

# CLIMATE CHANGE IN THE EUROPEAN URBAN CONTEXT

J. Graham<sup>1</sup>, A. Querrien<sup>2</sup>, E. de Santiago Rodríguez<sup>2</sup>

<sup>1</sup>URBAN-NET Project Manager, Scottish & Northern Ireland Forum For Environmental Research, SNIFFER, 25 Greenside Place, Edinburgh EH1 3AA, UK, [june@sniffer.org.uk](mailto:june@sniffer.org.uk)

<sup>2</sup>Senior Researcher, Plan Urbanisme Construction Architecture, Ministère de l'écologie, de l'énergie, du développement durable et de l'aménagement du territoire (MEEDDAT), [anne.querrien@developpement-durable.gouv.fr](mailto:anne.querrien@developpement-durable.gouv.fr)

Technical Advisor of Land and Urban Policies, Spanish Ministry of Housing, Paseo de la Castellana 112, 28071 Madrid, Spain, [edesantiago@vivienda.es](mailto:edesantiago@vivienda.es)

## Abstract

URBAN-NET is the Era-net on urban sustainability, a European consortium of organisations funding urban research. Climate Change In The Urban Context is identified as a priority research area in URBAN-NET's Strategic Research Framework.

The city-futures needed in adapting to and mitigating against climate change are:

- the city as a conscious community in which all actors are able to participate effectively in decision-making processes;
- the city as a complex adapting system able to assess and manage risk and uncertainty;
- the city as an embedded system with strong links between actors to maximise energy efficiency and minimise greenhouse gas emissions;
- the city as a healthy network supporting ecological diversity and ecosystem services that can adapt to and help mitigate against the impacts of climate change.

These desired futures are described by reference to:

- a comparative analysis of national research programs
- the development of a European Strategic Research Framework
- the pilot call projects
- collaboration on joint transnational research activities.

Keywords: integrated, trans-national, research, framework, priorities

## **Introduction**

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, including funding of transnational research teams.

URBAN-NET is funded by the European Commission's Framework 6 Programme under the European Research Area Network (ERA-Net) initiative. The project has wide geographical and cultural representation through its membership of 15 partners from 13 countries plus an international partner in the form of UN-HABITAT which provides the secretariat to the United Nations Human Settlement Programme. The project is managed by a partner consortium and runs for four years from August 2006 to July 2010.

Most urban problems, notably climate change cause and effects, are not confined to national boundaries. European policy levels are increasingly interconnected and require efforts that are often too comprehensive to be made solely at national level. A more pan-European focus is required therefore 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 of sustainable urban development. A promising way out of this dilemma is to promote a stronger focus on transnational collaboration for research at a European level. This attempt – pursued by the URBAN-NET – follows a bottom-up approach and is strongly dedicated to integrated research methods.

Urban sustainability was defined at the project outset as the equilibrium between the social, the environmental and the economic dimensions; the sense of an integrated approach between all of the sectors which constitute “urban life”. The research outputs are intended to help policy-makers find the right combination of measures including planning, building, social and cultural measures.

Since its inception in 2006, URBAN-NET has:

- carried out a comparative analysis of national and regional urban research programmes;

- published an online searchable database of research in the field of urban sustainability at [www.urban-net.org](http://www.urban-net.org);
- published the framework for a European urban research agenda; and
- funded 11 transnational research projects as part of a pilot call. A full call and other transnational activities will follow in 2009/10.

## **A Learning Process**

Access to up-to-date information on past and ongoing urban research in European countries is an important pre-condition for effective collaboration and a key input for the identification of strategic themes for future cooperation. Therefore, a comparative analysis of national and regional urban research programmes was one of the first tasks undertaken by the project (URBAN-NET 2007). Information was gathered by means of a questionnaire to all URBAN-NET partners and other stakeholders providing national profiles for 28 countries from across the European continent<sup>1</sup>.

To be able to compare and identify national or regional research programmes, the URBAN-NET partners had to agree on:

1. The scope of urban sustainability; and
2. The method of validating and evaluating research programmes.

To achieve this a taxonomy on urban sustainability was developed to support unambiguous naming and sharing of knowledge and research outputs via an on-line database. The taxonomy is based on three clusters of definitions and 9 dimensions or perspectives from which one can analyse each cluster, see diagram 1 below.

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<sup>1</sup> Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the United Kingdom.

