Frameworks
MORECO Tools for Planners and Mobility Actors

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1. Scope of the MORECO tools

What are the consequences of location decisions to commuting efforts and what are the environmental impacts? What about time expenditures and mobility costs? Can cost-benefit analyses of settlement structures influence sustainable spatial planning and mobility development? How is the resulting behaviour of the inhabitants?

These questions have often been discussed in various development strategies in the last time, e.g. spatial concepts or settlement development plans. The ÖREK 2011 answers the question of sustainable settlement development (ÖROK 2011, p. 57) by enhancing cost transparency and by introducing a cost-benefit analysis when assigning new building land. The necessity of building land control is also stated in the ÖROK Report “Spatial Developments in Austrian Urban Regions” (2009) mainly with regard to the problem of urban sprawl and dispersed settlement (ÖROK 2009, p.115ff).

Areas for action and objectives for a sustainable development in the mobility sector are mentioned on p. 158, including a more efficient usage of existing but under-used traffic infrastructures, avoiding an over-use of traffic infrastructure often resulting in heavy environmental impacts and a fair distribution of costs and benefits of the traffic system (→ paying contributions for traffic / transportation development). (ÖROK 2009, p.158f).

The Alpine Space project MORECO – Mobility and Residential Costs tries to support the solving of these mentioned problems. With the tools developed in the project awareness of the follow-up costs of different residential locations shall be raised – for citizens, who are looking for a building land, on the one hand, and for spatial and mobility planners, who are assigning new building land and are developing the traffic infrastructure, on the other hand. The integrative assessment of the settlement development and the mobility cost categories shall result in supportive measures for policy strategies and training tools in order to foster a sustainable settlement development and mobility planning.

The mentioned tools are used for better information. They provide a calculation of follow-up costs, like commuting costs, resp. time costs in general, for citizens looking for building land often outside urban centres. Furthermore the tools assist spatial planners and mobility actors in assessing potential building land regarding the accessibility and the connectivity to public transport.

The tool described on the next few pages is the one developed for spatial planners and mobility actors in order to gain a sustainable settlement development.

2. Intention of the tool for planners and mobility actors

The main focus of the tool to be developed is to support a sustainable settlement development, with a focus on mobility costs, mobility behaviour, or in more general with mobility aspects. For the tool-development geographical information systems, models, spatial indicators and geospatial data are used in order to create a decision support device.

The following points are important inputs for our henceforth generated models and tool:

- In the tool it is important to respect different scales. This fact is important in order to display
It is difficult to compare data transnationally, hence data harmonisation and also a data comparison between all pilot areas is not a goal of the project. Data shall be used, according to the lowest common denominators in order to keep data harmonisation efforts to a minimum.

It is interesting to show possibilities for analysis with different tools. In order to develop a functional and effective tool, several possible ways to analyse the regions regarding transport network, accessibility or development structures shall be used.

Support new cooperation forms with models and tools between public authorities and regional planning institutions.

A common data structure shall be developed in order to make data available and to make use of data for different application fields.

### 2.1. Application field 1: Regional Analysis

In this first part of the tool the aim is to show how indicators and information techniques can help to describe a region from an interdisciplinary point of view, to derive core indicators for further characterisation and to support a sustainable regional development.

Main focusses in characterisation topics and regional analyses are:

- Use of commuting data (describe and display merges and linkages)
- Use data from the traffic providers like Salzburger Verkehrsverbund, in order to find out about owners of annual tickets, degree of motorisation, modal split, etc.
- Cooperate with spatial planning institutions to make out the land consumption per inhabitant, service areas of S-Bahn axes for example, etc.
- Check demographic data like number of population, employees, unemployed, migration data etc.
- Price of different land use classes, especially with regard to building land
- Public transport accessibility, connectivity of different transport modes

For this part we may use existing data from several on-going or former EU-projects; a check of the necessary data for various cost calculation tools (Calculators Report) is necessary.

Additionally the findings of ÖREK 2011 (Spatial Development Concept) and the ÖROK-Accessibility Atlas are included in the analysis.

The output shall be a compilation of

- maps showing different aspects of accessibility and transport,
- diagraphs mainly to display the development of certain indicators,
- interpretation texts as support for maps and other visualisations,
- imaginable to produce indicator sheets for the most important, data descriptions to guarantee data exchange and interpretation among the partners.
Figure 1: Example of regional analysis: commuting flows in districts of Salzburg (F. Dollinger et al., 2011; visualisation: W. Spitzer 2011)

2.1.1. Indicatorset

(1) Path length / commuting network (commuting data, distances in min. and km → Isochrones) → EULE

(2) Demographic indicators (population development in past and future, households employment) → Demochange

(3) Land requirements / demand for building land / land consumption / density of settlement (land reserve, land potential) → ROB

(4) Accessibility (of bus/train stops, connection points of bus and train), proximity to public transport system, public transport quality → EULE, Checkliste?

