

Writers

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## Trends and Indicators for Monitoring the EU Thematic Strategy on Sustainable Development of Urban Environment - TISSUE

### 1 Introduction

Within the 6<sup>th</sup> Environment Action Programme, the Commission will develop a Thematic Strategy on the Urban Environment. The work will include the development of appropriate indicators and other monitoring tools to assess the effectiveness of the strategy. This task was taken as a premise for the 6th framework project **TISSUE**, which started in the beginning of 2004.

**TISSUE** belongs to the programme area Integrating and Strengthening the European Research Area and to the activity titled as Policy Support and Anticipating Scientific Technological Needs. **TISSUE** collects research organisations from seven European countries including VTT (Finland), TNO (the Netherlands), UNN (the UK), CSTB (France), Ambiente Italia and ISIS (Italy), ECONCEPT (Switzerland) and CEI (Czech Republic). In addition, five organisations representing the cities and local municipalities are members of the project. These include the ICLEI Europe, REC (The Regional environmental Center for Central and Eastern Europe), EURO CITIES, CEMR and the Union of Baltic Cities. VTT works as the coordinator of the project.

### 2 Objectives of the TISSUE project

TISSUE will evaluate whether the information that can be received with help of existing indicators will be adequate to monitor the Strategy or whether further indicators should be developed. The objective of the TISSUE project is to

- **analyse demand and define appropriate trends** which should be measured to properly determine progress towards sustainable development of the urban environment at local level;
- **carry out comparative research on existing sets of indicators to determine** whether they: i) are able to provide the information needed to monitor developments at the different local levels on the trends identified in the first step; ii) can be used to assess trends at the EU level; iii) their implementation is viable;
- **define the set-up needed for a harmonised set of indicators** and for effectively utilising the information from existing indicators and make **recommendations** for further research; **analyse the conditions how to increase the acceptance of harmonised sets of indicators through Europe and motivate the cities to use them.**
- **collect indicators and structure the indicators into a database.**

The indicators to be considered are urban environment indicators in use or being developed at EU level (e.g. European Common Indicators, Urban Audit), national level in the 15 EU member states and associated countries, and at regional and/or local level in use across EU.

**TISSUE** will make recommendations about the usability and usefulness of different sets of indicators. This will be assessed from the following points of view: (1) how these indicators serve for monitoring the sustainable progress and the effectiveness of undertaken actions at different levels (neighbourhood, city, local-regional, state) (2) what is the methodological level of indicators

enabling the rightful comparisons, (3) what is the need of common indicators versus specific indicators which consider area-specific premises, (4) what are the needs for further development to serve for the stated needs of the Commission.

### **3 TSUE related trends**

TISSUE has started its work by analysing the sustainable-urban-development related trends. The work started on the basis of the documents related to the preparation of the thematic strategy on urban environment. The thematic strategy on the urban environment (TSUE) is a tool with help of which the Community aims at realisation the goal of sustainable development of cities and high quality of life for Europe's urban citizens. TISSUE considered the work done by the Expert Group and the four Working Groups on Sustainable Urban Management (SUM), Sustainable Urban Design (SUD), Sustainable Urban Transport (SUT) and Sustainable Urban Construction (SUC) as well as the Communication "Towards a TSUE" given in February 2004.

TISSUE has concluded that with regard to sustainability indicators the intended key issues should be assessed on the basis of the following type of indicators:

- sustainable urban management:  
indicators that express the efficiency of doing things, availability of information, access and participation of citizens and others involved. According to the EEA terminology (Report 25, 2000), these can be called as descriptive/response indicators.
- sustainable urban transport:  
indicators that express the efficiency of using resources and the environmental efficiency of products (vehicles), indicators that express the state of the society with regard to freedom of movement, availability and usability of public transport and non-motorised transport, also indicators that express the efficiency of actions and decisions (response-type of indicators according to EEA terminology).
- sustainable urban construction:  
indicators that express the environmental and economic efficiency of products and building and the efficiency in using resources, indicators that express the performance and cultural value of buildings and built environment, also indicators that express the participation of all actors involved.
- sustainable urban design  
indicators that express the ecological quality, efficiency in the use of resources and the efficiency in resource use planning, indicators that express the quality of design (assessed on the basis of indicators like accessibility, density, the level of mixed land use, maintaining cultural value).

