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Strategic Research Framework in the Field of Urban Sustainability

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SIXTH FRAMEWORK PROGRAMME

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List of Abbreviations

CIVITAS	CIty-VITAlity-Sustainability on cleaner and better transport in cities
CONCERTO	EU FP7 initiative on developing and demonstrating strategies and actions on energy efficiency at local level
DG	Directorate-General - government department in the institutions of the European Union
DG EAC	Directorate-General Education and Culture
DG REGIO	Directorate-General Regional Policy
EC	European Commission
ECCP	European Climate Change Programme
EQUAL	EU Programme on testing new ways against discrimination and inequalities for working life
ERA	European Research Area
ERA-NET	European Research Area Network
ERDF	European Regional Development Fund
ESDP	European Spatial Development Perspective
ESF	European Social Fund
ESPON	European Spatial Planning Observation Network
EU	European Union
EUKN	European Knowledge Network on transfer of research results
EURA	Networks of research organisations
FP7	European Research Framework Programme 7
GHG	Greenhouse Gases
ICLEI	Local Governments for Sustainability
INTERREG	EU Programme on Interregional Cooperation
IPCC	Intergovernmental Panel on Climate Change
JEREMIE	Joint European Resources for Micro to Medium Enterprises
JESSICA	Joint European Support for Sustainable Investment in City Areas (EC financing instrument)
LIFE	EU financial instrument supporting environmental and nature conservation projects
LPIS	Land Parcel Identification System
NGO	Non Governmental Organisation
R&D	Research and Development
SDS	EU Sustainable Development Strategy
SRA	Strategic Research Agenda
UNEP	United Nations Environment Programme
URBACT	EU Programme for Sustainable Urban Development
URBAN	EU Programme on innovative, integrated development models in urban areas
WMO	World Meteorological Organization

0 Executive Summary

Today, more than half of the world's population, (c. 3.3 billion), lives in towns and cities, a number expected to rise to almost 5 billion by 2030. As unprecedented urban growth is accompanied by comprehensive risks, it counts among the most important socio-political challenges.

Yet urban areas are not merely problem-producers, they also offer significant potential for solutions. Well-functioning cities are a decisive prerequisite for the economic development of a country and key to societal well-being. The dense cohabitation of people must be organised so that: cities remain habitable; traffic networks function; environmental problems are avoided; the use of valuable resources is reduced and the provision of electricity and water is assured for all inhabitants. What are the right visions, principles and models for achieving this?

To foster urban areas which are liveable in the long run they have to be economically, socially and ecologically sustainable. That means cities have to become sustainable cities meeting the needs of the current generation without compromising the abilities of future generations.

Compared to other urban models in the world, the ‘European City’ holds advantages based on compactness, functional structuring, citizenship and the comparatively good preconditions for sustainable development. This model provides a good base to build upon.

Sustainable cities need investment: investment; of finances, investment of political and civic commitment and additionally investment of knowledge that is necessary for enabling cities curbing the manifold problems and hazards they are confronted with. Thus, research on urban sustainability is an important key. It is an indispensable provider of basic and applied knowledge suitable for deploying solutions on urban development problems.

In our time most urban problems are not confined to national boundaries, in Europe policy levels are increasingly interconnected and the efforts needed are often too comprehensive to be made solely at national level. Therefore, a more pan-European focus is required for urban policy and research. Presently, integrated research on urban sustainability supported by the European Commission (EC) appears to be of low priority and is comparatively fragmented. This does not satisfy the needs and, of sustainable urban development. A promising way out of this dilemma is for stronger focus on transnational collaboration for research at European level. This attempt – pursed by the URBAN-NET – follows a bottom-up approach and is strongly dedicated to integrated research methods.

URBAN-NET is aware that pan-European advancement needs strategic and focussed research that addresses current, evolving and future issues. Therefore, the network undertook the effort of developing a strategic research framework on urban sustainability, (the Framework). To summarise, the framework serves as an instrument for achieving the vision of the sustainable city by focusing on future research needs and activities and by stimulating the planning, financing, performance, dissemination and utilisation of research among all stakeholders – be they local, regional, national or transnational.

URBAN-NET believes that its framework can and should serve as a primary reference in the coordination of national and regional research activities in sustainable urban development. Therefore, specific research fields including topics and questions have been defined and

outlined that need to be the focus of future European research. They cover topics of relevance in four priority research areas:

1. Integrated urban management and city leadership
2. Sustainable land-use in city regions
3. Climate Change in the urban context
4. Health, quality of life and public spaces.

Within the first area URBAN-NET recommends concentration on city and civic leadership. Political, managerial and non-governmental leadership is in urgent need of attention; in relation to which a focus should be set on changing dynamics of local democracy, improving citizen participation in urban governance, developing policies and practices towards sustainability and promoting organisational innovations in integrated management.

In area two URBAN-NET suggests considering the basic drivers of land-use, socio-economic and spatial aspects and research implementation issues.

The focal points of the third priority area are in the establishment of Resilient Cities, the relationship of climate change and spatial development, common principles and cost-benefit ratios of possible actions as well as the resistance of the built environment.

Lastly, recommended research within area four centres on planning, design and management of healthy cities, social well-being, ecosystem services, accessibility and safety.

In addition to the thematic facet research promoted by partners to the URBAN network has been analysed. For that a ‘code of urban research’ has been defined which provides a frame for future research activities at European level. According to this code, urban research needs to pay a high level of attention to dissemination and policy influence. The objective must be to enlighten and contribute to progress in policy and practice, rather than just advancing knowledge for its own sake. Furthermore, it is imperative for URBAN-NET to bring results from European transnational research into practice and to enhance the uptake of these outputs at local and regional levels.

For the implementation of its framework URBAN-NET is determined to pursue a set of activities that range beyond the first project phase lasting until late 2010. For doing so it will adopt suitable ways to translate major parts of its framework into tangible, achievable, realistic and time-based cooperation activities. In doing so, the network will make use of the full tool box of public research instruments ranging from joint calls for tender to evaluator exchanges to shared dissemination events.

The members of the URBAN network believe that clear added value can be achieved through transnational cooperation by adopting the Framework.

1 Introduction

A central aim of URBAN-NET is to structure and coordinate research activities on urban sustainable development. To achieve this, the network decided to develop a European Transnational Research Framework in the field of Urban Sustainability. It focuses on the most significant future research areas and topics in the named field at European and transnational level. It includes strategic suggestions, which are based on a shared vision of urban research needs over the coming 5 – 10 years. The document was developed against the background of strong endorsement by the URBAN-NET partners of the merits of the 'European City' and the principle of the 'Integrated approach' which must be widely applied in the development of sustainable cities in Europe.

The framework will be used as the basis for future transnational cooperation activities amongst the URBAN-NET partners. This applies most prominently to the network's full call in 2009 but also to other joint activities. Beyond that it shall influence research programmes at national and EU levels. Therefore, whilst it finds its audience primarily amongst national programme owners and managers, it is also relevant to policy makers and researchers. The framework aims at broadening the view of sustainability in the field of urban development, attempts to illuminate current activities carried out at European level and highlights the importance of transnational cooperation in the field of research. As URBAN-NET is particularly dedicated to the implementation of the framework's contents, the report concludes with recommendations on how the research that is needed can be made to happen.

2 Sustainability as a goal and permanent task of cities

2.1 High potential for urban sustainable development

In this chapter the relationship between sustainability as a basic and widely accepted political ideal for Europe's future, and for urban development as a local approach, is further elaborated. Cities are not only an inseparable element of ongoing social and economic developments; they have a responsibility to arrange their own future in a sustainable way. In return this bottom-up local perspective is a precondition for making progress at regional, national or even European level.

Cities are limited spaces, densely populated and more or less artificial environments defining a living space for human beings. They were founded for different purposes and have been experiencing elementary changes by various drivers and impacts such as industrialisation, migration, mass car ownership and economic restructuring. Nowadays, more than 80 % of Europeans live in cities or in urbanised and metropolitan areas, which have been emerging from growing cities in recent years. The high level of urbanisation leads to the so-called urban dimension being an integrated part of social and economic development within Europe. Consequently, the urban environment is increasingly discussed as a subject on its own. A huge scale of city types has emerged, from small and medium-sized towns to major cities and metropolises – not to forget neologisms like "Edge City" or "urban landscape". Irrespective of their differences concerning scale, relevance, structure, history, mentality, inhabitants and local strengths and weaknesses, cities have a lot in common worth elaborating on in the context of sustainability and sustainable development. Therefore, the term "city" is used as a working definition for all different types and sizes of urban areas throughout this document.

Future oriented approaches at local level

From a transnational perspective it is highly recommended to emphasise processes and drivers as well as common interests rather than merely terms and classifications. The overriding relevant questions are:

- How is change evolving?
- What are the long-term ideas and models to deal with current and future challenges?
- How could goals of urban sustainability be reached in an urban context?

URBAN-NET appraises sustainable cities as part of the solution in terms of a preferable future. The sheer limitation to problem analysis and catastrophic scenarios does not help to innovate and develop models and ideas that are fit for the urban future. However, one thing is obvious: the way to a sustainable Europe leads via liveable, future orientated and innovative cities, which are able to develop transferable local solutions and adaptations.

Within cities different social, economic and ecological developments cumulate in both a positive and a negative way. On the one hand, cities are the biggest consumers and polluters suffering from environmental and social incidents and degradation. On the other hand, cities are economic and administrative players, being a political entity and – as such – constantly making relevant societal decisions. For this reason cities are often referred to as the fourth administrative and political level of Europe[1]. Their right of self-governance is emphasised

[1] The levels referred to are: European Union, National States, Regions and Cities

within the draft of the European Constitution and the Lisbon treaty. Cities are not only players; they compete amongst themselves in order to be attractive for inhabitants and companies. Urban development is not only a question of national and transnational benchmarking and competition, but also of common interests and cooperation in terms of influencing basic conditions. The engagement of citizens and a specific form of local democracy are equally important. Therefore, cities need not only suffer from overall ongoing global and national processes, they can also seize opportunities to become sustainable.

Complex developments require integrated approaches

Cities are known as places where capital and prosperity are centralised, where fortunes are made and social advancement is possible. Businesses, which generate jobs and assets, are usually located in urban areas. Therefore the concentration of people, capital and knowledge as well as of buildings, infrastructure and functions is a main characteristic of cities. Cities provide excellent conditions for the efficient use of economies of scale and innovations because of this concentration. This relates e. g. to saving energy, efficient transport facilities and effective decision making processes.

Diverse developments in related urban sectors such as housing, commerce, transport and social infrastructure make it difficult to steer and control whole cities or districts. It is impossible to optimise single sectors without impacting on other functions, sectors and characteristics due to the mosaic and organic nature of cities. This complexity leads to cities facing such ambivalences as opportunities and dependencies, safety and vulnerability, economic prosperity and negative ecological impacts, social integration and segregation, innovation and stagnancy, free mobility and noise exposure, rising maintenance costs and decreasing civic budgets etc.. There is no single solution or simplistic measures for achieving sustainable futures for our cities. They have to emerge from the permanent process of local and inter-local communication, negotiation and decision making. Urban development and respectively urban sustainability is a question of good leadership, management and governance. Therefore cities need to be balanced by holistic thinking and an integrated approach, as highlighted by the “Leipzig Charter of Sustainable European Cities”.

Common approaches for different local needs

Urban sustainability is based on common principles but differs in local characteristics. In this way the specific local “needs of the current generation are satisfied without compromising the ability of the future generations to meet their needs”[2]. For cities this means continuously debating, deciding and acting as well as developing a culture of partnership[3]. Due to specific local circumstances every city has to define its own route to sustainable development, but processes, instruments, methods, aims and projects can be compared and shared. Best practice can be developed and adapted for local circumstances.

To deal with this complexity URBAN-NET summarised different facets of urban sustainability into three clusters and nine cross-cutting dimensions (see figure 2).

