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DG Research

PROPOLIS, indicative list of urban sustainability indicators

COMPONENT		THEME	INDICATOR
	Environmental	Air pollution	greenhouse gases from transport and land use acidifying gases from transport and land use Organic compounds from transport
		Consumption of natural resources	consumption of mineral oil products, land use and transport land coverage consumption of construction materials
		Environmental quality	indicator addressing microclimate potential for biodiversity quality of open space
	Social	Health	exposure to particulate matter from transport in the living environment exposure to nitrogen dioxide from transport in the living environment exposure to traffic noise traffic deaths traffic injuries
		Equity	justice of distribution of economic benefits justice to exposure to particulates justice of exposure to nitrogen dioxides justice of exposure to noise segregation
		Opportunities	total time spent in traffic level of service of PT and slow modes vitality of city centre vitality of surrounding region accessibility to city centre accessibility to services accessibility to open space employment effects
	Economic indicators	Total net benefit from transport	transport user benefits transport operator benefits resource costs external costs investment costs
		Total net benefit from land use	user benefits operator benefits resource costs external costs
		Regional economy and competitiveness	

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For more information, see www.ltcon.fi/propolis

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PROPOLIS (Planning and Research Of Policies for Land Use and Transport for Increasing Urban Sustainability) *is a 32 months research project within the Fifth Framework Programme of the EC. It belongs to the Thematic Programme "Energy, Environment and Sustainable Development" and its Key Action "City of Tomorrow and Cultural Heritage". It is funded by DG Research and national organisations from six countries Finland, Germany, UK, Belgium, Italy and Spain. The project started 1.1.2000 and will be completed by autumn 2002.*

Abstract

The objective of PROPOLIS is to research, develop and test integrated land use and transport policies, tools and comprehensive assessment methodologies in order to define sustainable long term urban strategies and to demonstrate their effects in European cities.

The work is executed through developing a set of indicators measuring the environmental, social and economic components of sustainability. Values for these indicators are calculated using enhanced urban land use and transport models and new GIS and Internet based modules. A decision support tool is used to evaluate the sets of indicator values in order to arrive at aggregate environmental, social and economic indices for the alternative policy options. To include the long run land use effects a time horizon of 20 years or more is used.

In close contact with Client-Partners and international networks the system is used to systematically test and analyse policy options in 7 European cities in order to arrive at optimum combinations of different policy types (land use, transport, regulatory, investment, pricing and fiscal measures).

General recommendations for European cities are made based on the analysis of the policy testing together with city specific demonstrations of their effects. These effects address important issues, such as CO2 emissions, energy use of transport and land use, employment, regional economy and competitiveness, biodiversity, justice of the distribution of impacts, opportunities of people, exposure to noise and pollutants etc.

The innovations of the project are related to the integrated and comprehensive approach. The approach is also likely to produce innovative policy recommendations as the system is able to reveal the interactions and multiplier effects by following the impact chains in the system.

The results include evidenced strategies for improved sustainability, for instance a radical reduction of urban pollution and congestion.

Objectives

The goal of PROPOLIS is to research, develop and test integrated land use and transport policies, planning tools and comprehensive assessment methodologies in order to define sustainable long-term urban strategies and to demonstrate their effects in European cities.

To reach this goal the project develops a comprehensive and integral framework of methodologies, including integrated land use, transport and environmental modelling, indicator, evaluation and presentation systems.

The more detailed goals and ways to achieve them are presented below.

To develop further the theory of urban transport and land use systems by:

- developing the feed-back link from environment to land use and transport in order to have fully integrated *urban land use, transport and environmental models*
- developing and adapting recent studies and *theories concerning economic evaluation* in land use/transport models

To develop the planning and assessment methodologies further by:

- introducing *new essential key indicators* addressing, for example, employment, regional economy, biodiversity, accessibility, microclimate and total energy use by the land use and transport systems
- developing an *internet-based analysis tool to facilitate inter-city comparisons* and by improving access to results/information for the wider user community.
- *automating the data flows between different modules* in order to have a more efficient tool for policy testing
- developing and testing the *evaluation methods through a decision support tool*, which is developed in close contact with Client-Partners, to be more user-friendly and transparent.
- *developing the overall framework* to be more general and open for different types of models and by producing data on different indicators for benchmarking purposes.

To execute a policy testing process in 7 European urban regions by:

- *using the knowledge already gained* from the numerous tests made in the case cities and by concentrating on the most promising ones
- *executing a systematic process* of policy testing including innovative policies and their combinations
- studying, as a priority, the definition and the application of an *optimum level of pricing, its combinations with other policies and the long-term land use effects.*

To search for optimum policy combinations for each of the case cities and to demonstrate their effects.

