffic monitoring by camera

655 video camera installed in the city. (among them 26 at the top of high building) for monitoring trunk road and area.

Capture image of vehicles occupied BRT lane

Communication network

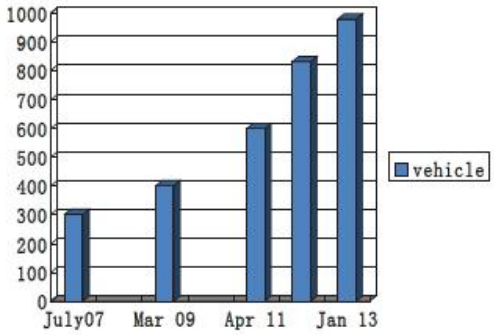


Traffic management centres

3,What's the Challenge now?

- Fast growth of urbanization
  - City scale increased 2.5 times in 10 years
  - Urbanization level increase 5.7% every year on average
- Fast growth of vehicles
  - vehicles increased 23.4% every year on average in the past ten years
- Fast growth of economic development ---- a huge demand for road transportation
- Lower density of road network

Fast growing No. of Vehicles



July 07	300,000	Mar.09	400,000
Apr.11	600,000	Jan.12	830,000
Jan. 13	980,000	Mar.13	1,000,000

Road Density in Downtown City

- Berlin

- Hefei

Congestion distribution inside 2nd ring road

25

Severe Fog & Haze

- 28th Feb,2013 PM2.5: 300μg/m3 v.s 75 μg/m3

Severe Fog & Haze

4, Efforts Made in Near Future

Hefei is one of the trial city for electric cars and buses

Already running: 3000 e-cars, 20 e-buses

5 charging stations and 536 charging posts were built

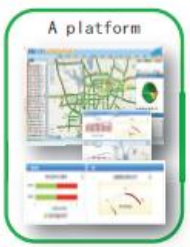
Will built in 2013: 100 e-buses,3 more charging stations and 1600 more charging posts

Public Bicycle Program

ITS project of 1st ring road

Investment: 80M RMB

To initiate the traffic service solution



A set of service

Web pages

Smart bus program

348 Bus message boards will be installed

Bus message board

App at mobile phone (navigation etc.)

Total investment RMB18M

Continuous ITS Projects are under construction

Thank you for your attention!

3.10 Low Carbon Urban Transport Solutions for Megacities of Tomorrow in China | Li Zhenyu

3.10.1 Abstract

Megacities are the main contributors for GHG emissions in transport. And urban transport is at a crossroad in China, what is the sustainable and low-carbonized urban transport for Megacities of Tomorrow in China, which way urban transport should take?

The presentation on “Low Carbon Urban Transport Solutions for Megacities of Tomorrow in China” has three components. It first outlines the current situation of urban transport development, the main characteristics of public transport, private car and non-motorised transport in Chinese Megacities nowadays, the key barriers existed in this key fast urbanization and motorization period, the main polices for low carbon transport development, and what results they can bring out. Then outlines some typical cases in Chinese Megacities cities, with description of what are the key characteristics of low-carbonised urban transport in Chinese Megacities cities, whether we should induce travel and redistribute travel or reduce travel, and rebound effects should be sincerely considered, what’s the differences between energy saving & emission reduction and low carbon development in China. Finally it identifies some of the key challenges for urban transport development and develops a package of measures including planning, regulations, economic, technical, mechanism and others in Megacities to combat and adapt Climate Change and foster sustainable and low carbon urban transport.

3.10.2 Presentation

METRASYS - Transport in of Megacities of Tomorrow in China

Mr. LI Zhenyu

China Urban Sustainable Transport Research center

China Academy of Transportation Sciences, MOT

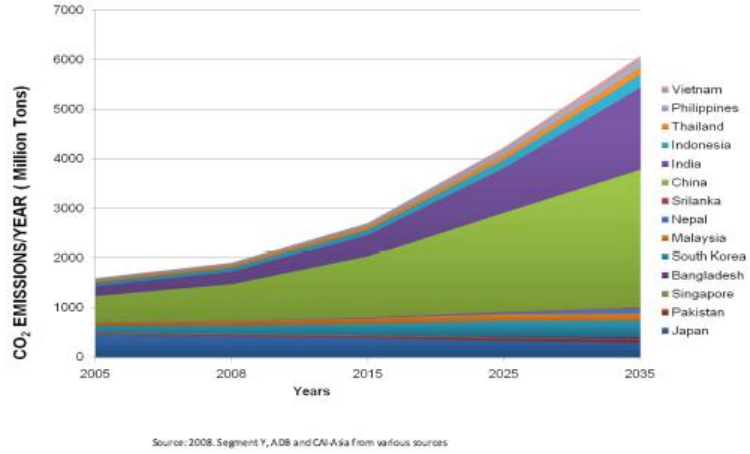
EI Gouna, Egypt

23rd, Feb., 2013

Mobility and Climate change

- 23% of CO_2 is globally from Transportation Area (Source: IEA)
- The fastest growth rate of fossil energy use
- The fastest growth rate of carbon emission
- With the rapid urbanization, both energy use and carbon emission of urban transport increase fantastically, it's one of the biggest challenge

Transport CO2 Emissions in Asia



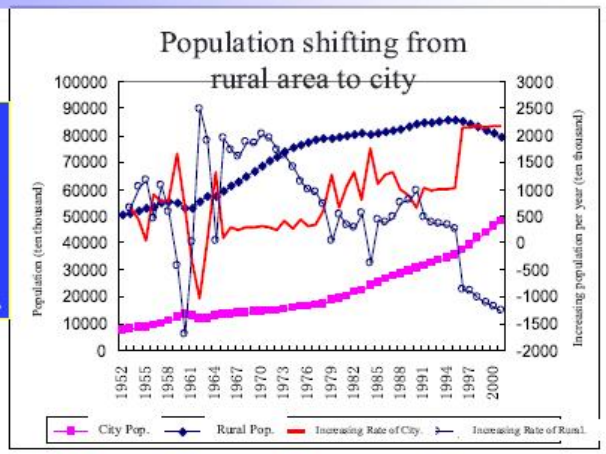
Source: 2008. Segment Y, ADB and CAI-Asia from various sources

Population and Mobility

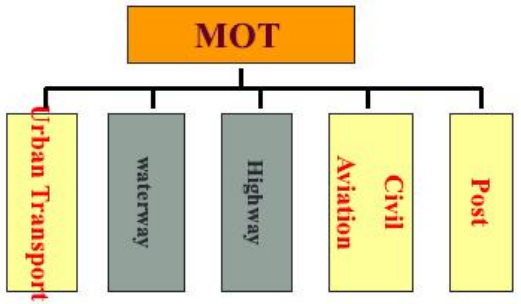
2020-2030:

Immigration from rural area to city in ten years

20 million population immigration per year.



Institutional arrangement



National planning, policy and standard and coordination to build up an integrated, efficient transport systems in China

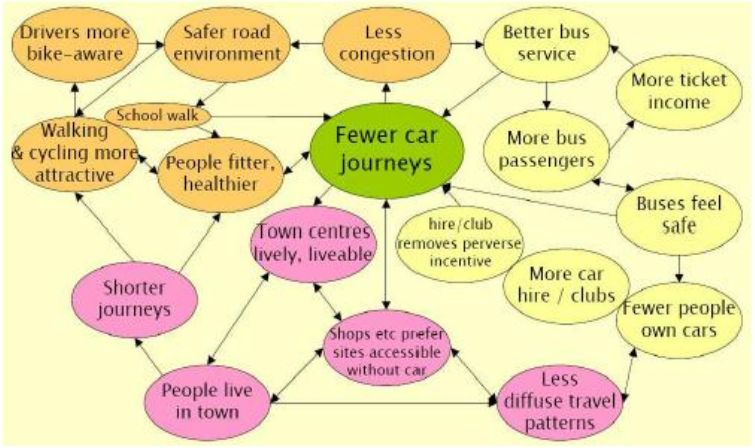
Contents

1. What is low carbon transport?

Focus on *Energy Saving* and *Emission Reduction*, a new transport system with the characteristics of *High energy efficiency*, *Low energy use*, *Low pollutant and carbon emission* will be gradually formed.

LOW-CARBON **TRANSPORTATION**

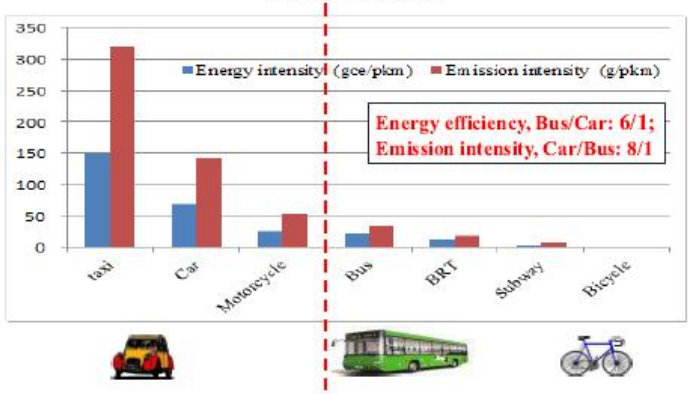
Transport – possible virtuous circle



Levett Therivel 2007 (http://www.lga.gov.uk/lga/aio/35744)

1. What is low carbon transport?

Energy efficiency and emission intensity of different transport modes



2. Main National policy

- China's National Climate change Programme, June, 2007
- The National emission reduction target in 2020: 40%－45%, 2009, 12
- The National target in 12th five year plan: energy intensity: -16%, CO2 emission intensity, -17%

2. Main National policy

- The launch of the National Pilot Program on new energy vehicles , 20+5 cities, MOST, 2009, 2010-2013
- The launch of the National Pilot Program on Low-Carbon Provinces and Cities : Five provinces and Eight cities, NDRC, July, 2010
- The national guideline for energy saving and emission reduction by comprehensive policies, 8 cities as pilot cities, MOF & NDRC, Aug. 2011

2. Main National policy

- As one of the main energy saving and emission reduction sectors, transportation sector is required to develop a low carbon transportation system by the State Council
- From 2009 to 2011, MOT carries out an important project 'Study on constructing low carbon transportation system'

  Sub task force: roadway transport, waterway transport, urban transport

2. Main National policy

- MOT issued 'the Guideline for constructing low carbon transport system' and 'the Action plan for constructing low carbon transport system ', 10 + 16 pilot cities, 2011-2012
  - ✓ Set up the special foundation: 700 million RMB per year
  - ✓ Target for urban passenger transport (public transport & taxi): compared with 2005

    the emission intensity: 2015: -20%

    2020: -30%

2. Main National policy

The six main tasks in the Guideline

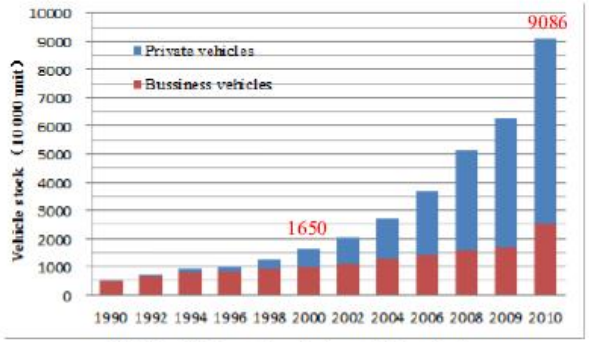
- Low carbon Infrastructure (Improve)
- Improve the vehicle efficiency (Improve)
- Promote low carbon modes (Avoid)
- Improve ITS for operation (Improve/Shift)
- Improve travel information for public (Shift)
- Improve transport emission management (Improve)

2. Main National policy

Low carbon transport map in China

3. Current status and Characteristics

◆ Motorization: high growth speed



Civil vehicle and private vehicle stock

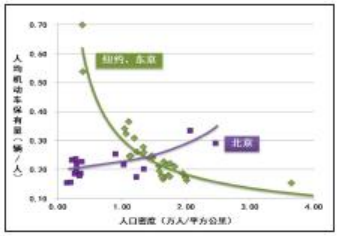
In 2020, the vehicle stock in China will be 200 million!

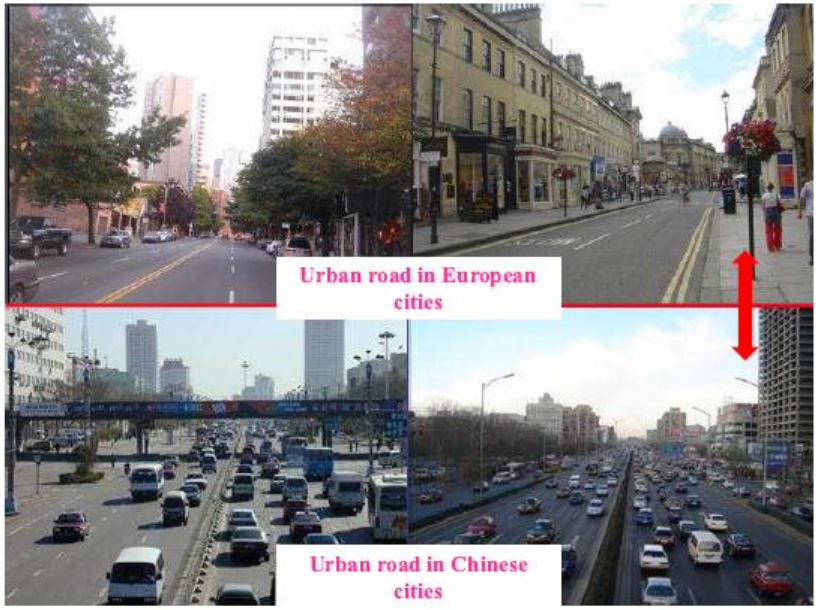
3. Current status and Characteristics

- **Motorization：high use**

By the survey in Beijing, the VKT of private car 15 000 km, which is 1.5 times of London, more than 2 times of Tokyo

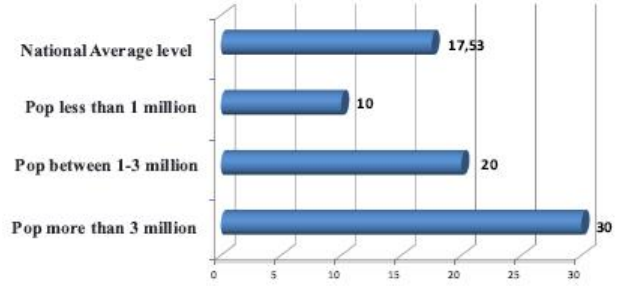
- **Motorization：high ownership density**





3. Current status and Characteristics

- **Public transport far behind**



Currently, the national model split of public transport is less than 20%

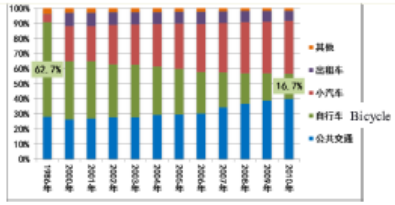
3. Current status and Characteristics

◆ **Cycling is on the decline**

Beijing:

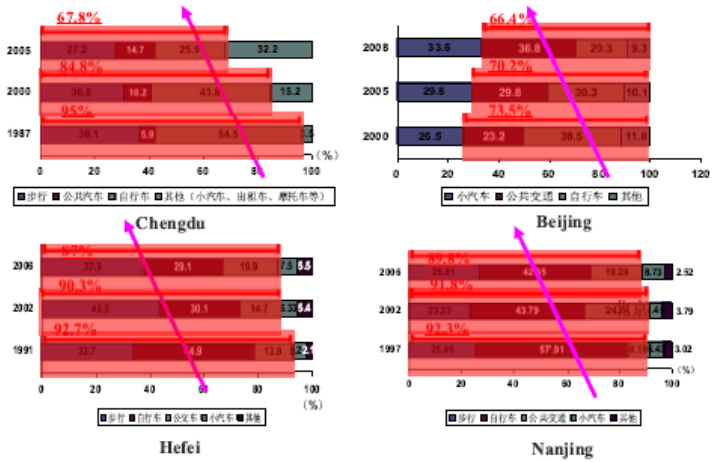
➢By bicycle, 2010: 16.7%, 46 decreased than that of in1986

➢ By car, VKT is less than 5 km, 44%.

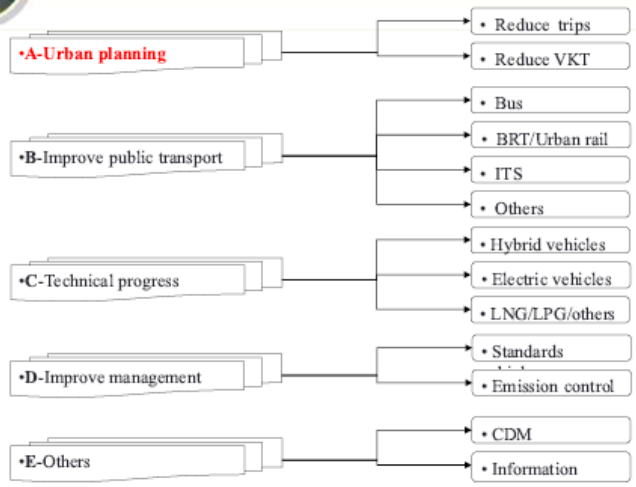


3. Current status and Characteristics

◆ **Low carbon transport is on the decline**



Main solutions



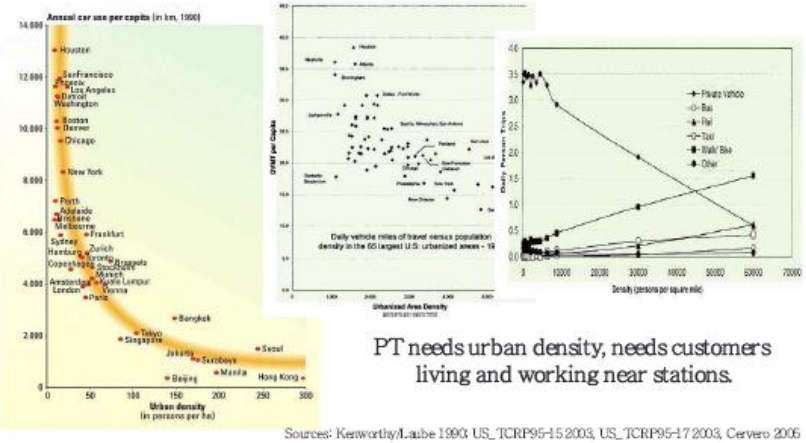
4. Low carbon development and planning

- Sustainable Transport Instruments

Strategy Responses: Planning

- Planning instruments include all measures that focus on "smarter" planning of infrastructure, *i.e.*, planning that helps reduce or optimise transport, encompassing both public transport and non-motorised modes such as cycling and walking
  - Land Use Planning
  - Planning for Public Transport Modes
  - Planning for Non-Motorised Transport Modes
  - Planning for Freight

Urban Density: Crucial for Travel Demand and Mode Choice

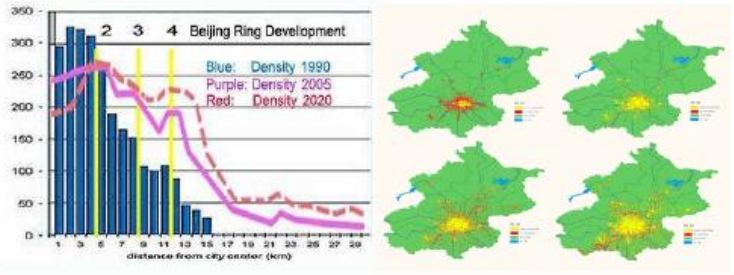


PT needs urban density, needs customers living and working near stations.

Sources: Kenworthy/Laube 1999; US_TCRP95-15 2003, US_TCRP95-17 2003, Cervero 2005

4. Low carbon development and planning

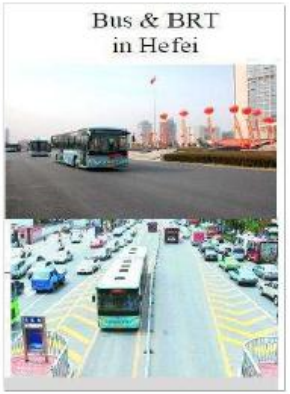
- Problem: How to Keep Compact Urban Forms

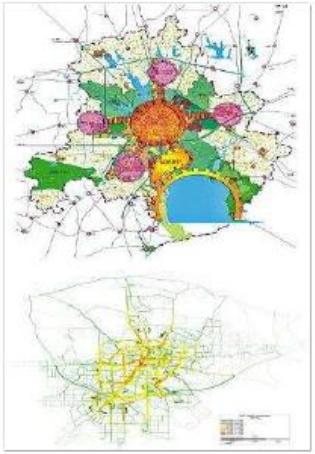


Radial and ring roads improve rural accessibility; settlements move outbound, central districts weaken.

4. Low carbon development and planning

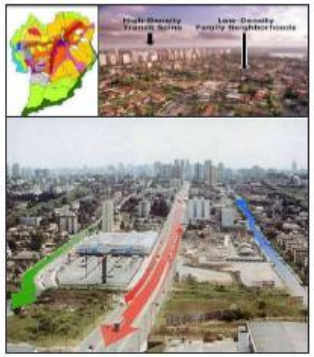
"141" strategy in Hefei



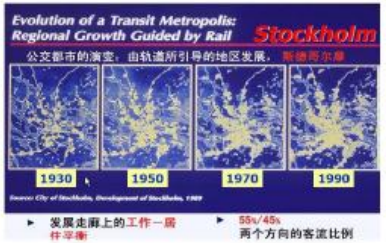


4. Low carbon development and planning

- TOD: Transit oriented development



Curitiba



4. Low carbon development and planning

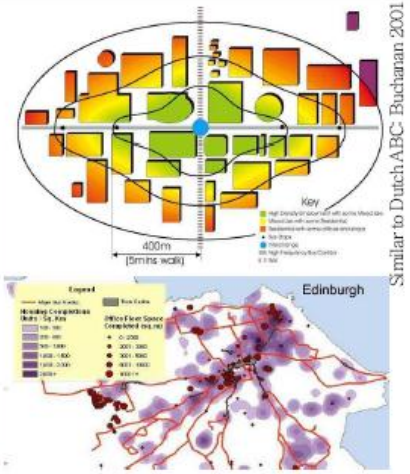
Classification of Land Uses: The Right Place for the Right Function

The Dutch ABC-Concept:

A: Excellent pt: Locations around train / bus station
- shopping centers, large office buildings etc.

B: Good / average accessibility by pt
- housing, work places, leisure facilities

C: Poor pt, edge of town, near highway ramps
- facilities with low number of visitors, good freight access

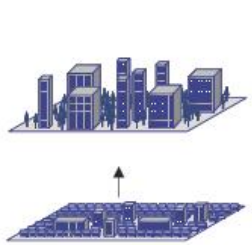


Similar to Dutch ABC Buchanan 2001

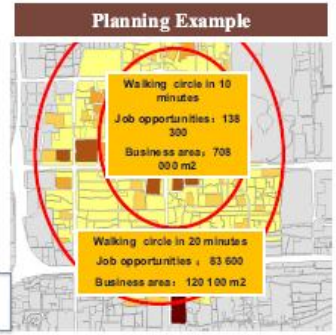
5. Conclusion

Good Planning and sustainable planning is very important in China

More international experiences and good practices.



Xidan subway station, Beijing



5. Conclusion

Land Use and Transport Planning – Focus on Integration

- Integration is a key tool in
  - Managing the demand for transport,
  - Reducing congestion and negative impacts on the environment of private vehicles use, and
  - Promoting public transport and non-motorised modes
- There is a needs for greater collaboration between transport ministries and other ministries that influence transport

Thank you for your attention!

Low carbon transport, Sustainable City, Better Life

http://www.urbansustrans.cn

3.11 Santiago de Chile - Transport Szenarios 2030 | Dr. –Ing. Dirk Heinrichs

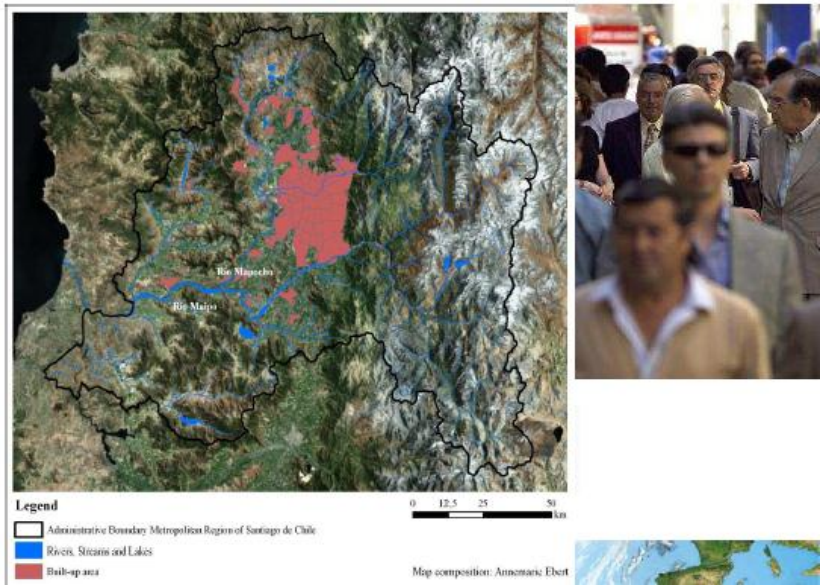
3.11.1 Abstract

Transport, land use change and emissions in cities and urban regions are closely linked. In the large urban agglomerations in Latin America, rapid expansion of motorized travel and urbanized area have gone hand in hand with rising air pollution levels. Cities like Mexico, Sao Paulo or Santiago de Chile face severe levels of emissions with negative effects on air quality.