[2] UN Brundtland Report, Our Common Future, 1987

[3] Towards, Liveable Cities and Town, Guidance for Sustainable Urban Management, 2007

Figure 2: Different facets of Urban Sustainability:

The following cross-cutting dimensions are identified and should be considered when dealing with urban sustainability:

- An integrated approach dimension: integration of the separated components into a holistic concept of urban management
- A time dimension: long-term perspective, planning without compromising future abilities
- A governance dimension: the perspective of decision-making and organisation
- A planning dimension: spatial issues, land-use and design incl integrated assessment of the constraints and benefits afforded by subsurface geology and infrastructure
- A legislative dimension: justice and regulation
- A risk management dimension: disaster management and local adaptation
- A financial management dimension: municipal finance at the background of the current financial crisis
- A monitoring dimension: measuring and monitoring concept in sustainable urban development
- An innovation dimension: implementation of innovative concepts in urban sustainability research.

2.2 Changing conditions as an opportunity for sustainable cities

Although the future is undetermined a broad consensus exists on current and future challenges and changes that can be observed throughout Europe. Cities are currently facing developments listed below. The list does not claim to be complete or universally valid:

- Ageing society and demographic change
- Increasing social and ethical differentiation
- Growing inter-regional and transnational migration
- Globalising economy and shorter product cycles

- Intensified far-reaching European integration including financing
- Growing competition between locations and cities
- Hybrids of cities and regions
- Environmental and climate change including extreme weather situations
- Limited non renewable resources and capricious prices
- New and comprehensive communication and organisation forms
- Raising dependencies and complexity of interrelations.

These challenges have and will continue to influence urban areas throughout Europe. They define a strong need for local adaptation and learning to deal with them in a sustainable and successful way. A large number of scientific studies and future scenarios analysing these trends have been developed at different scales. Examples are widely available at European[4], national[5] and local levels[6].

Among other perceptions it is broadly acknowledged that:

- in the near future 35 % of the European population will be over 60 years of age and specific mobility patterns or requirements to access public spaces will play a dominant role
- information and communication technologies as well as rapid transport connections and low-priced transport costs enable a real-time global market requiring high-capacity infrastructure and changing the traditional hierarchy of cities and regions
- due to efficient production technologies a high number of industrial jobs have been lost in the cities. This has led to stronger social differentiation
- due to growing urban divergence in terms of economic and social opportunities and also in environmental quality (for instance buildings, public space, infrastructure and air) deprived neighbourhoods need specific political attention
- the regional level has been gaining more importance because of rising functional interdependencies. Nevertheless regions often have neither exact spatial frontiers, nor are they defined as political authorities in terms of legitimated governance and decision making
- migration patterns have been rising and changing fundamentally with the onset of internationally available media making integration less of a necessity for self-sufficient ethnic neighbourhoods
- traffic growth will continue because of increasing mobility needs caused by catch-up effects, spatial and residential structures as well as individual behaviour patterns.

Obviously there is no lack of analyses of current developments and predictions for long-term future scenarios by extrapolating from the past. However, it is the present and the near future where decisions towards sustainability have to be made and in which solutions and innovations must be initiated.

As discussed earlier, urban development is not an automatism or linear but an ongoing public process, in which conflicting interests and goals need to be considered. For this purpose scientific and experimental approaches need to be developed and implemented. At present

[4] ESPON project 3.2, scenarios on the territorial future of Europe, 2007

[5] City Land-Plus by Council for Housing, Spatial, Planning and the Environment, 1998

[6] Research compound City 2030, Federal Ministry for education and research, Germany, 2003

there seems to be a lack of visioning and practical implementation. Appropriate models and guidance are missing. The task for cities is to develop solutions which anticipate future trends and baseline conditions and build thereon qualities and benefits for the local population. Here on they have to develop innovative projects which demonstrate visible benefits; for instance on the needs of elderly citizens, on energy efficiency or on the responsible application of metabolic cycles. This can only be accomplished by having a clear vision of preferable and possible futures within cities. Such a vision is necessary to foster innovations that will transform existing urban development and lifestyles that are grossly unsustainable.

2.3 Sustainability as a future orientated and comparable approach

Considering the complex challenges and changes mentioned above it makes sense to use simple goals for urban sustainability without neglecting the real contexts and dependencies. Such goals should summarise the existing consensus about urban sustainability and provide basic orientation to help address contradictory aims. Addressing such contradictions is more important than achieving any one goal for a specific sector or dimension. However, it is necessary to concretise each goal dimension by indicators which allow comparisons between cities and evaluation of progress or even regress. This assessment could be represented on a scale (figure 3). Such indicators are available and well elaborated within the scientific literature. They are not considered further within this document, but of course they have to be reflected in future transnational research.

For the use of such a tool a definition of “urban sustainable development” is indispensable. URBAN-NET circumscribes this term by the following – partly conflicting – urban development concepts:

- **The social city**, in which cohesion and equality of opportunities are a given and well-being is achieved for all citizen
- **The market city** which provides a framework for competitive jobs, income and prosperity and in which goods and services are available for local and trans-local markets
- **The ecological city** which limits its consumption of resources substantially and does not harm the natural environment through a zero-emission and cycle-orientation (cradle to cradle philosophy). Where possible renewable resources are preferred and non renewable resources are used in the most efficient way.
- **The built city** in which buildings, public space as well as green and blue areas combine beauty and regionally adapted building styles with appropriate mixed urban functions such as housing, working, shopping, entertainment, leisure and recreation
- **The net city** which supplies effective, well linked infrastructure and public goods such as roads, public transport, electricity, drinking water, sewerage, waste management, telecommunications etc. Additionally it is an integrated part of the regional polycentric development
- **The governmental city** whose effective administration is organised transparently at both local and regional levels and which is legitimised by democratic processes
- **The citizen city** in which differences in identity, needs, preferences and participation are acknowledged, promoted and integrated into planning and decision processes
- **The cultural city** in which all minorities and ethnicities are offered, and accept, the opportunity to integrate, contribute and participate as fully-fledged citizens, demonstrating mutual respect and tolerance.
- **The historical city** in which tradition and heritage is maintained and developed

Figure 3: Urban sustainability development concepts

2.4 The European City model as a value system

When discussing the future of cities in Europe we are talking about adaptability and rehabilitation of cities and in particular in relation to the European city model. This city type still holds a number of prominent qualities that differ from other types of cities around the world. The main values of the traditional European City can be described by 3 main characteristics:

- Morphological - the traditional shape: The traditional European city possesses compact urban patterns. It has a spatial mix of functions such as housing, labour, education, community supply and recreation. A clear contrast between city and landscape as well as a distinct centrality are obvious.
- Social - the urban way of life: The city shows the ability for integration and in general a low level of segregation, it has a polarisation between public and private spheres and a strong identification of inhabitants with their city.
- Cultural – the place for emancipation: The European city has set the frame for the development of a bourgeoisie and for political and economical emancipation, it is characterised by political self-government.

There has been some criticism of an alleged inflexibility towards and incompatibility with new infrastructure facilities and modern living in general. Additionally it is argued that the urban reality in most European countries nowadays includes a substantial proportion of suburban living. Yet, recent experiences have given confidence that the European city is able to cope with future challenges and is capable of managing the transition towards urban sustainability in a reconcilable way. The ability for adaptation and regeneration of European cities is self-evident. Thus the European city model holds great potential for the global process of urban transformation and in particular towards more sustainability within cities.

3 Urban Sustainability at European Level

3.1 Policy activities at European level

3.1.1 The urban dimension

Urban development and urban policy do not fall under the supra-national competency of the European Union. The European Commission (EC) lacks the legal and legitimate basis for official activities in this policy field as well as for direct collaboration with municipalities. There are massive differences of opinion regarding whether and in which way the EU should be active and 'interfere' in this policy area. It is disputed whether cities and their problems have a European dimension. Yet the EU affects urban policies and developments at local level to a high degree. As urban issues are cross-cutting the commission acts with directives, structural funds, new funding instruments and research from other policy sectors that influence urban affairs. European transport and environment policies for instance have eminent spatial impacts and thus the policies are particularly visible in urban areas. Cities themselves have to implement EU policies to a major extent.

Additionally and despite the principle of subsidiarity there are and have been increasing endeavours which can be subsumed under the term "European Urban Policy". This policy was started in the late 1980's when it became obvious that urban areas hold a key role for mastering the challenges of structural changes within the EU and the implementation of EU policy goals. Five motives – that are partially contradictive – can be differentiated for EU engagement in the urban policy field:[7]

1. **The ecological motive – the sustainable city:**
   Following publication of the "Greenbook on the Urban Environment" by DG Environment in 1990 the topic "sustainable development" has been promoted at Euopean level.
2. **The cultural motive – creating a sense of identity:**
   European cities are considered by some to be the cradle of civilisation and democracy. In particularly the physical shape of European cities (streets, buildings, squares, monuments) is seen as a cultural memory of European norms and values.
3. **The economic motive – the competitive city:**
   Cities are perceived as engines for growth, creativity and innovation. A competitive European city should play a decisive role in the competitiveness of the European economy.
4. **The social motive – the integrated and integrating city:**
   Cities are also places of poverty, social exclusion, polarisation and segregation. Therefore, the EU supports tackling of social and spatial crises at urban and neighbourhood levels.
5. **The policy-institutional motive – the well governed city:**
   The question of how opposing interests should be balanced is a core question of urban policies and planning. An important part of the answer is a changed perception of governance of cities and regions. The new governance approach should incorporate more flexible and less hierarchical means which include private and civil stakeholders.

For the time being at least 14 DGs of the EC are dealing with mainly sectoral aspects of the urban dimension at EC level ranging from DG TREN (energy and transport) across DG Envi-

[7] See Susanne Frank in: "Urban development through the EU: European urban policy and URBAN-approach in the area of conflict of the Lisbon Strategy and the Leipzig Charter"

ronment to DG EAC (Education and Culture). In 2005 the commission started a so called "Interservice Group on Urban Development". Lead by DG REGIO (Regional Policy) it should bring together all related DGs. In particular this group aims[8]:

- to promote an integrated approach to sustainable urban development when programming and implementing the assistance of the Structural Funds;
- to identify the initiatives under the various Community policies aiming to support sustainable development of urban areas and to ensure the necessary cooperation between the Commission services in this respect;
- to ensure partnership between the Commission, the European Parliament, the Committee of the Regions, the associations of towns and urban areas in relation to the urban dimension.

The most prominent and well known EC interventions are carried out under the "cohesion policy" which operates with Structural Funds such as the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund in favour of urban areas. Some €16 billion were explicitly allocated to urban policy for the period 2000-2006 under these Structural Funds. A number of financial instruments or programmes have been applied and most of them are still running in follow-up phases. Some are only focussing on urban issues whereas others have a broader focus and include the urban dimension among others. Major instruments are:

- URBAN: innovative, integrated development models for urban areas in crisis
- EQUAL: models for working life by fighting discrimination and exclusion.
- JEREMY and JESSICA: sustainable urban development funds, urban projects
- INTERREG: a large number of urban cooperation projects
- URBACT: exchange of experience for cities to benefit from urban pilot projects
- ESPON: studies on the territorial dimension of development policies
- LIFE: demonstration projects mostly in the environmental area
- CIVITAS: demonstration projects on clean and energy efficient urban transport
- CONCERTO demonstration of energy efficiency

3.1.2 The EU commitments on Sustainable Development

In the year 2000 the EU Member States agreed on the so-called "Lisbon Strategy for Growth and Jobs". With this strategy the following objective was stipulated: "By 2010 the European Union must become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion."[9] In 2001 the aspects of environment and sustainable development were added by the European Council with the Gothenburg Strategy. This policy was announced as a comprehensive framework in which the Lisbon Goals could act as the engine of a more dynamic economy.

Based on the Gothenburg Strategy the European Council adopted a comprehensive renewed Sustainable Development Strategy (SDS) for an enlarged EU[10] in 2006. This policy

[8] EC Interservice Group on Urban Development: "The urban dimension in Community policies for he period 2007-2013", 2007

[9] Lisbon Strategy for Growth and Jobs, 2000

[10] See European Council: "Sustainable Development Strategy, 2006"

sets out a single, coherent strategy on how the EU will more effectively live up to its long-standing commitment to meet the challenges of sustainable development. The overall aim of the SDS is to identify and develop actions to enable the EU in achieving a continuous long-term improvement of quality of life. This should be done through the creation of sustainable communities able to manage and use resources efficiently, able to tap the ecological and social innovation potential of the economy and able to ensure prosperity, environmental protection and social cohesion.

