Austrian and European Policies and Strategies for Smart Cities

Conference: Meeting the Urbanization Challenge - Smart City Solutions from Austria and California

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Austrian Federal Ministry of Transport, Innovation and Technology

Overview of Presentation

- European Union
  - o Research:
    - The Joint Programming Initiative Urban Europe
  - o Implementation:
    - The European Innovation Partnership Smart Cities and Communities
- Austria
  - o A Hot Spot for Smart Cities - Solutions
    - Energy
    - Mobility
- Summary:
  - o The complexity of modern urban development

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European Union: Research

Addressing the Grand Challenges of our time

through transnational joint programming

- The Joint Programming Initiative Urban Europe

www.jpi-urbaneurope.eu

What is Joint Programming?

- Member States decided to pool resources in creating **joint transnational RDI programs** (Council Decision of 2 Dec 2008 establishing a scheme of Joint Programming Initiatives)

- New focus on **grand challenges** which cannot be solved on level of individual countries

- **Urban Europe** accepted by the European Council as one of ten such *Joint Programming Initiatives* in December 2011

- Urban Europe is striving to establish a **large scale, long term, transnational research and development programme** dedicated to urban development

Crossing national borders

- European research on urban issues
  is not only fragmented across disciplines,
  but also between countries

- By integrating European urban research
  - more financial resources are made available for large scale projects,
  - projects can access a wider set of cities as research subjects,
  - results are more likely to reach a wider audience,
  - critical mass of top talent is assembled, and
  - research can more easily address strategic questions at the European level

- The JPI UE focuses on research where the sometimes high cost of
  international cooperation is likely to yield even larger benefits
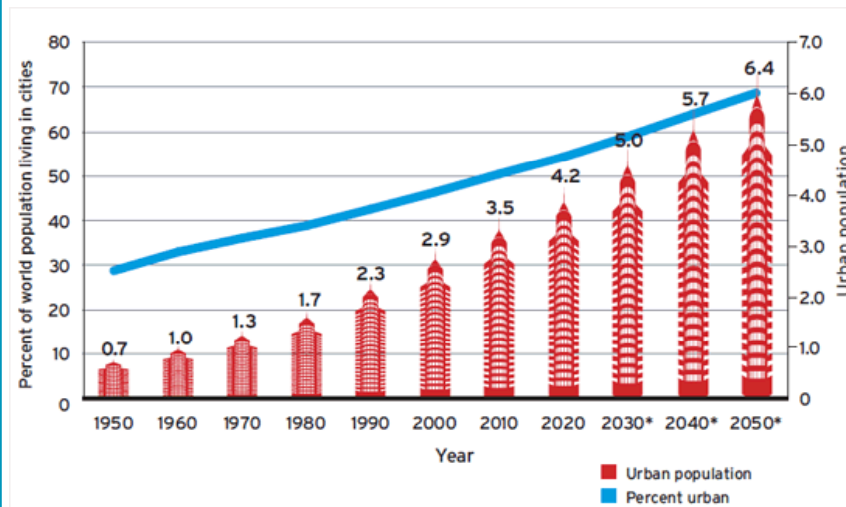
Source: UN, Department of Economic & Social Affairs, Population Division.