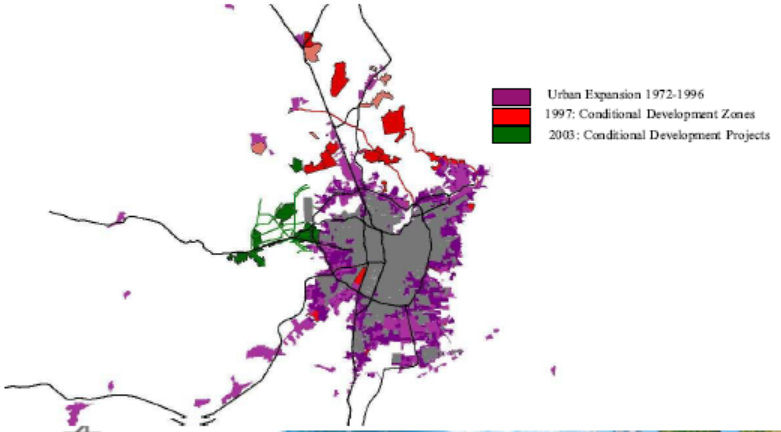
The Metropolitan Area of Santiago de Chile (AMS) has experienced a dual development in terms of transport in the recent decades with significant and mixed implications on both mobility and land use change. On the one hand, the development of a tolled highway network and its expansion into the urban periphery has promoted private car use and enabled the development of new mono-functional residential and commercial areas well beyond the boundary of the consolidated city. In parallel, the implementation of the integrated public transport system Transantiago together with improvements in the accessibility of depopulated inner city areas has increased the potential demand for public transport modes.

Based on original research carried out under the 'Risk Habitat Megacity' research initiative, the presentation describes plausible transportation scenarios, their interrelation with land use change and the likely implications for air quality until the year 2030. It firstly projects some of the main transportation trends like motorization rate, current and expected congestion levels, modal split and accessibility levels. Assumptions regarding economic and demographic growth for the AMS, as well as infrastructural projects and operational improvements are considered. Secondly, the presentation assesses the likely associated changes in land use, in particular the location of households in the Metropolitan Region. Thirdly, it discusses the sustainability implications of the scenarios, which for example predict increasing travel demand and share in motorized individual travel, rising travel times in combination with further spatial expansion. The presentation concludes with a discussion on the future challenges and suggests strategic policy options for an integrated transport and land use policy.

3.11.2 Presentation



Land use change: recent changes



Transportation: recent trends

- Expansion of highways (155 km; 2004 - 2006)
- Expansion of metro (2010: >100 km)
- 02/2007: Public Transport System 'Transantiago'
- 17 million trips/day in 2006 (3 trips/person)
- 1.2 million motorized vehicles in 2009 (MR=194), 42% increase since 2001

	EOD 1991 (in %)	EOD 2001 (in %)
bus	47.1	30.4
metro	6.7	5.0
car	14.6	27.4
taxi / taxi colectivo	2.8	4.1
walking	21.1	26.6
other	7.7	6.5

Modal Split in Santiago (left EOD 1991 / right EOD 2001), Source: Sectra, 2002

Future mobility and the effects in Santiago?

- To what extent is **car use** likely to increase and what will be the ***use*** *of* ***public transport*** in the context of urban expansion and population growth?
- How well will the system function (***travel time, congestion***)
- How will transport-related ***emissions*** *evolve*,
- How will this affect future **air quality** levels?

Santiago 2030: three scenarios

Business as usual (BAU)

- persistence of strong state-regulation
- safety net approach in terms of social protection measures and subsidy schemes for lowes income groups.

Market individualism (MI)

- reduced role of the state – regulation is reduced to facilitate more rapid market adaptation

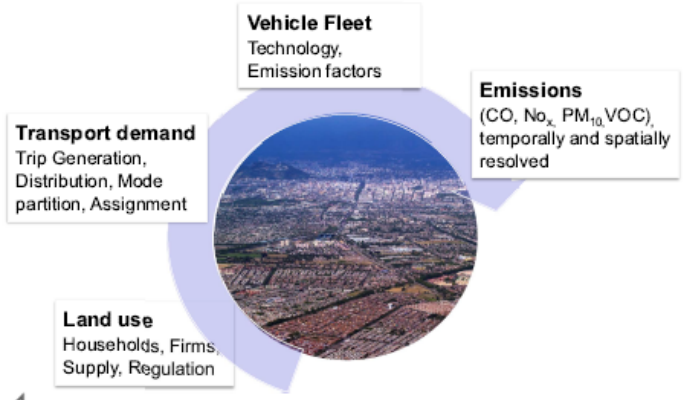
Collective responsibility (CR)

- social and environmental justice becomes the principal goal of state interventions and regulatory regimes
- emphasis on redistributive measures to deal with distribution limitation

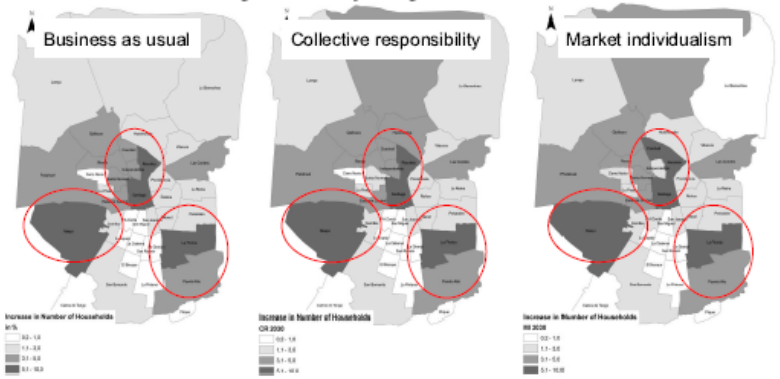
Methods (1): contextualize the three scenarios

Assumptions	BAU 2030	CR 2030	MI 2030	
Population (Mio.)	7.30	6.70	7.50	Socio-economic development
Households (Mio.)	2.4	2.1	2.7	
BIP change	2010-202: 5.1% 2021-2030: 4.2%	2010-2020: 4.8% 2021-2030: 3.7%	2010-2020: 5.2% 2021-2030: 4.4%	
Construction of new highways, road pricing	0%	0%, Yes	100%	Transport Policy / measures
Construction of metro	Line 6	Line 6,3	Line 6	
Increase bus capacity	15%	25%	10%	
Suburban Train	-	Yes	-	
Public Transport Fare	600CHP	400CHP	1000CHP	
Share of bicycle use	7%/day	10%/day	7%day	
Introduction of new vehicle technology	Otto 5/6: 2015/18 Diesel 5/6: 2017/20	Otto 5/6: 2015/18 Diesel 5/6: 2015/18	Otto 5/6: 2015/18 Diesel 5/6: 2017/20	Vehicle fleet technology
Phase-out of 'old' vehicle technology	Otto 3/4: 2013/2017	Otto 3/4: 2012/2015	Otto 3/4: 2013/2017	
Electric Vehicles (PHEV, BEV), share in 2030	10%	15%	15%	

Methods (2): Apply land-use, transport, emissions and air quality models



Results: Percentage increase in the number of households by municipality



Model results: MUSSA

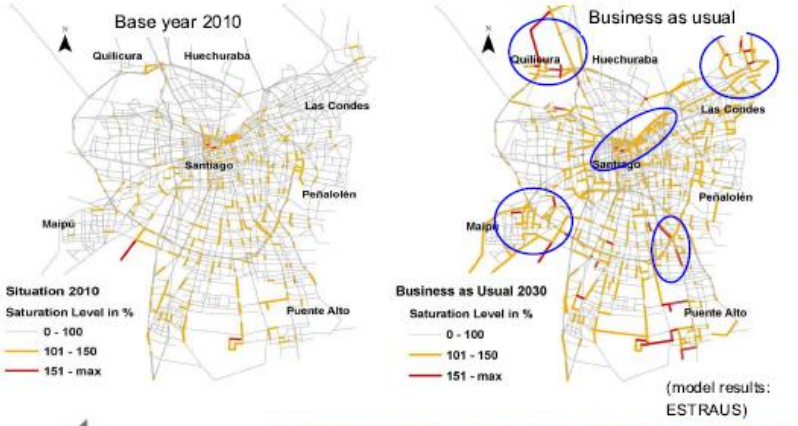
Results: change in daily trips and the modal split

N Daily trips				
-	2010	BAU	CR	MI
N° trips	100%	154%	140%	171%
N° daily trips (aprox.) in Mio.	17	26.2	23.8	29.1

Modal Split (%)				
-	2010	BAU	CR	MI
bus + metro	49.0	45.9	43.1	35.7
car	36.6	38.5	41.6	48.1
taxi / shared taxi	3.2	2.8	2.8	2.7
walking	11.2	9.8	7.6	10.6
cycling	-	3.0	5.0	3.0
Motorization rate	201	325	268	366

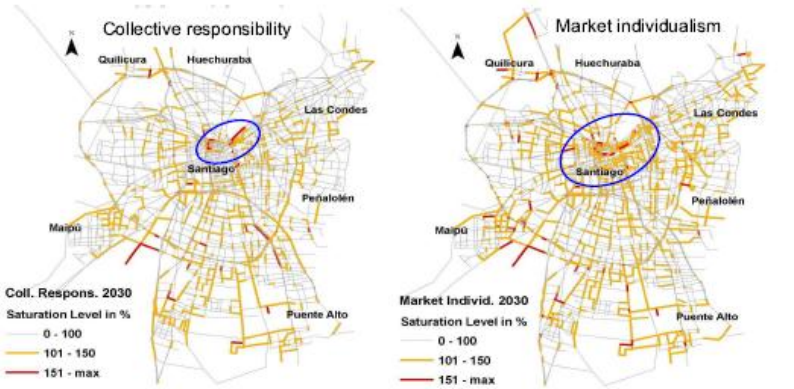
(model results: ESTRAUS)

Results: Saturation levels (morning peak)

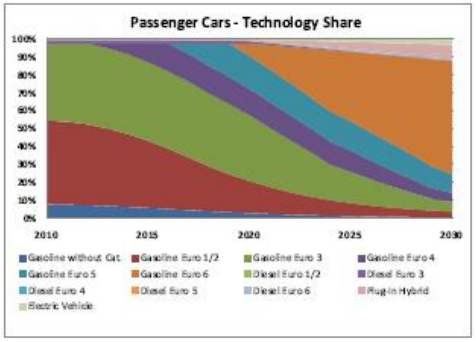


(model results: ESTRAUS)

Results: Saturation levels (morning peak)



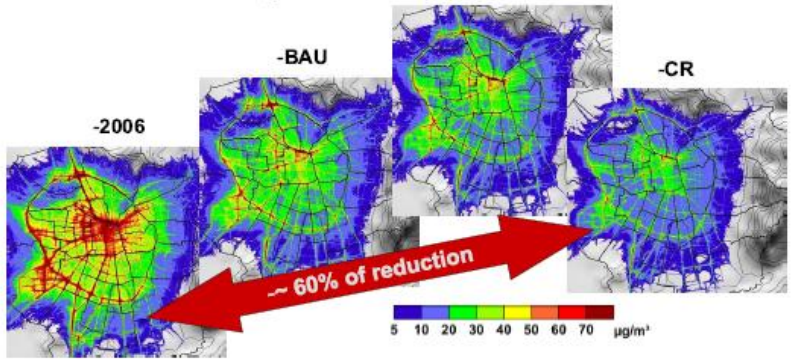
Results: change in passenger vehicle technology



BAU Scenario (model results: MODEM)

- Older technologies loose importance;
- Share of new technologies (Euro 6) increases;

Results: change in emissions -MI

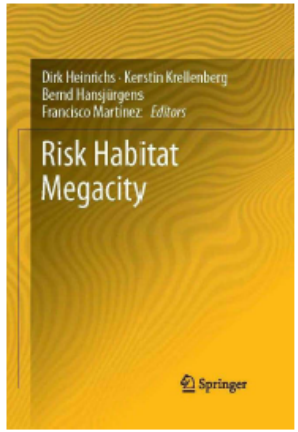


Annual mean concentrations of transport related NOx for a base case and the scenarios (at micro scale, model result: GRAL); meteorological conditions based on 2006

Summary, conclusions

- Drivers of land use and transportation demand: demographics and economy.
- Land use trends: mixture of re-urbanization in central Santiago, new urbanization (more sprawl) in the (south-east and south-west) periphery
- Technology improvements for motorized vehicles: significant reduction in the citywide traffic emissions
- But: despite strong measures for public tranport: tendencies towards a car-dependent city with (yet more sprawl) and higher congestion levels are evident

- **More radical approaches needed**



Thank you for your attention

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)
Institut für Verkehrsforschung | Rutherfordstraße 2 | 12489 Berlin
Dr.-Ing. habil. **Dirk Heinrichs**
Telefon +49 (30) 67055 196 | Telefax +49 (30) 67055 283 | dirk.heinrichs@dlr.de
-www.DLR.de/VF

3.12 Guiding urban evolution towards travel sustainability: a comparative analysis of public transport accessibility in world cities | Duncan Smith

3.12.1 Abstract

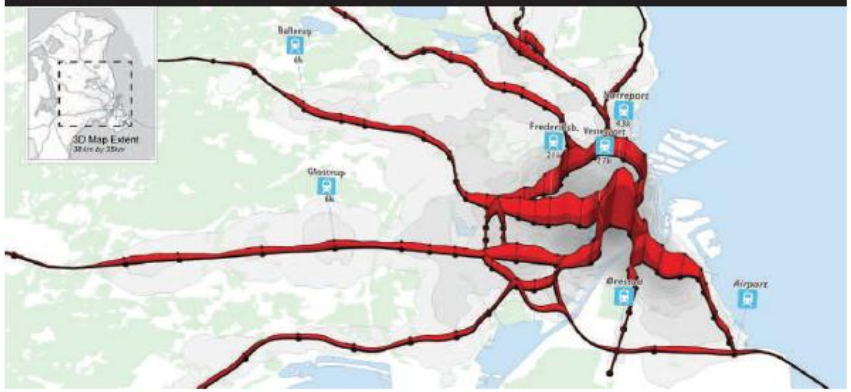
Land-use and transport planning is a highly influential policy framework for urban spatial development, with very long term impacts on urban functions. Urban form has wide reaching consequences for accessibility and travel patterns, which in turn affect urban economic performance, energy use, safety and social equity. A general policy consensus around the compact city model of urban form has become established in the last two decades. This model promotes high density mixed-use development closely integrated with public transport infrastructure and pedestrian based street networks. Yet despite this policy consensus, urban travel patterns continue to be dominated by the private car across much of the globe. There remains a wide gap between sustainable travel aspirations and real world behaviour. One means of addressing this gap and better informing urban planning is to improve the comparative analysis of urban structure, track trends in cities across the globe and share best practice between city innovators. Generally there is a lack of truly global comparative research of urban form and sustainability. The work of Newman and Kenworthy (1989, 1999)identified correlations between higher urban density and lower transport energy use across a wide range of world cities, and this work has been very influential in promoting the compact city agenda. This research does however have limitations and there has been little further analysis at a similar global scope building on this foundation.

This research paper looks at the comparative analysis of transport accessibility as a means of understanding varying travel patterns between world cities. Accessibility measures are derived from the spatial distribution of population, employment and transport infrastructure, allowing a more sophisticated understanding of urban form than basic density measures. Indicators are calculated using GIS analysis, drawing on widely available census and mapping data. The results are then correlated with travel behaviour and energy use data.

We draw on LSE Cities' Urban Age project for case study city-regions. The Urban Age has explored large rapidly growing cities across the globe in both developed and developing world contexts. There is a huge variation in accessibility results between cities, including those of similar income levels. For developed world cities, this study focuses in particular on London's recent efforts to intensify its urban core, and what it can learn from best practice in Copenhagen and Stockholm. The context for many developing world cities is generally of much more rapid urban growth, rising car ownership and constrained finances. We investigate Bogotá and Mumbai as models of high density public transport led growth, with investment in BRT and rail networks. Overall accessibility indicators are a promising approach to improving the comparability of transport performance between cities, and are applicable in a wide range of urban contexts. Data availability remains an issue, though is diminishing with open data innovations and tools such as Open Street Map. The next step is to use accessibility and travel behaviour data to derive comparative indicators of urban energy use and CO2 emissions.

3.12.2 Presentation

Urban Form, Accessibility and Transport Sustainability in World Cities



Duncan Alexander Smith
LSE Cities, London School of Economics

23/2/13 Urban Mobility and Integrated Transport Symposium, El Gouna

Urban Age Introduction

LSE Cities

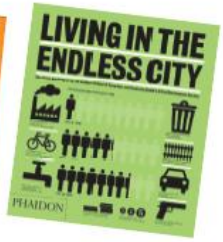
For the last decade the Urban Age has explored rapidly growing cities across the globe. Supported by Deutsche Bank's Alfred Herrhausen Society.

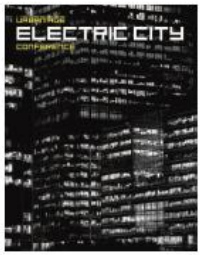
Focussed on sharing international experience, bringing together policy makers with planners and designers.

Extensive Outreach Activities-

Urban Age books- Endless City, Living in the Endless City. Urban Age Conferences.

More Recently Greater Academic Focus. My research using GIS analysis and geographical techniques to understand global city sustainability relationships.





LSE Cities

Research Background

Studied Geography and GIS at University of Edinburgh, then worked as a transport research consultant.

PhD at Centre for Advanced Spatial Analysis University College London

Topic about using computer models of city form for improving urban planning analysis. CASA led by Prof Mike Batty.

Research topic evolved into analysing relationships between changing urban form and travel patterns.

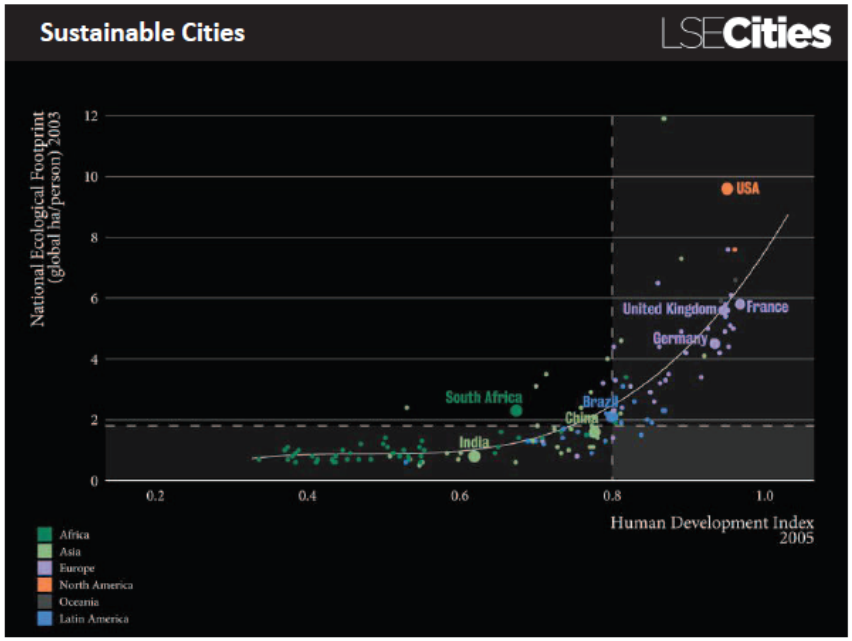
Research Partner Greater London Authority

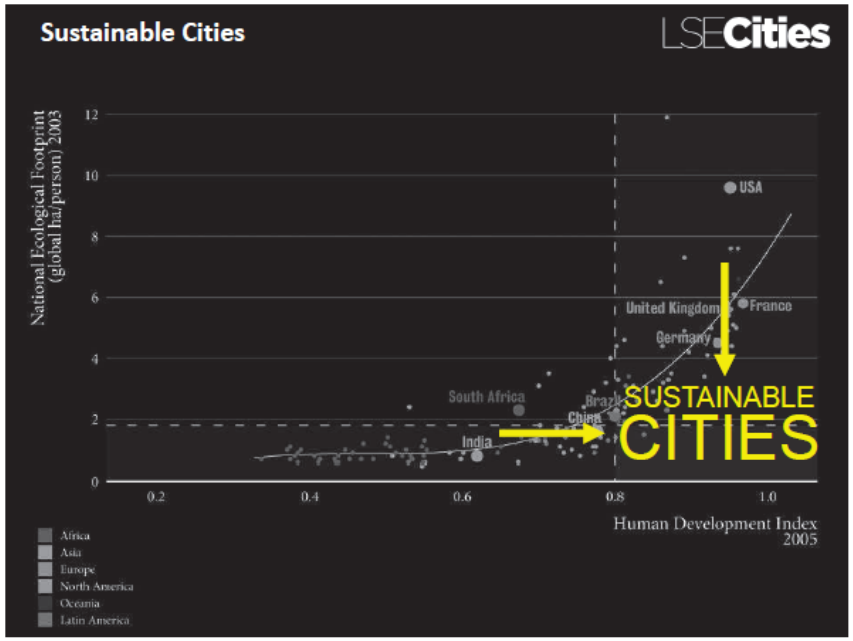
Strong business and efficiency focus. Interested in relationships between accessibility, agglomeration and business location.

Global Population Density & Urban Age Cities

LSE Cities

LandScan global population data


Sustainable Cities
LSECities
National Ecological Footprint (global ha/person) 2003
Human Development Index 2005
USA
United Kingdom
France
Germany
South Africa
Brazil
China
India
Africa
Asia
Europe
North America
Oceania
Latin America


Sustainable Cities
LSECities
National Ecological Footprint (global ha/person) 2003
Human Development Index 2005
USA
United Kingdom
France
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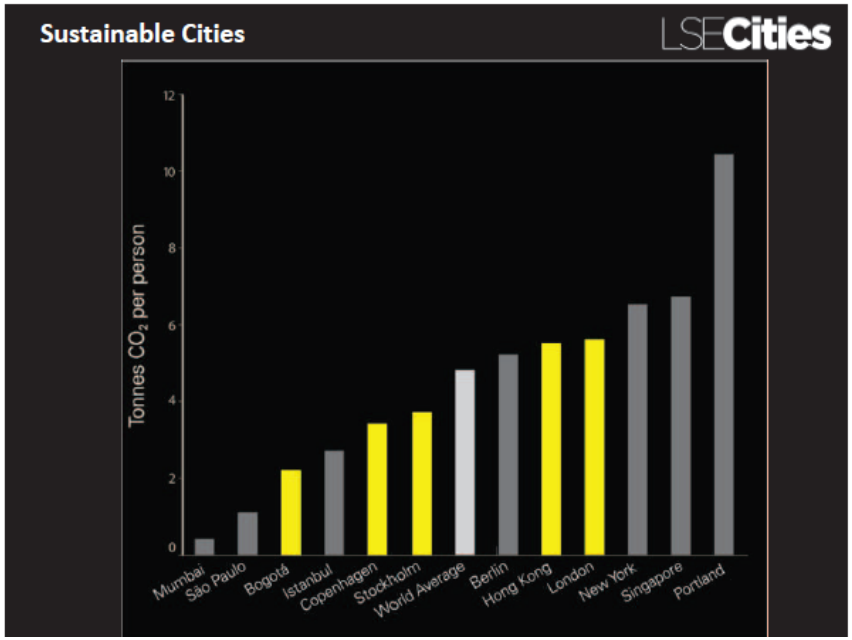
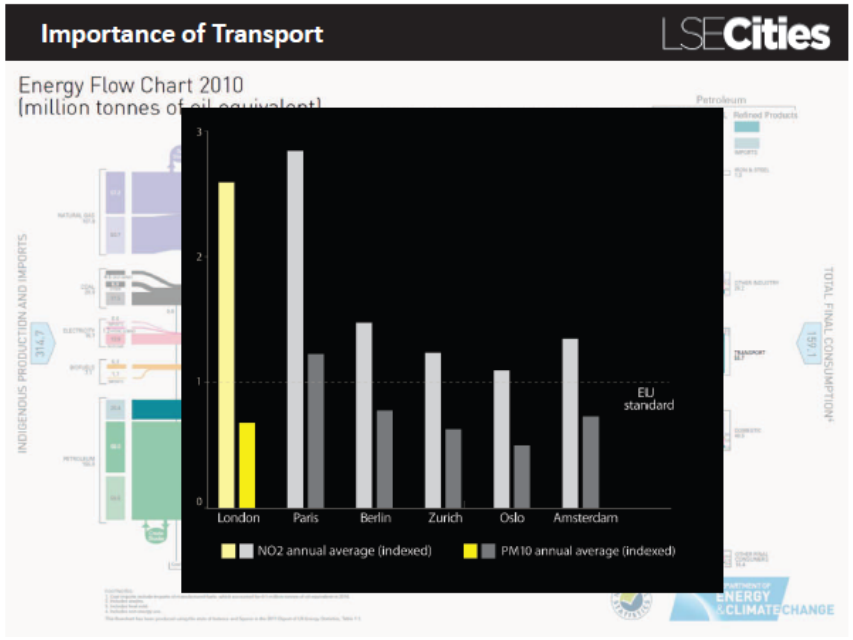
South Africa
Brazil
China
India
SUSTAINABLE CITIES
Africa
Asia
Europe
North America
Oceania
Latin America


Sustainable Cities
LSECities
Tonnes CO_2 per person
Mumbai
São Paulo
Bogotá
Istanbul
Copenhagen
Stockholm
World Average
Berlin
Hong Kong
London
New York
Singapore
Portland


Importance of Transport
LSECities
Energy Flow Chart 2010
(million tonnes of oil equivalent)
EU standard
London
Paris
Berlin
Zurich
Oslo
Amsterdam
NO2 annual average (indexed)
PM10 annual average (indexed)

Urban Density & The Compact City

LSECities

International Diversity

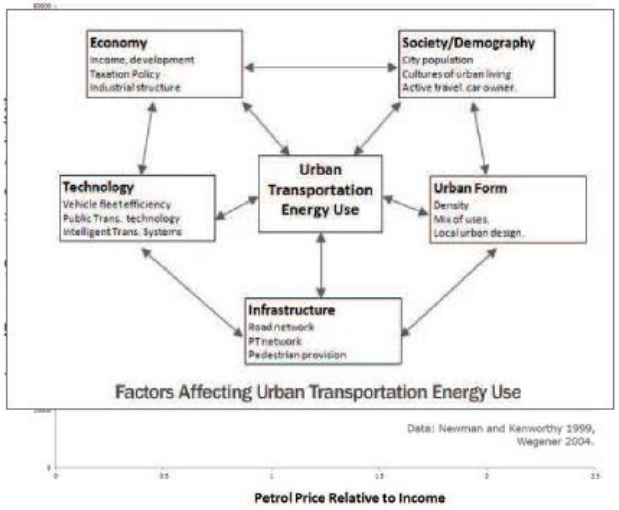
Comparison studies highlight relationships wit urban structure, particularly density. (Newman & Kenworthy, 1989). Also size-efficiency (e.g Glaeser).