The strategy sets overall objectives and concrete actions for seven key priority challenges for the coming period until 2010, most of which have spatial implications and an indirect link to urban issues:

- Climate change and clean energy
- Sustainable transport
- Sustainable consumption & production
- Conservation and management of natural resources
- Public Health
- Social inclusion, demography and migration
- Global poverty and sustainable development challenges.

To improve synergies and trade-offs, a more integrated approach to policy-making is proposed, based on better regulation and on the guiding principles for sustainable development, adopted by the European Council of June 2005.

Among other cross-cutting issues the SDS stresses the important role of local and regional levels in delivering sustainable development and in building social capital as well as sustainable communities in urban and rural areas. Approaches like Local Agenda 21, Aalborg Commitments, the European Sustainable Cities and Towns Campaign and the RegioStars award are referred to as core EC efforts in this field.

The initiatives in relation to the SDS are generally welcomed. However, they are not sufficiently applied to urban issues and thus their effects remain limited in this dimension. There is a strong need to break down strategies on sustainable development into spatial and in particular urban and regional levels.

3.2 Recent policy activities at European level

In May 2007, the national ministers responsible for spatial planning of the EU Member States adopted the Territorial Agenda of the European Union: “Towards a more competitive Europe of diverse regions” and the “Leipzig Charter on sustainable European cities” at the informal ministerial meeting on urban development and territorial cohesion in Leipzig.

The Territorial Agenda as well as the Leipzig Charter are policy documents. Both documents have strong interrelations. The Territorial Agenda addresses the whole territory of the EU and draws up principles of spatial development at the pan-European scale. The Territorial Agenda can thus be regarded as the overarching document.
The Leipzig Charter, in contrast, may be considered as a concluding strategy document focussing on only one specific type of territorial unit, the urban area. It defines basic concepts of sustainable urban development for the concerned local authority and policy maker. It also provides adequate instruments at the EU level.

The two documents may be characterised as follows[11]:

The Territorial Agenda

The Territorial Agenda – following upon the European Spatial Development Perspective (ESDP) from 1999 - provides recommendations for an integrated spatial development policy aiming at mobilising the potential of European regions and cities for sustainable economic growth and more jobs. The agenda stipulates six territorial priorities for spatial development measures:

- strengthening of polycentric development and innovation through networking of city regions and cities;
- new forms of partnership and territorial governance between rural and urban areas;
- promotion of regional clusters of competition and innovation;
- strengthening and extension of trans-European networks;
- promotion of trans-European risk management including the impacts of climate change;
- strengthening of ecological structures and cultural resources as added value for development.

The document also addresses the challenge of coordinating the policies of the EU and the Member States with respect to their spatial impacts.

There is a remarkable shift from 'soft' concerns (in the ESDP) to the pursuit of competitiveness in the Territorial Agenda. This corresponds to a shift of paradigm in European regional policy from the traditional focus on structurally weak and disadvantaged regions to strategies aiming at the development of the potential of all regions.

The Leipzig Charter

The Leipzig Charter emphasises the importance of cities in the formulation of future EU policies. It gains its importance primarily from the commitment of the ministers to initiate discussion in their own countries on how the urban dimension can be integrated in the different levels of policy. It calls for a greater use of integrated urban development policy by the cities with emphasis on

- creating and ensuring high-quality public spaces;
- modernizing infrastructure networks and improving energy efficiency;
- proactive innovation and educational policies;
- supporting deprived neighbourhoods.

The aim of the ministers is to establish common benchmarks and intensify the exchange of experience among European cities.

With this document the European countries commit themselves to a European wide application of integrated urban policies and for the generation of the necessary framework conditions at national and European levels.

[11] Directorate General for Internal Policies of the Union: "Follow-up of the Territorial Agenda and the Leipzig Charter: towards a European Action Programme for spatial development and territorial cohesion"

Both documents are of considerable importance. The Territorial Agenda is more than a political declaration of the national ministers. It embodies a new perception of territorial cohesion for the whole of Europe. The Leipzig Charter which orientates itself on the European city model makes urban development an issue with a European dimension.

As shown by the adoption of the Leipzig Charter, bottom-up initiatives from the Member States to the pan-European level as well as transnational cooperation are justified and necessary. Transnational cooperation offers significant potential for tackling the current European-wide challenges of globalisation, energy provision, climate change, demographic development as well as social and economic imbalances.

Due to the strong European impact at the local level many countries realise that urban policy is now very much a part of European policy. The European level – apart from the local, regional and national levels – is increasingly acknowledged as an additional sphere of government in the area of urban policies. It is very likely that this perception will receive greater attention in future policy-making and research.

4 European Research enables "Urban Sustainability"

Knowledge gaps are a key reason why most European cities are still not following a development path of sustainability. In order to encounter the above described challenges additional and new knowledge for urban development as well as experimental testing is needed. Without filling knowledge gaps it will be difficult to react appropriately and to exploit the advantages of the European and sustainable city models. Research is key to broadening the knowledge base and for the provision of tools that are essential to sustainable urban development. It is common sense and will be argued further in chapter 5 that this must be achieved through targeted research efforts. Many of the challenges have notably a European-wide dimension since they relate to common issues, are affected by EU legislation and regulations or they are linked to the European City Model. Therefore, corresponding knowledge gaps should be addressed at European and transnational level and need to be placed on a supra-national research agenda.

Other reasons for attention at European level lie in the possibility of carrying out necessary comparative research, to reach a critical mass of resources and to stimulate a more effective EU-wide dissemination of results[12].

It has been explained before that at European level there is no clear ownership of interests or responsibilities of urban issues. Thus urban aspects are dealt with by a wide range of sectoral activities which counteracts the necessary holistic approach and the pro-active attention of urban issues. This is a clear drawback for the development of European cities since immense benefits can be realised through supra-national actions. This awareness is not only valid for the urban policy, but it also holds true for research on urban issues.

4.1 EC research funding

Probably the core instrument of the European Union for research is the "Framework Programme for Research, Technological Development and Demonstration Activities". This programme co-finances research and development in 5-7 year periods.

With the current "7th Research Framework Programme" for 2007-2013 and the European Research Area, research policy has been mobilised to fully support the EU Sustainable Development Strategy (SDS). Additionally there is a commitment to sustainable urban living, which – according to the EC – "must be underpinned by high quality research"[13]. Despite such statements and despite the clear need at European level for integrated research on urban sustainable development it continues to occupy a low priority on the research agenda. This is underpinned by the rather limited integration of urban issues in the Framework Programme since 1998:

The 5th Framework Programme (1998-2002) supported urban research within two Key-actions: 'Sustainable Mobility and Intermodality' as well as 'City of Tomorrow and Cultural Heritage'. The 6th Framework Programme (2002-2006) addressed urban issues within two main thematic priorities: 'Sustainable Surface Transport' and 'Global Change and Ecosystems'. The current 7th Framework Programme (2007-2013) has spread urban-related issues

[12] European Academy of the Urban Environment: Thematic Strategy on the Urban Environment, Working Group on "Urban Environment Research and Training Needs" Final Report, Berlin, April 2005

[13] DG Research: "European research in action - Urban research, Living in the 'city of tomorrow' today"

across the 'Cooperation' Specific Programme. This 'Co-operation' category (one of four, along with 'ideas', 'people' and 'capacities') is designed to support transnational cooperation on defined research themes.

The thematic priorities related to urban issues under the Cooperation Programme are:

- Information and communication technologies
- Energy (e.g. energy efficiency)
- Environment
- Transport
- Socio-economic sciences and humanities[14].

However, there has been a constant claim of related stakeholder groups to incorporate sustainable urban development as an independent field in future research. The EC has yet to respond on this.

4.2 Transnational research funding

As discussed above urban research activities at European level are deemed eminently necessary but not yet sufficiently covered by the Framework Programme. Therefore, transnational research efforts gain a particular importance. Many European countries currently hold research funding programmes which are fully or partially aimed at research on urban sustainability. As attempted through URBAN-NET these efforts could be beneficially pooled and added value generated through supra-national cooperation activities.

Transnational research funding is particularly promising in research fields in which the participating countries have common objectives and where economic competition plays a minor role. This is especially true for urban research. With the aim of sustainability, given the 'European City' is a widely acknowledged common value model and has closer proximity to policy than industry issues, the urban field seems predestined for transnational cooperation.

Transnational research funding and opening up of programmes can provide a number of clear benefits of which the most striking are:

- Duplication and redundancies can be minimized among national programmes
- A critical mass can be obtained to ensure better use of scarce national resources
- Common policy challenges can be better addressed through joint forces
- A mutual learning on design, implementation and good practice of programmes is possible
- Participants can speak with one voice to third countries and the EC
- Through more extensive and wider cooperation of researchers a higher quality of results is achievable.

With the ERA-Net scheme that was introduced in 2004 by the EC a new instrument was created to coordinate programmes in various fields of research against the background of national policies. The URBAN-NET partners perceive this as a great opportunity for:

[14] Sander Scheuerwater at "The urban dimension of EU research and development policy",August 2007, on http://www.rics.org/Newsroom/Keyissues/Urban/EU_urban_research_development_08aug07.htm

- stressing the European character of sustainable urban development and research
- generating tangible added value though research results
- laying the foundation for permanent cooperation and a coordination platform for funding programmes in this field of research.

For the future, URBAN-NET perceives further development of a European research funding network and coordination with EU activities and other related networks as its prime task.

Lastly, it must be stressed that URBAN-NET considers the transnational level to be an additional explicit research coordinating level, both in terms of funding and research themes. It does not limit the activities and capabilities of both EC and national funding. URBAN-NET acts to complement and inform not exclude these programmes.

5 Types and approaches in urban research

In pursuing the URBAN-Net research framework it is important to employ a range of research methods and approaches. A deeper understanding of the challenges and the dynamic complexity of urban governance and management is needed. New approaches and mindsets, innovative solutions, methods, tools and instruments need to be developed. Furthermore, it is essential to disseminate, discuss and debate results, findings and conclusions, in order to raise awareness and stimulate necessary urban change.

Urban sustainability research offers the most added-value and the best cost-benefit ratios only if it is conducted in certain ways. URBAN-NET therefore recommends a 'code of urban research' that should be mandatory for all future research at EU and transnational level. The code, which is based on advice from the Working Group on Urban Environment Research Needs"[15] includes the following principles:

- Research on sustainable urban development in Europe must respond to the most hindering knowledge gaps, upcoming complex problems, major challenges and future necessities which are significant at European level.
- It shall provide additional knowledge that has not been funded so far at any of the programme levels, be it supra-, transnational or national. The results shall offer the most far reaching solutions and clear added value to national research arenas, policy makers or practitioners.
- Regarding the main principle of research on urban development, research shall have an integrative character. It shall concentrate on long- and mid-term approaches, addressing research areas and questions that inter-connect and integrate relevant aspects of urban sustainability with one another.
- Cities are not only recipients; they are also major actors of urban research. Thus, projects funded in that area should pursue problem-oriented inter- and trans-disciplinary approaches[16].
- Aside from the fact that there is still a need for new results in the area of applied policy related research, there should be sufficient space for more experimental research, more pilots and demonstration projects as well as more effective dissemination of results and the provision of appropriate training. Dissemination and considerations regarding demonstration and transferability should be widely included in the concept and methodology of research projects.

Indeed, it would be highly desirable if the next period of urban research in Europe could be marked by significant innovation in research methods – particularly methods which unite scientists and practitioners in the co-production of new knowledge and understanding. Allied to this future, urban research needs to pay a high level of attention to dissemination and policy influence. The objective must be to enlighten and contribute to progress in policy and practice, rather than just to advance knowledge for its own sake.

Research approaches that should be encouraged are:

[15] Compare: European Academy of the Urban Environment: Thematic Strategy on the Urban Environment, Working Group on "Urban Environment Research and Training Needs" Final Report, Berlin, April 2005, page 27

[16] Transdisciplinarity is an efficient form of learning and problem solving. We speak of a transdiciplinary approach when different stakeholder groups of society are cooperating in order to meet complex challenges. Through mutual learning, the knowledge of all participants is enhanced.

- Multi-dimensional case studies of particular topics or localities
- Cross-national comparative examination of specific topics in particular countries chosen to reveal the diversity of potential approaches and practices
- Evaluation studies focussing on assessing the strengths and weaknesses of alternative approaches in different settings
- Improving the comparative data base on the organisational forms of governance in the European Community
- Action research projects on carefully selected topics to generate new insights from demonstration projects
- Studies which focus strongly on lesson drawing for practice and involve a high level of practitioner input
- Development of frameworks and “universal” indices for comparative monitoring of the performance of cities within countries and Europe as a whole.