Source: UN 2002
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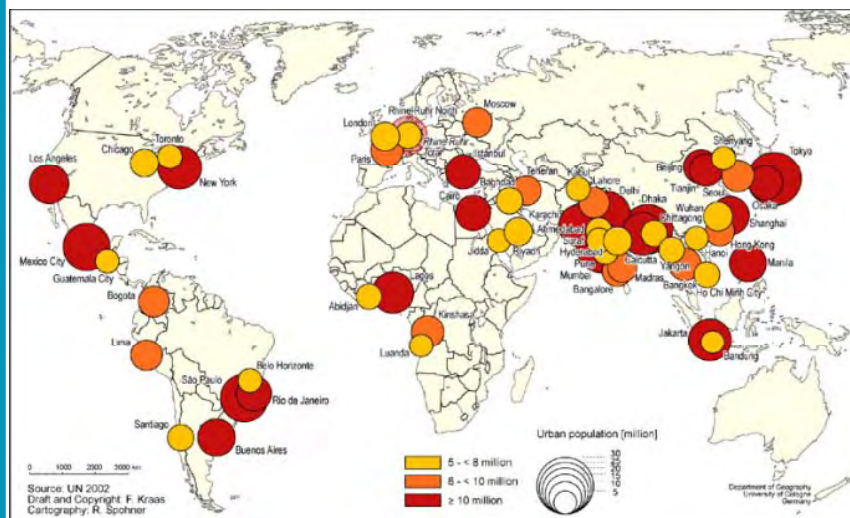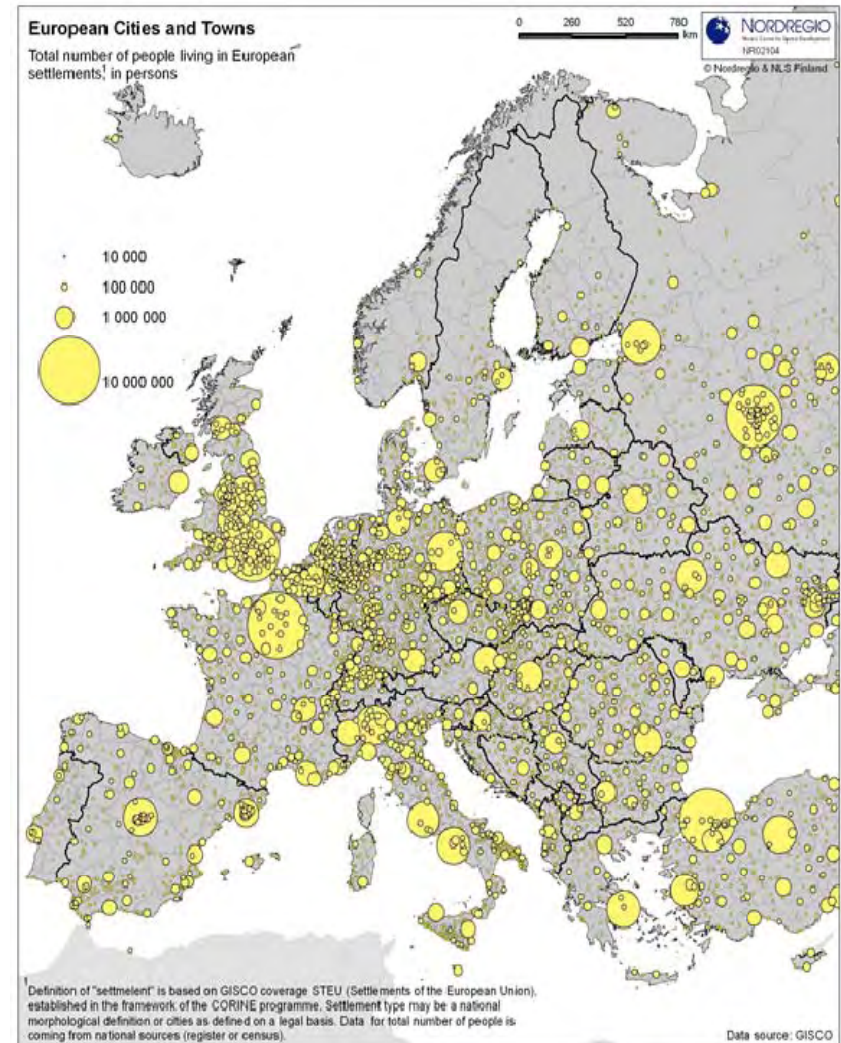
The world keeps urbanising

- The world is increasingly urban
- More than half of the world population, and two thirds of the Europeans, live in cities
- An even greater share of the economic output come from cities
- The city has become the de facto standard organisation of life and economies

Cities in Europe are different

- Typically smaller than in US & China
- A larger share of our population lives in small and medium sized cities
- Slow or stagnant growth
- The smallest cites get smaller
- The wealthiest are mid sized
- Migration mainly city-city
- Cultural heritage is important

Still, most research on cities is based on US cities.

European urban policy development has only a weak connection to urban research.