Compact city policies promote high density mixed-use development t reduce car use.

Complications: socio-economic context; causality; definition of urban regions; relationships in global networks (Taylor et al).

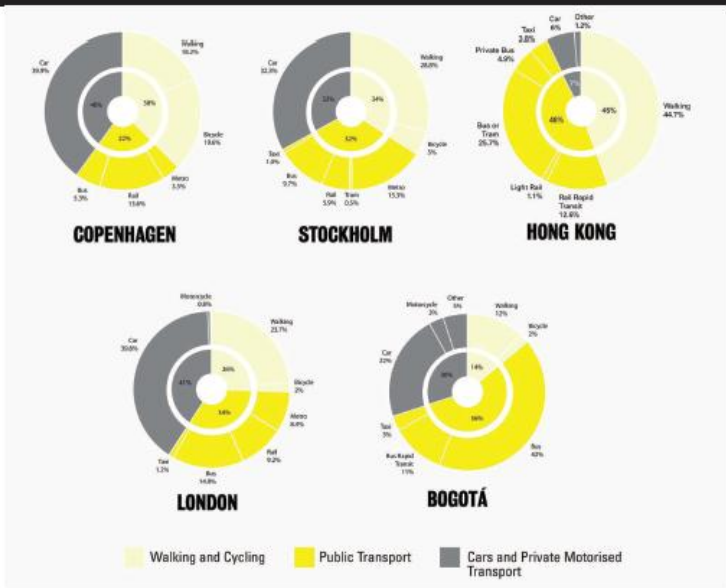
Multi-faceted Approach

Multiple socio-economic, urban form and policy factors inter-related and co-evolve together.



Transport Trips Modal Split in Five Exemplar Cities

LSECities



Key Factors in Achieving Sustainable Travel Patterns

LSECities

Metropolitan land use and transport planning integration

Copenhagen & Hong Kong example.

Guiding New Urban Development

London example.

New Public Transport Infrastructure

Bogotá example.

Walking and cycling provision

Copenhagen example.

Car ownership and demand management

Hong Kong example

Land use and Transport Integration- Accessibility

LSECities

Accessibility Concept

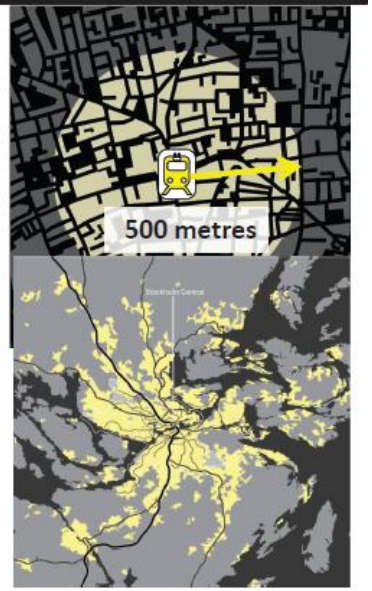
Combines land use (density, function) and transport (stations, stops) data to analyse integration.

Measures opportunities for citizens to travel by particular transport modes. Can calculate comparative indicators for multiple cities.

Walking Catchments to Public Transport Stations

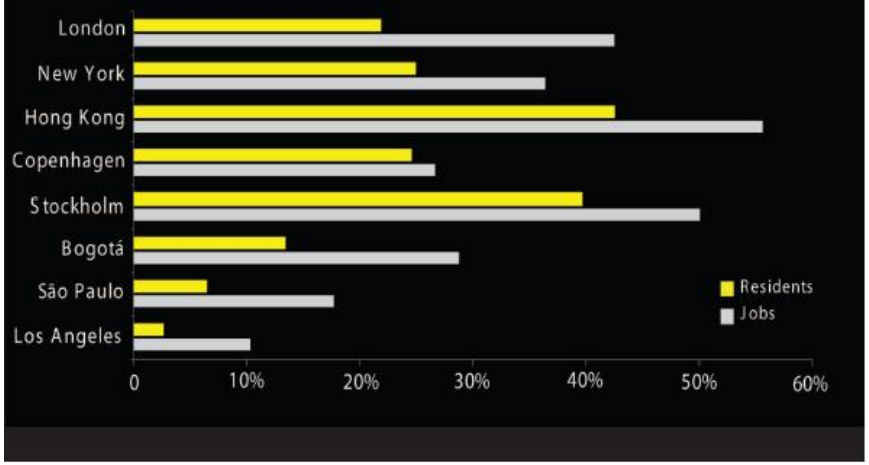
Begin with basic measure of population in walking distance of rail and metro stations.

Data- from government agencies, OpenStreetMap (needs to be validated).



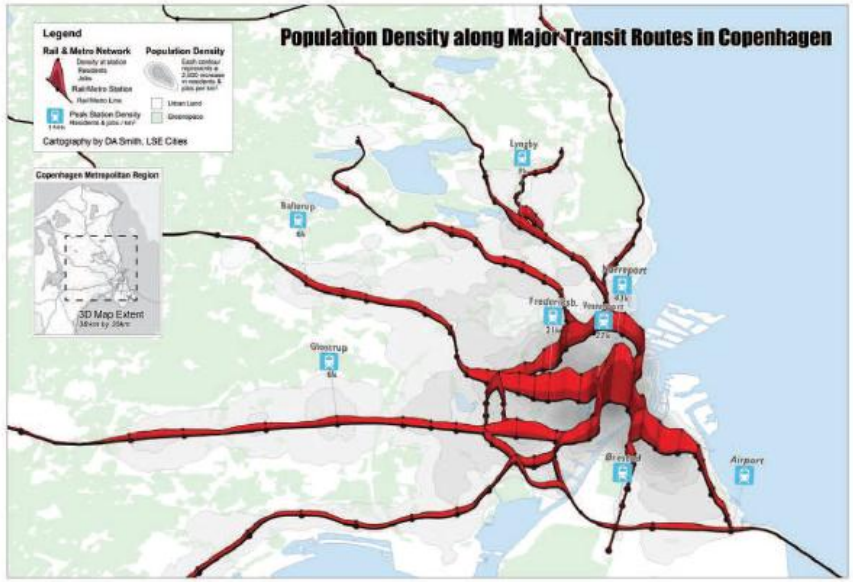
Land use and Transport Integration- Accessibility

LSECities



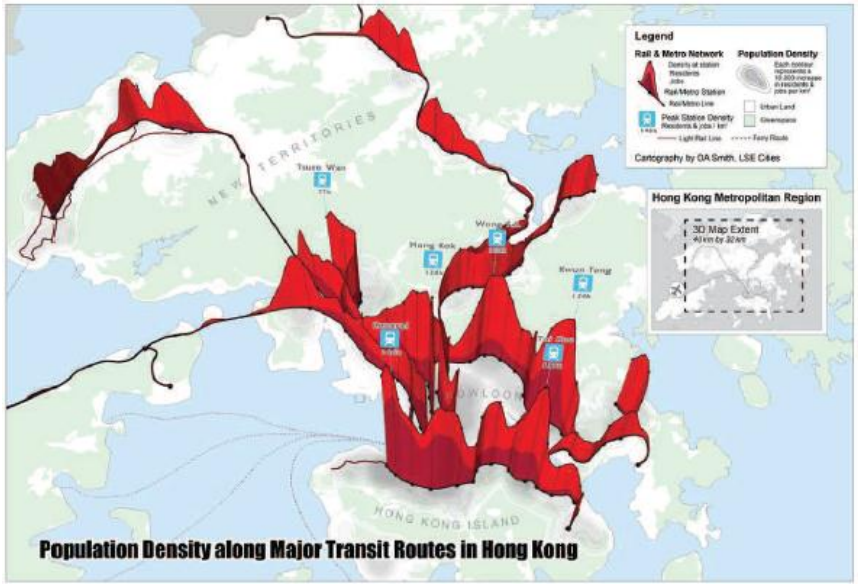
Metropolitan Planning Integration- Copenhagen

LSECities



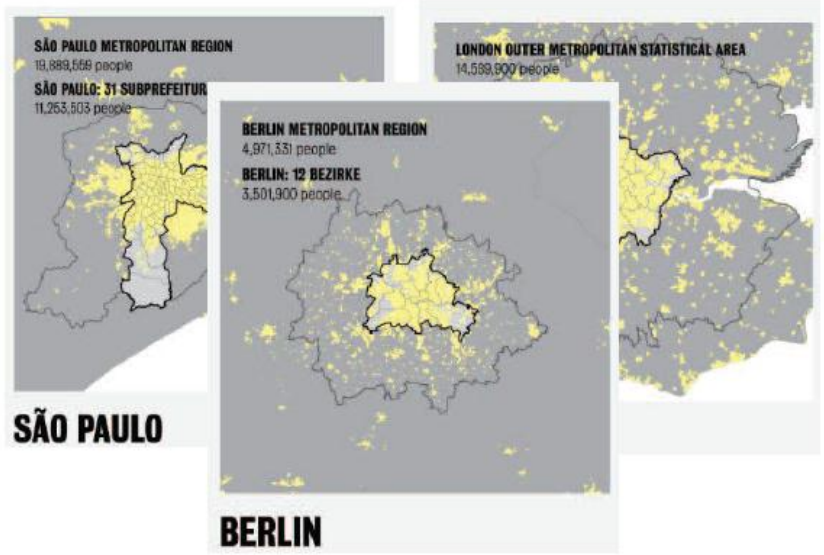
Metropolitan Planning Integration- Hong Kong

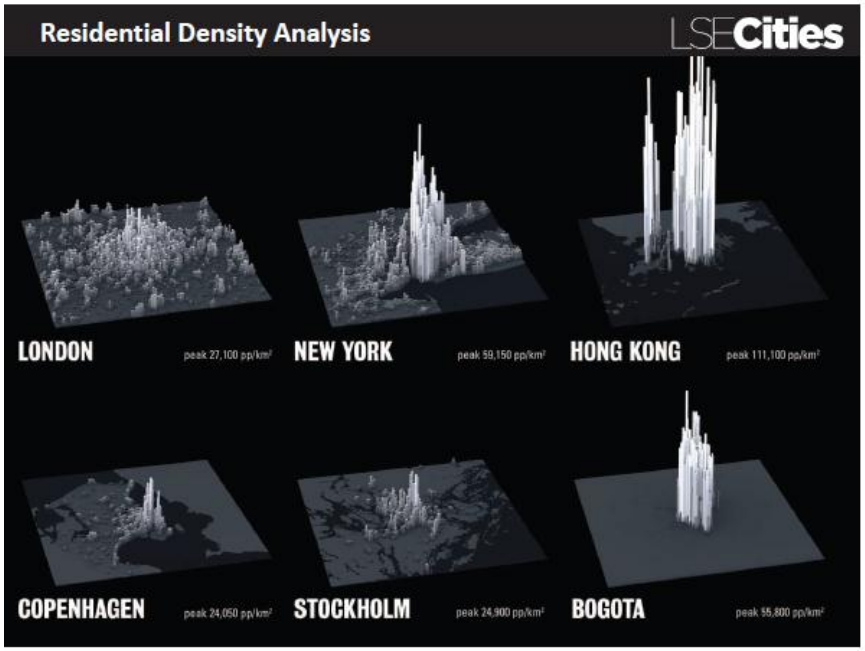
LSECities

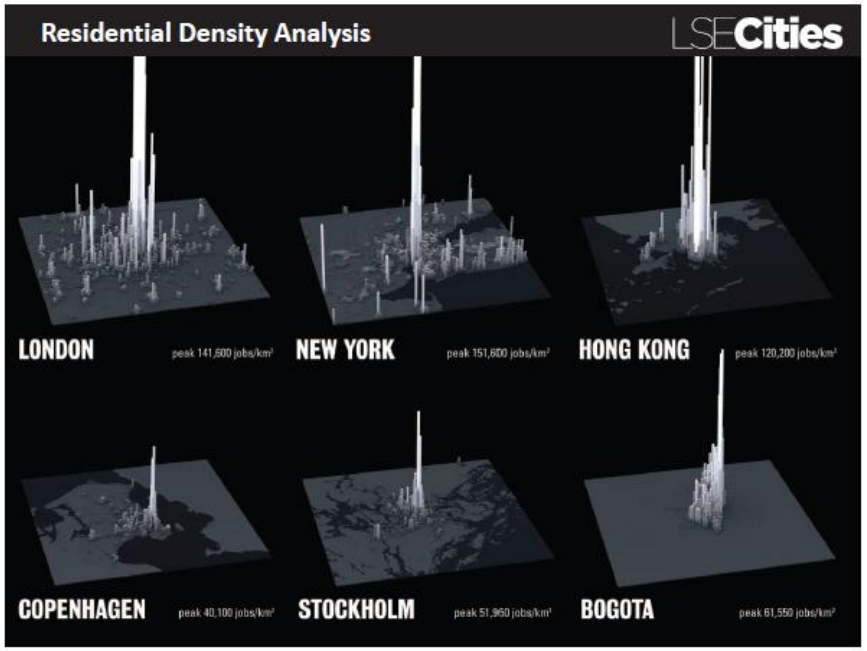


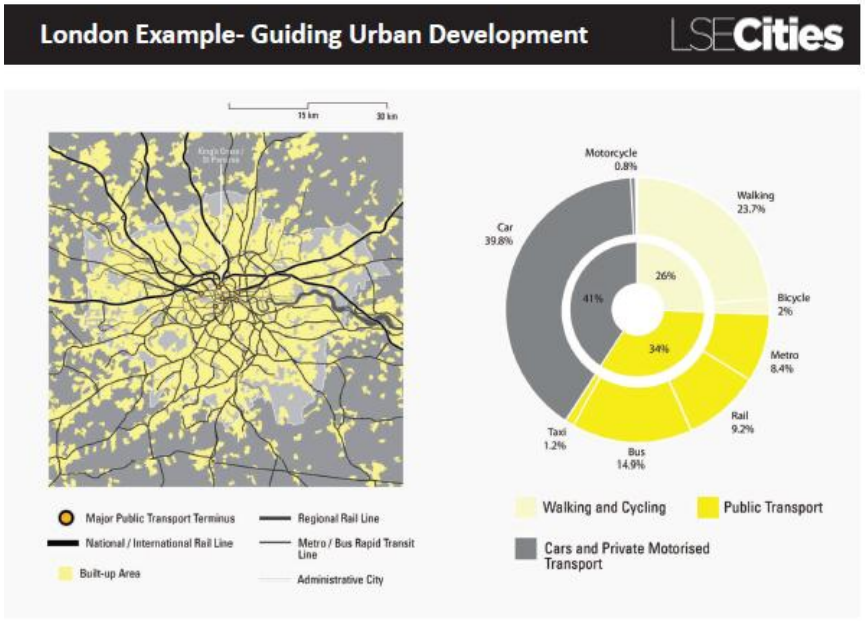
Political Jurisdictions and Metropolitan Planning

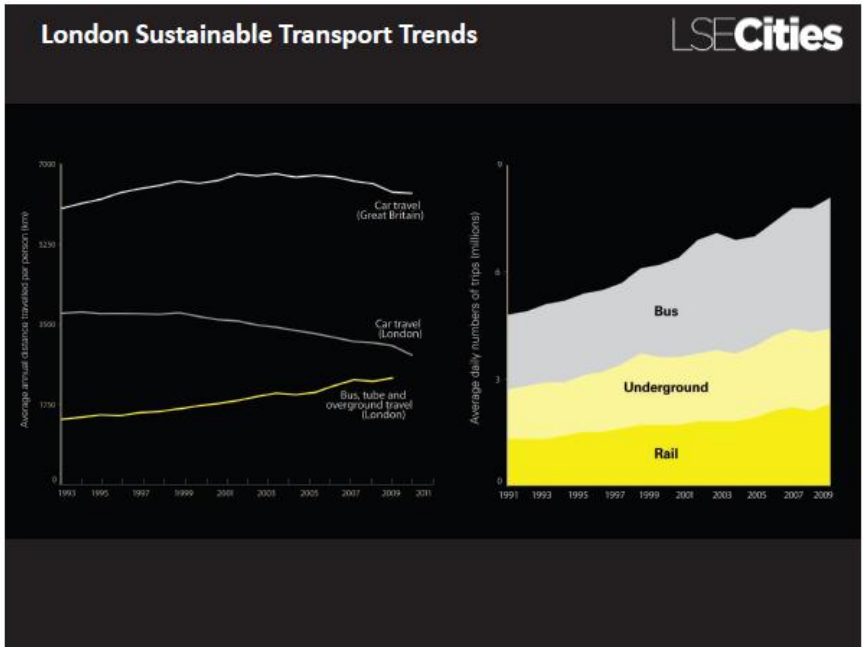
LSECities




Residential Density Analysis
LSECities
LONDON
peak 27,100 pp/km²
NEW YORK
peak 59,150 pp/km²
HONG KONG
peak 111,100 pp/km²
COPENHAGEN
peak 24,050 pp/km²
STOCKHOLM
peak 24,900 pp/km²
BOGOTA
peak 55,800 pp/km²


Residential Density Analysis
LSECities
LONDON
peak 141,600 jobs/km²
NEW YORK
peak 151,600 jobs/km²
HONG KONG
peak 120,200 jobs/km²
COPENHAGEN
peak 40,100 jobs/km²
STOCKHOLM
peak 51,960 jobs/km²
BOGOTA
peak 61,550 jobs/km²


London Example- Guiding Urban Development
LSECities
15 km
30 km
Major Public Transport Terminus
National / International Rail Line
Built-up Area
Regional Rail Line
Metro / Bus Rapid Transit Line
Administrative City
Motorcycle 0.8%
Walking 23.7%
Car 39.8%
Bicycle 2%
Metro 8.4%
Rail 9.2%
Taxi 1.2%
Bus 14.9%
26%
41%
34%
Walking and Cycling
Public Transport
Cars and Private Motorised Transport

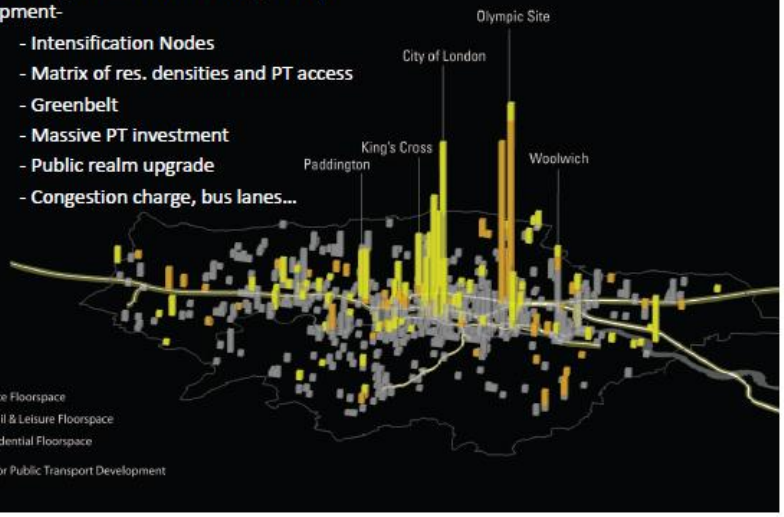

London Sustainable Transport Trends
LSECities
Car travel (Great Britain)
Car travel (London)
Bus, tube and overground travel (London)
Bus
Underground
Rail

Urban Development in London, 2004-2011

LSECities

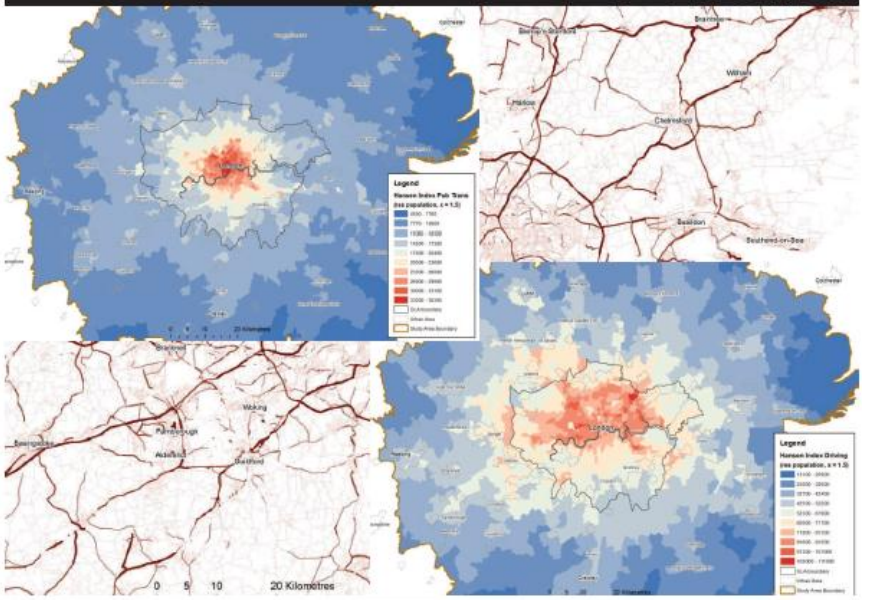
GLA created 2000, London Plan with strong land-use transport integration. Delivered compact city development-

- Intensification Nodes
- Matrix of res. densities and PT access
- Greenbelt
- Massive PT investment
- Public realm upgrade
- Congestion charge, bus lanes...



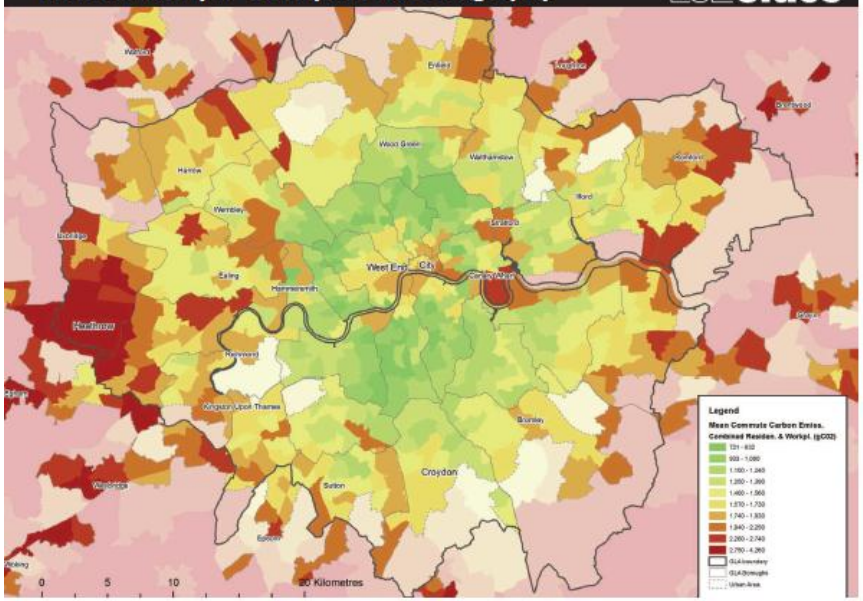
London Example- Public Trans vs. Car Accessibility

LSECities



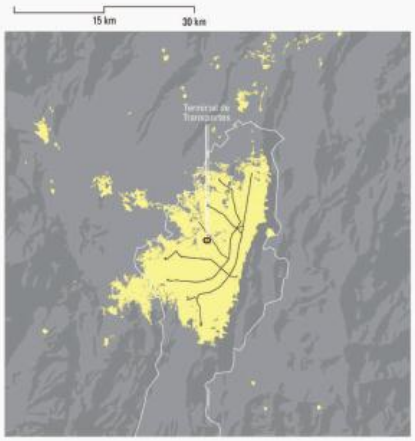
London Example- Transport CO2 Geography

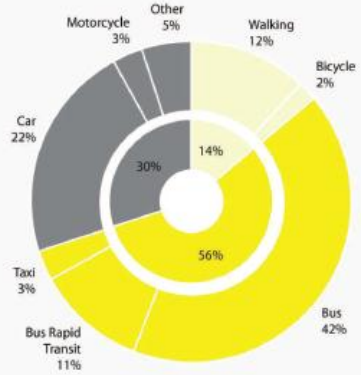
LSECities



Building a New Metro Network- Bogotá Example

LSECities





Major Public Transport Terminus
Metro / Bus Rapid Transit Line
Administrative City
Built-up Area
Mountain Slopes
Walking and Cycling
Public Transport
Cars and Private Motorised Transport

Transmilenio Bus Rapid Transit Example

LSECities

Walking and Cycling Example- Copenhagen

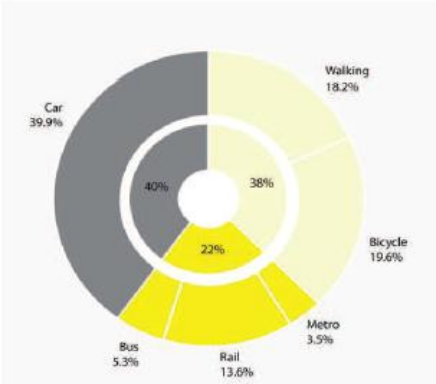
LSECities

One of the world's leading cycle cities.

370 km of dedicated cycle lanes

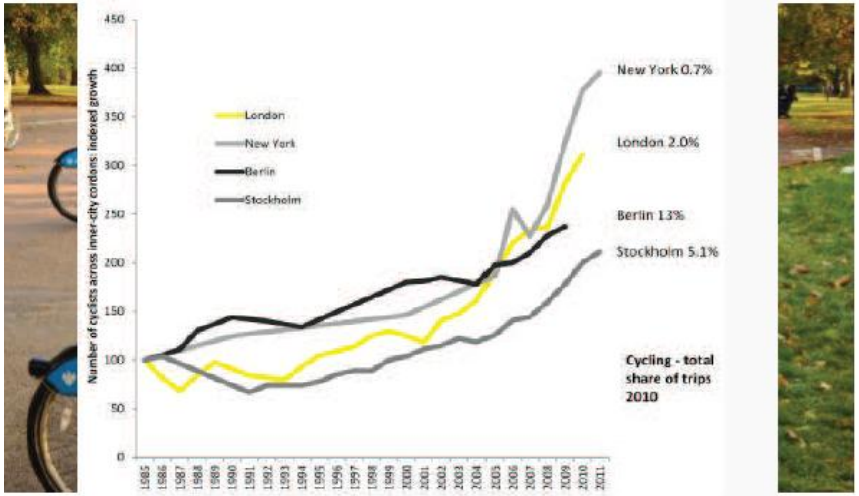
36% of work trips by bike, 20% of all trips.