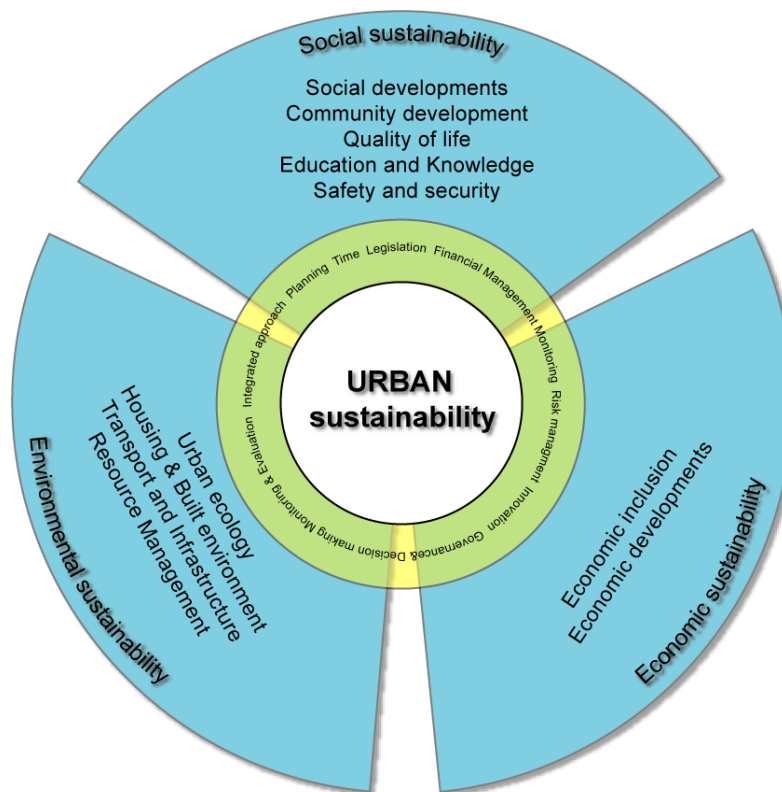


Diagram 1: The relationship between the clusters and dimensions in urban sustainability

The 9 cross-cutting dimensions to be considered when dealing with urban sustainability are:

- 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.

Interestingly, analysis of questionnaire responses in early 2007 did not identify “climate change” as a core research driver or theme at that time. The UK was the only country to feature climate change as an explicit priority in national research programmes. Elsewhere it was implicit in programmes about sustainable buildings, sustainable land use etc. Climate change emerged as a high priority, however, during subsequent project activities designed to determine common strategic areas for future research funding. This involved identifying commonalities between existing research programmes, establishing strategic research areas of sufficient interest to the majority of consortium partners to be funded through transnational cooperation and extensive engagement with stakeholders and respected experts.

### **The Emergence of Priority Research Areas**

A total of 15 themes were initially identified and ranked by URBAN-NET partners and stakeholders, generally representatives from research funding organisations or prominent researchers and programme managers as follows (URBAN-NET 2008):

1. urban-sprawl or compact city/integrated reuse 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 life 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 areas.

The top four themes scored significantly higher than the others. This is an interesting result when compared to the comparative analysis which gave a wider spread of themes and topics and indicated a strong preference for more local environmental and social problems.

These four priority themes were the subject of a stakeholder workshop on shared urban research needs and priorities for new works across Europe (Berlin 2008) bringing together 60 experts from URBAN-NET's 13 European partner countries and UN-Habitat. Participants had an affinity to practical urban development or applied urban research and included policy makers, researchers, funders and practitioners.

The workshop served to:

- structure each pre-selected priority research area and further deepen the knowledge in a thematic group
- reflect trends and the state-of-the-art for each priority research areas
- derive research themes as well as research questions for each research area
- agree on future needs for best-practice development
- formulate concrete recommendations for URBAN-NET's future actions

Core themes, key topics and questions for each research area were formulated through a process of workshop activities and outputs that sought to address the following:

### **Appraisal of Urban Sustainability in Europe**

- What are the core problems and challenges in the given thematic area?

### **Visions for Sustainable Cities**

- What visions of the future are preferable?

### **Making the Vision Happen**

- In which fields of action do you see additional need for activities?
- What kind of policy measures are currently missing?

## **How Can Research Facilitate Urban Sustainability**

- What are the knowledge gaps in the identified action fields?
- What are relevant research questions?
- Recommendations on the types of future research and concrete actions which should be carried out at European level
- How can the implementation of research results be improved?

## **A European Urban Research Agenda**

A shared vision of urban research needs over the coming 5 – 10 years began to emerge which formed the basis of URBAN-NET's Strategic Research Framework.

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. Specific research fields including key topics and questions are defined and outlined for each of the 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; and
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.