The intended issues deal very much with environmental aspects. Sustainable urban construction is the part of the four themes that most addresses the economic efficiency and competitiveness as part of sustainable development. Sustainable urban transport and design also address the efficiency in supporting inclusive economy. The social aspects emphasised mainly deal with access, participation of all actors involved, availability of information, freedom of movement and the respect of cultural heritage. In addition to these aspects, the themes also address the performance of built environment for example in terms of attractiveness, durability, accessibility, comfort and healthy aspects.

### **4 TISSUE typology for sustainable urban development related trends and indicators**

A "trend" can be defined as a general direction or tendency in which something tends to move or to change. The TISSUE projects speaks about concerns, trends and indicators. The relationships between concerns, trends and indicators are such, that one or more trends can be attributed to

every concern and each trend can be linked with one or more concerns. Similarly, there can be one or more indicator(s) attributed to each trend, and each indicator can be linked with one or more trends:

**TSUE concerns Relevant trends Indicators**

**TISSUE** has preliminary outlined the SUT, SUC and SUD related basic trends that cause pressures on the environmental change and - on the other hand - express the attempts to avoid irreversible changes:

<b>SUT related P trends</b>
Transport demand
Accessibility, transport quality
Affordability
Generally, travel costs for private and public transport, as well as freight transport costs are increasing.
Transport safety
Vehicle park
Public Transport System Quality
New Transport Technologies
Modal split
Traffic Volume
Traffic circulation, congestion
Infrastructure
Parking and (un)loading facilities in inner cities
<b>SUC-related P trends</b>
<b>Environmental impacts and consumption of resources</b>
Energy efficiency of buildings
Usage of renewable energy sources
Water consumption and water management in buildings
Recycling, sorting out and minimising the amount of construction waste
Minimising the soil-sealing and the take-off from the earth-crust
Access to information, environmental declarations of building products
<b>Health, comfort and safety in buildings and settlements</b>
Indoor air quality and micro climate in built environment
Noise reduction during and after the construction
Avoidance and prevention of health risks
Safety and security of residents
<b>Adjustment of building stock to socio-economic changes</b>
Accessibility and barrier-free use for the elderly, disabled and other groups with special needs
Availability and affordability of housing
Individuality, client orientation and new services
Utilisation of ICT for control, information and comprehensive management of environmental performance of buildings
Adaptability, maintenance and renovation of buildings
<b>SUD-related trends</b>
<b>Land use trends</b>
Car dependency
Consumption of land and space
Urban sprawl and suburbanisation
Decreasing accessibility of basic services and facilities
<b>Urban design trends</b>
Densification, compact city strategies
Mixed-land use
Short-distance and public transport oriented development
Balanced development of green-field and brown-field areas
Availability and accessibility of green and open space
Attractiveness of city centres and amenity of streets and neighbourhoods
ICT-contribution to sustainable design of cities and communities

## 6 SUD, SUT and SUC related trends

### 6.1 Sustainable urban design related trends

Sustainable Urban Design (SUD) is one out of four fields of concern of the Thematic Strategy on Urban Environment (TSUE), and it is strictly related to the concept of Sustainable Urban Land Use. Therefore, the Sustainable Urban Design priority covers both the main land use trends – growing car dependency, consumption of land and space, urban sprawl and sub-urbanisation, decreasing accessibility to basic services and facilities - and the strategies which are the main responses to the unsatisfactory land use trends, and can be classified under the general heading of “sustainable urban design”.