Investment and planning for cycling over several decades, aiming for further doubling of cycling.



Cycle Hire- London

LSECities



Cycle Lanes- Bogotá

LSECities

Rising Car Ownership- Demand Management

LSECities

Hong Kong Example

Spectacularly low car use due to very low car ownership: 56 per 1000 people, OECD average 404 per 1000 people.

Ownership Restrictions

High vehicle registration tax- from 40% on the first US$19,000 to 115% on car purchase prices above US$64,000. High annual licensing fees and limited parking availability for existing and new housing.

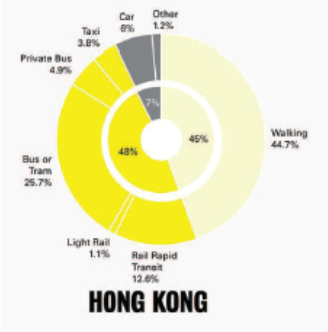
Less Extreme Alternatives?

All cities with sustainable travel patterns have some form of demand management, unless car ownership restrained by very low incomes. Clearly developing cities most rapid growth- Bogota car use doubled in five years.

Fuel Taxation- Used across European Union. National level means beyond control of city governments.

Space Restrictions- Parking restrictions- extensive across the globe. Road Space restrictions- Bus Lanes, pedestrian widening.

Congestion Charging- More expensive to implement. Found in London, Stockholm, Singapore. Many political objections to implementation, but temporal variation in costs very useful and efficient.



Conclusions

LSECities

Compact City Model Still Widely Applicable

Need to ensure local mix-of-uses, challenges with monocentric structure.

Diversity of Transport Solutions

Range of urban forms, income levels requires flexibility. Political context very important for achieving planning goals.

Comparative Urban Analysis

Highly useful method of benchmarking cities, identifying successes and failures and disseminating best practice.

Accessibility Analysis and GIS Methods

Visualisation and spatial analysis can be used to examine relationships between urban form and transport, and benchmark cities internationally.

Previously data availability major hurdle, but increasingly being overcome, and much data now available open source through city datastores.

Find Out More

LSECities

www.lsecities.net

D.Smith2@lse.ac.uk

geographics.blogs.casa.ucl.ac.uk

3.13 Mobility in Mega Cities – Transport Typologies and Their Meanings | Prof. Jeffrey Kenworthy (via Skype)

3.13.1 Abstract

A cluster analysis of 41 world mega-cities and large cities reveals six unique types of cities each with a different general set of transport circumstances, problems and potential solutions. The presentation briefly explains the different clusters and shows some examples of the underlying data and how it varies within each city. The work provides some basis for discussing policies and priorities for the future. Cairo is included in the analysis.

3.13.2 Presentation

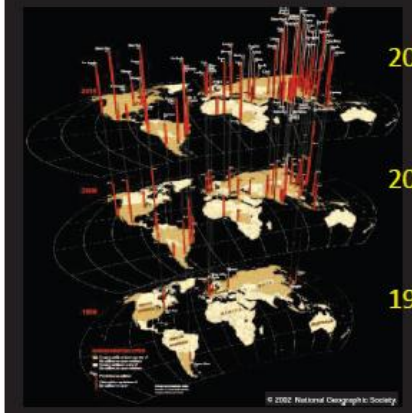
Mobility in Large Cities: Transport Typologies and Their Meanings

Sao Paulo *Paris*

By Jeff Kenworthy
Professor in Sustainable Cities
Guest Professor University of Applied Sciences, Global Mobility Research, Frankfurt and
Curtin University Sustainability Policy Institute, Perth, Australia.
International Symposium "Mobility and Urban Structure"
El Gouna, Egypt, February 23, 2013

1

Growth of Megacities from 1950 to 2015



Outline of Talk

- An an overview of a global megacities cluster analysis study for IFMO/BMW involving 41 major world cities in the developed and less developed world. What are the types of megacities in the world from a mobility perspective?
- An overview into how a wide range of variables differ amongst that group of 41 world cities and what this means.
- Selected key planning and transport policy implications along the way.

Acknowledgements:
- Roland Priester Technical University, Munich for some of the data graphics and cluster analysis work.
- IFMO: research arm of BMW for use of some of the slides from a book launch presentation in Washington DC given by me.

2

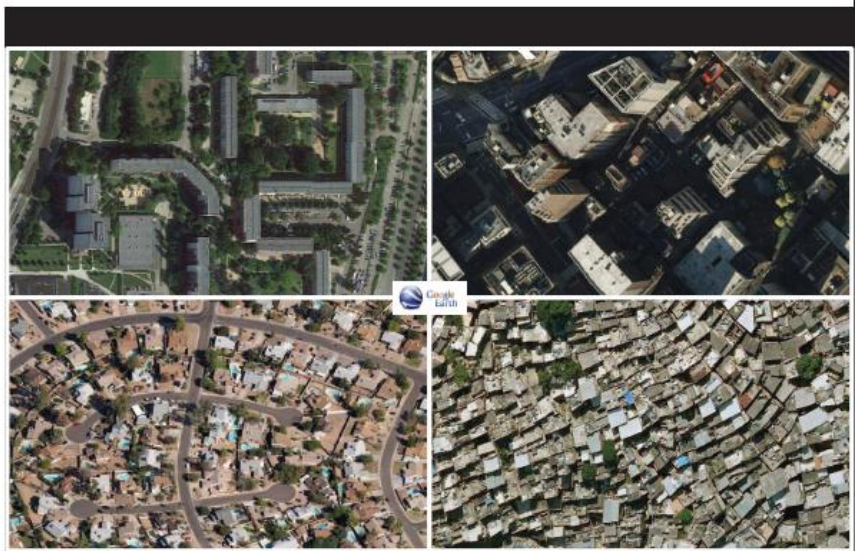
Indicators for Clustering

- Data provided from *The Millennium Cities Database for Sustainable Transport (Kenworthy and Laube, 2001 – UITP, Brussels)*
- Selected 59 relevant key indicators:
  - Land use and general characteristics (e.g. urban density, job density, GDP per capita)
  - Transport supply indicators (e.g. length of road network, freeways, length of PT network, motorization rate)
  - Mobility indicators (e.g. no. of daily trips (per mode), trip distances etc)
  - Investment in transport (per mode)
  - Transport resource use and externalities (e.g. energy use, emissions, fatalities)
  - Overview here of a few of these variables.

3

Urbanisation – Overwhelming Diversity

ifmo



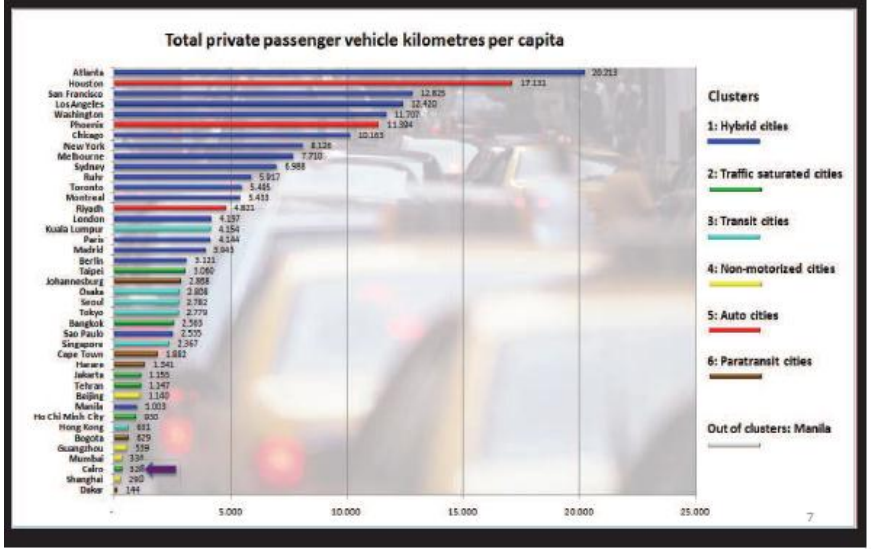
City Clusters

Hybrid Cities	Auto Cities	Transit Cities	Non-Motorised Cities	Paratransit Cities	Traffic-Saturated Cities
Melbourne	Houston	Osaka	Beijing	Cape Town	Jakarta
Sydney	Phoenix	Tokyo	Guangzhou	Harare	Kuala Lumpur
Montreal	Riyadh	Hong Kong	Shanghai	Johannesburg	Bangkok
Toronto		Singapore	Mumbai	Bogota	Ho Chi Minh City
Paris		Seoul		Dakar	Tehran
Berlin					Taipei
Ruhr					Cairo
Madrid					
London					
Atlanta					
Chicago					
Los Angeles					
New York					
San Francisco					
Washington					
São Paulo					

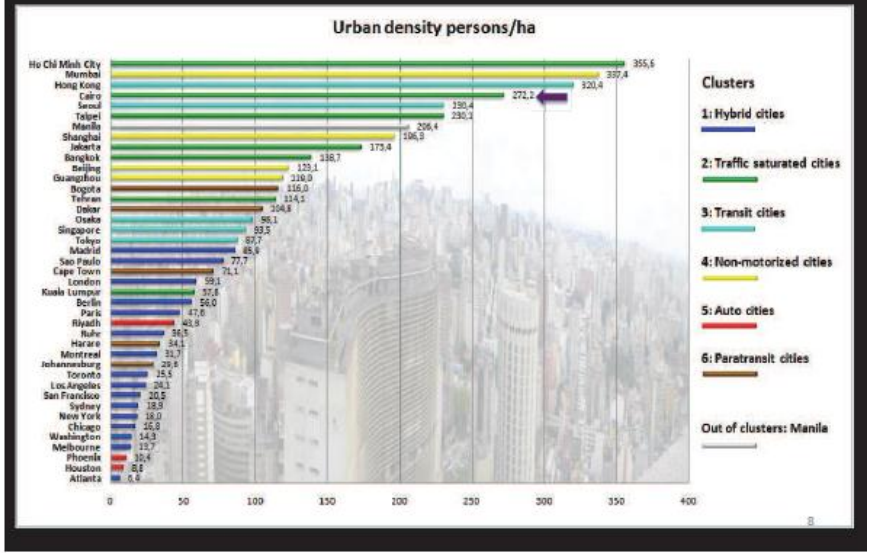
Note: Manila formed a cluster all on its own.

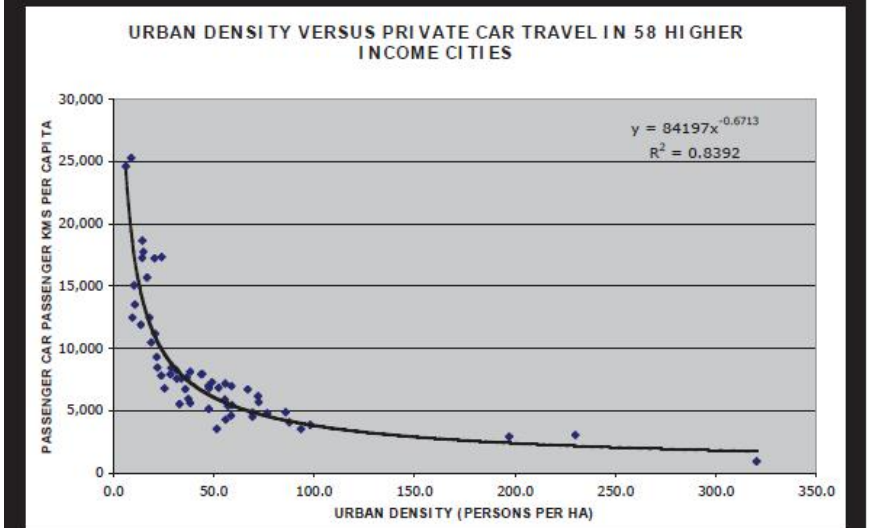
Inner city area with good infrastructure and high usage of transit and non-motorized modes, surrounded by vast sprawling auto-dependent suburban areas. A kind of "schizophrenic" urban area for mobility.

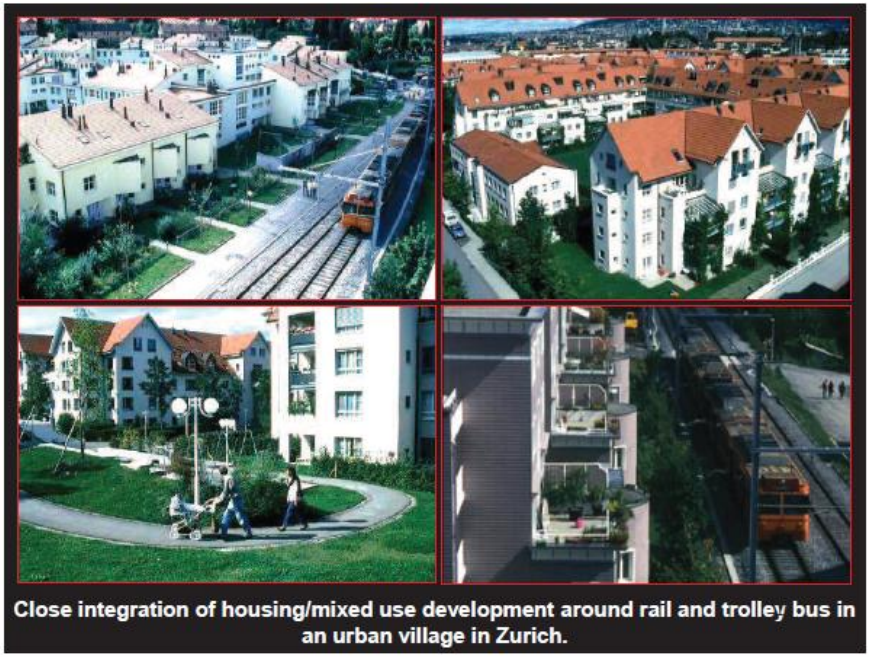
Private Passenger Vehicle Use



Urban Density





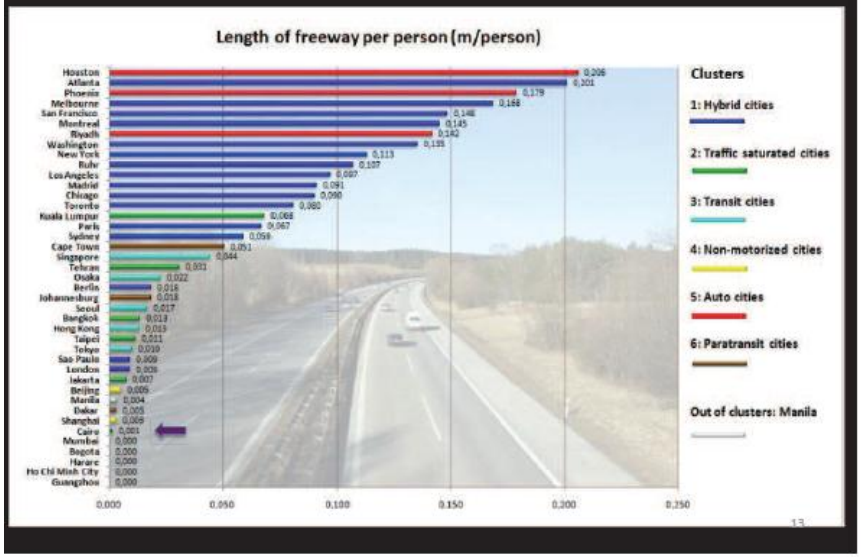


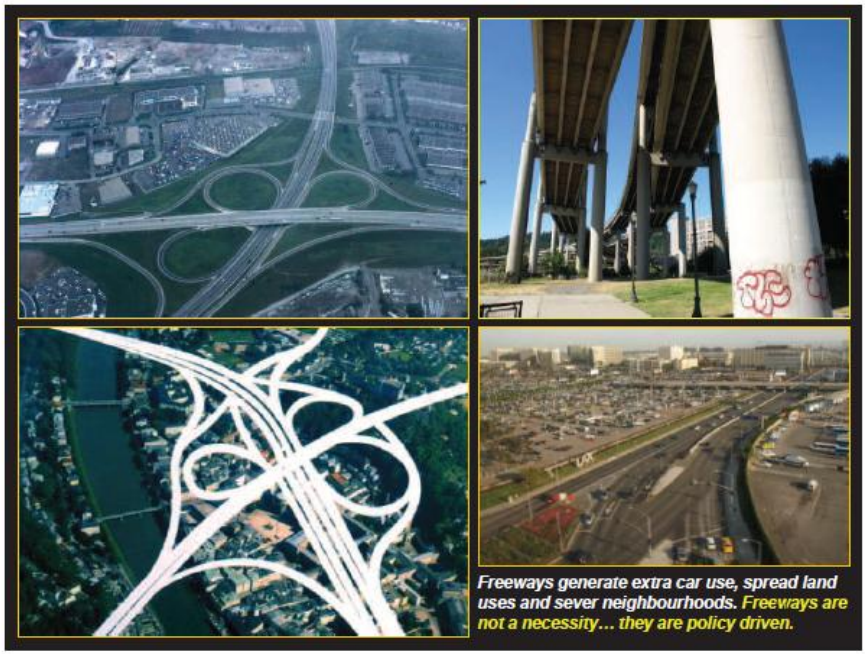
Close integration of housing/mixed use development around rail and trolley bus in an urban village in Zurich.

Vancouver, BC is renowned for the quality of the public realm and density in all its new developments. Yaletown in Vancouver's central area is developing at an enormous rate, but the attention to the public realm is superb. *Investment in the public realm is democracy in action.*

Sprawling, relatively wealthy and absolutely car-dependent cities.

Length of Freeways



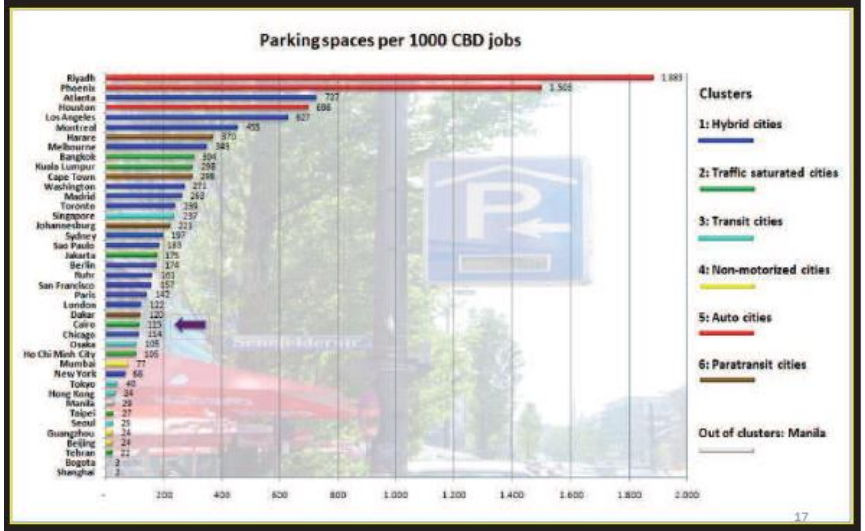


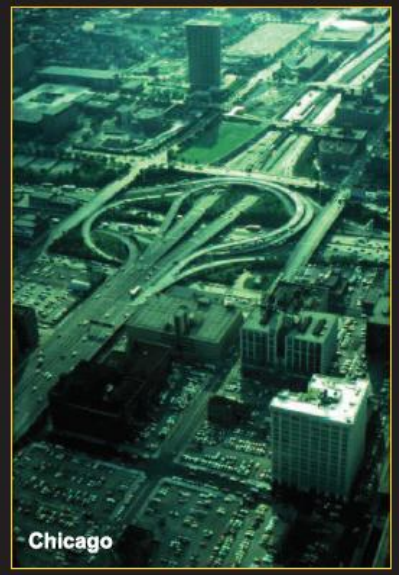
Freeways generate extra car use, spread land uses and sever neighbourhoods. Freeways are not a necessity... they are policy driven.

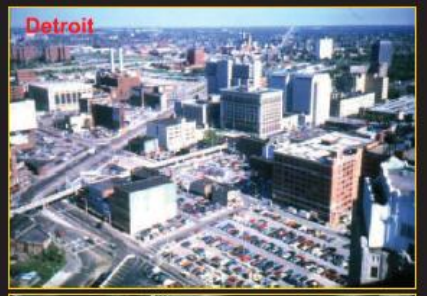
In Seoul they tore down 5.8 km of elevated freeway and exhumed a buried river. In Bangkok and other places the response to congestion has been to build more freeways.

Seoul now has a green heart with a cultural icon restored: It received an international award in Washington DC in January 2006. Average traffic speed IMPROVED.

Parking Spaces in The CBD





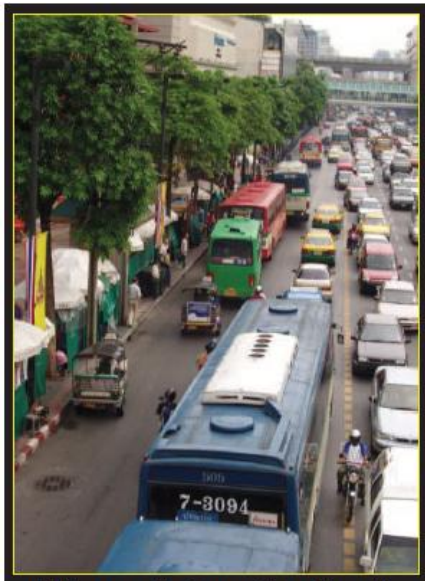


Central city parking destroys the public realm

Munich and Barcelona - pedestrianised city centres (left)
Munich's Arabella Park – an effective traffic free sub-centre (right)

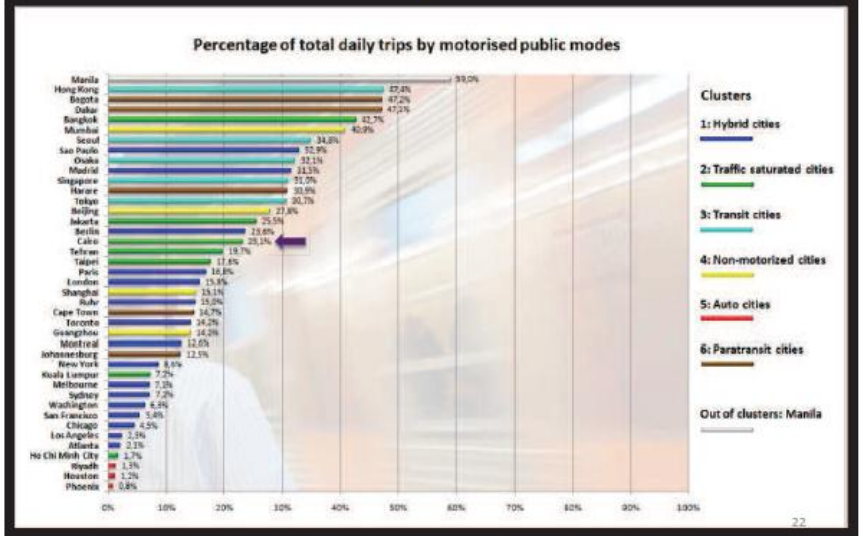
High density cities with highly developed transit systems with very high transit usage (only Asian cities in this sample).

ifmo

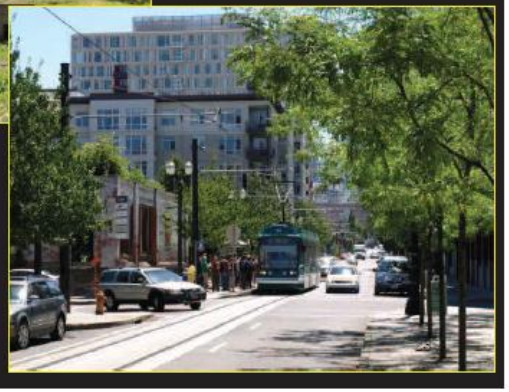


Differences in the quality of transit service in cities.