The research areas are not mutually exclusive, therefore, whilst key climate change research topics and issues are discussed within the Climate Change theme, the other 3 research areas also raise research questions that have high relevance in the context of climate change in the urban environment.

### **Climate Change in the Urban Context**

This theme explores how research can facilitate urban sustainability in the face of anthropogenic climate change.

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

Climate change, its causes, effects and consequences, presents 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 and global pressures and contexts. Cities are relevant entities, both in adaptation and mitigation processes, as they are one of the prime levers for coordination of individual behaviours.

Climate change is not approached at the city level generally or in the interactions between urban actors. To imagine a city mobilizing all its actors to mitigate climate change whilst adapting to its impacts, is to imagine the future of the city - a future that we will have to make happen.

The city-futures developed in the framework are:

- the city as a conscious community in which residents, citizens, consumers, enterprises, local officials are well-informed by scientist and policy-makers and are able to participate effectively in decision-making processes;
- the city as a complex adapting system able, with the help of researchers, to translate assessment and management of risk and uncertainty into concrete,

visible transformations in the local fabric and in how land is used and managed in city regions;

- the city as an embedded system with zero-carbon emissions, zero-waste, shorter supply chains and strong links between actors to maximise energy efficiency and minimise global warming;
- the city as a healthy network optimising mobility and accessibility for work, recreation and leisure, including networks of green and blue infrastructure benefiting health and wellbeing, supporting ecological diversity and mitigating the impacts of climate change.

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.

### **Curbing climate change: adaptation and mitigation**

Two globally agreed strategies for combating climate change to which every urban region, city, institution and individual can contribute are:

- Adaptation to climate change in terms of reduction and management of the expected impacts and maximising opportunities to benefit from the changing climate and environmental conditions.
- Mitigation through reduction of greenhouse gases emissions in all sectors (mobility, building, production, consumption etc.)

Particular care is needed to ensure that efforts on one part do not limit or negate the other, but are well-integrated. This demonstrates the importance of careful examination and understanding of the synergies as well as trade-offs between adaptation and mitigation strategies.

Cities are relevant entities both in adaptation and mitigation processes. In this context, the concept of the “Resilient City” is helpful in defining a goal to work towards. There is a real need to work towards the establishment of Resilient Cities, urban areas able to absorb changes, reorganize and develop flexible integration processes in the economic, social/cultural and ecological dimensions. A clear

definition of “resilience” is needed to help explore 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.

Further inquiries into the relationships between spatial planning, logistics, energy and resource use and infrastructure are needed. 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.

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 is essential. Researchers currently report difficulties in effective data gathering and evaluation of territorial vulnerability due to changing political pressures and short-term goals.

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 “climate change proof” they are.

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

- A reduction of 20% of greenhouse gas emissions (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 allows Member States considerable freedom to implement further measures in the national context. With urban infrastructure users being major GHG emission sources, urban life will be increasingly modified by mitigation measures.

Research that will contribute to the attainment of EU emission targets should aim to overcome the lack of objective information on monitoring and bench-marking in the urban context and target how to communicate and adapt information for different actors at all urban scales. The lack of short-term monitoring and statistical data must be addressed nevertheless to enable the development of robust models.

Land-use changes together with the use of fossil fuels are the major anthropogenic sources of carbon dioxide which have to be reduced to address climate change. Integrated, long-term orientated decision making about land use is crucial for sustainable development. Urban sprawl is fed by and feeds increased mobility and transportation which has implications for greenhouse gas emissions.

Land-use planning determines ecological functions of land and has significant scope to promote nature and biodiversity interests which have a fundamental role in responding to climate change. Land is part of the natural cycle providing biodiversity, drinking water, clean air and food. Value must be afforded to these critical functions, in assessing local land-use strategies.

Built areas have to make profound progress in reducing CO<sub>2</sub> emissions. Environmental standards for new buildings and emission limits for existing stock have to be rigorously implemented. This leads to economic, social, technical, and political problems, some of which are being addressed but with no apparent evidence of an integrated approach.

### **Living with climate change: quality of life**

The IPCC (2007a) 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:

- 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. The IPCC (2007b) also emphasizes that climate change and quality of life are linked in complex ways, such as in recreational patterns.

In this context research could contribute to the development of a pan-European definition of quality of life, including the development of a minimal common standard throughout the European continent. Such research should preferably include an examination of the social impacts of climate change, providing feedback on which groups are the most vulnerable and the type of measures that would be the most beneficial.

The Leipzig Charter on Sustainable European Cities (2008) gives particular emphasis to “creating and ensuring 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 or the role that public spaces may play in minimising discomfort and maximising the opportunities and benefits of climate change.