European Cities and Towns
Total number of people living in European settlements, in persons

- 10 000
- 100 000
- 1 000 000
- 10 000 000

Definition of "settlement" is based on GISCO coverage STEU (Settlements of the European Union), established in the framework of the CORINE programme. Settlement type may be a national morphological definition or cities as defined on a legal basis. Data for total number of people is coming from national sources (register or census).

Data source: GISCO

Vision of the JPI Urban Europe

"Global Urban Challenges

– Joint European Solutions"

Mission of the JPI Urban Europe

Urban Europe

- represents a forward-thinking and **long-term oriented**, coordinated research and innovation initiative to shape urban development in times of a global shift.

- is an **integrative, interdisciplinary and horizontal approach across the interfaces of economy, society, mobility, and ecology**, serving society by raising public awareness and acceptance, and consequently putting expertise into practice.

- promotes intensive **interactions between researchers, policy makers, business and civil society**, resulting in an innovative and impact-oriented approach.

- endeavours to **become recognisable as an EU entry point** open to all relevant stakeholders with an interest **in urban development**.

Objectives of the JPI Urban Europe

- To establish a **world class research environment** in Europe for all "City of the Future" developments;
- Based on relevant scenarios and patterns, to **create input for radical innovation, technology development and implementation strategies**;
- To design **tools, models and concepts** for technology assessment and dissemination as well as for urban governance and urban management
- To develop **policy recommendations** for the European Union, its Member states and cities

Goals for JPI Urban Europe

- Allocate 100M€ per year in research funding by 2020

- Organise all European research and technology organisations spending at least €1M/year on urban issues in a Research Alliance by 2014

- Get all Member States and Associated Countries to join by 2016

- Keep a productive and trustful relationship with all major organisations and networks focused on urban issues

- Be kept in high regards in the scientific community, for our ambition, rigour, and ability to deliver results.

Governance Structure
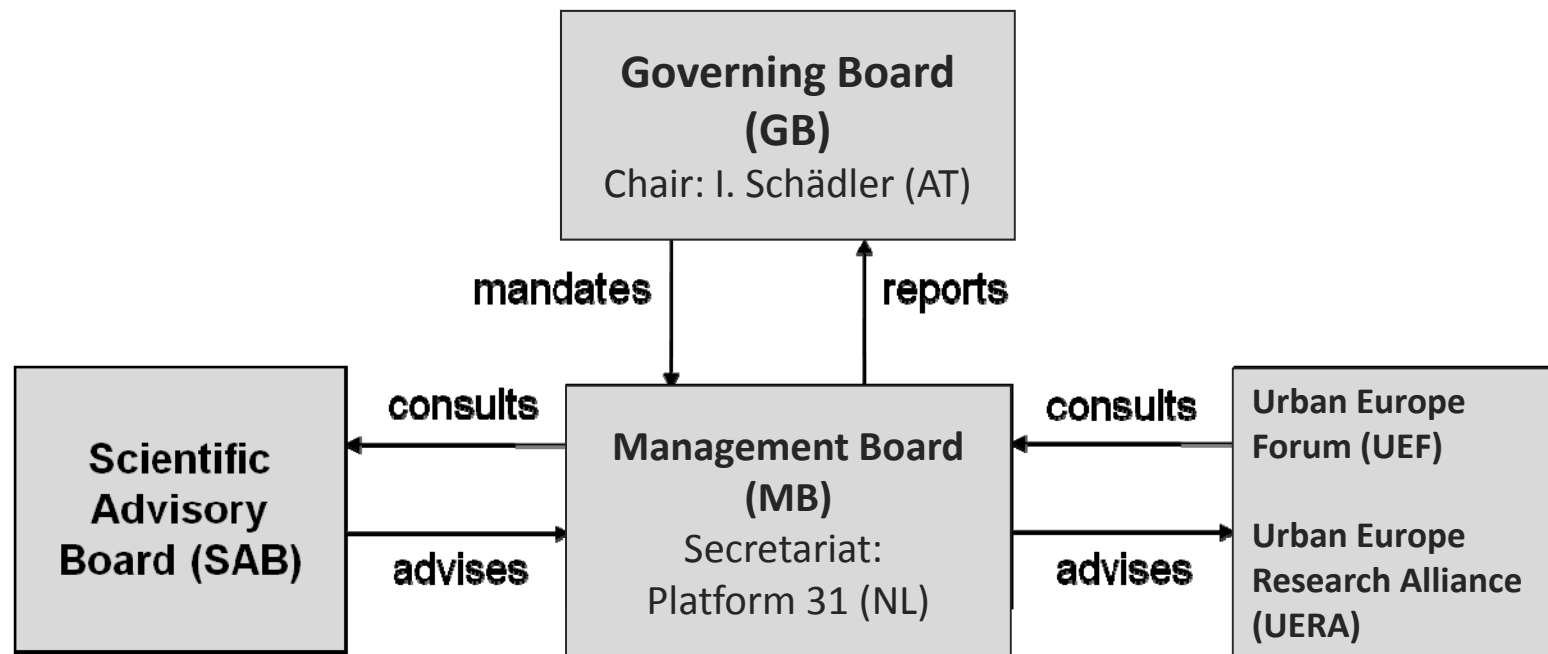
Participants: 16 Member States and Associated States (in alphabetical order): Austria, Belgium, Cyprus, Denmark, Finland, France, Ireland, Italy, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Turkey, and UK