(5) Quality of basic supply (including leisure facilities) with regards to the public transport offers / services → EULE, Checkliste?, PTS

(6) Fuel prices → mobility index (see therefore: Statistik Austria)

(7) Infrastructural development

(8) Mobility behaviour (annual tickets, public transport use, individual traffic, modal split, car density, offers of parking spaces, car ownership, degree of motorisation) → Salzburg AG

(9) Transport / traffic development (changes in individual traffic, changes of ways, maps of traffic jams, utilisation level of roads)
2.2. Application field 2: Settlement Assessment

The focus of this tool-part is to analyse settlement areas with regard to their suitability as residential locations and to support residential location decisions. Settlement assessment in this context is necessary for estimating distances between place of residence and infrastructural facilities, like local suppliers, schools, and kindergartens and to locate best possible locations, mainly regarding centrality, accessibility of transport networks and connectivity to public transport.

Another focus of this part is to assess settlement areas regarding their induction of mobility costs. A tool like the energy certification for settlements shall be developed with focus on mobility offers and follow-up costs.

In order to gain the proposed outputs geographical information and geospatial data is processed in a network analysis, in advanced spatial analysis or indicator based settlement assessment. The aim is to show how planning approaches in regions can be assisted or supported by former mentioned analyses in order to, for example, create as short ways as possible or to place facilities within walking distances. This shall help to assign building land which is best connected to the public transport, and to locate missing supply facilities in central and well accessible locations. In this context bus and railway stations have to be analysed as well as street networks and crossing places, which can be incorporated via Open Street Map. Next to textual descriptions the following ArcGIS models are developed:

- Settlement assessment and assessment of residential locations concerning distances to local supply, kindergartens, schools, etc. via a set of spatial indicators → target groups = public, subsidy service points
- Assessment of settlement areas under consideration of public transport qualities (accessibility, frequency …) via network analysis → target group = spatial planners, mobility actors, public
Additionally a simplified Excel tool is developed in this part and if possible integrated into a GIS model. This tool will at first be implemented for the regional association of Salzburg and the urban hinterland. It will show a rough assessment of settlement areas concerning connectivity to public transport and related expenses. The Excel tool is a possible refinement resp. adaption of the energy certification for settlements (Emrich - “Energieausweis für Siedlungen”) with emphasis on mobility and accessibility assessments of different existing or planned residential locations.

Figure 2: Example of a settlement assessment per raster cell (50m) – with regard to public transport (D. Schnuerch, 2011)

Figure 3: Example of an existing Excel tool (Emrich Consulting, 2009; visualisation: D. Schnuerch, 2011)

Application field two will cover
- calculation of indicators
- assessment of settlements and settlement development
- visualisation of results in demonstrative maps
- calculation of scenarios showing the future development of indicators

Raised questions in this context are still:

- Which aspects are important to be analysed with indicators, especially in the Alpine Space?
- Is a linkage of the Excel tool to GI systems necessary or even possible for calculating and visualising?

### 2.2.1. Indicator sets

1. Assessment of settlement structures regarding distance to public transport stops, basic (daily) suppliers, kindergartens → Checkliste, Wohnstandortbewertung
2. Assessment concerning public transport connection / accessibility → EULE, PTS
3. Integration of scenarios (development of households, commuting distances, fuel prices → dynamic linkage?) with possible individual fuel price entries and a forecast of public transport ticket prices development
4. Assessment tool similar to “Energieausweis” as a GI toolbox; important = interface between modelling and cartography)
5. Assisting the assignment of building land and location decisions

### 2.3. Application field 3: Mobility Planning

This part deals with accessibility analysis of settlement areas. The aim is the protection and sustainable development of settlement and mobility systems to guarantee an efficient, socially and environmentally friendly mobility of people. The main factors therefore are reliable and affordable public transport systems.

The potential of urban centres concerning all day mobility lies in linking short ways, which best connect various locations of the all-day life, like residence, working place, facilities, education and leisure time. It becomes more and more important to organise the urban traffic the way that it serves various used-demands and mobility needs.

The goal is to show how population data, data of basic supply, land use concepts, etc. can be used to adapt the public transport to the actual demand and the settlement development in a more efficient way.

- In this context the basic analyses can be built upon the EULE project outputs
- Provision of guidance with maps, diagraphs, interpretational texts, case studies (e. g. Lokalbahn Salzburg).

The objectives of this third tool part are mainly

- To support short ways for public transport accessibility and good connectivity
- Show potential and demand for further connectivity to public transport, like additional public transport stations
Figure 4: Example of sustainable mobility planning: population within a certain distance of public transport stations – potential and demand analysis (T. Prinz et al., 2011)

What could be possible further developments in this realm?

Short-time measures could be new offers from public transport services, e.g. car-sharing offers, bike-rentals, vehicle sharing. The traffic peaks in the morning and the late afternoon can be diminished by a staggered arrangement of schools starting their classes in the morning or flexible working models. Also companies can contribute by supporting an internal mobility management, e.g. fostering different mobility offers to be utilized more intensively, supporting environmentally friendly transportation modes, for example by weatherproof bike parking places, Job tickets for the public transport system, car-sharing etc.

2.3.1. Indicatorsets

(1) Sustainable connections between residential location, working place, schools, kindergartens, leisure facilities etc. Unterstützung bei Haltestellenplanung und ÖPNV Angebotsplanung

(2) Foster short ways

(3) Planning tool for Decision Support → EULE, Accessibility potentials

(4) Assessment of public transport stops: service area, accessibility potential, potential number of users (walking distance)

(5) PTS service tool, planning of public transport stops in connection with modal split

(6) Make explicit deficiency areas where individual traffic is high, public transport is low.

(7) optional: Web Tool (PTS)
3. Bibliography