In addition to encouraging these different ways of carrying out research and analysis it is important to connect new research activities into the ongoing arrangements for continuous learning within and between cities and city regions. As mentioned earlier research activities need to be seen as part of a strategy for enhancing the adaptive capacity of urban governance to cope with rapid change. There are opportunities for using research to develop the professional cross-national learning skills of politicians and officials by linking leaders and future leaders into appropriate projects and learning sets.

Moreover, there are significant opportunities for linking the research capacity of the higher education institutions of Europe more directly into the organisational learning strategies of particular cities and localities. This aim will require innovation within the worlds of universities as well as government but a closer partnership between these two worlds would be to the advantage of both. To encourage closer collaboration, consideration should be given to making research grants available to consortia of organisations comprising cities and universities working in joint teams.

Lastly, future research should put a much stronger emphasis on dissemination and policy influence. In any given research budget dissemination should not be thought of as an ‘add-on’ at the end of the research. Rather the potential users of research should be consulted and involved in the research process and dissemination of interim insights should be valued as well as the production of findings and lessons for practice towards the end of each project.

6 Future urban research areas

Urban sustainability covers a wide range of themes that are interconnected and which include a number of sub-topics. This diversity applies to research and future research needs in the field. Although a holistic and comprehensive view is deemed important, thematic prioritisation is necessary to allow a focussed action. Therefore, URBAN-NET has defined and outlined specific integrated research fields including topics and questions that need to be concentrated on by future European research[17]. They cover topics of relevance on four priority research areas:

1. Integrated urban management and city leadership
2. Sustainable land-use in city regions
3. Climate Change in the urban context
4. Health, quality of life and public spaces.

6.1 Integrated urban management and city leadership

6.1.1 Introduction

The rapid changes now taking place in modern society require city leaders and urban managers to develop new approaches to the planning and management of urban areas. Recent turbulences in the world's financial markets remind us that the quality of life is increasingly influenced by global forces. Climate change, economic restructuring, the migration of peoples across national frontiers, the emergence of new social movements – these are just some of the transnational changes that have important consequences for place-based leadership and management.

European leaders at all levels of government have responded to these challenges in an imaginative way. In particular, it can be claimed that significant progress has been made in relation to the creation of sustainable cities, certainly if compared with the practices encountered in some other continents. However, it is clear that further improvements are needed in the way governments plan and manage cities and city regions. In particular, it is important to develop more integrated – or more holistic – approaches if governments are to meet the new and more complex challenges that now confront them. These new approaches and modes of operation will have to involve a more interactive dialogue between different groups involved in the transformation and regeneration of cities, and moreover it will take place in a context of new forms, methods and tools for communication.

In this section we explore four dimensions to the challenges associated with developing more holistic and responsive approaches to city leadership and urban management:

- Enhancing citizen participation in urban governance
- Organisational innovation to achieve integrated urban management
- Policies and practices to secure sustainable development
- Changing dynamics of local democracy

A cross-cutting theme concerns the adaptive capacity of cities, which has significant implications at two levels. First, there are implications for the personal and professional develop-

[17] See also Annex on the identification process and additional priority areas

ment of individual politicians, professionals and other stakeholders. Second, there are implications for the design of practice-oriented organisational learning networks at local, national and international levels.

6.1.2 Enhancing citizen participation in urban governance

The forces of globalisation referred to earlier have had the effect, over the years, of weakening the ability of many place-based communities to articulate their needs and secure urban development that responds to local priorities and concerns. This is particularly the case in poorer communities that lack the economic and social resources to influence key stakeholders in their locality. This is troubling as there is a risk that a growing number of citizens, perhaps whole communities, will become alienated from the institutions of urban governance.

Added to this there is evidence that rapid migration to and from urban areas across Europe has created further strains on local political processes. For example, where large numbers of migrants are arriving in a locality, leaders and managers will need to develop innovative approaches to community involvement to avoid unintentional exclusion of migrants.

URBAN-Net is convinced, that cities will only become sustainable as citizens adopt sustainable lifestyles, values, behaviours and attitudes. This requires the design, development, adoption and adaptation of participative, inclusive and cohesive forms of government and governance across all public and private sectors and hierarchies - individuals, communities, authorities and representatives.

The importance of strengthening public involvement in local decision-making, going beyond voting in local elections, is widely recognised in urban areas across Europe and a number of studies and models to improve citizen participation are underway in many cities and city regions.

Topics that would merit further research and analysis include:

- Developing methods of sharing experiences relating to alternative approaches to community involvement
- In recognition of the growing multicultural diversity of European cities, analysing the community involvement needs of different ethnics
- Examining alternative approaches to community leadership and community empowerment, for example, participatory budgeting
- Studying innovations in the use of new interactive modes of operation in urban governance, including developing and studying applications of information technologies to widen public input into decision making, for example, through electronic participation
- Examine the degree to which communities vary in their ability to organise and influence decision making in their area
- Developing improved understanding of the roles of elected politicians in facilitating public participation
- Explore alternative ways of engaging the ‘third sector’ or Non-Government Organisations (NGOs) in citizen participation processes.

6.1.3 Organisational innovation to achieve integrated urban management

In order to meet the changing needs of society the institutions of urban governance are constantly being updated and adapted. These institutional reforms are not well understood and it would repay dividends if research could be conducted to compare and contrast the effectiveness of different public management reform strategies. The forces driving institutional updating are complex but it is helpful to distinguish three overlapping drivers of change.

Firstly, global economic restructuring means that cities and city regions now compete and collaborate in ways that differ markedly from the past. These pressures have spurred moves to establish metropolitan governance or collaborative arrangements between cities in many parts of Europe.

Secondly, the shift from 'government' to 'governance' requires city governments to become more effective in working with other stakeholders in the city – for example, the private sector, the third sector, and other levels of government.

Thirdly, citizen demands for more responsive services that meet their needs 'in the round' lay down a major challenge to traditional departmental approaches to decision making.

Topics that would merit research include:

- Examination of new institutional arrangements that have been put in place at the level of the city regions with the specific intention of comparing the strengths and weaknesses of alternative metropolitan governance models
- Study of alternative leadership models and strategies for bringing agencies together at city or city region level, including the developing pattern of directly elected mayors in several countries as well as more familiar leadership models
- Review of alternative approaches to the measurement of moves towards more integrated approaches – as viewed from the perspective of different stakeholders
- Developing ways of engaging in the long-term monitoring of the impact of organisational reforms to enlighten the discussion of the balance between short-term political considerations and long-term objectives
- Studies and comparisons of different conditions for performance in various sectors of government and administration – professional cultures, regulations and codes, financial and other types of instruments, education and training, etc. – in order to understand explicit and implicit barriers and constraints to more holistic and integrated urban management.

6.1.4 Policies and practices to secure sustainable development

European cities have become world leaders in relation to the promotion of sustainable development. For example, the European Commission Sustainable Cities Report (1996) set out a range of imaginative proposals and, at the local level, many cities are now building on their Local Agenda 21 strategies to develop innovative responses to climate change[18]. However, there is no room for complacency and the European Commission Green Paper on 'Adapting to climate change in Europe'[19] makes this clear. It urges governments at all levels to take more decisive action in relation to mitigating the effects of climate change and in adapting to a changing climate.

[18] see Section 5.3

[19] June 2007

Research is needed on the policies, instruments and approaches that are felt to be most effective in promoting sustainable urban development. At one level research can gather insights on policies, procedures and practices in different contexts. However, it is also important to research the way localities learn from each other and develop innovative approaches.

Topics that would merit research include:

- Comparative evaluation of sustainable development policies and instruments being used in different countries to draw lessons for policy at different levels – local, national, and European
- Comparative case studies on sustainable development practices at city level, city to city, within countries and between cities in different countries
- Development of frameworks and "universal" indices for comparative monitoring of the performance of cities within countries and Europe as a whole
- Examination of learning processes used by different localities, cities and agencies to enhance their ability to bring about sustainable urban development
- Creation of new learning networks of cities concerned with sustainable development in order to build cross-national exchange more firmly into urban policy-making in different countries.

6.1.5 Changing dynamics of local democracy

Successful city leadership and urban management rests on two 'pillars of democratic legitimacy': 1) Input legitimacy – meaning adequate citizen participation in elections and participatory processes; and 2) Output legitimacy – meaning effectively promoting the common welfare by delivering good quality services and enhancing the local quality of life. Global forces, mentioned earlier, are weakening 'place-based' leadership and management which, in turn, weaken the democratic legitimacy of local, city, and regional governments.

While the situation is clearly different within different countries in the European Community, it is clear that research on the changing dynamics of local democracy is needed in order to inform thinking about how to increase the democratic legitimacy of local systems of governance.

Topics that would merit research include:

- Comparative analysis of the relative financial power of local authorities coupled with an interpretation of the implications of the local capacity to address collective problems and challenges
- Comparative study of the governance models used by cities and city regions in different countries to tease out the strengths and weaknesses of alternative models in relation to the two 'pillars of democratic legitimacy'
- Examination of the role of the professions in local government and consideration of how to strike the right balance between specialist knowledge and general management skills
- Studying alternative ways of handling the relationships between different levels of government, for example, concordats, contracts, performance regimes, and constitutional protection
- Comparative study of alternative approaches to public service innovation in different countries and contexts.

6.2 Sustainable land-use in City Regions

6.2.1 Introduction

Different facets of land-use

Land use is human modification of the natural into the built environment such as fields, pastures, and settlements. Soil and land are immobile as well as being limited and non-renewable resources which are often subject to simultaneous demand for conflicting uses. It is acknowledged that land-use changes, together with the use of fossil fuels are the major anthropogenic sources of carbon dioxide which has to be reduced to minimise climate change[20]. As the total amount of land cannot be increased, integrated and long-term orientated land-use policies are crucial for sustainable urban development. The question of availability and suitability of land generally becomes more prominent when demands for building and infrastructure increase in growing cities, but can also occur in stagnating cities. The same applies to increasing crop production for food, materials and renewable energy resources. Integrated research could help to optimise land-use whilst increasing crop productivity.

Land-use and land management practices have a major impact on natural resources including water, soil, nutrients, plants and animals. Land is part of the natural cycle providing biodiversity, drinking water, clean air and food. Any encroachments of these environmental functions of soil have an enormous impact on quality of life in both rural and urban environments. In order to avoid accelerated sealing of soil surfaces it is vital to focus on existing developed land which has a more or less typical life-cycle of: use, decline, deconstruction, remediation, re-development, re-use and so on. At each stage comprehensive economic interests and possibilities play a dominant role requiring adaptable financial and political actions.

The built environment has a strong impact on social and economic developments as e. g. affordable housing contributes to social integration whereas on the contrary social segregation is often caused by spatial mono-structures. Health and wellbeing are highly dependent on available and safe public spaces and have to be maintained and improved by local institutions[21].

Improvements though conservation and retrofitting

The long-term life-cycle of buildings and infrastructure as well as their high investment costs and long use periods have to be considered when it comes to necessary changes in terms of urban sustainability. Timing becomes decisive because once an investment has been made it has to amortise for a longer period. Although built up areas have a high potential for reducing carbon dioxide (CO_2) emissions there are limited opportunities for actually realising the required changes. The reasons for these limitations lie in financial shortages and the fact that new building standards can inherently apply only to newly built houses. But it has to be considered that cities are dominated by the given land-use and building stock whose modernisation and replacement needs more than two generations. This means that future sustainable cities have to emerge from existing land-use and building patterns. Urban research can help deal with these challenges.

[20] ICCP, 2007

[21] See chapter 5.4

Persistency of buildings prevent alternative uses

Under current building design and standards once a structure is built it generally determines and restricts future types of use, leading to possible future vacancy and dereliction. In economically prospering cities such places are rebuilt or redeveloped in response to strong market drivers. In shrinking and economically re-structuring cities their continued neglect causes a negative spiral of dereliction, environmental degradation and social deprivation. Therefore planning and financial capacities are required to improve the quality of shrinking cities, by so-called brownfield reclamation initiatives, and to steer development in a sustainable manner to minimise the acquisition of greenfield sites for settlement and traffic purposes. Research is needed to understand the driving forces, interactions and dependencies and to find innovative solutions as part of a participatory decision-making process between citizens, local government and other actors. Research could also contribute to an international comparison on planning instruments and good practices.