**Land use trends** include:

- Increasing role of the car in shaping the urban form (car dependency)
- Increasing consumption of land and space
- Increasing urban sprawl and suburbanisation
- Decreasing accessibility to basic services and facilities

**Sustainable urban design strategies** include:

- Increasing attention to poly-centric and mono-centric strategies, densification and clustering of settlements (“compact city strategies”)
- Mixing of land uses
- Increasing attention to walking, cycling (“short distance”) and public transport oriented development at the neighbourhood, city and urban region levels
- Balanced development of green-field and brown-field areas
- Increasing attention to availability and accessibility of green and open space
- Increasing attention to the attractiveness of city centres and amenity of streets and neighbourhoods
- Increasing role of Information and Communication Technologies (ICT) in the design of sustainable cities and communities

The former may be considered as fundamental negative pressures on the environment, while the latter are important policy responses that should be considered as favourable trends counteracting urban sprawl and the other unfavourable land use trends.

### 6.2 Sustainable urban transport related trends

Sustainable Urban Transport (SUT) is also one of the four fields of concern of the Thematic Strategy on Urban Environment. Generally, the SUT-related trends concern the freedom of movement, environmental efficiency and the ability to support inclusive economy.

TISSUE has outlined the SUT-related trends as follows:

- **Transport demand**  
Total demand for passenger and freight transport shows a rapid increase, especially in terms of distances covered
- **Accessibility, transport quality**  
Generally, accessibility tends to increase as a result of general system improvement. However, due to growing transport demand on a limited space, accessibility deteriorates at certain places and times. Due to growing car dependency and decreasing public transport quality, accessibility deteriorates for non-car users. The latter is a relevant aspect already mentioned as land use trend

- **Affordability**  
Generally, travel costs for private and public transport, as well as freight transport costs are increasing.
- **Transport safety**  
Due to growing transport demand, transport safety will deteriorate, unless an effective safety policy is carried out.
- **Vehicle park**  
Growing car ownership leads to increased car use (with all kinds of positive and negative impacts), and growing car dependency. The bicycle could be an alternative for car use.
- **Public Transport System Quality**  
Investing in the quality of public transport leads to decreasing car dependency and a better accessibility of inner cities, with positive impacts on economic development. Offering good P+R facilities can diminish the pressure on the urban road network,
- **New Transport Technologies**  
Investing in new engines, intelligent transport systems and travel information systems leads to positive impacts on system quality, efficiency and environment.
- **Modal split**  
Due to growing travel distances and growing car dependency, the use of the private car increases, in the disadvantage of public transport, bicycle and walking.
- **Traffic Volume**  
Due to growing transport demand, the traffic volume (the amount of vehicles in circulation) increases.
- **Traffic circulation, congestion**  
Rising traffic volumes lead to growing pressure on the infrastructure capacity available. When congestion occurs, this leads to delays with all its negative impacts. Congestion tends to shift from urban roads to main roads leading to the city
- **Infrastructure**  
Generally, building new infrastructure in urban areas is very expensive and in many cases it is not favourable from environmental point of view.
- **Parking and (un)loading facilities in inner cities**  
Parking and (un)loading facilities in inner cities become growingly scarce.

### 6.3 Sustainable urban construction related trends

The Sustainable Urban Construction (SUC) related trends are linked with the environmental changes, health related risks, changes that happen with regard to the European people like aging and increasing mobility, changes in the behaviour of consumers and changes in the business environment. These include the following trends:

- **Environmental pollution and consumption of resources**  
The changes in the environment and the increasing threats especially with regard to climate change, pollution and decreasing bio-diversity causes increasing requirements for building and all industrial sectors. The quality of life suffers increasingly from the changes in the environment and the related threats. Thus there is an increasing pressure towards energy efficiency of building, making use of renewable energy sources, decreasing water consumption, sustainable products and environmental declarations, minimising, sorting out and recycling the household wastes and wastes from building site, efficient maintenance and management of buildings.
- **Health and comfort**  
Growing number of people suffer from allergic reactions and discomfort because of particles and harmful emissions in outdoor and indoor conditions. Increasing share of people in urban

environments suffer from disturbing noise. There is an increasing pressure towards improved indoor climate, less noise and risks.