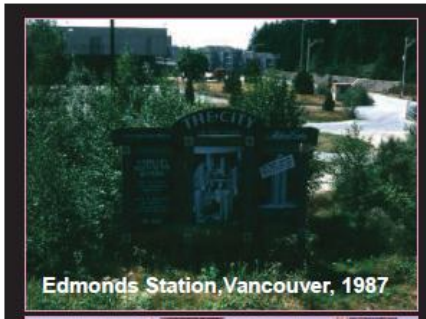
Public Transport Mode Use

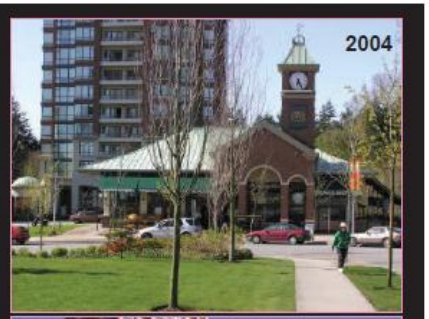


Freiburg



Portland



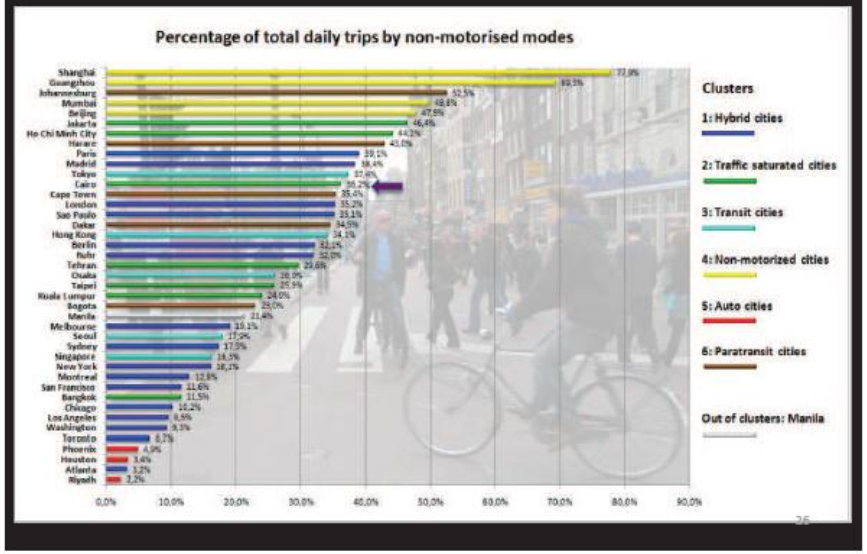


Rail can attract huge re-development over a 15-20 year period

High density cities with very high use of walking and cycling and low development of both road and public transport infrastructure.

ifmo

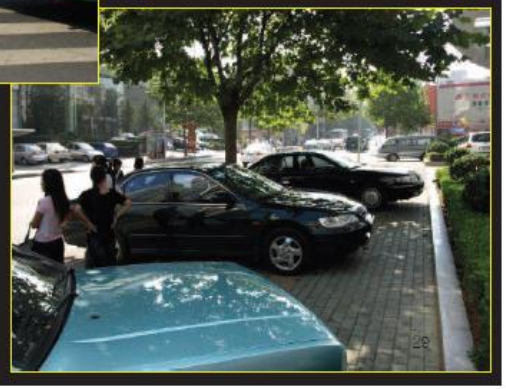
Non-Motorised Mode Use



High walking and cycling must be encouraged through superior urban design and facilities for pedestrians and cyclists, density and mixed land use. It happens in Europe and even in Washington DC

In low density auto-based areas, distances are too great and there is nowhere to walk to.

Small cities like Groningen (Netherlands) and Erlangen (Germany) have prioritised bikes and achieved around 50% of daily trips by that mode.



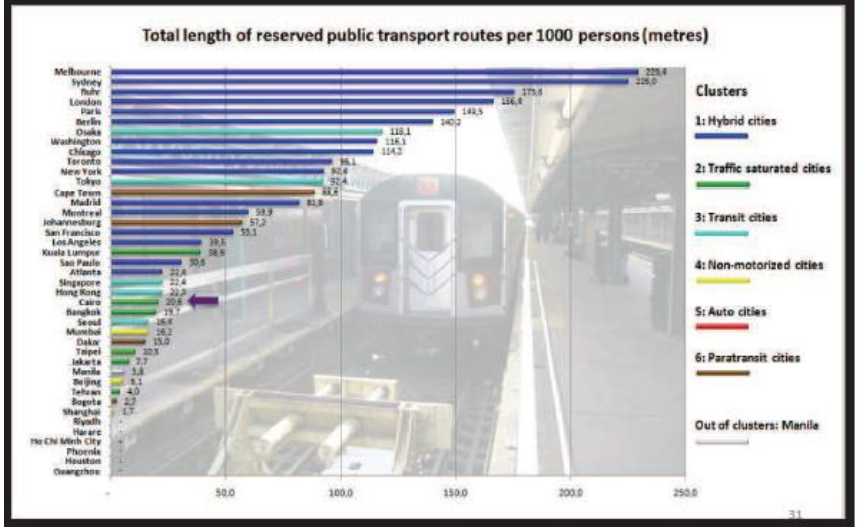
Dalian, China

China's pedestrians and cyclists are becoming increasingly alienated in cities where all space is taken for the car.

Low income cities with poor transit infrastructure development and heavy reliance on informal, low grade bus systems and shared taxis.

ifmo

Length of Reserved Routes per 1000 Persons



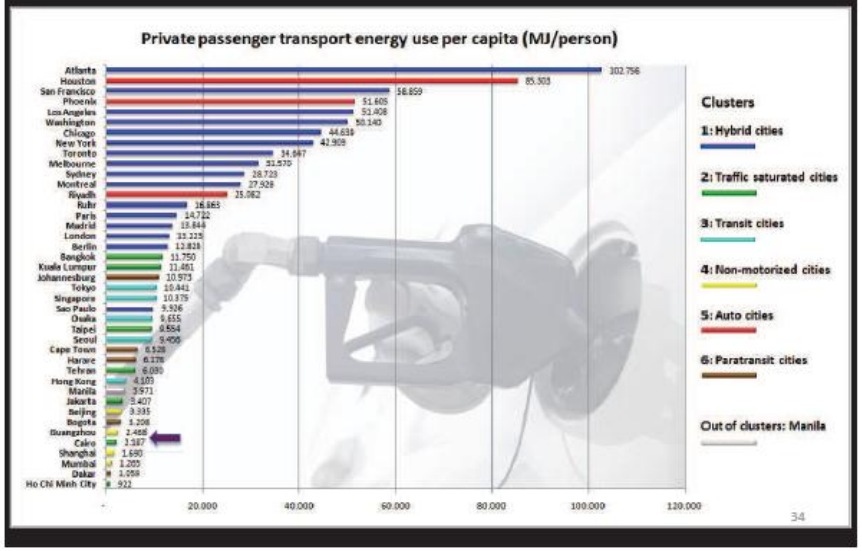
Porto Alegre and Hamburg, Busways

Helsinki- effective tram right-of-way

Reserved rights-of-way are critical for transit to provide speed competitiveness and on-time running.

Fundamental mismatch between the degree of development of private and public transport infrastructure and the existing transport demand, leading to extreme congestion – a relatively high motorization rate compared to wealth.

Private Passenger Transport Energy Use



Conclusions

- Urban mobility and transport infrastructure patterns are radically different around the world.
- Different characteristic city types can be recognised that help us to understand each city better.
- Different types of cities therefore have different critical problems.
- The sustainable transport solutions needed in cities vary according to their urban structure, existing car ownership levels, governance and leadership factors and many more things.
- The important thing is: Which direction are cities heading? For example, are cities becoming Auto Cities or are they moving in the direction of transit cities? Are non-motorised cities heading towards traffic saturated cities?

3.14 Curitiba – Transport oriented Development | Prof. Fabio Duarte (via Skype)

3.14.1 Abstract

Curitiba, a 1.8 million people city, became worldly known for its public transport based on buses, linked with a strict land use zoning which is seen to lead to sustainable urban mobility patterns. The system was launched in the 1970s, as the core project of the city's master plan. In the 1980s the transport network had already reached some neighboring cities and became metropolitan in scale. From the 1970s, the development of the city was along two growth axes: North-South and East-West. These axes received mass transportation in segregated corridors, intermediate terminals for the integration of the feeder- to-trunk lines, and a land use allowing densification only along the corridors, in order to stimulate the use of public transportation and optimize the use of public infrastructure. While most of the city is horizontal, along the axis virtualization was stimulated. In recent years, a federal highway, which crosses the city, has been converted in a BRT corridor in order to improve the public transport system within the city. Like in previous projects, land use zoning was rewritten to stimulate densified housing projects. And the more than 100 km of bike lanes is now in expansion to work as a feeder system to the BRT. Buses for 270 passengers, propelled by electricity and bio-fuel are been used in two corridors. After 40 years, TOD is the key for urban development in Curitiba.

TOD in Curitiba:
how BRT may reshape a city

fábio duarte

city council advisor +

professor at the
graduate program in urban management
www.pucpr.br/ppgtu

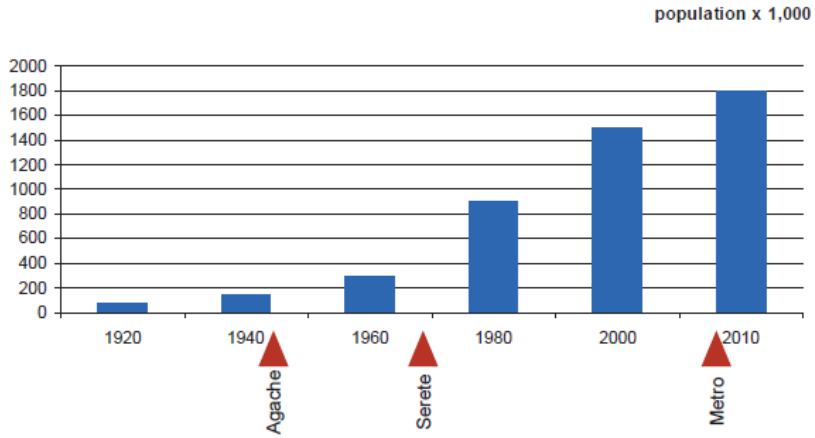
1.8 million inhabitants
3 million in the metropolitan area

430 km²

numbeo quality of life

Brasil 48
Curitiba 96
Rio de Janeiro -14

2



a growing city

3

BRT: more than a technological shift

4

1952 the last tram

5

1972 transportation and road system
dedicated lanes

6

2012 high density along the transportation corridor

7

elements of a **full brt**

dedicated lanes
specific terminals and stops
special vehicles
operation and service plan
fare collection
information technology systems
marketing

the **success of brt** results from a permanent struggle to fulfil all demands that should be provided by rail

8

tubes special stops for special vehicles

9

express lines longer buses stopping only at the terminals

10

. **fleet** 1,920 buses
. **lines** 355
. **terminals** 30
. **tubes** 362
. **daily km** 478,000
. **private operators** 11

. **passengers / day** 2.3 million (1.2 million fares paid, due to integration and 15% of gratuities)

	Curitiba	Metropolitan Area
Integrated Demands	92%	73%
Costs and Revenue participation	75%	25%

transport and the city

the success of curitiba's BRT has never been a matter of buses, but of planning urban development and transportation together.

12

brt in curitiba

curitiba's public transport is based on 4 elements

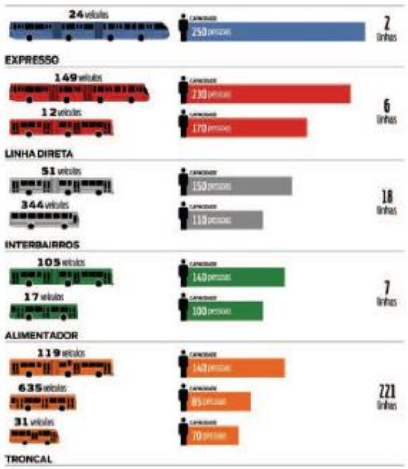
. a complex **network of feeder lines**

. link between **transport and road system**

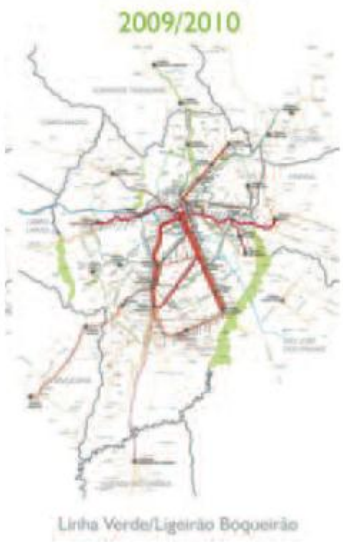
. link between **transport and land use**

. BRT corridors keep the city at a **human scale**

13



14 **operation** lines, purpose and vehicles: dealing with complexity



RIT brt as a transportation network

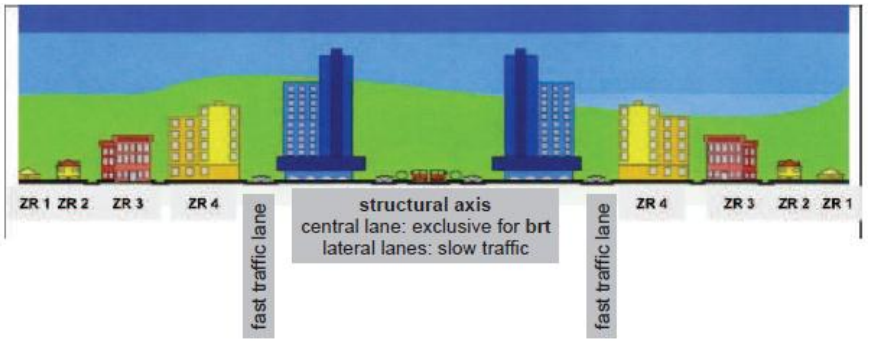
15

transport and zoning

16

system
. transportation and zoning
. transportation and road system
. transportation hierarchical network

17



structural axes transportation and land use
1972

18

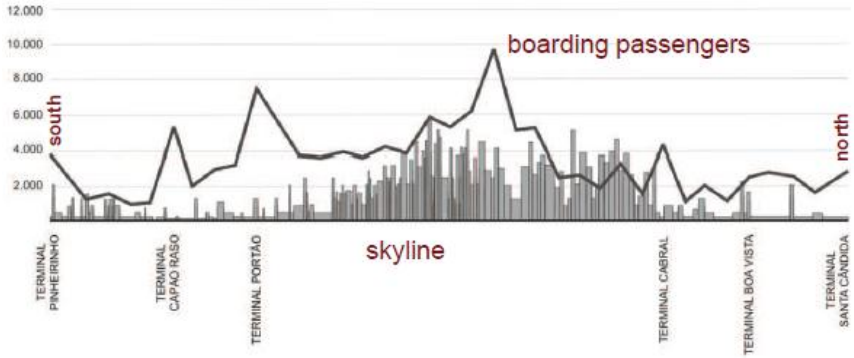
structural axes transportation and land use
2010

19

contemporary challenges
metropolitan scale

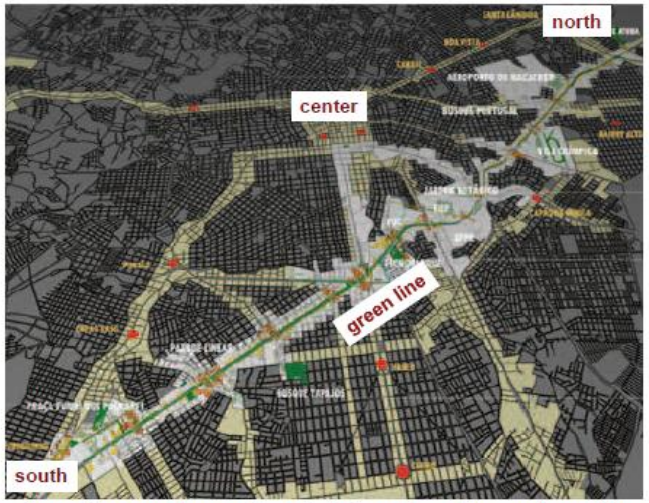
20

verticalization x boarding passengers



21

green line: BRT shaping a metropolitan axis



22

an alternative north-south axis integrating the metropolitan area

green line: BRT shaping a metropolitan axis

23

former federal highway: transportation and land use

green line: BRT shaping a metropolitan axis

24

TOD needs to transform the city, not only transportation.


obrigado // thank you // merci // شكرا

3.15 Urban Transport Issues in Egypt | Prof. Khaled El-Araby

3.15.1 Abstract

The presentation provides an overview of the typical transport problems faced by Egyptian cities. Due to diverse nature of Egyptian cities, several examples from various cities of different sizes and planning contexts are presented. A focus will be made on the problems faced in Greater Cairo metropolitan area with its expanding population of over 14 million and daily trips of over 35 million.

A discussion follows on the root causes of the problems and how they are related to lack of sustainable urban planning practice and long-time neglect of the root causes. The focus of authorities on quick fix solutions and cost-intensive expansion of mostly road-based transport infrastructure at best alleviate the problems on a temporary micro-level scale without effective delivery of adequate transport services. Arguments will be made on the need to integrate economic feasibility, increased mobility, reliability and safety of transport services, environmental impacts in urban transport strategies and above all the need to focus on transport needs on low- to medium-income urban populations.

Several solutions are presented to tackle the transport problems from the policy, organisational, strategic planning and project scales. Examples of planned strategies and projects inside the Greater Cairo and in the various Egyptian urban regions are presented and discussed with the audience.

3.15.2 Presentation

Urban Transport Issues in Egypt

Prof. Dr. Khaled El Araby
Chair Professor of Transport Planning
and Traffic Engineering,
Faculty of Engineering, Ain Shams University,
Cairo, Egypt

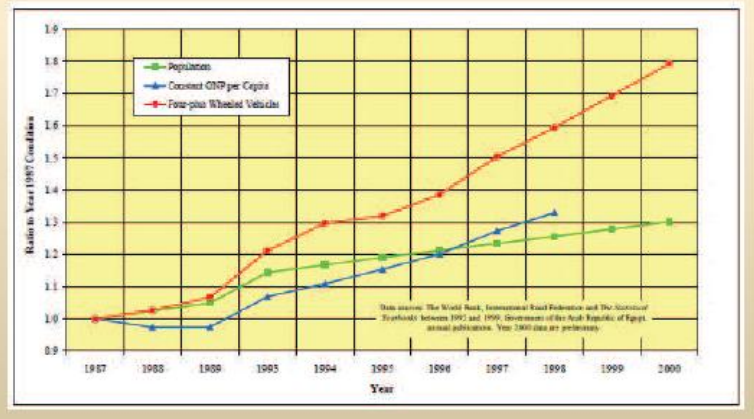
International Symposium
Mobility and Infrastructure

El Gouna, Egypt
22-24 February 2013

Presentation Outline

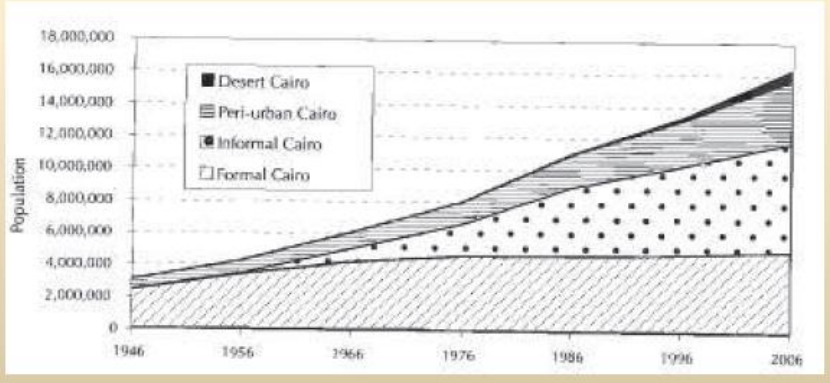
- Context
- Problems: Causes and Effects
- Case studies: Cairo and Assiut
- Pitfalls
- Proposed Solutions

Egypt Vehicle and Socio-Economic Index (1987-2000)



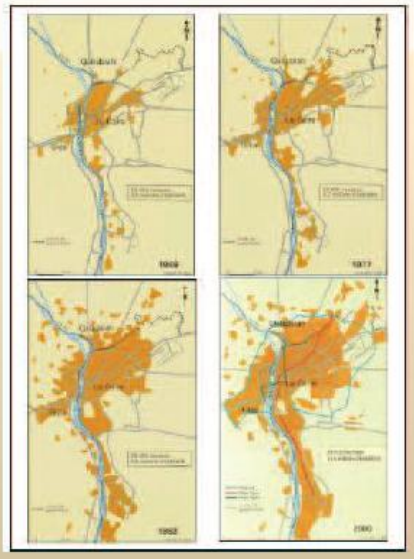
Source: CAPMAS, 2006

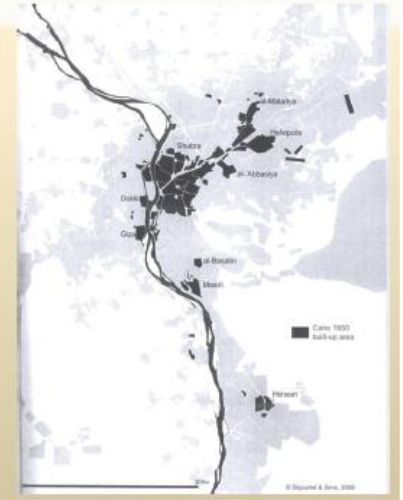
Population Growth of Greater Cairo (1946-2006)



(Ref.: Sims, 2012)

Cairo Urban Sprawl





Ref.: GOPP, 2008; Sims, 2012

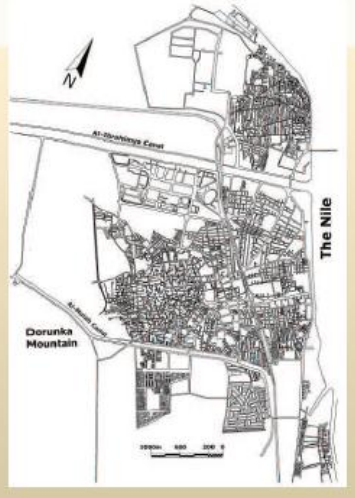
Urban Boundary of Greater Cairo

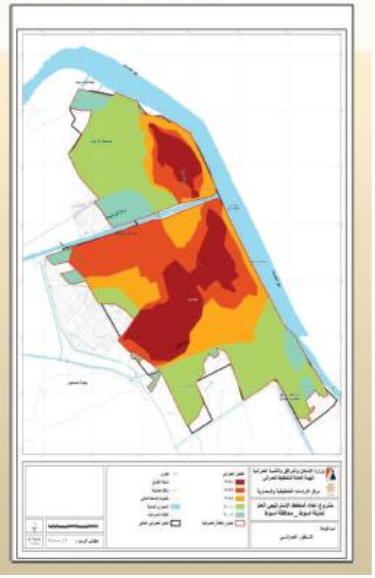
Population Density:
- 15,000 per sq.Km
- Current Pop.: 17.3 million

Year	Area (km²)	Population (millions)
1900	42	1.5
1950	120	5
2000	525	13.5

Ref.: GTZ, 2010

Development of Assiut Urban Form





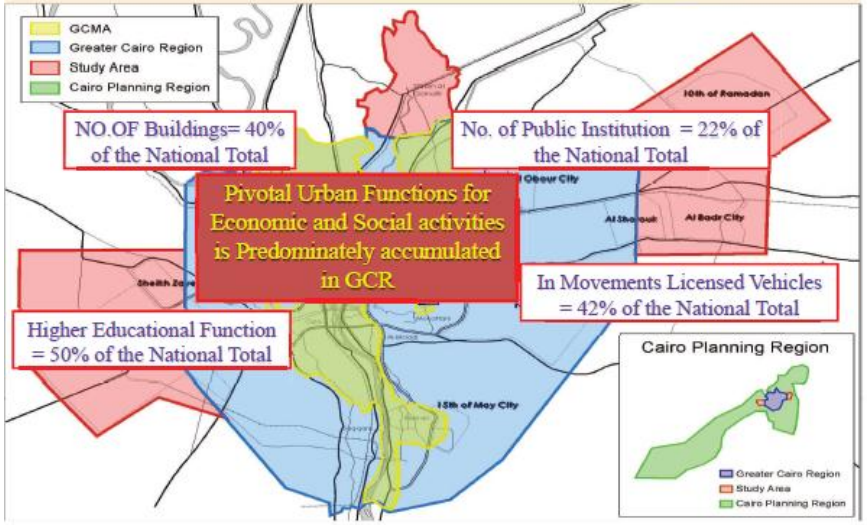
Ref.: GOPP, 2010

Cairo Urban Structure

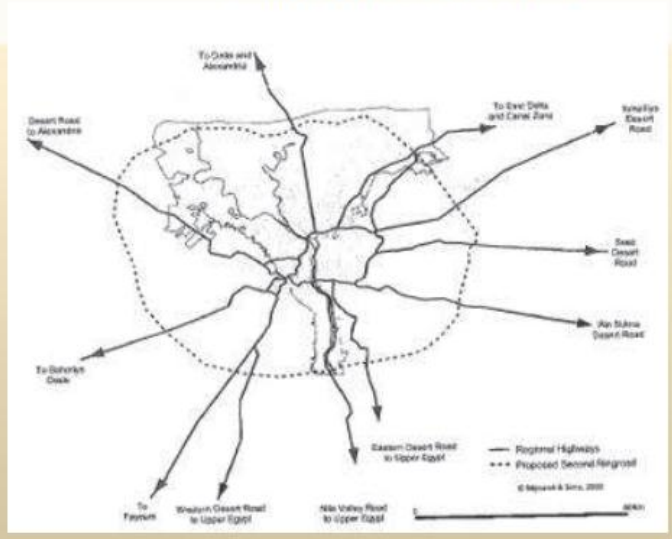
- City is dense and for most part compact within the built-up area.
- Trips are relatively short: 50% of population live within 15Km of Ramses Square downtown
- Informal areas represent 39% of Greater Cairo built up area and 17% of Greater Cairo gross area holding 63% of the total urban population in 2008 (around 11 million of Greater Cairo 17.3 million inhabitants)
- Historical Cairo occupy significant portions in the central core.
- New Towns in desert areas occupy 2.2 times current Cairo built-up area and house only less than 5% of population (800,000 inhabitants)

Challenges for Innovative Cairo Transport

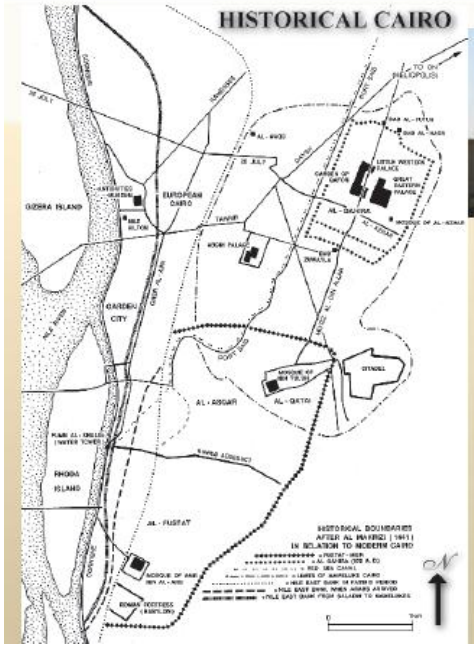
Urbanization structure



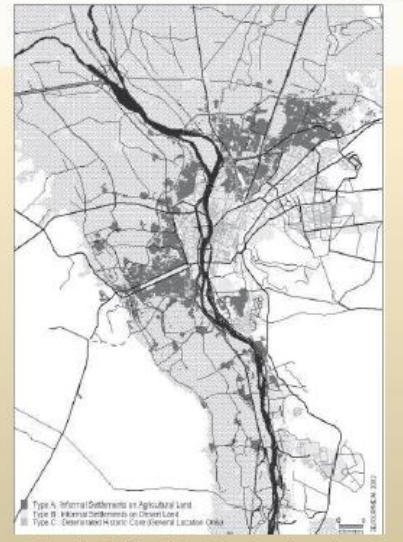
Cairo Access Roads

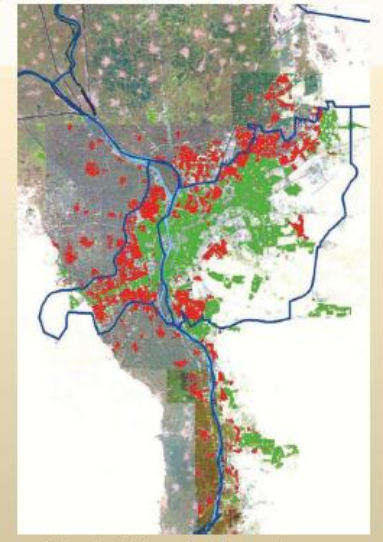


HISTORICAL CAIRO



Informal Areas- Cairo (1)