Portugal, Spain, and UK are observers (status: September 2013)

Priority to Implementation:

- The European Innovation Partnership Smart Cities and Communities

    http://ec.europa.eu/eip/smartcities/

EIP Smart Cities and Communities

- Proposed by the EC on 10 July 2012

- Adopted by the European Council on 21 March 2013

- Focus on energy, mobility, and ICT related to cities

- Governance:

  o High Level Group, supported by a "Sherpa" Group

  o Smart Cities and Communities Stakeholder Platform

- Time frame:

  o Strategic Implementation plan by October 2013

  o Launch Conference on 25-26 November 2013

  o Implementation phase until 2020

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EIP Smart Cities and Communities

- The European Innovation Partnership on Smart Cities and Communities (EIP-SCC)
  - combines Information and Communication Technologies (ICT), energy management and transport management and
  - endeavors to come up with innovative solutions to the major environmental, societal and health challenges facing European cities today.

- The aim is to come up with scalable and transferable solutions
  - to contribute to the EU's 20/20/20 climate action goals, and
  - to reduce high energy consumption, green-house-gas emissions, bad air quality and congestion of roads.

EIP Smart Cities and Communities

- The Partnership aims
  - o to overcome bottlenecks impeding the changeover to smart cities,
  - o to co-fund demonstration projects and
  - o to help coordinate existing city initiatives and projects, by pooling its resources together.