Urban development requires regional attention

Urban sprawl in terms of low density and disintegration of municipal functions causes social and economic costs which need to be considered during the planning process. In recent decades sprawl has accelerated in response to improved transportation means[22]. Modern road networks have enabled longer commuting distances. Residential areas as well as public and commercial facilities have been placed in a regional rather than in an urban context. This in turn has weakened the provision of public transport and other public services which need a minimum density of users.

All these examples demonstrate the interrelated, multi-dimensional character of land and built-up areas and have led to the development of settlement models from which the so-called “Compact City” and “Urban Sprawl” are well-known examples. Compact Cities seem to be the preferred solution of many urban professionals; but sprawl is a reality which has to be considered and understood in terms of inhabitant needs and market forces. The price and availability of land, housing preferences and cultural traditions often have a bigger influence on location decisions than planning ideals. It is strongly recommended to avoid an antagonistic discussion about the right or wrong model of settlement. For both settlement models individual administrative and spatial means have to be found for optimizing land-use development at the regional level.

Poly-centric City Regions as a preferable future

It must be stated that future-oriented land-use policy is not only a physical question about sprawling or shrinking cities. It is also a question about efficient and legitimate governance, social integration and economic development, environmental quality, mixed urban functions and integrated settlement and traffic development.

Integrated sustainable land-use development as a combination of different urban issues at both local and regional levels is a desirable aim[23]. This could be characterised by poly-centric

[22] European Environment Agency, 2007, Urban sprawl in Europe

[23] See Chapter 5.1

and multi-polarity structures; by less new land consumption as well as by a systematic re-use of brownfields inside Cities.

As a basic orientation model and a vision of Urban Sustainability the “Polycentric City Region model”[24] has been agreed, in which autonomous Cities create a continuum of dense built up as well as mixed-use areas and landscapes, integrating energy, food production, open space and spatial concentration of buildings. This City Region contains various local daily centres that offer attractive and competitive neighbourhoods for inhabitants. Further attributes of this new form of City Regions are efficient transport systems between main centres, quality green and blue spaces in every quarter as well as forests and open landscape within the region. Regional facilities for leisure, shopping and culture are preferably situated in integrated locations allowing daily access by non-motorised transport.

Suggestions for research that would contribute to this poly-centric and multi-polarity land-use model to control and channel urban expansion is described by the following five clusters:

- Basics of land-use and settlement
- Driving forces of land use
- Spatial aspects of settlements and Cities
- Socio-economic impacts and consequences of land-use
- Implementation of a sustainable land-use policy

6.2.2 Basics of land-use and settlement

As discussed earlier it is necessary to deal with a high complexity of land-use issues and to clarify the research questions and topics within this research field. The picture becomes more complicated by considering that there is no clear scientific consensus about preferred settlement structures and how sustainable land-use should be measured. Even if clear indicators are available[25] it is difficult to identify the right size of cities or regions for national or transnational comparisons. However, such comparisons are useful in order to identify and analyse the current state and integrate existing knowledge. Case studies analysing the ongoing development of sprawling cities quantitatively make sense and are available, but they cannot answer the question about the appropriateness to future challenges. That is and will be a political decision dependent on local circumstances. Therefore comprehensive surveys reflecting and integrating other European examples and methods need to be developed. Research projects could contribute to this “benchmark thinking” in order to trigger regional and local learning processes. A scientific evaluation of these self-learning processes could be part of a “European Competition on Sustainable Land-Use”, in which applicants have to explain how they define sustainable land-use and demonstrate how they would reach corresponding goals. The focus should be on applied research projects in which cities and scientific institutions cooperate and in which comprehensive existing material is used effectively.

[24] Peter Hall

[25] Indicators in use are e.g.: built up area per inhabitant, number of new houses, amount of unused brownfields

Topics that would merit further research and analysis include:

- Studies of urban sciences and national planning systems reflecting on legal frameworks, good and bad land-use practice and policy
- Comparative analyses of urban structures to develop a common understanding of what to sustain including an explicit European contribution to the ongoing urbanisation processes worldwide
- Developing frameworks and "universal" indices for comparative monitoring of the performance of cities within countries and Europe as a whole
- Study of how the acceptance of land consumption and value of open landscape can be measured and used for integrated decision making
- Benchmarking of cities and regions and their comparability in terms of land-use issues.

6.2.3 Driving forces of land-use

Residential and economic activities, combined with the comprehensive development of transport networks, are intrinsic causes of widely expanding cities. It is also a consequence of relatively high market prices of already urbanised land and high costs for brown-field conversion. Although the driving forces of urban sprawl are well known and analysed, knowledge and implementation gaps still exist in terms of future scenarios and guidelines for action. In a recent study by the European Energy Agency[26], causes for city growth were structured as follows:

- Macro-economic factors (such as economic growth, globalisation),
- Mirco-economic factors (price of land, competition between municipalities),
- Demographic factors (increase of population, household formation),
- Housing preferences (increasing space per person),
- Inner city problems (air quality, noise, safety, social problems),
- Transportation (car ownership, availability of roads) and
- Regulatory framework (weak land-use planning, lack of horizontal and vertical coordination).

This overview helps to explain how and why cities have been sprawling over the last decades and to analyse local strengths and weaknesses. However, it is insufficient as a framework of conditions for city regions including their suburbs which continue to change structurally. It is still unclear what is meant by sustainable land-use and how different settlement structures can integrate and adapt to future trends.

Topics that would merit from further research and experimental models include:

- Analysis of social and demographic change (increasing proportion of elderly, single households and migrants) and consequences or opportunities for land-use
- Analysis of climate change and its consequence for land-use particularly within Cities
- Implications of rising energy prices and mobility costs (longer distances, car dependency)
- Appraisal of rising needs for agricultural productivity and consequences for ecological functions of soil

[26] European Environment Agency –EEA-, 2006, Urban Sprawl in Europe

- Depletion of suburban structures and cites (changing needs and living forms, shrinking cities)
- Vulnerability and resilience of single and mixed functions areas
- Unforeseen or unplanned events e.g. the financial crisis or geohazards (landslides, earthquakes, volcanic activity etc.).

6.2.4 Spatial aspects of settlements and Cities

The model of a poly-centric City Region seems to be able to combine the advantages of a Compact City such as density, mix of functions, public transport with the individual qualities of suburban areas like green spaces, children-friendly environments and house ownership. One of the most important tasks of a sustainable land-use policy should be to minimise environmental impacts and in particular the consumption of natural resources. Landscape and Cities have to be balanced in a complementary way. However, it is still unclear how this goal could be reached and what measures would be appropriate. The initial question refers to the governmental level as often the City Region does not exist as an autonomous political unit able to develop a consistent land-use strategy. The region is often a patchwork of different (suburban) municipalities having conflicting interests. Even where there is a regional development strategy it is not always clear whether it is obligatory and must be obeyed.

The second relevant question refers to sectoral thinking in which investments and structural changes are carried out. Many transport, leisure or retail developments are often established without considering the impacts and consequences on other functions and sectors.

Topics that would merit further research and experimental projects include:

- Analysis of costs of different settlement models including sprawl and infrastructure and public services: who pays, who benefits and how can it be balanced?
- The Poly-centric city model: what should it include specifically? What would a scientifically and socially acknowledged model look like? How can it be introduced and administrated?
- Landscape urbanism: how can the landscape become part of cities and regions?
- Understanding and dealing with complexity, many actors, interests, constraints
- Appraisal of the integration of underground 3D-planning in order to gain new land-use opportunities
- Studies on the response to climate change
- Appraisal of how to handle conflicting uses and rising demands for different land-use types such as housing and agriculture.

6.2.5 Socio-economic impacts and consequences of land-use

From a social perspective urban sprawl contributes to social segregation as suburban and peripheral areas are often typified by middle and upper income families. On the other hand segregation creates areas inhabited by minority ethnic groups and low income families. A spatial concentration of problems may turn these areas into deprived neighbourhoods where social inequalities become more evident. These areas are often perceived as threatening and insecure by citizens.

From an economic perspective the costs of a non-integrated settlement model are also highly relevant. Typical incurred costs include commuting time, congestion and travel delays

and additional costs for urban infrastructure. Due to structural economic changes inner city areas often suffer from abandoned industrial sites.

Topics that would merit further research and experimental projects include

- Relationship between lifestyles, environmental impact and land use
- Analysis of polarisation processes; contributing factors and conditions
- Cohesion as a common value and an overall concept: impacts of and possibilities arising from European policy
- Comparative study of sustainable renewal and regeneration of neglected or deprived areas for minimising the conversion of new land
- Exploration of new approaches for public transportation investments and promotion of non-motorised mobility.

6.2.6 Implementation of a sustainable land-use policy

Beyond the described knowledge gaps and needs for experimental research, sustainable land-use and settlement structures seem to be more a question of decision-making and implementation. Of course research could and should also contribute to implementation through scientific analyses, advice and evaluation. One of the most important points is to guarantee independency between researchers and city councils which could be achieved through national or transnational competitions as well as by separate budgets. Research for and about implementation has a role other than implementation alone. It is about observing or preparing and analysing decisions and their implementation.

Topics that would merit further research and experimental projects include

- Concepts on integrated management including approaches on measuring and comparing integration actions
- Analysis and backcasting / scenarios for regional orientation models and development plans and their connection to decision-making processes
- Methods for how governance and participation can be organised in terms of self-organising capacities, including at the regional level
- Methods for how regional views can be developed beyond local perspective
- Comparative analysis and development of new policy instruments like obligatory urban growth boundaries and greenbelts, banning of new developments, purchase and transfer of development rights or residential and commercial development moratoria, developer impact fees (pay for infrastructure if contribute to sprawl)
- Evaluation of new urban models and principles (new urbanism) and possible ways for their introduction.

6.3 Climate Change in the urban context

6.3.1 Introduction

In 1958, Charles Keeling was the first to accurately document atmospheric climate change. Subsequent research put the increase in CO_2 and greenhouse gas emissions at the centre of research on global warming. In 1990, Wigley and Raper demonstrated that observed climate change could not be explained by naturally occurring phenomenon[27] alone. Human-induced climate change became a strong hypothesis.

The World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988, giving increasingly focused impetus to anthropogenic climate change research as well as public awareness of the topic. Two years later the panel concluded with certainty that anthropogenic emissions led to an increased greenhouse gas effect, in turn resulting in enhanced global warming.

On the European level, the EU has worked towards climate change impact reduction since the 1990s. The launch of the European Climate Change Programme (ECCP) in 2000 established its main instrument in coupling cost-effective greenhouse gas emissions reduction with increased economic growth and job creation as set out in the Lisbon strategy. The EU research frameworks are another means by which the Union stimulates research and innovative solution-seeking in this field.

Coming forth from such a framework, this chapter explores how research can facilitate urban sustainability in the face of anthropogenic climate change and its consequences. All ideas in this chapter depart from the URBAN-NET tripartite vision of the sustainable city. These preferred urban futures are the following:

- The city as a conscious community in which residents, citizens, consumers, humans are well-informed by and with local political leaders and policy makers
- The city as a complex adaptive system, which translates into for example risks and uncertainties' assessment and management at the urban level
- The city as an embedded system, which is a zero-emission, de-carbonized, low-waste, water-balanced, self-sufficient city that is regionally connected in a sustainable way.

Suggestions for research that can serve to attain these desired futures are discussed in four clusters:

- Curbing climate change: adaptation and mitigation
- Living with climate change: quality of life
- Handling insecurities: risk assessment & management
- Policy-making in the face of climate change: the integrated approach.

6.3.2 Curbing climate change: adaptation and mitigation

The latest IPCC assessment report on the consequence of climate change reads "the most vulnerable industries, settlements and societies are generally those coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources and those

[27] Wigley & Raper, 1990

prone to extreme weather events, especially where rapid urbanisation is occurring"[28]. In addition, the report draws specifics for the European continent, whereby:

- Climate change is expected to exacerbate regional differences, including negative impacts such as inland flash-flooding and increased coastal flooding and erosion
- Southern Europe is expected to suffer from high temperatures and droughts leading to reduced water availability, hydropower potential, summer tourism and crop productivity
- Health risks will increase due to more frequent occurrences of heat waves and wild fires.