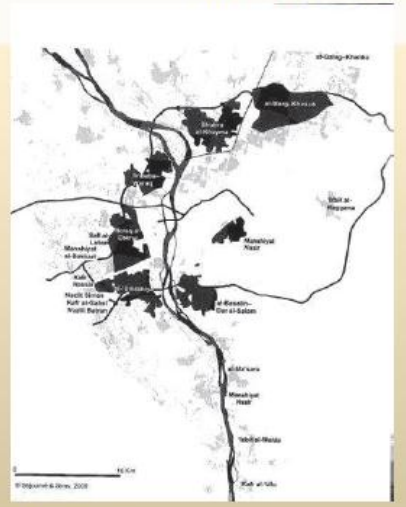




Close to 65% of inhabitants of greater Cairo are living in informal settlements

Ref.: GTZ, 2010

Informal Areas – Cairo (2)



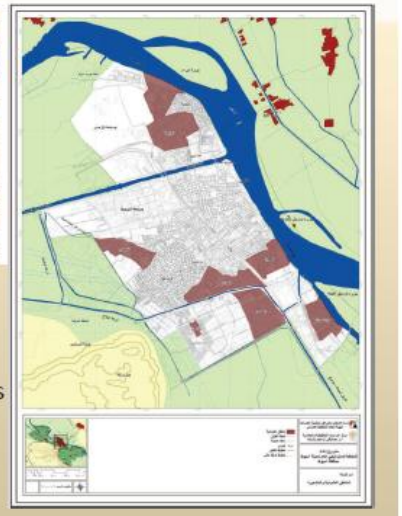
Ref.: Sims, 2012

Informal Areas Cairo (3)

- Informal areas absorb additional population and generate most jobs, economic activities and services.
- Mostly good locations close to urban boundary

Ref.: Sims, 2012; GTZ, 2010

Assiut City



Informal Areas

Source: GOPP, 2010

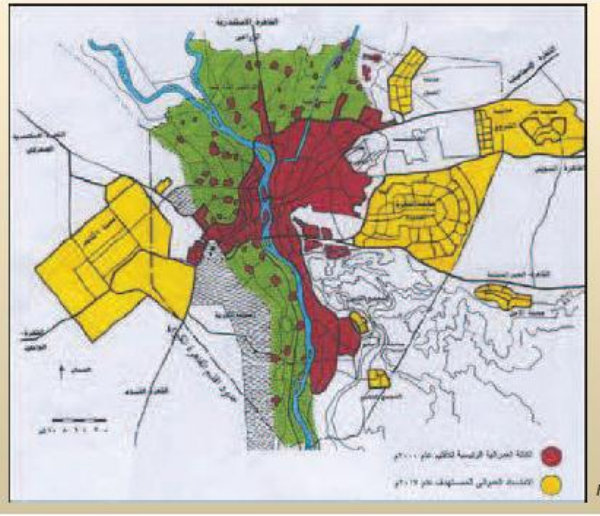
Informal Areas Assiut

Informal areas constitute 26% of city area and house 50% of population

Transportation in Informal Areas

More than 55% of vehicle trips are minibus trips

New Towns- Greater Cairo Area



- Huge Areas
- Huge Investments

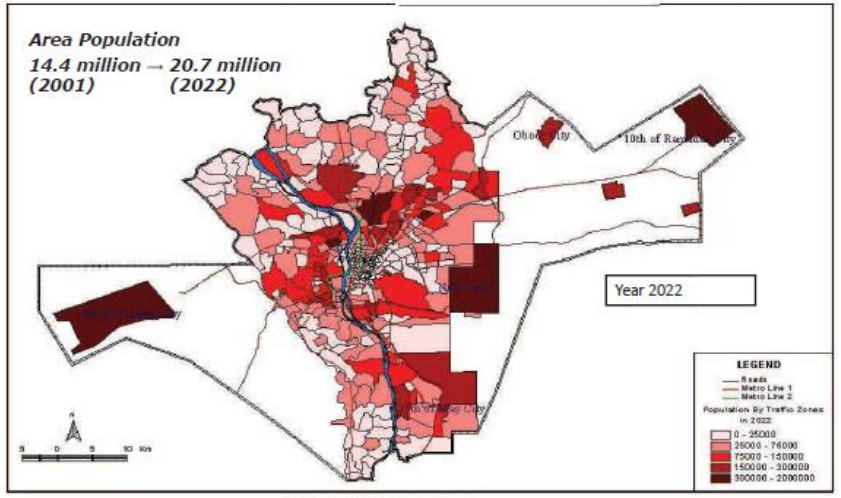
- Little uptake
- Much speculation
- Large travel distance

Ref.: GOPP, 2002

New Assiut

Challenges for Innovative Cairo Transport

A look Into The Future



Ref.: CREATS, JICA, 2002

Greater Cairo Region Faced with Two Critical Urban Development Issues

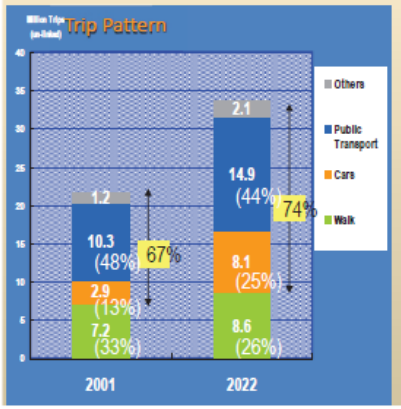
- How to Redevelop or Serve the Inner City areas with an Extremely High Population Density=217 (person/ha).
- How functionally can the Growing New Communities be integrated that are physically spreading over more than 60 Km distant From the metropolitan center.

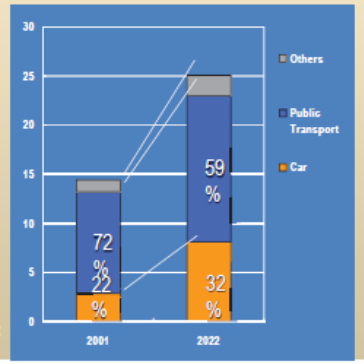
Challenges for Cairo Transport

Motorization will Progress Faster than the Economic Growth

- Car Ownership will grow at 4.2% p.a.
  From 1.05 million (2001) to 2.5 million (2022)
- Households without access to car
  From 70% (2001) to 55% (2022)

Per Capita Income Growth : 2.9%

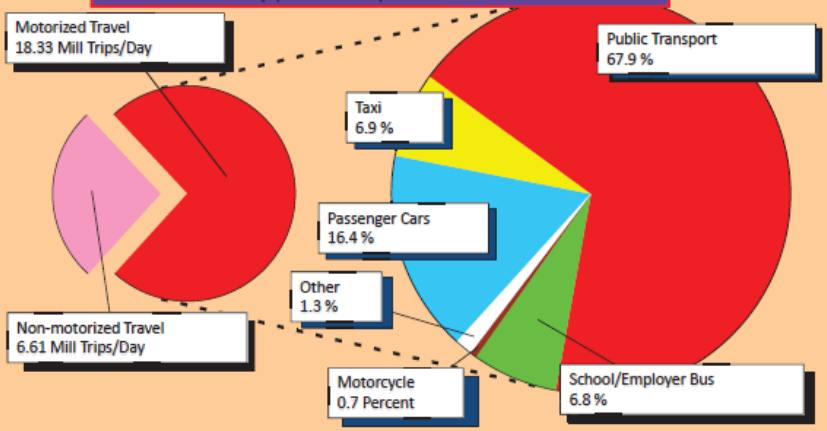




22

Challenges for Cairo Transport

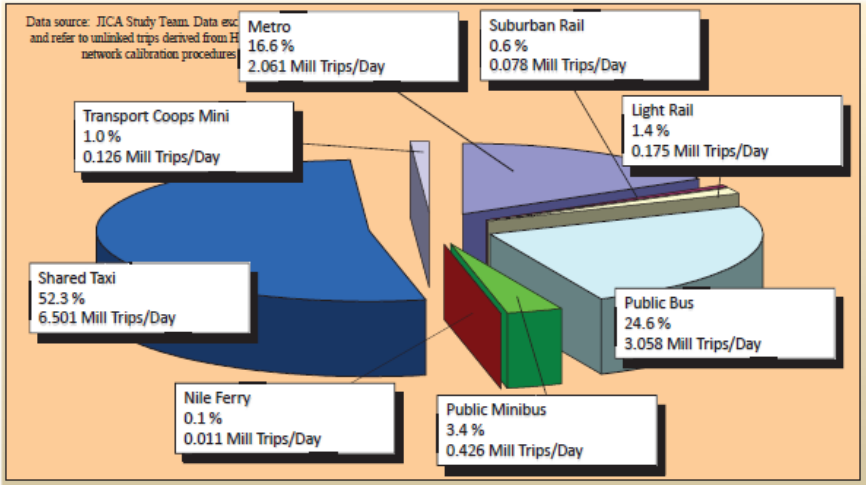
- 24.9 Million Trips/Day (Unlinked trip)
- 18.3 Million Via motorized Modes.
- 68% are made by public transport.



23

Ref.: JICA, 2011

Year 2010 Public Transport Trip Distribution



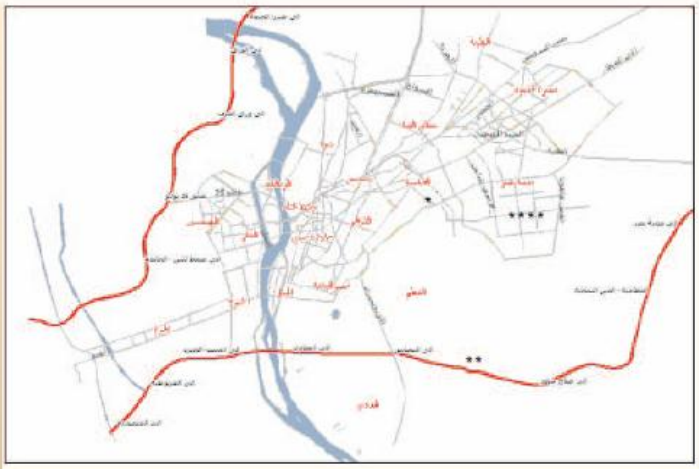
24

Ref.: JICA, 2011

Typical Transport Problems (1)

Mix of Vehicles/Pedestrians/Street Vendors on Street

Typical Transport Problems (2)



No clear functional hierarchy of roads

Conversion of Land Uses

Residential to Commercial

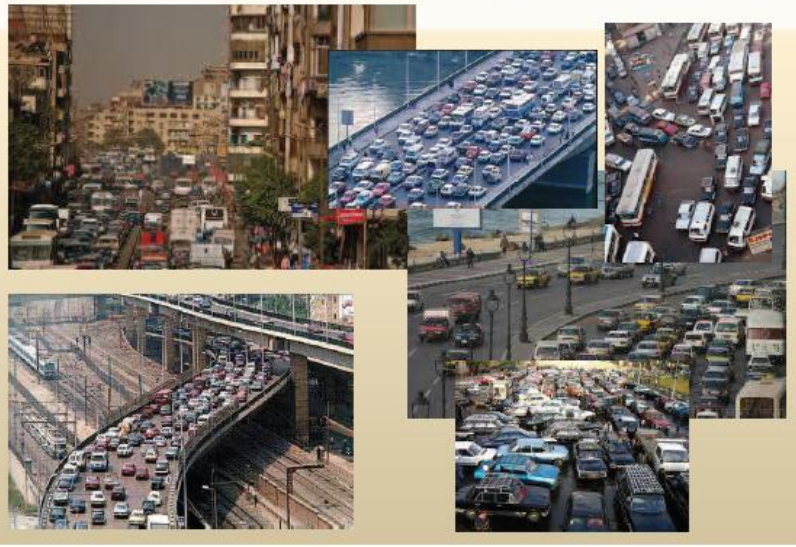
Residential to Administrative

Non-Enforced Building Code

Above Limit Building Heights

Inadequate Residential Parking Spaces

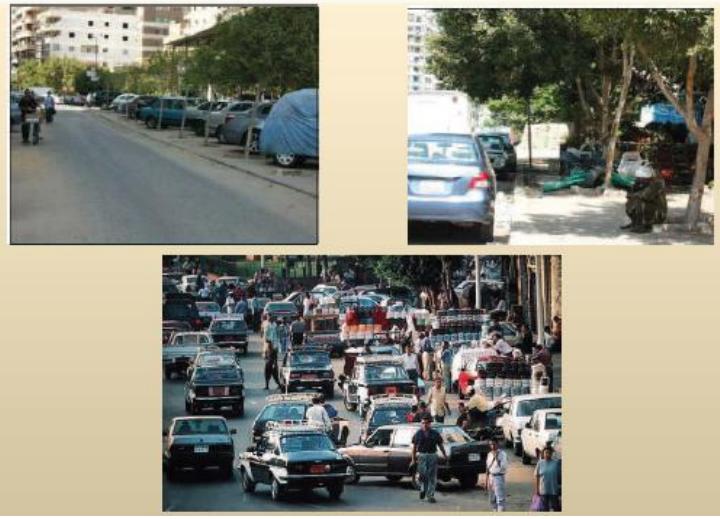
Chronic Traffic Congestion



Poor Public Transport

Inadequate Parking and Bus Stops

Inadequate Side Walks

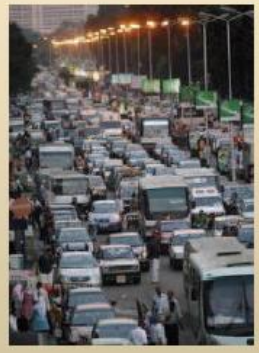


Bad Planning

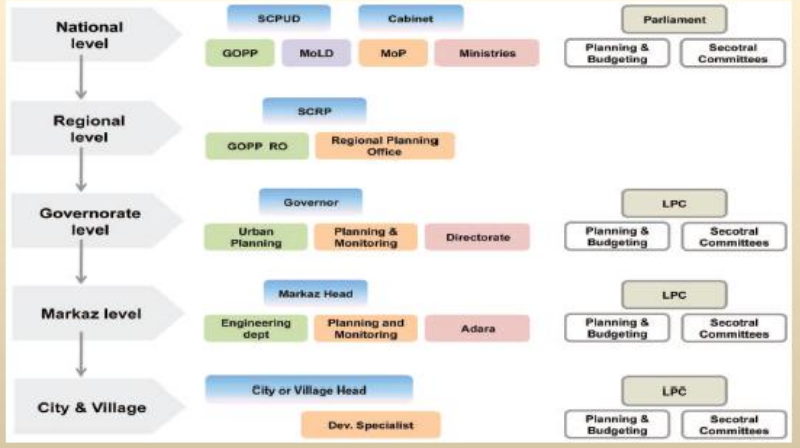
Ramses Square till 1970's

Ramses Square Now

Air and Noise Pollution



Complex Decision and City Planning Structure



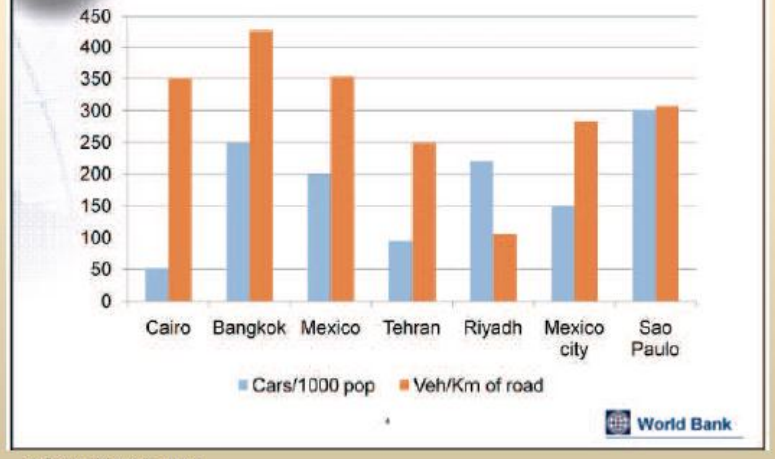
(Ref.: Nada, 2012)

Effect and Cause

- Increase of Traffic Volumes
  - Non-uniform distribution of urban populations: Low income housing away from job opportunities and high income housing away from business opportunities
  - Inadequate urban planning practices
  - Poor observance of traffic laws
  - Average daily commuting time more than 60 minutes , particularly to new cities
  - Lack of proper infrastructure capacities to accommodate increased traffic demands. Large investments not keeping up with traffic congestion
  - Limited parking supply
  - Bad road design and inadequate traffic planning and control
  - Increased private car ownership: low bank loans, inexpensive fuel, coupled with increased local car production/assembly
  - Lack of public transport coverage and low service levels and inter-modal transfer
  - Lack of proper traffic management
  - Yearly economic cost of traffic congestion could reach up to 4% of Egypt's GDP

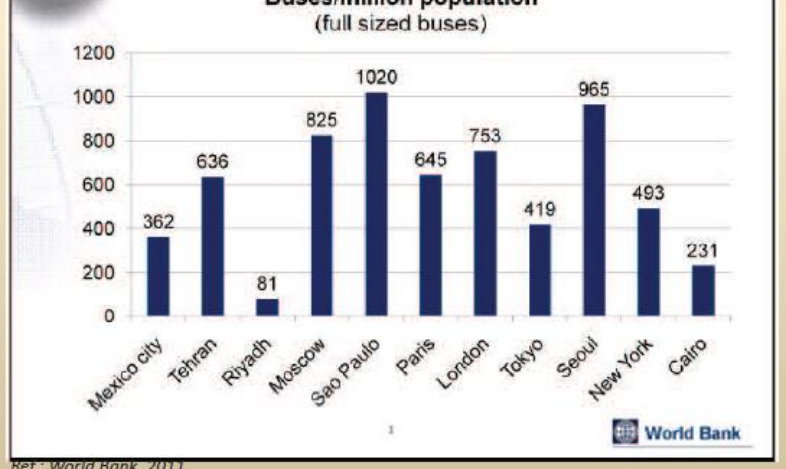
(Ref.: World Bank, 2010)

Benchmarking



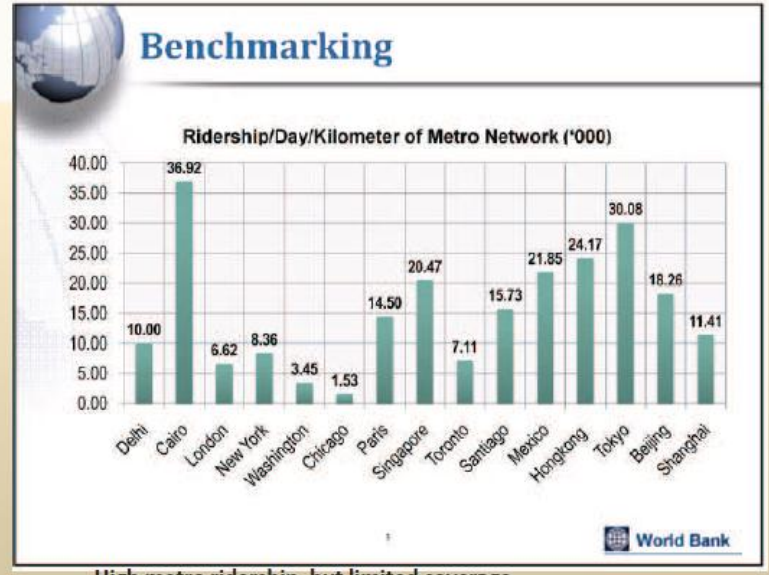
Ref.: World Bank, 2011

Benchmarking



Ref.: World Bank, 2011

Benchmarking



High metro ridership, but limited coverage

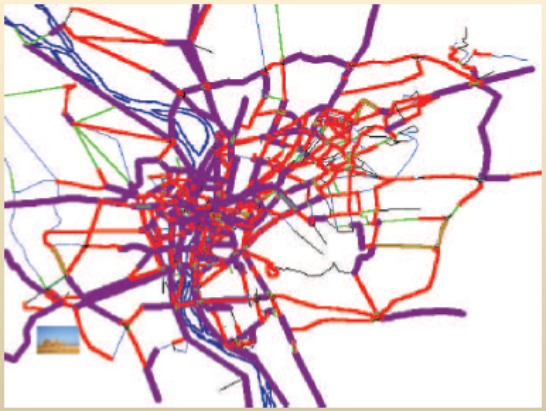
Ref.: World Bank, 2011

Critical Urban Transport Issues

- Aggravated traffic congestion
- Poor public transport system
- High accident rate: 1000 fatalities and 4000 injuries per year in Cairo
- Air and noise pollution
- Institutional Weakness and Fragmentation
- Inadequate financial arrangements

Challenges for Cairo Transport

What will happen in 2015 ?
< "Do Nothing" Situation>



Daily Average Road Traffic Speed:
21.4 Km/h (2001) → 9.3 km/h (2015)

Daily Average Person Speed (all modes):
19.0 km/h (2001) → 4.6 km/h (2015)

Commuting time (Car Mode)
34 Minutes (2001) → 150 Minutes (2015)

Huge Economical Loss
More than 30 Billion L.E/Year (Value of time, Fuel cost and emission cost) (2010)

Poor Environment
CO2 Emission
25.9 (mill. ton / y) (2010)

Ref.: JICA, 2002

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Barriers to Effective Urban Transport Planning (1)

- Focus on single infrastructure investments or technology driven approaches without an integrated view on broader requirements for successful intervention
- Pressing needs to find solutions to pending day-to-day problems at the costs of adequately addressing the long term sustainable development needs of the transport sector
- Lack of inter-sectoral co-ordination (harmonization of policies, institutional co-operation) and limited institutional capacity to effectively adopt, implement and further develop comprehensive programs
- Shortage of sustainable transport models and new approaches tested in Egypt to gain experience, reduce the risks and build the confidence of the targeted stakeholders

(Source: UNDP, Cairo Sustainable Transport Report, 2009)

Barriers to Effective Urban Transport Planning (2)

- Negative experiences with some early experiments such as the introduction of separated bus lanes in Cairo in late 1970's and 1998 or with trolley busses in 1970's;
- Possible public perception, social and cultural barriers and occasionally conflicting interest between the different key stakeholders;
- Limited access to suitable financing mechanisms to meet the required investments needs;
- Inadequate emphasis on integrating sustainable transport planning with urban planning of new cities and on promotion of non-motorized transport in middle size provincial cities.

(Source: UNDP, Cairo Sustainable Transport Report, 2009)

Current international concerns for sustainable development pose a challenge for transport planners particularly in cities with historical zones as Cairo to:

- Serve the whole components and activities of the city socially, economically and environmentally as well as
- To maintain/reduce the bearing capacity of the environment.