- The EIP-SCC ultimately looks to **establish strategic partnerships between industry and European cities to develop the urban systems and infrastructures of tomorrow**.
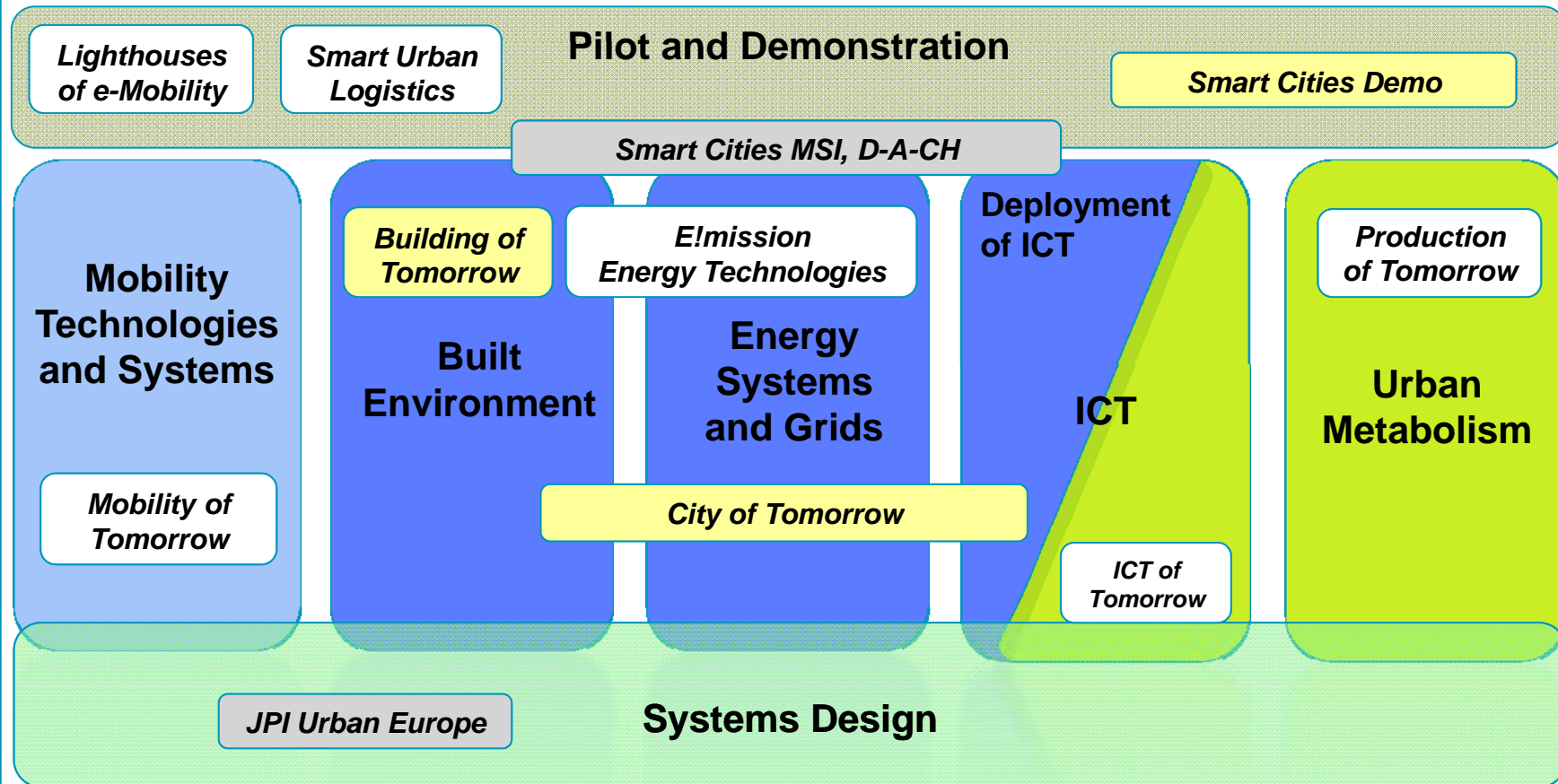
EIP SCC: High Level Group

- 22 Members invited „ad personam"

  o representing stakeholder groups

  o <u>not countries or sectoral lobbies</u>

- Stakeholders represented:

  o 12 - Industry

  o 8 - Cities, city networks

  o 1 - Member States Networks (JPI Urban Europe, SCMSI)

  o 1 - Research Networks (EERA)

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Austria

A Hot Spot for Smart Cities - Solutions

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Overview of Austrian Urban
RDI Programmes and Collaborations

Pilot and Demonstration

Lighthouses of e-Mobility

Smart Urban Logistics

Smart Cities Demo

Smart Cities MSI, D-A-CH

Mobility Technologies and Systems

Mobility of Tomorrow

Built Environment

Building of Tomorrow

E!mission Energy Technologies

Energy Systems and Grids

Deployment of ICT

ICT

ICT of Tomorrow

Production of Tomorrow

Urban Metabolism

City of Tomorrow

Systems Design

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Programme ... Austrian RDI programmes

Programme ... part of current presentation

Programme ... Transnational RDI programme collaborations

„From Zero-Energy-Buildings to PLUS-Energy-Buildings"

- **PLUS** strengthening technological leadership
- **PLUS** buildings as generators of energy
- **PLUS** from building to urban district
- **PLUS** from individual to pre- and series manufacturing
- **PLUS** visible demonstration projects
- **PLUS** intensified international networking
- **PLUS** know-how transfer and education

(documentation: http://tinyurl.com/hausderzukunft-technical-guide)