With European cities traditionally being built in strategic geographical locations such as along major rivers or next to the sea and southern European local economies often dependent on tourism, a substantial number of European cities are likely to experience direct impacts of climate change such as flooding and extreme temperatures.

Broadly speaking there are two responses to climate change. Adaptation aims to minimise the impact of climate change on natural and human environments and systems. The other response is mitigation which aims to reduce emissions of greenhouse gases and curb further anthropogenic climate change.

In reality both responses are needed and should not be thought of as being mutually exclusive. Particular care is needed to ensure that efforts on one part do not limit or negate the other, but rather are well-integrated. This demonstrates the importance of careful examination of the synergies as well as trade offs between adaptation and mitigation strategies. Where good practice, strategies and models are defined, it needs to be taken into account that these have to be implemented in differing local contexts. As such, support to local and regional climate change adaptation and mitigation processes can be provided through case studies and governance support at the appropriate level.

Adaptation

Adaptation takes a number of forms. It can occur naturally, natural selection is a form of adaptation to the environment. As the natural environment changes in response to climate change we are already witnessing adaptations amongst certain species such as a migration northwards and to higher altitudes. Natural phenomenon such as floods, droughts and landslides will increase in intensity and frequency which will not only have direct consequences on buildings, infrastructure, telecommunications, transport etc but also indirect consequences for food, energy and resource supplies, health and welfare, mobility etc. all of which will influence demographics, migration and settlement patterns, security and other socio-economic issues.

We need to plan and develop strategies for adapting to both direct and indirect climate change impacts, from improving building fabric and design to withstand more extreme climate conditions through implementing sustainable flood management practices including flood avoidance and awareness measures to drought planning.

The IPCC indicates that key vulnerabilities in need of adaptation measures lie in the following domains[29]:

[28] Bernstein et al, 2007, p.48

- Air and water pollution, caused by extreme weather events, negatively impacting environmental quality;
- Sensitivity of linkage systems (transport; water, food, fuel supply; communication networks; waste disposal);
- Accelerated degradation of the built environment due to negative climate change impacts;
- Possible changes to the various roles of the social system (e.g. emergency preparedness; changes in recreational patterns and health care systems) as a consequence of increased pollution and temperature rise;
- Declining regional comparative advantages for economic growth and production due to altered tourism flows, declined crop production or a decrease in other service and business opportunities;
- The lack of advanced understanding of the probable indirect impacts of the consequences of climate change. Increased temperatures can e.g. lead to increased air pollution levels exacerbating respiratory problems and placing additional pressure on health and wealth-fare facilities
- The allegedly heavier burden of negative impacts on different social groups (e.g. the very young, poor or elderly).

In light of the above, the following areas of research are recommended for further advancement of European adaptation to climate change.

To start with, there is a real need to work towards the establishment of Resilient Cities, urban areas able to absorb changes, reorganize and develop integration in the economic, social/cultural and ecological dimensions. A clear definition of “resilience” is needed to help examine how the Resilient City should be constructed. Increasing resilience in all urban sectors would be a step forward in the creation of synergies amongst the urban leadership, executives and populations.

Evaluation of current national climate change adaptation vulnerabilities and strategies is needed to identify common principles for joint action. The establishment of clear indicators and researchers having open access to data will be essential to the success of such undertakings. Currently, researchers report difficulties in effective data gathering and evaluation of territorial vulnerability due to political pressures and short-term goal-setting caused by the limited duration of political terms in office.

Innovations in land-use planning, which is pivotal to the urban environment are needed to ensure adaptation to extreme weather events. Whereas basic knowledge exists (e.g. Vitruvius[30]), there is a desire for information on the implementation of knowledge in all planning domains. The establishment of an urban Land Parcel Identification System (LPIS), a monitoring system for local and regional planning, would be beneficial to this end.

Ways of increasing infrastructure resistance to climate change and deployment of early warning systems to ameliorate disastrous impacts are desirable. A ‘climate check’ of national and regional planning and building codes and regulations could be implemented to assess how much they take account of climate change.

Further inquiries into the relationships between spatial planning, logistics, energy and resource use and infrastructure are recommended. Such analysis would benefit from the stan-

[29] Wilbanks et al, 2007, p. 362

[30] Sustainable Architectural Design by the EC Thermie Program, DG Energy & Transport

dard inclusion of (probable) consequences of climate change. Multi-discipline, multi-scale integrated assessments of cities, merging qualitative and quantitative research, is the right approach to such an undertaking. Research might be able to contribute to market-based approaches towards adaptation and mitigation at the European level, offering non-regulatory approaches allowing for competition in this field.

Topics and actions that would merit further research and experimental projects include:

- Development of principles, models and tools for establishing Resilient Cities
- Comparative studies on current national climate change adaptation vulnerabilities and strategies and development of common principles for joint actions
- Establishment of clear indicators and researchers open access to data
- Setting up of an urban Land Parcel Identification System (LPIS), a monitoring system for local and regional planning
- Comparative 'climate check' of national and regional planning and building codes for assessment regarding their inclusion of climate change aspects
- Analysis of cost / benefit ratios of options, including " do nothing" option
- Study of the resistance of the built environment
- Development of non-regulatory approaches towards climate change effects
- Development of frameworks and "universal" indices for comparative monitoring of the performance of cities within countries and Europe as a whole.

Mitigation

The main EU mitigation strategy is based on its 20/20 Energy Package (European Commission, 2008), which sets out the following targets:

- A reduction of 20% of greenhouse gas emissisions (GHG) by 2020, with a possible rise to a 30% reduction level subject to international agreement on comparable cuts;
- An increase in renewable energy to 20% of European production by 2020.

Said standards are binding and the Emissions Trading Scheme is used as a catalyst in forcing industries to work towards emission reduction targets and contribute to mitigation. The package leaves the Member States considerable freedom to implement further measures in the national context. With urban infrastructure users being major GHG emission sources, urban life is likely to be increasingly affected by mitigation measures.

Research that will contribute to the attainment of the EU targets should aim to overcome the lack of objective information on monitoring and bench-marking in the urban context. With basic knowledge being available, it is necessary to gain a better understanding of details while at the same time learning how to communicate and implement the existing knowledge at all urban scales.

Modelling (with the aim to learn more about community benefits from mitigation structures) shall be named as another important research area in this field. Research on models would preferably include examination and assessment of existing good practices as well as hindrances to the implementation of mitigation models. However, with a lack of short-term statistical data as a weak point in modelling, the emphasis on data collection remains of primary importance.

Summarised, topics and actions that would merit further research and experimental projects include

- Collection and analysis / assessment of successful mitigation best practice and mal-practice
- Development of monitoring and bench-marking tools in the urban context
- Models for community benefit from mitigation infrastructure (wind, solar, heat pumps)
- Strategies on communication and implementation of the existing knowledge at all urban scales
- Hindrances to the implementation of mitigation models
- Promotion of short-term statistical data as a precondition for modelling
- Synergies / trade-offs between adaptation and mitigation strategies.

6.3.3 Living with climate change: quality of life

Since the topics health, quality of life and public spaces are discussed later this chapter will not deal with these topics extensively. It remains necessary, however, to devote some attention to quality of life in the context of climate change in the urban environment.

The IPCC[31] predicts that quality of life will be most threatened by the consequences of climate change in poor communities, particularly those situated in high-risk areas. Major threats include the following:

- Death, disease and injury due to increased occurrence of extreme weather events;
- Increased frequency of cardio-respiratory diseases;
- Altered spatial distribution of infectious diseases.

Consequently, the factors that directly shape the health of a population - e.g. education, health care, public health initiatives, infrastructure and economic development - will be critically important in maintaining acceptable levels of quality of life[32]. The IPCC also emphasizes that climate change and quality of life are linked in complex ways, such as in recreational patterns[33].

In this context research could contribute to the development of a pan-European definition of quality of life, including the settlement of targets to attain a minimal common standard throughout the European continent. Such research should preferably include an examination of the social impacts of climate change, giving feedback on which groups might need additional support in adapting to and adopting climate change measures.

In order to keep cities competitive and following the 3P's[34], scientists could for example contribute to working groups comprising government, industry and NGO's with socio-economic data and trends analysis to establish how these factors will influence social vulnerability to climate change.

[31] Bernstein et al, 2007, p.48

[32] Bernstein et al, 2007, p.48

[33] Wilbanks et al, 2007, p.49

[34] Triple Bottom Line: (TBL) is an approach that tries to weigh economic, social and environmental performance. The 3P's - People, Planet, Profit are often used when referring to TBL and the goal of sustainability

Following on the point made above, techniques to empower and motivate citizens to respond favourably and positively to climate change and its consequences should be a focus of research in this field. Techniques could include fiscal incentives, legislative measures, social support systems, and marketing strategies to increase awareness. Action research or the creation of citizen panels in research project assessments could be beneficial in bringing research results to the level of the individual citizen. In the same vein, climate change models should be developed with a public, interactive, informative, and educational front-end to increase the public's learning curve on climate change and its consequences. There is also growing recognition of the need for more psycho-social research into personal motivation and responses, in particular to large-scale, often gloomily reported, changes where individuals may feel emasculated and hence become apathetic or worse depressed and antagonistic in their behaviour and actions.

Topics and actions that would merit further research and experimental projects include

- Development of a pan-European definition of quality of life, including the setting of minimal common standards or thresholds throughout Europe
- Examination of the social, in particular psycho-social impacts of climate change
- Analysis of socio-economic data and trends on their influence on social vulnerability to climate change (including fiscal incentives, legislative measures, social support systems, and marketing strategies)
- Designing tools to increase the public's learning curve on climate change issues and motivate behavioural change
- Development of techniques to empower citizens to respond positively to climate change and its consequences.

6.3.4 Handling uncertainty: risk assessment & management

Climate change introduces a web of complex uncertainties that need to be addressed more effectively by modelling and research. Causes of uncertainty are due to gaps in knowledge and lack of reliable data. For example it is very uncertain how emissions of greenhouse gases will change in response to political, demographic, socio-economic and technological development, all of which have inherent massive uncertainties.

There is a lack of understanding of the magnitude of potential consequences of climate change, so-called uncertainty risks[35]. Predicted effects of climate change might differ markedly from observed effects, e.g. climate models currently in use have consistently underestimated climate change trends to date. Climate simulation models from across Europe differ markedly in their outputs due to gaps in monitoring data for certain regions and indicators which results in divergent conclusions about impacts. Such divergence has significant implications for scenario planning and strategic risk assessment and management with consequences for urban spatial planning processes and other policies.

Risk assessment and risk management are of prime importance in preparing urban areas for climate change. They provide information on the spatial impacts of natural hazards and extreme weather events. Risk management in the urban context is the development of procedures to integrate risk assessments into the spatial planning process[36].

[35] Uncertain risks pertain to possible new, imaginable hazards based in complex causalities, with which we have none or limited experience. Their multiple, heterogeneous and long-term consequences are unknown. While we do not have scientific or historic proof for these, they can no longer be refuted either. (van Asselt, 2007)

[36] Fleischhauer, 2005

Increasing the spatial resolution of climate models on the local, urban level might reduce insecurities and risk. There is a need for high-resolution models that are adapted to the urban environment and regions, taking into account the various factors of influence on urban life such as population, land-use, energy sources and consumption, etc.

In addition, the development of socio-economic scenarios is needed to provide decision makers with adequate information on potential risk situations. These should assist decision makers in assessing risks and developing adaptation strategies within an appropriate planning time-frame.

Managing uncertainty is dependent on the quality and quantity of reliable data. URBAN-NET calls not only for the quantification, analysis and improved accessibility of existing data but also for the development of methodologies to assist with decision-making under conditions of high uncertainty as presented by climate change.

It is also advisable to develop a common baseline to bring the entire European area up to a common standard of risk assessment and preparedness. Such a baseline would for example stipulate the minimum amount of information local governments need to provide about flood occurrences, flooding risks and anti-flooding measurements taken.