Spontaneous vs. Deliberate

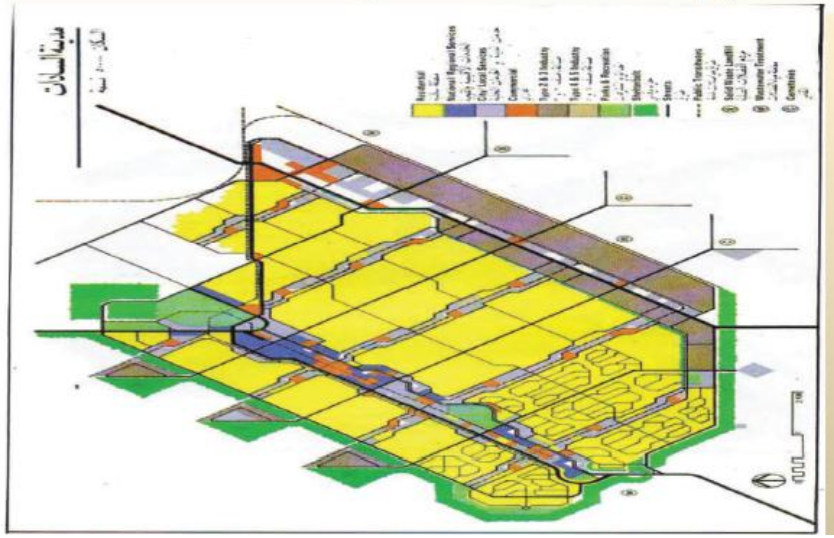
- More spontaneous evolution of urban area versus little deliberate planning
- Positive Assets of Cairo:
  - Human Capital
  - Education, tourism and health centre
  - Urban buzz
  - Global linkages
- Negative:
  - Transport
  - Quality of Life: Egypt rank 80 on Quality of Life Index (EIU, 2007)
- Cairo a Megacity but not a Global city (UN, 2002)

Pitfalls

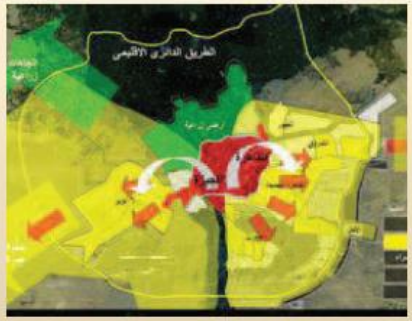
- Pre-occupation with "modern" car-based suburban living in new towns
- Biased transport policy:
  - 11% of households own a car, cars make up 67% of total urban road traffic on average
  - Only 4-5% of population live in new towns
- No public transport priority schemes exist
- Lack of effective traffic management
- No serious measures for restricting car movement

Short-Term Quick Fix Solutions (1)

Short-Term Quick Fix Solutions (2)



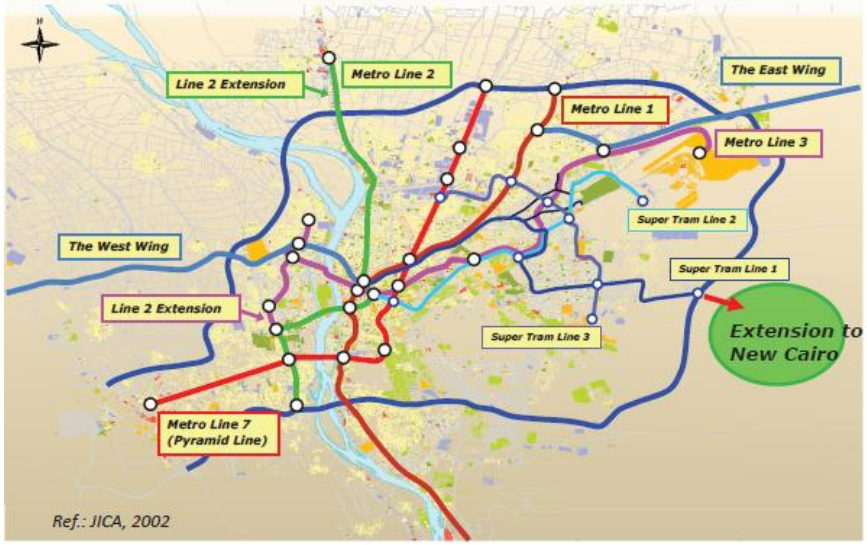
Greater Cairo Regional Road Ring



CREATS Masterplan for 2022

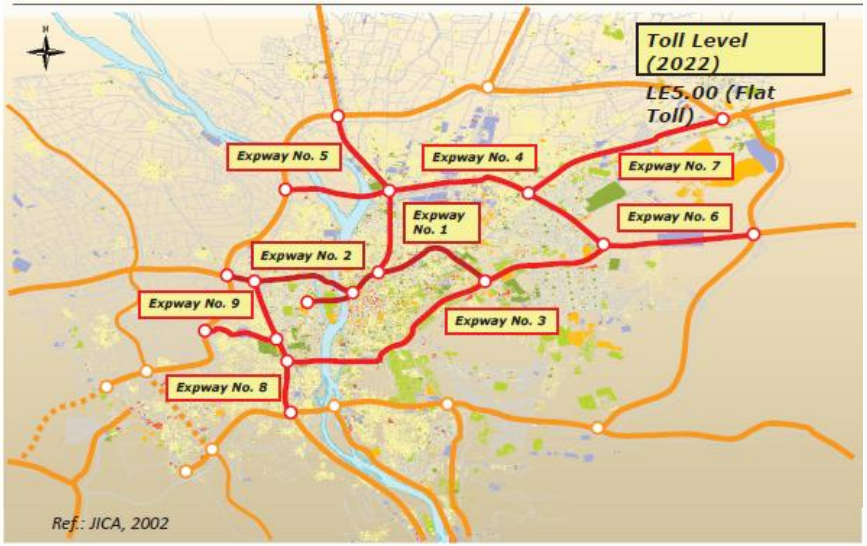
Ref.: JICA, 2002

Public Transport (MRT/LRT) -



Ref.: JICA, 2002

Urban Expressway Network



Ref.: JICA, 2002

How to mange growth in transport demand by developing a sustainable transport system?

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Challenges for Cairo Transport

Planning Goal

To develop a well-functioning "Urban Transport System" for up-lifting people's quality of life

BUILDING BLOCKS OF THE STRATEGY

Efficient Urban Transport Institutions
- Planning / Policy Formulation
- Priority Investments
- Monitoring and Information Systems
- Regulations and PPP framework

Sustainable Urban Transport Funding
- Pricing Policy of UT services
- Streamlined Subsidies
- Other Financing sources

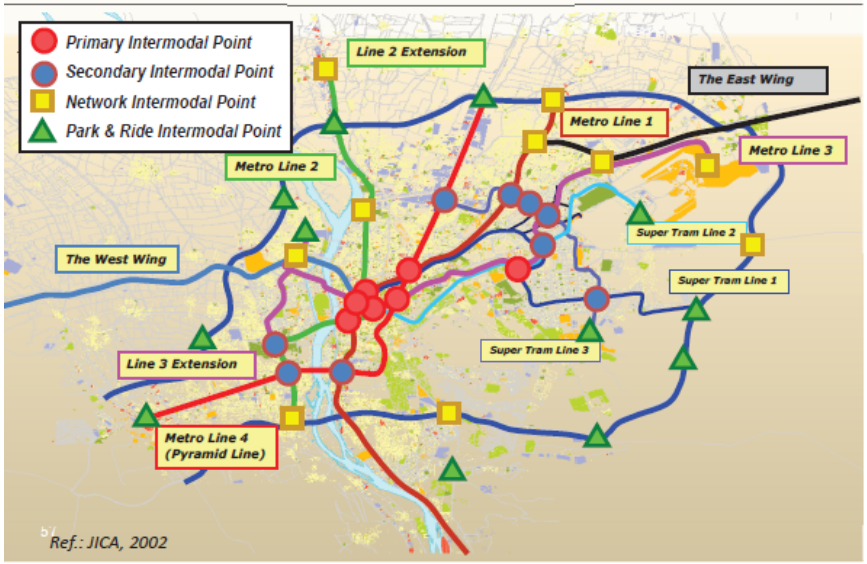
Objective: Efficient, Environmental Friendly and Affordable Urban Transport Services in GCR

Efficient Public Transport System
- Road-based high capacity mass transit systems
- Restructured bus network (formalize the informal)
- Efficient Operators (contracting out and PPPs)

Improved Traffic Management Practices
- Traffic/Parking inst. Capacity
- Traffic Management Plans
- Parking Strategies/Policies
- Implementation/Monitoring
- Enforcement of Traffic Rules
- Priority Toll corridors

Cairo Urban Metro Lines

Integrated Public Transport



Sustainable Planning Practice

- Strategies and measures to defuse the increased population densities in major urban centers coupled with no further expansion beyond existing urban boundaries for major cities
- Effective management of urban development in parallel to effective traffic management
- Limit private car usage and improve modal transfer and shifts
- Enforcement of planning measures: building codes, parking, traffic code
- Improved planning capacities

Sustainable Solutions (1)

1. The concept for new, high quality integrated public transport services for Cairo and its satellite cities to exert shift from private car use
2. Increase the modal share of non-motorized transport (NMT) in middle size provincial cities
3. Successful introduction of the Transport Demand Management (TDM) concept with an objective to expand it towards more aggressive measures over time to effectively discourage the use of private cars, when good quality public transport services are available
4. Improved energy efficiency of urban freight transport
5. Enhanced awareness, capacity and strengthened institutional basis to promote sustainable transport sector development

(Source: UNDP, Cairo Sustainable Transport, 2009)

Sustainable Solutions (2)

- Speed up completion of Cairo urban metro network
- Improve roads and transport services within and serving informal areas
- Integration of public transport modes
- Parking management schemes
- Congestion zones

Sustainable Solutions (3)

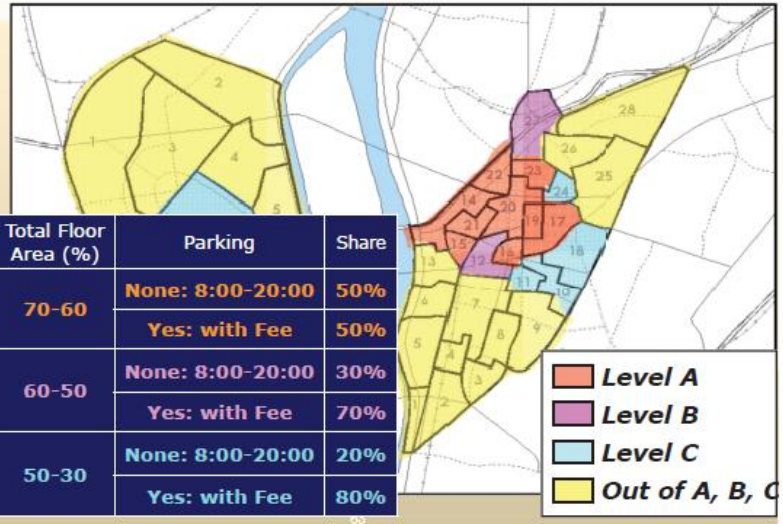
- Reduction of travel distances through effective land use policies
- Improve public transport in terms of coverage and level of service
- Preferential public transport
- Make private car usage expensive
- Manage parking space
- Provide proper space for pedestrians
- Enforcement of traffic rules and building code
- Revision of transport pricing
  - Reallocation of fuel subsidies
  - Introduction of parking charges
- Traffic demand management: flexible working hours and telecommuting
- Urban transport authority with enough skills, adequate powers and funding for leading the planning, regulation and execution of key urban transport activities.

TDM: How much effective?

TDM Policy Options	Public Transport	Vehicle Transport	Public Transport Revenues
(1) Introduction of a common ticketing system	+ 9%	n.a	+ 5.2%
(2) Fuel Tax and Parking Charge	+ 8.4%	-10%	+ 12%
(3) Multi-polar Urban Structure	+ 2.5%	- 8%	+ 11%

Ref.: World Bank, 2010

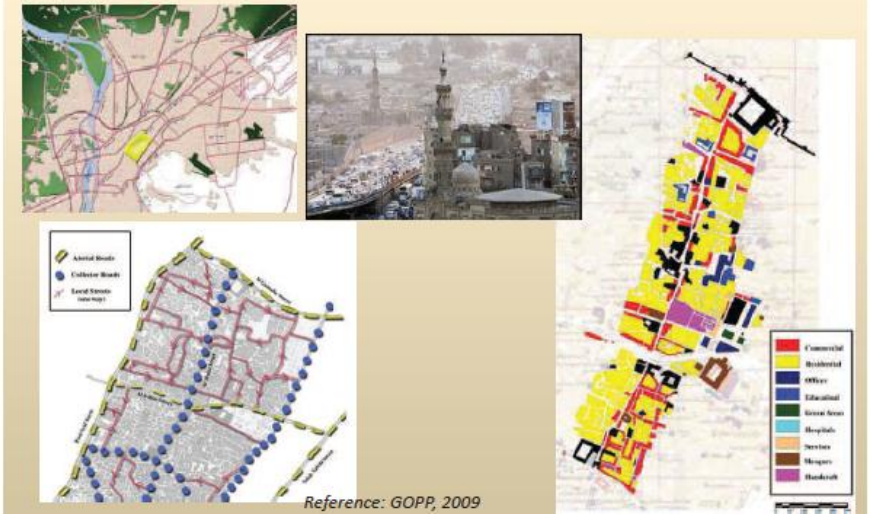
Short-Term Plan for Parking Management



Level	Total Floor Area (%)	Parking	Share
A	70-60	None: 8:00-20:00	50%
		Yes: with Fee	50%
B	60-50	None: 8:00-20:00	30%
		Yes: with Fee	70%
C	50-30	None: 8:00-20:00	20%
		Yes: with Fee	80%

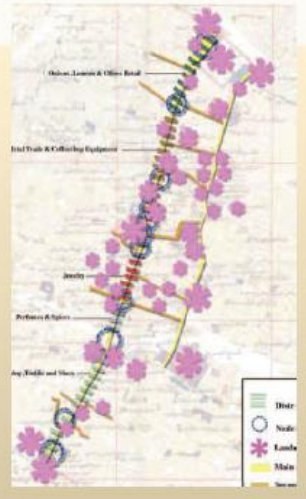
Successful Case Study (1)

- Historical Cairo – Al Muizz Street

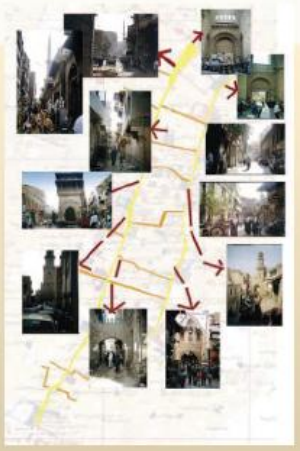


Reference: GOPP, 2009

Successful Case Study (2)



Reference: GOPP, 2009



- Holistic comprehensive development approach
- Pedestrianisation
- Traffic Diversion
- Green modes of transport

Conclusions

- Transport policy in many cases biased. Need for effective urban planning
- Need exists to concentrate policies on improving services to informal areas, including transport
- Expansion and integration of public transport services
- Restrict car usage

THANK YOU !

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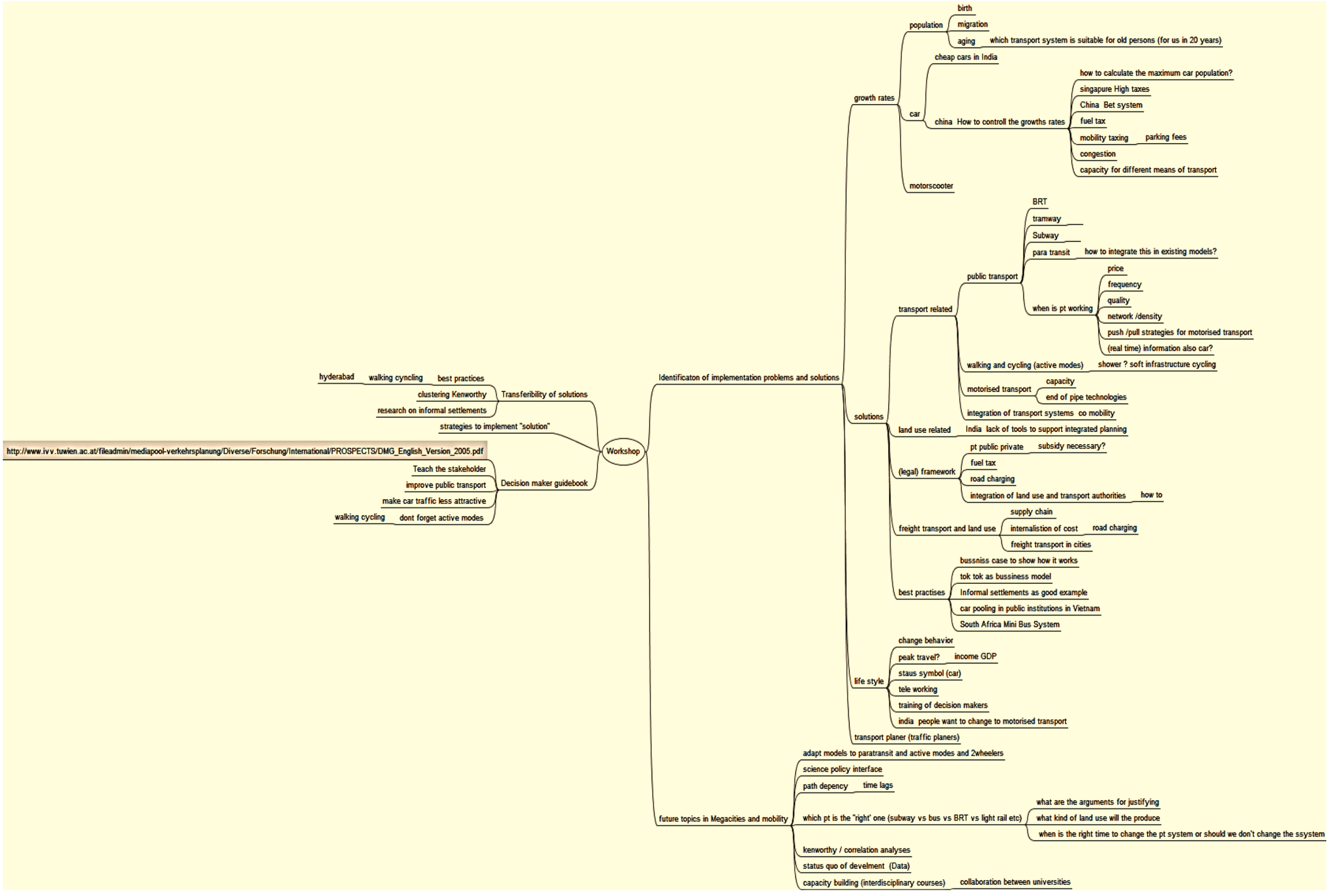
4 The Symposium's Workshop

The symposium held a workshop in its third day on the 24th of February 2013. The workshop was mainly concerned about meeting the main objectives of the symposium of addressing; (1) the interrelation between land use, settlement structure and growth of traffic performance; (2) experiences in several projects solving traffic problems based on this interrelation; (3) integrated transport approaches and projects' results from other research programs for urban development and mobility; and (5) basic ideas for research projects in Egypt. The main thematic fields of the workshop, therefore, were essentially settlement structures and traffic, public transport and paratransit, and also mobility management. The workshop succeeded to document the stream of ideas, concepts, and topics discussed in the form of a "mindmap" as in the following page. Here, it should be mention that the mindmap is kept in its original form without any editing.


Workshop
Identificaton of implementation problems and solutions
growth rates
population
birth
migration
aging
which transport system is suitable for old persons (for us in 20 years)
car
cheap cars in India
china How to controll the growths rates
how to calculate the maximum car population?
singapure High taxes
China Bet system
fuel tax
mobility taxing
parking fees
congestion
capacity for different means of transport
motorscooter
solutions
transport related
public transport
BRT
tramway
Subway
para transit
how to integrate this in existing models?
when is pt working
price
frequency
quality
network /density
push /pull strategies for motorised transport
(real time) information also car?
walking and cycling (active modes)
shower ? soft infrastructure cycling
motorised transport
capacity
end of pipe technologies
integration of transport systems co mobility
land use related
India lack of tools to support integrated planning
(legal) framework
pt public private
subsidy necessary?
fuel tax
road charging
integration of land use and transport authorities
how to
freight transport and land use
supply chain
internalistion of cost
road charging
freight transport in cities
best practises
bussniss case to show how it works
tok tok as bussiness model
Informal settlements as good example
car pooling in public institutions in Vietnam
South Africa Mini Bus System
life style
change behavior
peak travel?
income GDP
staus symbol (car)
tele working
training of decision makers
india people want to change to motorised transport
transport planer (traffic planers)
future topics in Megacities and mobility
adapt models to paratransit and active modes and 2wheelers
science policy interface
path depency
time lags
which pt is the "right' one (subway vs bus vs BRT vs light rail etc)
what are the arguments for justifying
what kind of land use will the produce
when is the right time to change the pt system or should we don't change the ssystem
kenworthy / correlation analyses
status quo of develment (Data)
capacity building (interdisciplinary courses)
collaboration between universities
Transferibility of solutions
hyderabad
walking cyncling
best practices
clustering Kenworthy
research on informal settlements
strategies to implement "solution"
Decision maker guidebook
http://www.ivv.tuwien.ac.at/fileadmin/mediapool-verkehrsplanung/Diverse/Forschung/International/PROSPECTS/DMG_English_Version_2005.pdf
Teach the stakeholder
improve public transport
make car traffic less attractive
walking cycling
dont forget active modes

5 Board of Speakers

5.1 Dr. –Ing. Wulf-Holger Arndt

Name: Dr.-Ing. Wulf-Holger Arndt
Topic: Energy-efficient Transport Planning, Megacities and Mobility, Urban Commercial Transport in Germany

Head of the Research Unit „Mobility and Space“
Center for Technology and Society
Technical University Berlin

Contact Data:
email: wulf-holger.arndt@tu-berlin.de
fon: +49 (030) 314-25230

Center for Technology and Society
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Hardenbergstr. 16-18,
D - 10623 Berlin, Germany

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Current Engagements

- Head of the Research Unit “Mobility and Space”, Center for Technology and Society, Technical University Berlin
- Scientific Researcher at the German Institute of Urban Affairs
- Head of the FGSV Working Group 1.8.3. “Data Surveying Methods for Commercial Goods Transport”

Running Projects

- Development of a Master program “Urban Development and Transportation Planning” German-Argentinian University Center (2012-2013)
- Energyatlas Berlin, Climate-KIC, European Institute of Innovation and Technology (2010-2013)
- Neighborhood Demonstrators, Climate-KIC European Institute of Innovation and Technology (2011-2013)
- Young Cities - Developing Energy-Efficient Urban Fabric in the Tehran-Karaj Region, Dimension leader Mobility and Transportation, Megacities of Tomorrow Program, Federal Ministry of Education and Research (BMBF) (2009-2013)

Finished Projects

- Estimation of follow-up costs for transportation in urban development, German Institute of Urban Affairs, Mobility and Infrastructure, project leader (BMVBS) (2008-2010)
- Usedom - Analysis and concept of commercial transport in Usedom/Wollin, Subcontract of PTV Berlin, project leader (BMVBS) (2008-2009)

Publications

- Transport in Megacities of Tomorrow. (together with Guenter Emberger, Tanja Schäfer, Oliver Lah, Jan Tomaschek), TU Berlin 2012
- Mobility behavior in Germany, Processing and evaluation of mobility specific values, (together with Frank Zimmermann) Difu-Impulse 1/2012, Berlin 2012
- The boards that mean the future. Mobility planning on greenfield site (with Andreas Karger), its magazine Fachmagazin für Straßenverkehrstechnik 3/2011 (Siemens), pages 12-15.
- Eco-Mobility and Transportation, Integrated Transportation Planning for Energy Reduced Traffic, in: Young Cities Research Paper Series, Volume 02. Accomplishments and Objectives. Rudolf Schäfer, Farshad Nasrollahi, Holger Ohlenburg, Florian Stellmacher (Eds.). 2011. Universitätsverlag der TU Berlin.
- Intelligent Transport for Metropolises - Interlinking Transportation, Settlement Planning and User. Proceedings conference „Future Megacities in Balance“ Essen, 2010
- Potential of optimization in commercial transport by cooperation of orderer. Dissertation in the Technical University of Berlin, 2010

5.2 Dr. Rahim Hashempur

Name: Dr. Rahim Hashempour

Topic: Attitude and Sense of Place in New Towns in Iran – Experience of Hashtgerd New Town

Member at the International University of Qazvin, the Urban Planning Department

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Municipality of Hashtgerd New Town
Hashtgert New Town
Savoojbalagh
Alborz
Iran

Current Engagements

- Head of Hashtgerd New Town Council
- Member at the International University of Qazvin, the Urban Planning Department
- Manager of Archi Pars Consulting, Design, and Implementation Company in France
- Chief of the Journal of “Urban Thought” under the supervision of Imam Khomeini International University (IKIU).

Running Projects

- The first “Urban Landscape” conference, March 2013
- The first “Urbanism over time “conference, April 2013

Finished Projects

- Tenon Hospital Projects, Design and Implementation, Paris, District 20
- Robert Ballanger Hospital ,Villepinte City , Paris Suburb
- Paul Doumer Hospital , Saint Mouris City , Paris Suburb
- Saint Dizier Hospital , North East of France
- Bièvre Hospital , Paris Suburb

- Mineral Water and Ocean Bath Treatment Centre in Pornic City providing traditional and advanced treatment methods
- Supervision of Tuboeuf Hotel Project near Paris Stock Exchange Building
- Preparation of Statistical Road Map of Toulouse Province in France
- Design Proposal for Tarrcasson City Centre Project in France
- Design of Nimes City Stadium
- Design of Expansion Project for Expressways and Side Roads in Nimes City
- City design and construction for several cities and commercial centers in France
- Design and implementation of Residential and Commercial High Rise Building in several cities in Iran (Archi Pars Co)
- Design and Supervision of Recreational, Cultural, Training and Educational Complex
- Design and Supervision of Water Park Recreational Complex

Publications

- Author of more than 15 Scientific Articles in official magazines
- Author of "Urban furniture and Beautification" under the supervision of the Ministry and the Municipalities.
- Given more than 20 press interviews about Urban Planning and New Towns
- Secretary of the first "Urban Landscape" conference, March 2013
- Secretary of the first "Urbanism over time "conference, April 2013
- Supervisor of more than 60 Urbanism's BS thesis's
- Supervisor of more than 25 Master of Architecture's thesis's
- Supervisor of more than 22 Master of Urbanism's thesis's

5.3 Thomas Haasz

Name: Mr. Thomas Haasz
Topic: Gauteng – Energy Modeling of Transport Systems

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Germany

Current Engagements
Institute for Energy Economics and the Rational Use of Energy (IER)
Department: Energy Economics and System Analysis (ESA)

Running Projects

- EnerKey - Energy as a Key Element of an Integrated Climate Protection Concept for the City Region of Gauteng, South Africa.

Publications

- Tomaschek, J., Dobbins, A., Haasz, T., Fahl, U. (2012): EnerKey Fact Sheet #1 – Development of an Energy and Emissions Balance for Gauteng 2007.
- Tomaschek, J., Haasz, T., Dobbins, A., Fahl, U. (2012): Energy Related Greenhouse Gas Inventory and Energy Balance – Gauteng: 2007-2009.