- **Aging.** Disabled and other special groups of users of buildings.  
The average age of people in Europe is increasing and the share of the elderly is growing. A willingness to take into account the needs of disabled and other special groups can be distinguished. There are increasing requirements for barrier-free use and accessibility.
- **Mobility.** Changes in the living standard  
The mobility of people in Europe is still increasing. There will probably be a rapid increase in the standard of living in the new member countries of the EU. There is an increasing concern about the availability of housing and buildings.
- **Business environment, productivity**  
The real estates can be seen as part of an investor's portfolio. More and more, the driving force for all activities is the return on capital and the attractiveness of investment. New services has to be developed in order to ensure the high utilisation rate of real estates and the increasing value.
- **Individuality and client-orientation**  
The development is towards increasing emphasis on individual solutions, products and services. An increasing willing for client-oriented products and services can be distinguished.
- **Age of building stock**  
The average age of housing and building stock in the European cities is growing. Thus there is a growing need to refurbish and renovate buildings, to ensure the adaptability of new buildings and to develop methods of efficient maintenance management of buildings.
- **Technological and information and communication technological development**  
There is a rapid development going on in technology and information and communication technology. This offers improving possibilities to improve the efficiency of building process and improve the quality of buildings.

## 7 How to get a harmonised set of indicators

This section of the paper presents the approach that TISSUE intends to follow to set-up a harmonised set of indicators and to promote acceptance and use of this harmonised set in the cities throughout Europe.

What is presented is still a preliminary draft of the strategy to produce such a harmonised set of TSUE related indicators, which will be discussed in the occasion of the 2<sup>nd</sup> TISSUE Workshop with representatives of the main European city networks, planned for the next 22 June in Brussels.

The aim of the harmonised set is ambitious: to provide the European Commission and the cities in Europe with a reference set of indicators to monitor the development and impacts of the TSUE strategy in the years to come. However, to develop a harmonised set of indicators is a difficult task for technical and practical reasons which may limit the consensus, acceptance and use of a common set of indicators. In order to be useful, the same set of indicators needs to be used for a long time to allow tracing changes in trends.

In the first stage TISSUE provided an outline of trends that should be considered in relation to the Thematic Strategy on the Urban Environment. This was described in the previous section of the paper.

Secondly, TISSUE is now performing a review of the existing sets of indicators at international, national as well as on local/regional level. TISSUE will assess the available indicators from the

view-point of suitability for measuring the trends related to the TSUE. The indicators of concern cover the following areas:

SUT related indicators	Indicators of transport-related environmental pressures Indicators of transport demand trends Indicators of transport supply
SUC related indicators	Indicators of building related environmental pressures Indicators of quality of the built environment for the users (health, comfort, safety of users and occupants) Indicators of social quality of the built environment (availability, affordability, accessibility, involvement of all concerned etc.)
SUD related indicators	Indicators of land use trends Indicators of urban design strategies
Urban environment indicators	Indicators of availability of resources (bio-diversity, energy, water, land, materials) Indicators of resource consumption (energy, water, land, materials, food) Indicators of emissions to air, water, soil Indicators of management of resources (including waste collection and recovery)
SUM related indicators	Indicators of existing resources, cooperation and institutions of urban management Indicators of implemented measures and policy integration Indicators of perceptions, attitudes and behaviour

Systems and corresponding Indicators are first collected into the TISSUE data base. The systems will be characterised with help of the following information:

- Name
- Description and aims
- Developer (name and type)
- Area of application
- Main focus
- Users

Correspondingly, the indicators are characterised with help of the following information:

- Name
- Definition
- Trends measures
- Collection methods

The TISSUE review of indicators is expected to point out for each trend:

- 'theoretical' indicators that can be applied to measure the stated trends (based on the theory or methodologies suggested by international indicators programmes, e.g. UN Habitat, UN Sustainable Development, OECD, WHO, Healthy cities etc.);
- existing empirical indicators in use in international, national or local systems of urban indicators.

On the basis of the analyses, TISSUE will define the set-up needed for a harmonised set of indicators and summarise the conditions how to increase the acceptance of harmonised sets of indicators through Europe and motivate the cities to use them.

## 8 Problems concerning the adopting of the harmonised set of indicators. Future plans.

The problem is “how to get a harmonised set of indicators that the European cities will be stimulated to use?” The answer is not to develop a uniform set of common indicators that must be used by all the cities, because this will hardly be acceptable for everybody at least in the short term. A different strategy is possible and it will be suggested by the TISSUE project.