- **Wooden hybrid building with up to 30 stories**
    - 90 % reduction in CO_2 emissions regarding material
    - Reduced use of resources

- **Innovative prefabrication**
    - Short construction time, precision pre-fabrication
    - Low level of pollution during construction phase regarding noise and dust
    - Cost certainty
    - Minimising defect potential on site
    - Optional concrete core
      (required for Austrian building permit)

- **Energy efficiency and high quality of life**
    - Enabling efficiency from low-energy to passive house
    - Individual design of appartments, or offices
    - Good indoor air quality

Upgrade of building stock from the 60s to the 80s

Example: Renovation and upgrade of a 1960s building in Kapfenberg using pre-fabricated roof and façade elements, integrated building services, and grid coupling

- large prefabricated façade modules (active and passive)
- including windows and utility modules for heating and ventilation ductwork
- integrated active elements such as **PV modules, solar collector panels and honeycomb solar cells**

Copyright: AEE INTEC

- **200 m² of solar-thermal collector panels and up to 1000 m² of PV modules on façade and roof**
- renovation of building envelope in short time, independent of weather and without scaffolding, passive house quality (HED 11,50 kWh/m²a)

**Nineteenth century with a future**

Innovative modernisation of late nineteenth-century buildings

- **integrated system solution** for renovating nineteenth-century buildings with **80% reduction of energy use**
- to be implemented under the currently existing grant regime and replicated at reasonable cost
- inner sashes of traditional Viennese box-type windows replaced by passive house windows
- interior insulation including moisture-adaptive vapour barriers, HED: 20-30 kWh/m²a
- exterior insulation where possible
- central ventilation facility with heat recovery
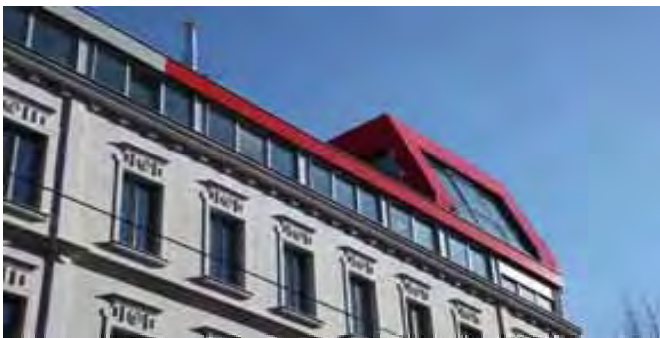
- **loft conversion** to passive house standard
- implementation below 10 % extra cost
- **renewable energy sources** integrated in façade: photovoltaic system and solar heating backup
- vacuum insulation around the terrace area to allow full accessibility, HED: 13,8 kWh/m²a

PLUS Energy Districts

From buildings to districts:

- **Solar orientation**
- **Smart Grids**
- **Traffic reduction & smart mobility**

Quelle: www.eco.at

aspern plus

Vienna's Urban Lakeside

- An urban district of 240 ha for 20,000 residents and 20,000 additional jobs to be created over the next two decades
- Open space and microclimate connected to district development
- Energy supply and consumption cross-linked within small districts
- Demonstration buildings as "lighthouse projects", e.g. aspern IQ
- Quality monitoring at planning stage, and central monitoring of energy consumption during operation
- Development and use of simulation tools for district planning

Copyright: www.aspern-seestadt.at

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The RDI program "Future Mobility"

- **The focus of the program is on**
  - o integrated solutions designed to help build the mobility system of the future
  - o a balance social, environmental and economic needs
  - o ensuring mobility while minimizing the negative impacts of transport

  by supporting technological, social and organisational innovations

- **Four central themes (innovation and technology fields):**
  - o personal mobility
  - o freight mobility
  - o Infrastructure technologies
  - o vehicle technologies

    www.bmvit.gv.at/en/innovation/mobility/index.html

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Future Mobility: Examples

"Shared Mobility" for more efficient car use and multimodal lifestiles

Challenge: Promote selective car use and multimodal mobility, ensure accessibility / affordability

Austrian Solutions and Impact:

- Integrated cars/e-cars/bike sharing concepts with public transport
- Safeguards mobility options without car ownership also beyond urban areas
- Social Innovations by fostering social networks and community building
- Replacement potential: Up to 15 private cars/shared car; CO^2 saving of 290kg/pers/year

➢ **Project „Caruso" for sharing private vehicles (www.carusocarsharing.com)**

Source: project "Caruso"; smart-phone application to reserve, schedule and bill rides

Future Mobility: Examples

Intelligent freight–logistics in urban areas

Challenge: CO^2-neutral Logistics by 2030

Austrian Solutions and Impact:

- Development of advanced indicators to describe the saving potentials of transport tours
- Routing Optimization by considering of traffic information and functional patterns of different services
- Saving potential up to 60%: e.g. 15% in distance, 10% in fuel consumption and emissions, 30% in costs

➢ **Example: „ILoS" – Optimizing freight-logistic routes in urban areas**
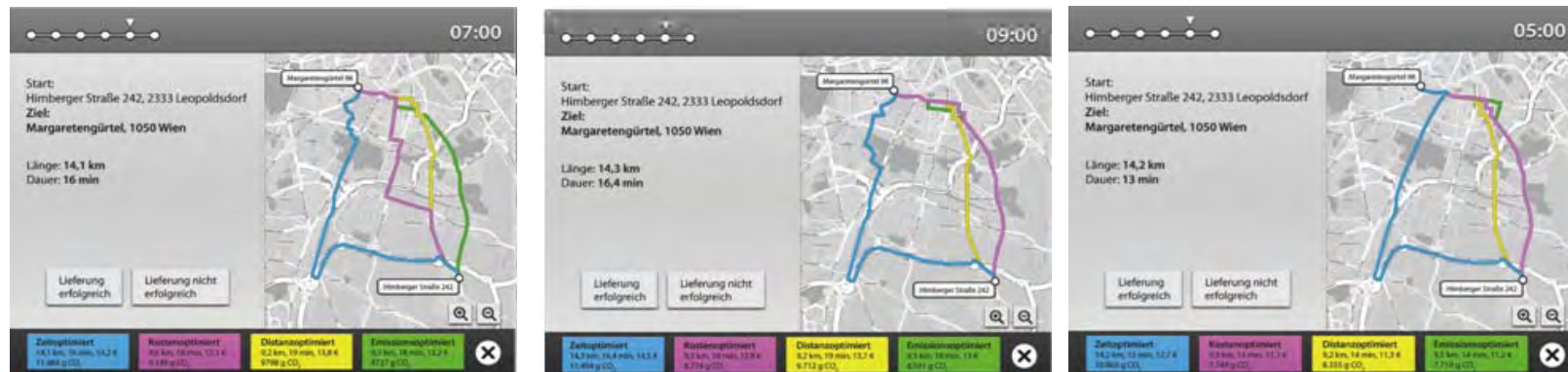
Future Mobility: Examples

Advanced Transportation Land Use Planning

Challenge: Design livable and inclusive urban environments for sustainable mobility

Austrian Solutions and Impact:

- Promote equitable use of public space (shared space concepts) with modeling/simulation
- Provide new decision support tools for Planners/Authorities/Citizens
- Develop new technologies and tools to support participatory planning processes

➢ **Project "MixMe" – Mixed Traffic Microsimulation Environment**

➢ **project „ways2gether" – Augmented Reality application for participatory transportation land-use planning**
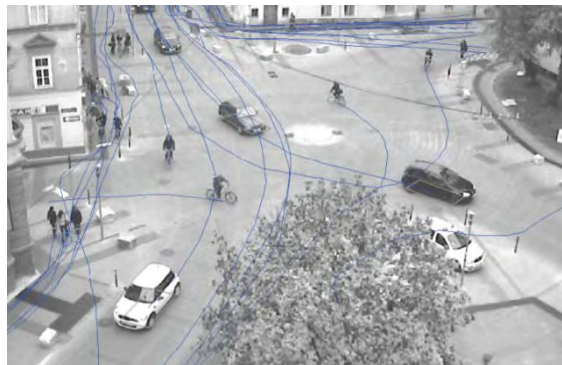
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