PROPOLIS case cities

To analyse the test results in order to define general urban strategies, to demonstrate their effects in the case cities and to aim for generalised conclusions that are not dependent on the test cities nor the models used by:

- using a variety of different state of the art urban land use and transport models
- using a variety of different types of test cities
- using exactly the same indicators for each city to measure the effects in order to have comparable results

To identify policy packages that are likely to achieve the following goals, among others, without compromising economic efficiency and social sustainability (compared with the base scenarios):

reduction of greenhouse gases from the urban land use and transport system	*>20 %*
reduction in energy use of the urban transport system	*>20 %*
reduction in traffic accidents	*>15 %*

These policy packages are likely also to *reduce urban pollution and congestion while, at the same time, ensuring accessibility and mobility.*.

To establish close contacts with the policy and decision makers and users of the system

To adopt an effective dissemination and exploitation programme during and after the project

Points of departure

Urban sustainability

Sustainable development is usually viewed as consisting of three dimensions: Environmental and ecological, Socio-cultural and Economic

PROPOLIS will build on this theory, although problems with detailed interpretation of the above dimensions exist.

Indicators

Indicators will be used to measure the above three dimensions of urban sustainability.

Special demands that the PROPOLIS indicators have to fulfil include:

- They should measure relevant aspects (without overlapping) of sustainability and have a sound theoretical background.
- The project has to be able to forecast the indicator values into the future. This is an essential difference compared with monitoring indicators.
- The indicators, to be relevant in PROPOLIS context, should be policy sensitive.

Models and Tools

The project builds on state-of-the-art urban land use and transport models. In addition, a number of other models will be adapted including emission, dispersion and exposure models. For certain indicators new models have to be developed during the project, addressing land consumption, biodiversity, energy use in buildings, economy etc.. Geographical space is the common factor linking the different levels, scales and stages of analysis.

Assessment

PROPOLIS will use both cost-benefit and multicriteria analysis methods. The economic index value for the economic component of sustainability will be based on cost benefit analysis but the environmental and social dimensions of sustainability are measured using multicriteria analysis. The assessment will take place using an existing decision support tool to be enhanced to meet the needs of group decision making, coping with uncertainty and citizen's involvement through internet application.

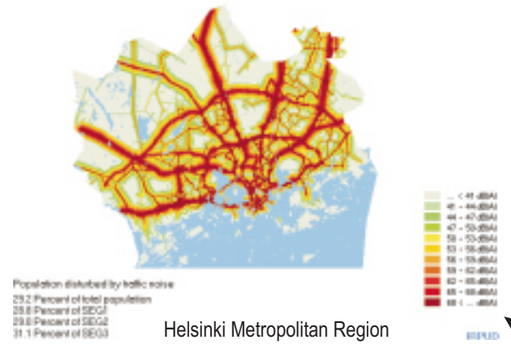
Policies and Policy testing

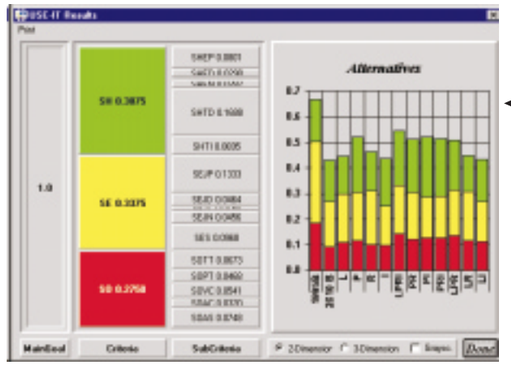
Potential policy options are defined using the external and national networks of the project. Special emphasis is on policies, which have been implemented with success in Europe.

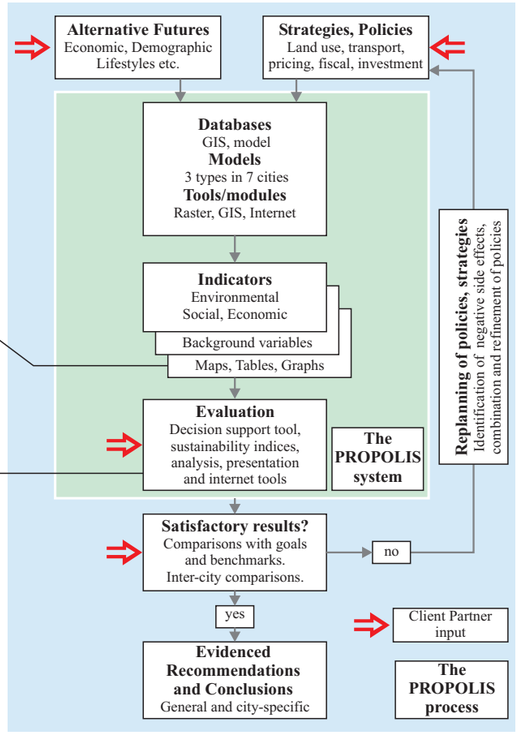
Part of the tests are the same for all test cities. However, as every city is individual the best policy combinations are likely to differ. This is why optimum policy combinations are sought also separately for each city.

The PROPOLIS approach, process and system

The PROPOLIS approach, process to define urban strategies and the system used aiming at policy assessment is illustrated in the figure below.







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