Topics and actions that would merit further research and experimental projects include;

- Design of high-resolution models on the urban environment and regions
- Socio-economic scenarios on potential risk situations for decision makers at local and regional levels
- Deployment of decision support tools on risks assessment and development of adaptation strategies
- Quantification and analysis of existing and ever-growing data in order to develop methods for decision making in light of uncertainty
- Development of a common European baseline on minimum information for local risk assessments.

6.3.5 Policy-making in the face of climate change: the integrated approach

Climate change is an international problem. Yet the consequences of climate change will be felt most at the local level. As such local authorities, mostly municipal leaders, will need to respond timely and adequately to the challenges ahead. Such responses might also include taking unpopular measures or making decisions based on uncertain risks. Thus it is essential that all branches of local government are fully involved in climate change related policy and decision-making. In turn, such decision making and forth-coming policies need to be connected to decisions and policies on the regional, national, European and international scales.

Section 6.1 dealt with the integrated approach more extensively. The following paragraphs put forward a few suggestions towards research on integrated urban management in the light of climate change.

Pivotal to this topic is the question, how can we strengthen the delivery capacity at the local level, taking into account the many differing contexts and various levels of knowledge, skills and organizational issues. Research should be applied to finding out how we can overcome different levels of competencies, both within administrations, between administrations and in different locations on the European continent.

For citizens to become more involved in climate change strategies will require enhanced dialogues between elected representatives, policy-makers, business leaders, local populations

and scientists. Three different approaches are recommended. Science should be required to work towards evidence-based tools that facilitate visualization and communication while actively supporting citizen participation in envisioning sustainable urban futures. The science-policy-public debate could also be improved by establishing 'science for society' projects. Research programs commissioning research funds to such projects would be based on a policy-relevant approach whilst also including citizen panels in the project proposals assessment phase.

In order to further bridge the gap between research and practice, research capacity building at the local and regional levels is essential. One of the ways in which this goal can be attained is by validating models with local field data.

Topics and actions that would merit further research and experimental projects include:

- Options to overcome different levels of competencies, within administrations, between administrations and in different locations
- Tools and methods to better involve citizens in climate change strategies
- Research capacity building at local and regional levels for bridging gap between research and practice.

6.3.6 Recommendation for Research within Climate Change

Climate change and its consequences pose complex, multi-scale challenges to the urban environment that demand a multidisciplinary approach, integrating socio-economic, environmental and scientific dimensions. Developments in the field need to balance the local context and its participatory democratic processes with scientific research outcomes, proper planning and the pressures of political representation, while taking the global context into account. Cities are relevant entities both in adaptation and mitigation processes.

In this context, the concept of the Resilient City seems to be helpful in defining a goal to work towards. With a large variety of research still ongoing in different locations, there is a need for easy access to and sharing of information. Communities of research and practice on climate change could be established on the local and regional levels. These would define best practice and introduce new practice where necessary.

URBAN-NET stresses a clear need to evolve all knowledge to the local level. The establishment of dialogue between all involved is crucial. Research programs on curbing climate change for a future of urban sustainability should include methods and tools for communication and dissemination in the given area.

The recommendations for further research outlined in the text above may not constitute a full agenda, but certainly provide a framework of current needs in the field of climate change related urban sustainability research. These will be developed further and implemented in an interactive process that includes representatives from cities across Europe.

6.4 Health, quality of life and public spaces

6.4.1 Introduction

According to the World Health Organization, health "is a state of complete physical, mental, and social well-being and not merely the absence of infirmity"[37]. In a study of regional well-being and exclusion within EU regions, the concept of well-being is described in terms of five dimensions: material well-being, health, education and literacy, participation in the productive sphere, and participation in the social sphere. These indicators are broadly similar to those used in the UNDP (United Nations Development Programme) Human Poverty Index for industrialised countries, and to common measures of social exclusion[38]. Public Space refers to the formal and informal physical spaces for public interaction, work, and recreation that enable and sustain our quality of life - like public squares, footpaths, streets, parks, playing fields, shopping malls, business parks, and other publicly accessible spaces.

Public spaces are important for the quality of peoples' life. They provide the setting for a wide range of social interactions and pursuits that support personal and community well-being. They allow individuals to find space and to interact with each other in a shared environment. Green networks and corridors linking spaces also promote biodiversity and enable movement of wildlife. Trees and planting can play a role in the control of air and water pollution and contribute to energy reduction by providing shelter for buildings. They can also help to soften the impact of development and make green and civic spaces more appealing. Public spaces can also be important in defining the character and identity of settlements. Existing spaces are often under pressure not just from physical development but also from poor management and maintenance. In the context of urban sustainability and the three pillars; social, environmental and economic, public space has particular value, for example; Well-managed and maintained spaces can create opportunities for all sections of the community to interact. They can promote a sense of place and be a source of community pride, and also offer opportunities for people to play an active part in caring for the local environment. Well-designed spaces can reduce opportunities for crime and the fear of crime. Open space provides opportunities for sport and recreation, helping to promote active and healthy lifestyles. Furthermore, they can open up opportunities for environmental education for local groups, schools and individuals.

Generally speaking, national, regional and local planning policies are underpinned by statutory requirements, frameworks and guidelines to include provision for public space. These variously involve multidisciplinary approaches comprising town planning, architectural, sociological, economic, environmental and health sectors among others. Recently, the impacts of climate change, global economic and demographic trends are forcing consideration of these additional factors in the design and provision of public space. Also, the issues of social and environmental justice are key factors. The linkages between public space and the benefits it provides in terms of contribution to good health, quality of life and well-being are increasingly realised and incorporated into policies and guidelines to enshrine these into mainstream practice. There is much documented and anecdotal evidence to support this. Also, Government and non-government and public bodies promote various policies, strategies and initiatives to encourage urban space planning and provision that specifically addresses the health and well-being aspects of individuals and communities.

The Leipzig Charter on Sustainable European Cities, May 2008 of the Member States' Ministers responsible for Urban Development, gives particular emphasis on "creating and ensuring

[37] Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946

[38] Quality of life and well-being: measuring the benefits of culture and sport: literature review and thinkpiece, Scottish Government 2006

high-quality public spaces". Moreover, the charter is overlaid by the requirement that "attention should be paid to cultural and health aspects" but does not make an explicit link between public spaces and health.

The following four clustered areas are underpinned by their contribution to good health and well-being and focus on the processes and factors within the context of provision and availability of public space in the urban setting.

- Planning, design and management
- Social well-being; interaction and inclusion
- Ecosystem services, leisure and recreation
- Accessibility and safety

6.4.2 Planning, design and management

The level of citizen participation in the practice of urban planning and design varies across Europe at both national and local levels. This influences the extent to which local needs are met with regard to provision of adequate and appropriate public space. Different modes of procurement for development also prevail between developer-led and local government-led provision of public amenities including housing, public buildings and the adjacent spaces. These different modes result in very different patterns of development. Existing infrastructure will still be in use in coming decades and the impacts of climate change, flooding, changing demographics and social needs will require flexibility to be built in to public space provision. Consideration for future proofing for changing use and provision for retrofitting will need to be borne in mind at the conceptual and design stages. National and regional strategic planning frameworks and guidelines often indicate measures to ensure provision of good quality public space against competing economic development priorities.

Topics that would merit further research and experimental projects include

- Clarification of to what extent the provision of appropriate public space is affected by the extent of citizen participation in the development process
- Comparative study on the influence of different procurement modes and planning instruments on promotion of good civic infrastructure and public space
- Analysis of models of urban governance that incorporate citizen's views and aspirations into the provision of appropriate public space
- Development of evaluative tools on the effectiveness of strategic planning frameworks in ensuring that public space provision meets citizen's needs
- Analysis of regulatory assessment tools such as open space audits, health impact assessments and their contribution to the provision of good quality public space
- Development of tools that evaluate and promote sustainable design criteria
- Study on implication of city design and the incorporation of public space on a healthy active population.

6.4.3 Social well-being; interaction and inclusion

Often, badly designed, badly managed public space is in the most deprived urban areas. Because of the lack of investment, they fail to improve the quality of life for the local people as they could, and shabby, badly maintained public spaces only worsen the sense of physical and social decline in an area. Higher density of housing increases the greater the need for well-designed, well-managed public spaces to aid well-being in that community. Individuals who have some form of nearby greenspace are shown to be more able to cope with life's

stresses, coping with poverty and performing cognitive tasks. This applies both to adults and children and especially those living in difficult social or economic circumstances.

The UN Convention on the Rights of the Child gives children the right to play, recreation and culture. Play is crucial for children to develop social skills, emotional control, moral understanding, cognitive skills such as language and comprehension, and physical skills. But increasing urbanisation has often left children with far fewer opportunities than previous generations to play freely outdoors and experience the natural environment. Good-quality public spaces can provide children with opportunities for fun, exercise and learning. There is evidence that some behavioural or emotional problems such as attention deficit disorder can be improved by exposure to greenspace for example.

Public spaces are by their nature; open to all, regardless of ethnic origin, age or gender, and as such they represent a democratic forum for citizens and can help strengthen civic society. When properly designed and cared for, they bring communities together, provide meeting places and foster social ties of a kind that have been disappearing in many urban areas. These spaces shape the cultural identity of an area, are part of its unique character and provide a sense of place for local communities and provide a venue for social events and festivals.

Topics that would merit further research and experimental projects include:

- Models of space valuation for spaces that enable and support community and cultural cohesion
- Analysis on how communities with poor access to good quality open spaces map against measures of wellbeing and how does this pattern appear across Europe
- Clarification whether good quality spaces can enhance educational success – and whether particular public or outdoor environments are directly supportive of learning environments
- Analysis of efforts on “place-making” or “locale-branding” and their benefit for local residents in terms of building social capital
- Study on the role of public spaces in enabling community development and cohesion and the question how to turn “ghetto” culture into “barrio” culture
- Understanding of the qualities of public spaces that promote social and community values of public space
- Analysis of which types of public space work for certain cultural groups and which benefits can be achieved though quality spaces
- Study of changing user-needs over time
- Understanding the effects of creating segregated space for different users and of spaces that meet the interests of a number of different user groups.

6.4.4 Ecosystem services, leisure and recreation

Human beings benefit from a multitude of resources and processes that are supplied by natural ecosystems. Collectively, these benefits are known as ecosystem services. Ecosystem services are distinct from other ecosystem products and functions because there is human demand for these natural assets. Services can be subdivided into five categories: provisioning such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and crop pollination; cultural, such as spiritual and recreational benefits; and preserving, which includes guarding against uncertainty through the maintenance of diversity. In line with sustainable development principles, policy decisions could benefit from a better understanding of the contributions of ecosystem services to economic and social welfare in the urban context in relation to greenspaces, water

courses, drainage systems, clean air and biodiversity and aesthetics of a natural environment that may be elements of public spaces. However, there are difficulties in determining how a market-driven economy can take account of ecosystem services that may not have market values and incorporating this into policy making. Equally there are difficulties in understanding how ecosystem services can be maintained or restored through policy or other measures due to the complexity surrounding the study of ecosystems in general. Ecosystem services are not explicitly protected by EU legislation; however, directives do provide protection for some aspects.

There is increasing evidence that 'nature' in the urban environment is good for both physical and mental health. Natural views – of elements such as trees and lakes promote a drop in blood pressure and are shown to reduce feelings of stress. The rise in obesity amongst youngsters is an increasing concern due to more sedentary lifestyles. Increasing access to high-quality public spaces where green exercise can take place produces substantial public health benefits and can reduce certain healthcare costs.

The significant increase in hard surfacing and the reduction in green spaces lead to higher temperatures in towns and cities than in the surrounding countryside, known as the 'heat island effect'. Vegetation – whether in public spaces or private gardens – can help to redress this imbalance. It brings many important environmental benefits to urban areas, including the cooling of air and the absorption of atmospheric pollutants. Vegetation, whether individual trees, gardens, allotments or parks also provides an opportunity for people to be close to nature, with the associated positive impact that this can bring in terms of mental health and the simple pleasure of experiencing plants, birds, animals and insects and other wildlife in an urban setting.

Topics that would merit further research and experimental projects include

- Study of relation between ecosystem health and human health as well as demonstrable links between a healthy urban ecology and healthy humans
- Better understanding of the types of vegetation that effectively mitigate against airborne pollution, heat-island effects, and noise reduction and establishment of normative ratios for urban green spaces
- Analysis of basic principles in the area of preventative health and appraisal on significance and effectiveness of urban green space
- Measuring the physiological and psychological gains from exercise in urban green spaces compared to that gained in indoor gymnasia, and what are the motivating factors to use public spaces for excercise. For example, cycling in nature versus cycling on a fixed machine in a gym. Hill-walking or rambling versus using a training machine indoors.