A possible strategy in the short term is to allow the cities to maintain their current indicators while offering a possibility to join the clusters of users of sustainability indicators. The added value would be to make the average results of these clusters visible with help of the TISSUE data base – showing how many cities use the various types of indicators. Provided that a cluster is consistent enough there will be the possibility to produce meaningful comparisons within the clusters of cities adopting the same indicators.

Moreover, the cities which have adopted “minority” indicators may decide to shift to the most popular indicators, if they see the benefits in doing so (e.g. to allow a wider comparability with other cities). The possible final result of this strategy will be a self-selection of TSUE related trends indicators operated by the cities themselves.

TISSUE data base could be later on made use of in such a way that it forms a platform of comparing and developing common indicators. The data-base should include a questionnaire to enquire what indicators the cities are using from the list provided by TISSUE, and if there are any difference in the calculation methods (data used, formulas etc.) as compared with the standard method proposed in the data-base. The cities might also signal totally new indicators, that may be validated and added in the TISSUE data-base. Within certain limits, based on the information provided by the cities, it would be possible to harmonise the indicators of the same type.

Benchmarking would be meaningful only within the groups of cities using the same type of indicator, and the system would become more and more reliable while the number of cities joining the cluster would grow in the future. To make the benchmarking more effective and the comparisons easier, the single indicators – each having a different unit of measure – should be standardised and normalised as scores. The scores per se have no more the meaning of the original indicator, they are only ordinal measures that let us know if the performance of a city is above or below that of other cities in the same cluster.

TISSUE is going to develop the data-base of TSUE related indicators, which could be used for the kind of benchmarking exercise described above. However, the actual benchmarking activities are beyond the possibilities of TISSUE.

The added value of an European benchmarking exercise would be high: the single cities would benefit from adopting more consolidated indicators and methodologies, and comparing their performance with those of other cities, and not only with the past records of the city history. They could discover, for instance, that they are positioned well on some indicators and bad on others, and possibly decide to change priorities.

One possibility would be to require that any forthcoming system benchmarking the TSUE related trends, would be able to achieve a confidential report for the end users, which shows the level of the city in comparison to the average of other cities in similar conditions and adopting similar indicators. These reports would be produced automatically based on a self-assessment process in which cities were asked to fill in at regular intervals questionnaires where they can specify the

values and other characteristics of the TSUE related indicators in use in the cities. This information could be then elaborated and returned to the cities in the form of a managing report showing, for instance, the percentiles achieved by the city with regard to the different urban indicators. A similar self-assessment approach has been promoted recently by the LASALA project, with the aim to compare the performance of the Local Agenda 21 processes in the different cities of the LASALA network.

## 9 Summary

The overall goal of the TISSUE project is to analyse trends which should be measured to properly determine progress towards sustainable development of the urban environment at local level; to carry out comparative research on existing sets of indicators; to define the set-up needed for a harmonised set of indicators; to analyse the conditions how to increase the acceptance of harmonised sets of indicators through Europe and motivate the cities to use them and to collect indicators and structure the indicators into a database.

TISSUE project has started its work in the beginning of 2004 and the final report will be ready in the beginning of the next year. TISSUE will make recommendations about the usability and usefulness of different sets of indicators. This will be assessed from the following points of view: (1) how these indicators serve for monitoring the sustainable progress and the effectiveness of undertaken actions at different levels (neighbourhood, city, local-regional, state) (2) what is the methodological level of indicators enabling the rightful comparisons, (3) what is the need of common indicators versus specific indicators which consider area-specific premises, (4) what are the needs for further development to serve for the stated needs of the Commission. When formulating recommendations, TISSUE will also pay attention that the acceptance and implementation readiness of the cities are among the main bottle-necks and problems for the common usage of urban environment indicators.

The preliminary outcomes of the project include the analysis of Sustainable Urban Design, Construction and Transport related trends and concerns. TISSUE has also developed a web-based browser, with help of which urban sustainability indicators are now collected and outlined according to their characteristics.