The Framework’s priority research area on Health, Quality of Life and Public Spaces highlights a few of the many benefits that well planned, designed and effectively managed public spaces could afford urban regions in combating climate change impacts. Green networks and corridors promote biodiversity and enable movement of wild life - a key adaptation strategy for motile species. Trees and vegetation can contribute to energy reduction by providing shade and shelter for buildings. They also play a role in controlling air and water pollution by absorbing pollutants and provide vital water management functions helping to balance surface water drainage by dampening peak flood events and maintaining baseline flows in rivers. The significant increase in hard surfacing and the reduction of green spaces in urban areas leads to higher temperatures in towns and cities than in the surrounding countryside and also exacerbates flood/drought cycles.

Developing new indicators of quality linked to biodiversity and the management of water and green resources in the face of climate change will help provide stronger evidence to redress these imbalances.

Existing infrastructure will still be in use in coming decades and the impacts of climate change, changing demographics, social and cultural needs will require flexibility to be built into public space provision. Opportunity for future proofing for changing uses and provision for retrofitting will need to be considered at the conceptual and design stages.

## **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 uncertainties as to how political, demographic, socio-economic and technological changes will affect emissions of greenhouse gases.

There is a lack of certainty surrounding the risks and magnitude of potential consequences of climate change. Predicted effects of climate change might differ markedly from observed effects. Climate simulation models from across Europe differ markedly in their outputs due to gaps in monitoring data and indicators for certain regions 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. Risk assessment provides information on the spatial impacts of natural hazards and extreme weather events. Risk management requires the development of procedures to integrate risk assessments into the spatial planning process<sup>2</sup>.

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 such variables as population, land-use, energy sources, consumption, etc.

Different socio-economic scenarios are needed to 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 partners call not only for the quantification, analysis and improved accessibility of existing data but also for the development of methodologies to

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<sup>2</sup> Fleischhauer, 2005

assist with decision-making under conditions of high uncertainty as presented by climate change.

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

Climate change is an international problem but its causes and consequences operate 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 tiers of governance are fully involved in climate change related policy and decision-making. In turn, such decision making and forthcoming policies need to be connected to decisions and policies at regional, national, European and international scales.

Pivotal to this topic is the question, how can we strengthen delivery capacity at the local level, taking into account the differing contexts and multiple levels of knowledge, skills and organizational issues? Research should be applied to finding out how we can overcome different levels of competencies, both within and 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. Science needs 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 programmes commissioning research funds to such projects would be based on a policy-relevant approach whilst also including citizen panels in project proposal assessments.

In order to 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.

With a large variety of research ongoing in different locations, there is a strong need for access to and sharing of information. This could be facilitated by creating more communities of research and practice on climate change at local and regional levels which would also define, develop and share best practice.

Dialogue between all involved actors is crucial. URBAN-NET stresses a clear need to devolve all knowledge to the local level. For example, arguments for new social and behavioural attitudes will need to be supported by convincing research if we are to effectively and sustainably address flooding in coastal cities and encourage responsibility for global change, the economics of energy efficiency alone will not suffice in tackling climate change. Research programmes should include methods and tools for communication and knowledge exchange.

Measures that empower and motivate citizens to respond positively to the challenges of climate change should be a focus of research. Interventions may include fiscal incentives, legislative measures, social support systems and marketing strategies to increase awareness. Action research or the implication of citizen panels in research project assessments could be beneficial in bringing more direct understanding and citizen engagement with research methodologies and results. Climate change models should be developed with a public, informative, interactive and education front-end to increase the public's learning curve on climate change.

The recommendations for further research outlined above do not constitute a full agenda, but provide a framework which will be developed further and implemented in an interactive process that includes representatives from cities across Europe.

### **URBAN-NET Research Projects on the Theme of Climate Change**

An URBAN-NET pilot call last year on the broad theme of Urban Sustainability resulted in 26 applications from researchers in 8 European countries. A prerequisite for funding was that the proposal included researchers from at least three funding countries. Eleven research projects have been funded 4 of which feature climate change as an explicit theme.

**Research network for climate neutral cities:** The project aims at formulating research questions and developing evaluation criteria in relation to an Interreg IVC project application - climate neutral urban districts in Europe. The Interreg proposal is to support the integration of climate aspects into urban planning processes for 15 or more urban districts in Europe in order to make a contribution to climate change.

**The potential of climate change on heat stress in different built structures and cities across Europe:** The aim of this pre-research is to carry out a pilot study,

including simulations of future heat stress in different built structures and cities across Europe. Yearly, monthly and daily heat stress maps will be produced and aerial means for different built structures will be calculated in order to analyse the interaction between urban geometry and the thermal environment – knowledge that can be used to mitigate heat stress in urban areas.