6.4.5 Accessibility and safety

The fear of crime and crime itself can deter people, not just vulnerable groups, from using even good-quality public spaces. Parents' fears about crime, based on their perceptions, whether accurate or not can often lead to children being kept from using parks, squares and streets. Women and certain their social groups often also face particular concerns. Different methods of planning, physical layout and management of public space can help to allay these fears.

One of the fundamental functions of public space is that it allows us to move around – on foot, by bicycle, by car, motorcycle or public transport. A key objective of public-space design and management is to balance the preponderance of conflicting modes of transport. Streets and public spaces can be designed to encourage enjoyable walking and cycling, and have

the power to make our environment a safer one by reducing vehicle speeds and use. Certain types of zoning have begun to demonstrate the benefits of enabling shared use by residents and pedestrians, not just cars. Coupled with this is having reasonable proximity to good quality public space for all social groups to realise the associated benefits for health whether through exercise, somewhere to “get away”, to ponder the aesthetic or for social interaction.

Topics that would merit further research and experimental projects include:

- Understanding the real or perceived safety concerns of citizens as a barrier to using certain types of public spaces and the actual versus perceived levels of crime in different types of public space
- Development of methods of managing space in relation to perceived anti-social behaviours, especially regarding the displacement of people and conflicting uses
- Study of the ability of improved public space to act as a catalyst for a general turnaround in a community and options of activating community capital though the creation of environmental capital
- Better understanding of the importance of developing links between public and green spaces and the use of mobility models

6.4.6 Research methods within this area

At the European and national levels public spaces are by their nature shaped by local cultural, historical, political and social forces providing diverse and characterful city spaces. Health and social responses to these environments are as varied and pose challenges to be properly understood. Many studies already carried out within this research area have been correlational and not demonstrated cause and effect relationships. There are numerous examples of case studies, comparative studies and surveys based on self-reported data – on personal perceptions and feelings rather than empirical studies. Affordances have been used to guide some of the empirical methods utilised. Thus there is scope for exploring and understanding why certain types of public space and spatial planning arrangements work in situations better than others. Also, there is a good deal of good practice and lessons learnt that can be the subject of demonstration and knowledge or know-how transfer. There are well – developed methods that incorporate some form of econometric approaches either to public spaces or health. Increased interest by the health sector and the appearance of health related interest within architectural and engineering faculties is noted. There is therefore the scope for methods normally adopted by these sectors to drive innovative research in this area. It is clear that there have been strides made in certain (mainly northern) European countries in this area and that further collaborative efforts will both make use of this advantage and provide greater scope for adapting tried and tested research methods to new situations.

7 Implementation of URBAN-NET's Research Framework

7.1 Implementing the framework

After a full year of preparation and stakeholder engagement processes the implementation of URBAN-NET's strategic research framework will be started in early 2009. The related management tasks of the network will include activities such as influencing research funding programmes and research projects, coordinating its contents and priorities with national agendas where possible, identifying funding opportunities and facilitating the creation of joint cooperation actions.

More specifically, URBAN-NET will adopt ways to translate major parts of its framework into tangible, achievable, realistic and time-based cooperation activities. To do so the network is determined to make use of the full tool box of public research instruments and means of transnational collaboration. This endeavour comprises joint activities such as

- Joint calls
- Coordination and clustering of ongoing nationally funded research projects
- Exchange of good practice in programming
- Dissemination of good practice
- Shared dissemination events
- Staff exchanges or training
- Shadowing, exchanging PhD students
- Joint programming
- Exchange of evaluators (evaluator database).

At present URBAN-NET is preparing a full joint call that is based on this framework to be launched by late 2009. Possible cooperation options other than calls will be explored in a dedicated stakeholder workshop in March 2009.

As the framework is mid- to long-term oriented its implementation will exceed URBAN-NET's first project phase. After 2010 a follow-up is foreseen that will be built on a more permanent structure, focussing on a network rather than on a project character. Here it is the network's aim to build up an organisational structure suitable to implement cooperation actions on the topical key issues. For instance URBAN-NET is determined to become *the* formal network of national research funding organisations in the area of sustainable urban research. That network will develop joint and transnational activities at a European level with the task to lobby and influence the European and national research agendas. Such an organisational structure will benefit from experiences gained in the networks initial phase.

It is URBAN-NET's aim to find suitable means of cooperation in order to implement a broad scope of its research framework. Therefore, in addition to network-internal collaboration, URBAN-NET will include actions with external organisations and thereby broaden its horizon. When it comes to rather focussed thematic issues that overlap with related thematic areas other existing funding networks will be potential partners. Within the thematic frame of urban sustainability contacts with more established European fora dedicated to urban issues have been established and will be developed. With respect to their specific roles this includes URBACT (exchange of experiences), EUKN (transfer research results), EURA (networks of research organisations), Eurocities (networks of cities), ICLEI (networks of local governments), Social Polis (social platform on cities and social cohesion) amongst others.

Such a move towards widened collaboration will also help to broaden the number of national programmes and funding organisations engaged and thus the likelihood of realisation of the framework's contents.

7.2 Financing possibilities beyond URBAN-NET

URBAN-NET is a network assembling national research funding programmes throughout Europe. These participating programmes are the main dependable funding source of the networks transnational research activities. As URBAN-NET is planning the implementation of a wide range of varying actions in terms of topics, nature of actions and participating countries, financing will be a likewise changing subject. Joint calls for instance will be carried out by a varying number and group of participating countries, following the so-called principle of "variable geometry".

As Urban Sustainability is considered a particularly cross-cutting issue, other non-partner programmes from the participating countries that cover related issues shall be actively incorporated. URBAN-NET insures this through its "national ambassador system". With this arrangement national network partners fulfil the role of a "national contact point" holding tight contacts with its national community including other relevant programme owners and research policy makers. If applicable other programmes will be asked to join specific transnational activities. Additionally, URBAN-NET is constantly seeking enlargement of the network *inter alia* for the expansion of a critical mass for coordinated actions.

As the recommended research themes are valid for treatment at the European level, the action has not necessarily been taken solely at the transnational level. Implementation may or may not include EU funding through the Framework Programme, by means of alternative instruments (e.g. ERA-Net plus or other), or through cooperation with other networks (see section 7.1). Here the lobbying and communication abilities of the URBAN-NET management group will play a decisive role for the fruitful inclusion of a wider range of partners in the future.

7.3 How to bring results into use - utilisation of research outputs

How to bring research results into use? This refers to the ability of research results contributing meaningful impacts in practice and innovation but it also leads to effective means of dissemination.

It is imperative for URBAN-NET to bring results from European transnational research into practice and to enhance the uptake of these outputs at local and regional levels. This is to be done through dissemination and communication measures which are already in place or which are to be developed (e.g. use of Web2 interactive approaches). Here URBAN-NET will make use of its national and European stakeholder networks will organise or participate at relevant conferences and workshops and utilise the network channels including the URBAN-NET website and newsletters. Close contact with national dissemination channels including the European Knowledge Network (EUKN) will be a major benefit when it comes to bringing research outputs into use. Other channels preferably need to be and will be further developed.

Annex 1- Background and framework development process

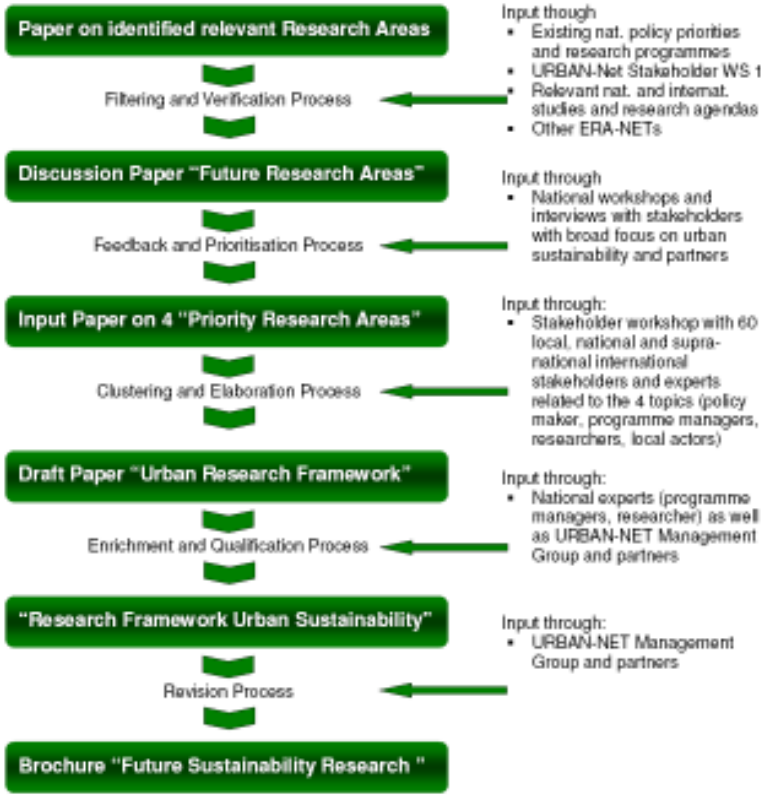
This framework was generated through a differentiated procedure that put strong emphasis on the comprehensive involvement of stakeholders from all relevant areas – including representatives of the EC, who have taken an active part in this process.

The process commenced with a widespread screening of relevant material, which was already at hand. This included national and international research programmes, studies, policy papers, and strategy documents of thematically related ERA-Nets as well as the URBAN-NET short-term agenda. After clustering the field of Urban Sustainability into 15 action and research areas, the URBAN-NET partners organised national consultation processes in order to define topical priorities. Many experts and stakeholders in the involved countries were asked for their preferences as well as for feedback and recommendations on the discussion paper. The sum of these national priorities has resulted in the following sequence of future research areas:

1. Urban sprawl or compact city – integrated re-use of land
2. Integrated urban management through multi-sector/-actor governance
3. Climate change and ecological risk management
4. Health, quality of life and public spaces
5. Proximity, access, transport and mobility
6. Social stability and deprived neighbourhoods
7. Energy efficiency and infrastructure management
8. Competitive urban futures and adaptation to globalisation
9. Environmental management and social behaviour
10. Demographic change - opportunities and consequences for cities
11. Migration and diversity as a challenge and an opportunity
12. Heritage, identity, culture, tourism and branding
13. Shrinking Cities
14. Commercial locations and centralised supply areas
15. Housing and urban design in highly differentiated cities

With a strong commitment to the retention of crosscutting issues, the URBAN-NET Steering Group decided to elaborate the first four prioritised areas in a more targeted approach. This included discussions about naming of the research areas, which have changed as the framework has developed.

Figure1: Development Process URBAN-NET Strategic Research Framework



Next the national URBAN-NET partners nominated dedicated experts to attend a targeted workshop. They were selected because of their strong relationship to the priority policy and research areas and their backgrounds:

- Local/regional political or administrative decision makers
- Researchers: from research institutes and universities
- Net-workers and multipliers: urban networks, professional umbrella associations and NGOs
- Research and programme managers from URBAN-NET partner countries

From the Stakeholder Engagement Process and the targeted workshop in particular, valuable feedback and recommendations were provided for consideration by the task group assembling the framework[39].

[39] For comprehensive information on the workshop and its outcomes see Del. 3.3 "Proceedings of Stakeholder Workshop 2: 'Future research areas on Urban Sustainability in Europe "

Annex 2- Description of URBAN-NET

The URBAN-NET project addresses issues of urban sustainability in Europe. Its overall aim is to increase the cooperation and coordination between European Member and Associated States through networking and collaboration on joint research activities. URBAN-NET is funded by the European Commission's 6th Framework Programme under the European Research Area Network (ERA-NET) initiative. The project has wide geographical and cultural representation through its membership of 16 partners from 13 countries. It is managed by a consortium formed by these partners and will run for four years from August 2006 to July 2010. URBAN-NET sets out to address the urban research agenda in Europe and will result in long-lasting transnational coordination primarily through jointly funded research programmes.

More information can be found at www.URBAN-NET.org.

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