5.4 Prof. Dr. Günter Emberger

Name: Prof. Dr. Günter Emberger
Topic: Ho Chi Minh City – Promotion Public Transport and Slow Modes

Ao.Univ.Professor at the Institute for Transportation, Center for Transport Planning and TrafficEngineering, University of Technology Vienna, Austria

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© http://www.iiid-expertforum.net/2012/Speakers/Speaker%20Profile%20Emberger.pdf

Current Engagements
Ao. Univ. Professor at the Institute for Transportation, Center for Transport Planning and Traffic Engineering, University of Technology Vienna, Austria
Austrian Journal of Transportation Science, Member of the Editorial Board

Running Projects
Megacity Research Project TP. Ho Chi Minh. Integrative Urban and Environmental Planning Framework. Adaptation to Climate Change, Megacities of Tomorrow Program, Federal Ministry of Education and Research (BMBF) (2009-2013)

Finished Projects
Transport model AT-CZ, EU-research project, 01.06.2012 – 30.09.2014, Project coordinator

Transport model AT-HU, EU-research project, 01.10.2011 – 30.09.2013, Project coordinator

Transport model (MARS) Strasbourg, European Institute for Energy Research, Karlsruhe, Deutschland,01.02.2012 - 31.12.2012, Project coordinator

COMPASS – EU-research project – Optimized Co-Modal Passenger Transport for Reducing Carbon Emissions, 01.10.2011 – 30.09.2013, project manager TUW-IVV

ORIGAMI; EU-research project, Optima Regulation and Infrastructure for Ground, Air and Maritime Interfaces, 01.03.2011 – 27.02.2013, project manager TUW-IVV

Transport model Mulhouse(FRA)/MARS – European Institute for Energy Research, Karlsruhe, Deutschland; 05.07.2010 -05-12-2013, project manager TUW-IVV

GHG-Transpord, EU-research project, 01.10.2009-30.11.2011, Project leader TUW-IVV

OBIS- Optimising Bike Sharing in European Cities, EU-funded project, IEEA 2007, IEE/07/682/SI2.499209, Start: 01.09.2008, End: 30.08.2011, Project leader – TUW-IVV

VN-HCMC -Urbane Wachstumszentren: urban.network HCMC - Integrative Stadt- und Umweltplanung für Ho Chi Minh City zur Anpassung an den globalen Klimawandel - Strategien für eine klimagerechte und energieeffiziente Stadtentwicklung und Wohnungsversorgung, funded by BMBF-Deutschland, Start: 01.09.2008, End: 30.06.2013, WP leader – TUW-IVV

CityMobil – EU funded research project, Project start 01/05/2006, Project end 31/10/2007, project leader – TUW-IVV

FUNDING - Funding Infrastructure: Guidelines for Europe, EU-funded, Directorate General for Energy and Transport, Priority 6.2, Sustainable Surface Transport, FP6-2003-TREN-2, Work programme 1.6.2.4.4.9, Project start 01/06/2005, Project end 31/12/2007, team leader – TUW-IVV

DISTILLATE - Design and Implementation Support Tools for Integrated Local Land use, Transport and the Environment, joint research project with ITS Leeds, University of Leeds, UK, Project Start 1/4/2004 Project end 31/4/2008, team leader – TUW-IVV

STEPS - Scenarios for the Transport system and Energy Supply and their Potential Effects, FP6 research project, project start: 15/1/2004, Project end 31/7/2006, team leader – TUW-IVV

SPARKLE - Sustainability Planning for Asian Cities making use of Research, Know-how and Lessons from Europe, Asia Eco Pro Programme, Project start: 01.11.2004, Project end: 31.08.2006, team leader – TUW-IVV

INTRANSNET - Network of European Medium- and Large-scale Transport Research facilities Operators, Project start 1.1.2002, project end 31.12.2004, team leader TUW-IVV

PLUME - PLanning and Urban Mobility in Europe, Programme for research, technological development and demonstration on "Energy, environment and sustainable development, 2002-2005, Project duration 30 month, Start 2002-11-01, End 2005-04-30, FP5, team member / project manager - ITS

Publications (Choice)

Book chapter: May Anthony D., Shepherd Simon P., Emberger G., (2005), "Optimisation of Transport Strategies", Handbook 6: Transport Strategy, Policy and Institutions edited by Kenneth J. Button, David A. Hensher, Elsevier, ISBN 0-08-044115-7, S.665 - 683

Book chapter: Milne Dave, Emberger G., Stillwell John, Unsworth Rachel, (2004), "Providing for Mobility: Transport Planning Under Pressure"; in: "twenty-first century leeds. geographies of a regional city", R. Unsworth, J. Stillwell (Hrg.); Leeds University Press, Leeds, ISBN 0853162425, S. 215 - 240.

Jounalarticle: Shepherd Simon P., Zhang X., Emberger G., May Anthony D., Hudson M., Paulley N., (2005), "Designing optimal urban transport strategies: The role of individual policy instruments and the impact of financial constraints", Transport Policy 13 (2006), 49-65,

Journalarticle: Pfaffenbichler P.C., Emberger G., Shepherd S. (2010): "A system dynamics approach to land use transport interaction modelling: the strategic model MARS and its application"; System Dynamics Review, Volume 26 (2010), No 3; S. 262 - 282.

Emberger, G.; Arndt, Wulf-Holger; Schaeffer, Tanja; Lah, Oliver; Tomaschek, Jan, ”TRANSPORT IN MEGACITIES OF TOMORROW”, Submitted to WCTRS 2013,

5.5 Prof. Dr. Nguyen Ba Hoang

Name: Prof. Dr. Nguyen Ba Hoang
Topic: River transport in Mekong delta and the adverse effects of Climate Change

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Ho Chi Minh city,
VIETNAM

Current Engagements
Professor of Transport Engineering, Vice Rector of Ho Chi Minh University of Transport

Running Projects

- Research on the Noise Map of Transport in Binh Duong, Vung Tau, Dong Nai Province
- Research on Impact of Climate change for river transport in Vietnam

Finished Projects

- Highway and Bridge Design of National Highway No. 7 Vietnam (Chief)
- HaiVan tunnel Project (participated of management board)
- Danang Port Project (participated of management board)
- HoChiMinh metropolitan region planning (HCM city and 8 other province), (as chief Transport specialist)
- HCM urban railway network planning of HCM city
- Public transportation network of CanTho province
- Transport planning of Phu Quoc- Transport specialist
- Research on transport safety of Dong Nai city -black spot on transport network of HCM city
- Research on the Noise Map of Transport in HCM city

Publications:

- Evaluation of Effectiveness of Fuzzy Multi-Attribute Ordering in a Support System for Bridge Type Selection, 1996, Japan Structure Engineering Journal (with Ito M, Kubota Y.)
- Current situation and tendency of development of railroad in Vietnam, Symposium of railroads in EUROPA and ASIA, Soul Korea, 2005
- Application of Geographical Information System (GIS) in research on the affects of Climate Change on the rivers transport in Mekong Delta- APTE symposium Thai land 2012

5.6 Dr. Dr. Hien Quoc Nguyen

Name: Dr. Hien Quoc Nguyen
Topic: Transport in Ho Chi Minh: Past, Present, and Future

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Ho Chi Minh city,
Vietnam

Current Engagements

- Dean, Faculty of Transport Engineering - Ho Chi Minh city University of Transport
- Lecturer in Transport Planning Department - Ho Chi Minh city University of Transport

Running Projects

- Update of household survey for Ho Chi Minh city

Finished Projects

- Sustainable development of Mass Rapid Transit for Ho Chi Minh city (2010)
- Building GIS map of construction material for Southern Vietnam region (2011)
- Preliminary study on High Speed Rail for Vietnam (2012)

Publications

- Nguyen H. and Montgomery F., Comparison of Discharge Rate at Traffic Signals. Paper presented at the 84th TRB Annual Meeting, Washington DC, January 2006
- Nguyen H. and Montgomery F., Saturation Flow and vehicle Equivalence Factors in traffic Dominated by Motorcycles. Paper presented at the 85th TRB Annual Meeting, Washington DC, January 2007
- Nguyen H. and Montgomery F., Patterns of Discharge Flow at Signalled Junctions. Journal of the Eastern Asia Society for Transportation Studies, Vol. 7, 2007
- Nguyen H. and Montgomery F., Different Models of Saturation Flows in Traffic Dominated by Motorcycles. Journal of the Eastern Asia Society for Transportation Studies, Vol. 7, 2007
- Nguyen H, Montgomery F and Timms P, Should motorcycles be blamed for traffic congestion in Vietnamese cities? Paper presented at the 13th CODATU conference, Ho Chi Minh city, 2008
- Nguyen H, Another approach for urban transport planning in Vietnam, Vietnamese Journal of Transportation Science (written in Vietnamese), 2010
- Nguyen H and Doan D, An outlook for Ho Chi Minh city public transport, Vietnamese Journal of Transportation Science (written in Vietnamese), 2011

5.7 Prof. Dr. CSRK Prasad

Name: Prof. Dr. CSRK Prasad
Topic: Hyderabad – Public Transport Improvement

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National Institute of Technology (NIT)
Civil Eng. Department
Warangal - 506004, A.P
India

Current Engagements
Prof. & Head, Transportation Division and Department of Civil Engineering, NIT, Warangal, India

Running Projects

- "Sealing of Gravel roads", R&D Project Sponsored by NRRDA, Ministry of Rural Development, GOI, New Delhi, 2009-2014 (Rs. 19.50 lakhs)
- MoUD Centre of Excellence on "Centre for Urban Transportation Studies", sponsored by Ministry of Urban Development, GOI, New Delhi, 2009-2015 (Rs. 530.00 lakhs)
- "Development of Rural Road – GIS", sponsored by PRED, GoAP, Hyderabad (Rs. 25.50 lakhs)
- Development of Toolkits on "Traffic Analysis and Performance Measurement" and "Urban Road Capacity & LOS and Traffic System Design" sponsored by IUT, New Delhi. (2012-2013) (Rs. 24.00 lakhs)

Finished Projects

- "Analysis, Modeling and Management of Air Pollution due to Motor Traffic under Multimodal Environment", R&D Project Sponsored by MHRD, New Delhi. 2000-2003. (Rs. 5.00 lakhs).
- "Modernization and Up gradation of Centre for Transportation Engineering", Level 1 FIST Project sponsored by DST, New Delhi. 2003-2008. (Rs. 40.00 lakhs)
- "Rural Roads Pavement Performance Study (RRPPS)", R&D Project sponsored by NRRDA, Ministry of Rural Development, GOI, New Delhi. 2006-2009. (Rs. 10.00 lakhs)
- Pilot Research Projects on "Urban Corridor Improvement" and "Routing & Scheduling of Public Transport", sponsored by PTV Vision, Germany (Rs. 15.00 lakhs)

Recognitions

- Member, Selection Committee, Empanelment and Performance Review of National Quality Monitors (NQMs) April 2006 to till date
- Coordinator, Principal Technical Agency (PTA) & State Technical Agency (STA) PMGSY Programme, NRRDA, New Delhi. 2003 to till date
- Member, Technical Advisory Committee, CTS, HMDA and ITS Implementation, HMDA, Hyderabad, Govt. of Andhra Pradesh
- Member, Highway Research Board, IRC, New Delhi (2012-2014)

5.8 Alexander Sohr

Name: Mr. Alexander Sohr
Topic: Hefei – Traffic Management

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Institute of Transport Systems (TS)
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Germany

Current Engagements

- Traffic data Processing and Prediction
- Use new data sources for traffic information (Bluetooth, …)
- Estimate traffic induced emissions with FCD

Running Projects

- Metrasys - Sustainable Mobility for Mega Cities (BMBF)
- SimpleFleet - Democratizing Fleet Management (EC)
- AIM – Anwendungsplattform Intelligente Mobilität

Finished Projects

- Track & Trade - Building a data mart for floating car data (EC)
- ORINOKO – Operative Regionale Integrierte und Optimierte Korridorsteuerung (BMWI)
- Dynasty – Bringing TMC to China (EC)

Publications

- Kuhns, Günter und Ebendt, Rüdiger und Wagner, Peter und Sohr, Alexander und Brockfeld, Elmar (2011) Self Evaluation of Floating Car Data based on Travel Times from actual Vehicle Trajectories. 2011 IEEE Forum on Integrated and Sustainable Transportation Systems, 2011 , Wien, Österreich.
- Brockfeld, Elmar und Sohr, Alexander und Wagner, Peter (2010) Buoyant market. ITS International (September/October 2010), Route One Publishing Ltd. ISSN 1463-6344
- Sohr, Alexander und Brockfeld, Elmar und Krieg, Sascha (2010) Quality of Floating Car Data. 12th World Conference on Transport Research (WCTR), 11.-15.07.2010, Lissabon, Protugal.
- Sohr, Alexander und Wagner, Peter und Brockfeld, Elmar (2009) Floating Car Data based travel time prediction with Lomb periodogram. 16th World Congress on ITS, 2009, Stockholm, Schweden.

5.9 Prof. Tingjian Fang

Name: Prof. Tingjian Fang
Topic: Hefei – Traffic Management

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Current Engagements

The coordinator of Chinese partners for the METRASYS project
Chief scientist in the field of ITS at the Research Center for Software Engineering Technology of Anhui Province, China, with special focus on traffic information collection and traffic management

Academic Background Running Projects

Graduated at Dept. EE of Zhejiang University, China in1962

Finished Projects

- Visiting scholar at Dept. Computer Science, University of Maryland, US between 1980-1982
- Working at the Institute of Intelligent Machines, CAS in Pattern Recognition and AI field between 1980 - 1999
- Directing the Institute of Intelligent Machines, CAS in Pattern Recognition and AI field between 1987 - 1999
- Guest professor at University of Science and Technology of China between 1987 – 1999
- Research on the Theory, algorithm and Application of Intelligent Optimization for Multi Objects - 3rd place award of Science & Technology of Anhui Province, China Dec.2011

Publications

- "Evaluation of Urban Transport System Using Floating Car Data" IEEE 2010 3rd International Conference on Environmental and Computer Science
- "Traffic Monitoring Using Floating Car Data in Hefei" IEEE 2010 International Symposium on Intelligence Information Processing and Trusted Computing. Oct. 28-29, Hubei, China
- "An Automatic Traffic Congestion Detection Method Based on Floating Car Data" 15th ITS World Congress, 2008 New York
- "Vehicle Integrated Navigation Based on Multi-sensor Information Fusion" 14th ITS World Congress, 2007 Beijing
- "Visual Traffic Flow Detection Based on Improved Gussian Mixture Method" 11th ITS World Congress, Oct. 2004, Japan

5.10 Li Zhenyu

Name: Mr. LI Zhenyu
Topic: Metrasys – Transport in Megacities of Tomorrow

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China

Current Engagements

Research Analyst in CATS, Focus on Policy study of low carbon urban transport, modeling on energy demand and CO2 emission of urban transport

Running Projects

- CUSTReC—China Urban Sustainable Transport Research Center, funded by the Volvo Research and Educational Foundations (VREF) Study on the Mine Resources Management System Based on Geographic Information System
- Regional pilot cities on low carbon transportation system on Guiyang, 2012-2013
- Low carbon transport development, Sino-German cooperation project, 2011-2014

Finished Projects

- Study on low carbon transportation system, sponsored by MOT, P.R. China, 2009-2011
- LCA on urban transport modes in China, sponsored by the World Bank, 2010
- Energy Efficiency and Urban Development, sponsored by CCICED, 2009
- QUANTIFY—Quantifying the Climate Impact of Global and European Transport Systems, this project is the Sixth Framework Programme funded by EU(Contract No.: 003893) from 2006 to 2007
- Strategy and Policy for Sustainable Transport in China---sponsored by CCICED, 2003-2005

Publications

- Policy for Energy saving of urban transport in China, China Communications Press, Oct. 2009, main participant
- Li Zhenyu, Guo Shanshan, Zhang Min. Present Situation, Problems and Countermeasures of New Energy Vehicles, Journal of Engineering Studies, 2012, 03
- Li Zhenyu, Zhang Min, Chen Xumei.Energy Efficiency Development of Urban Passenger Transport in China, Sustainable Automotive Technologies 2012, Pages 253-259, 2012, 03
- Li Zhenyu. Low Carbon Urban Transport Development Mode and Implementation Strategy, Journal of Engineering Studies, 2011, 03
- Li Zhenyu, Zhang Haozhi.Main approaches and the enlightens on energy savings and emission education of European Urban Transport, Highways & Automotive Applications, 2011, 05
- Jiang Yulin, Li Zhenyu. Practices and Policies of Green Urban Transport in China, Journeys, July, 2010, LTA Academy, Land Transport Authority
- Li Zhenyu, Jiang Yulin, Chen Xumei. Urban Transport Policy Response to Global Climate Change in China, Science of Engineering in China, 2010.01
- Li Zhenyu, Chen Xumei, Jiang Yulin. Policy Study for energy saving of urban tranpsort, Urban Transport, 2010. 09
- Li Zhenyu. Experience and Enlightenment of Urban Transport policy in Japan for China, Construction Science and Technology, 2009.9
- Jean-François Janin, Jun Li, Zhenyu Li. Methodology of measuring carbon emissions in urban transport in China: review of the state-of-art and a research proposal, The Second Sino-France Sustainable urban transport Forum, 2009.11

5.11 Dr. –Ing. Dirk Heinrichs

Name: Dr.-Ing. Dirk Heinrichs
Topic: Santiago de Chile – Transport Szenarios 2030

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Germany

Current Engagements / Research Interests

- Urbanisation trends and spatial development: suburbanisation, Reurbanisation, informal settlements, megaprojects
- Mobility und urban space: residential choice and daily mobility, spatial planningand mobility
- Mobility andclimatechange
- Teaching: TU Berlin (Urban Management Master Programme),

Current Projects (Selection)

- Transport and Environment:Scenarios for transport demand and effects on climate, air quality and noise (2010 – 2013);
- EnergyTrans: Regional Szenarios for trnasport demand under the energy turn (Energiewende) (2011- 2015);
- Multimodal Mobility in Cities in Colombia and Germany (MoMo) (2012 – 2014);

Completed Projects

- Adapting Cities to Climate Change (2009 – 2010)
- Risk Habitat Megacity (2007 – 2010)

Publications

- Heinrichs, Dirk; Krellenberg Kerstin; Fragkias, Michail (2013): Urban responses to climate change. Theories and governance practice in cities of the Global South, International Journal of Urban and Regional Research (IJURR) (forthcoming)
- Heinrichs, Dirk; Krellenberg, Kerstin; Hansjürgens, Bernd; Martinez, Francisco (2011) *Risk Habitat Megacity.* Springer. ISBN 978-3-642-11543-1
- Heinrichs, Dirk; Lukas, Michael, Nuissl, Henning (2012): Privatisation of the Fringes – a Latin American Version of Post-Suburbia? The Case of Santiago de Chile. In: Phelps, Nicolas, Wu, Fulong (Eds): International Perspectives of Suburbanisation. A Post-Suburban World? Basingstoke / New York: Palgrave Macmillan. 101-121.ISBN 987-0-230-277639-0
- Heinrichs, Dirk; Aggarwal, Rimjhim; Barton, Jonathan; Bharucha, Erach; Butsch, Carsten; Fragkias, Michail; Johnston, Peter; Kraas, Frauke; Krellenberg, Kerstin; Lampis, Andrea; Ling, OoiGiok; Vogel, Johanna (2011) *Adapting Cities toClimate Change: OpportunitiesandConstraints.*In: Cities and Climate Change Urban Development Series. The World Bank Publications. Seiten 193-224. ISBN 978-0-8213-8493-0
- Nuissl, H.., Heinrichs, D. (2011): Fresh wind or Hot Air? Does the Governance Discourse Have Something to Offer to Spatial Planning; Journal of Planning Education and Research 31 (1): 47-59

5.12 Duncan Smith

Name: Dr. Duncan Smith

Topic: Density, land-use and travel patterns in Urban Age cities

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Current Engagements
LSE Cities Research Officer and GIS Analyst.

Running Projects

- The Economics of Green Cities
  This is a global collaborative programme, chaired by Professor Lord Stern, which aims to examine the risk-adjusted costs and benefits of green policy frameworks on the sustainable economic growth of cities in different parts of the world. This includes public transport modelling of leading green cities, particularly Stockholm and Copenhagen, and has contributed research to the Urban Age conferences, most recently in the Electric City Conference, London 2012.

- London and New York, Public Transport Investment and Urban Governance
  A joint project between Columbia University and LSE, we are examining relationships between New York and London in terms of their urban development and infrastructure investment. This includes modeling recent public transport expansion, impacts on growth and the different paths taken by these two major world cities.

Finished Projects (Projects completed while employed at CASA UCL)

- ARCADIA: Adaptation and Resilience in Cities: Analysis and Decision making using Integrated Assessment. With Tyndall Centre for Climate Research.
- Greater London Authority Economics Unit Spatial Analysis Research Fellow.
- Virtual London- 3D interactive modeling of the urban environment for spatial analysis.

Publications

- Rode, P. et al. (2012), Going Green: How Cities are Leading the Next Economy, London: ICLEI & LSE Cities.http://lsecities.net/publications/reports/going-green-3gf-edition/
- Smith, D. A., Vargas, C. and Batty, M (2012), Simulating the Spatial Distribution of Employment in Large Cities: with Applications to Greater London IN Pagliara, F., de Bok, M., Simmonds, D. and Wilson, A. G. (eds), Employment location in cities and regions: models and applications, Heidelberg: Springer.
- Batty, M., Vargas, C., Smith, D., Serras, J. and Reades, J. (2013), Visually-Intelligible Land Use Transportation Models for the Rapid Assessment of Urban Futures, Environment and Planning B (forthcoming).

5.13 Prof. Jeffrey Kenworthy

Name: Prof. Jeffrey Kenworthy
Topic: Urban Transport Challenges Worldwide

Guest Professor
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Professor in Sustainable Cities, Curtin University, Perth

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Current Engagements
Guest Professor, University of Applied Sciences, Frankfurt a. M.
Professor in Sustainable Cities, Curtin University Sustainability Policy Institute (CUSP), Curtin University of Technology, Perth.

Running Projects
Global Cities Data Update
BRIC Mobility Monitor (with ifmo/BMW)

Finished Projects
Consultant to World Bank on Urban Transport Indicators in 37 cities.

Consultant to UITP, Brussels and Project Director, $504,000 project entitled Millennium Cities database for Sustainable Transport

Publications

Schiller, P.L. Bruun, E.C. and *KENWORTHY, J*.R. (2010) An Introduction to Sustainable Transportation: Policy, Planning and Implementation. Earthscan, London.

***KENWORTHY*, J. and Laube, F. (2001) The Millennium Cities Database for Sustainable Transport. (CDROM Database)** International Union (Association) of Public Transport, (UITP), Brussels and Institute for Sustainability and Technology Policy (ISTP), Perth.

***KENWORTHY*, J., Murray-Leach, R. and Townsend, C. (2005)** Sustainable Urban Transport. In: Hargroves, K.C. and Smith, M.H. **The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century**. Chapter 19, pp 371-386. Earthscan Publications, London.

***KENWORTHY, J. R.* (2005)** Sustainable urban transport: Developing sustainability rankings and clusters based on an international comparison of cities. In **Handbook of Sustainability Research**, Chapter 16. Peter Lang Scientific Publishers, Frankfurt.

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5.14 Prof. Fabio Duarte

Name: Prof. Dr. Fábio Duarte
Topic: Transit Oriented Development

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Current Engagements
Director, Graduate Program of Urban Management, Pontifical Catholic University of Paraná, Brazil

Running Projects
When planned cities become metropolis: challenges of public transport in Brasilia and Curitiba. (2012-2014). Apoio: CNPq.
Habitele. Wearable digital identities. (2012-2016). Apoio: Agence Nationale de la Recherche (ANR).

Finished Projects
Examining the best practices of World's premier Bus Rapid Transit System: Curitiba, Brazil and Bogotá, Colombia.
Transport and sustainability: a review of the international journals.

Publications
DUARTE, F.; ULTRAMARI, C. Making Public Transport and Housing Match: Accomplishments and Failures of CuritIba's BRT. Journal of Urban Planning Development., 138(2), 2012; pp. 183–194.
DUARTE, F.; ROJAS, F. Intermodal Connectivity to BRT: A Comparative Analysis of Bogotá and Curitiba. Journal of Public Transportation. 15(2), 2012; pp. 1-20.
DUARTE, F.; FIRMINO, R. J.; PRESTES, O. Learning from Failures: Avoiding Asymmetrical Views of Public Transportation Initiatives in Curitiba. Journal of Urban Technology, v. 18,2011, pp. 81-100,.
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5.15 Prof. Khaled El-Araby

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Topic: Urban Transport Issues in Egypt

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Running Projects

- 2013: Expert in Egyptian National Commission for Rail Safety
  Development of plans and quality management for rail safety policies and measures on Egyptian national railway system.

- 2012: ITS Expert for the Fully Automated Level Crossings in Egypt - 2nd Phase – 1st. Priority Project Review of specifications and tender evaluator for "Supply and installation of fully automatic level crossings protection systems for 150 critical crossings in Egypt"

- 2009-present: European Traffic Management Expert Group and Member of European Study on Traffic Management Services and Co-Modality, TEN-T EasyWay Project Development and validation of guidelines for core European traffic management services, development of deployment indicators, cross-fertilisation and best-practice documentation. Development of traffic management decision support systems in Europe. Assessment of cooperative systems services.

Finished Projects

- 2009-2012: Task Leader for the development of ITS deployment support Toolkit
  Design and development of a Toolkit for sustainable decision-making in ITS planning and deployment in Europe, based on European ITS Action Plan (www.2decide.eu), DG-MOVE, EC
- 2008-2009: Senior Transport Planner, Development of Regional master Plan for the Homs Governorate. Development of transport strategies and projects, including road, rail and public transport, to serve proposed developments and transport demand within the Regional Plan
- 2006-2009: Deputy Technical Manager and ITS System Architect. ITS Masterplan for Bahrain. Planning, development and deployment of Intelligent Transportation Systems for the Kingdom of Bahrain including setting ITS policy directives, the development of system architecture, assessment and development of control and information services as well as planning of integrated traffic management centre.
- 2005: Domain Co-Manager, Transport research Knowledge Center for European Transport Research Programmes, EXTR@WEB, DG MOVE, EC
- 2003-2005: Domain Expert, Assessment of National Policy Frameworks for Urban Transport in Europe (NPF-ARMOUR), DG MOVE, EC
- 1998-2000: Transport Planner: Calibration of Strategic Transportation Models, Egypt. Update and testing of strategic freight and passenger national transportation planning models of Egypt.

Publications

- Kulmala R., Mans D., Pettinen M. and El-Araby K. (2012) How to Infer Impacts of ITS Services in Different User Cases. Paper to be published in IET Intelligent Transport Systems Journal.
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- El-Araby K, M. Sabry, "Valuation of Traffic Accidents in Egypt", Proceedings of the International Conference on Strategic Highway Research Program and Traffic Safety at Prague, The Czech Republic, Swedish Road and Transport Research Institute, September 1995.