The pre-research consortium includes researchers working within urban climatology, urban design, biometeorology, epidemiology and environmental psychology across Europe. The results from the pilot study will be presented and discussed at a European workshop with invited research partners, advisory partners as well as other researchers and practitioners involved in urban planning, climate and health issues. Problems and questions arising will provide the basis for a full joint URBAN-NET or FP7 research proposal.

**Urban tourism and climate change:** The hypothesis for this research proposal is that urban tourism in Europe will change in relation to global climate change. The main objective is to prove the hypothesis by investigating i) the future regional and local climate in respect to thermal comfort and stress, ii) the awareness and knowledge among different actors, iii) the preferences of tourist destinations in respect to season and climate, iv) adaptation strategies and consequences for society.

Case studies including questionnaires and interviews will be carried out in urban regions of Sweden, Portugal and Turkey, focusing on actors involved in tourism and urban planning as well as travellers and researchers. Results will be compiled in a database to be used for future urban tourism recommendations and strategy across Europe.

**Towards an optimisation of urban-planning and architectural parameters for energy use in Mediterranean cities:** Recent studies on the influence of climate change on North-European cities suggest that within 50 years they may experience a climate close to that of South-European cities today. This has enormous resource implications when the design and layout of the urban fabric and the individual buildings are not well suited to mitigate extreme conditions. There is a strong need therefore for strategic designs to be developed which would mitigate such environmental changes. Whilst the general cause of overheating of cities is well known, it is not well understood how much influence different urbanization characteristics as well as building materials have on the intensity of the city overheating.

The project aims to investigate the influence of urbanisation in terms of architectural parameters in relation to energy use. Most research hitherto has addressed individual street canyon flows, and the effect of the canyon aspect ratio and orientation. Research will focus on the whole real city, its overall form and the street network, which can be seen as a ventilation network removing heat. In particular, the project will address a typical Cypriot urban site as a generic Mediterranean case.

The complexity of the problem requires an inter-disciplinary approach involving computational and experimental methods: Computational Fluid Dynamics (CFD) simulations, wind tunnel laboratory experiments and field measurements of surface heat fluxes.

Climate change is an implicit factor in a number of the other funded projects which range from an innovative approach to integrating “ecosystem services” into urban spatial planning to promote urban resilience to another project which intends to analyse the interaction between socio-ecological systems and governance systems, and to show how they might mutually adapt in response to crises, such as climate change.

### **Framework Principles and Implementation**

To implement the framework URBAN-NET is determined to pursue a set of activities that range beyond the first project phase lasting until late 2010. It will adopt suitable ways to translate major parts of the framework into tangible, achievable, realistic and time-based cooperation activities. Such activities, forming part of an implementation plan to be delivered by the URBAN-NET partners in association with interested stakeholders will include: communities of practice; knowledge exchange; indicators and future funding options. Beyond that it will 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, urban practitioners and researchers.

An URBAN-NET full call will be launched in October 2009. The call text will be developed from the research framework and evaluation of the proposals will incorporate the main principles for urban research developed as part of the Framework.

Principles include the need to pay a high level of attention to knowledge exchange and policy influence with the objective of enlightening and contributing to progress in policy and practice. It is imperative for URBAN-NET that results from European transnational research are brought into practice and the uptake of these outputs are enhanced at local and regional levels. Research on sustainable urban development within the framework should respond to the most constraining knowledge gaps, upcoming complex problems, major challenges and future necessities which are significant at the European and international level. It should provide knowledge that has not been obtained so far at any programme levels, be it supra-, transnational or national. The results should offer far reaching solutions and provide clear added value to national research arenas, policy makers and/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.

Projects should pursue problem-oriented inter- and transdisciplinary approaches. There should also be sufficient space for more experimental research, more pilots and demonstration projects as well as more effective dissemination of results and provision of appropriate training. Dissemination, demonstration and transferability are a key concept and methodology of research projects under the URBAN-NET framework.

### **Future Oriented Approaches at the Local Level**

The path to a sustainable Europe in the face of climate change leads via liveable, future orientated and innovative cities, which are able to develop transferable local solutions and adaptations. From a transnational perspective, therefore, it is highly recommended to emphasis 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?

To summarise, URBAN-NET's Strategic Research 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.

The Framework is now being used to promote a pan-European focus on current, evolving and future urban sustainability issues with strong endorsement for wider application of the 'integrated approach' in the development of sustainable cities in Europe.

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