



# Adaptation Strategies for European Cities

## *Final Report*

This is part of the Final Report of the project "Adaptation Strategies for European Cities" which has been compiled by Ricardo-AEA for the European Commission Directorate General Climate Action



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## Adaptation Strategies for European Cities

Final Report



**Report for EC Directorate General for Climate Action**

Ricardo-AEA/R/ED57248

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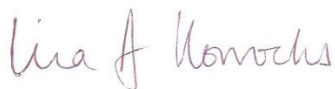
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# Executive summary

## Background.

Cities in Europe are major centres of economic activity, innovation and employment; over 70% of Europeans live in cities and this is likely to increase in the future. Cities never stand still and their future development includes demographic changes, technological advances and economic transitions. These changes may lead to increased vulnerabilities and challenges, as well as opportunities for improving quality of life, economic competitiveness, health and urban biodiversity. Climate change is an additional pressure, which may exacerbate current and future risks faced by European cities, but proactive adaptation can enhance resilience and provide additional opportunities for sustainability and growth. The major climate challenges are impacts resulting from flooding, heatwaves, water scarcity (drought), coupled with coastal impacts for those cities in vulnerable locations. The EU Adaptation Strategy has highlighted the importance of implementing adaptation measures at city level<sup>1</sup>.

## Purpose of this project

Against this backdrop, DG Climate Action commissioned this project “Adaptation Strategies for European Cities”, which has been carried out over the period December 2011 – June 2013 by a consortium led by Ricardo-AEA and ICLEI, including Arcadis, adelphi, University of Manchester and Alexander Ballard Ltd. The aims of this project were to provide capacity building and assistance for cities in developing and implementing an adaptation strategy, and additional technical support to DG CLIMA on the state of play of urban adaptation. The project also intended to raise awareness throughout Europe of the importance of preparing for climate change in cities. Exchange of knowledge and good practice and development of tools and guidance on how cities can adapt to climate change were also important aspects of the project.

These aims were achieved through a large number of tasks and activities within the project which are summarised in the following sections of this Executive Summary. Further information on each of these is then provided in the main body of the report.

## Raising the Profile of Urban Adaptation

Awareness of the importance of urban adaptation was raised across Europe through engagement with many cities and city networks. The following activities were carried out:

- A survey to find out how well cities understand the need for adaptation and their capacity to develop and implement adaptation strategies.
- The organisation of two stakeholder dialogue meetings.
- Engagement by the project team at over 17 conferences and events across Europe.
- A panel session at the launch of the EU Adaptation Strategy.
- The EU Cities Adapt final conference held during the Resilient Cities Open European Day.
- A project website<sup>2</sup> and email communications.

The project has highlighted that there is an appetite and enthusiasm for adaptation at city level, and that cities view adaptation strongly as an opportunity to enhance sustainability and quality of life. City planners and key target groups were able to see how climate change challenges and risks can be transformed into significant opportunities. Political resistance to implementing adaptation measures has been reduced through presenting potential no- or low-regret measures, win-win solutions and good practice examples from other European cities.

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<sup>1</sup> [http://ec.europa.eu/clima/events/0069/index\\_en.htm](http://ec.europa.eu/clima/events/0069/index_en.htm)

<sup>2</sup> <http://eucities-adapt.eu/>

The project was able to bring political leaders (such as Mayors or Deputy Mayors) to see the importance of climate change adaptation to the city's socio-economic development agenda. It helped to link adaptation and mitigation agendas (e.g. in Lahti) and provided vital encouragement to political leaders who are prioritising adaptation within long-term city policies and plans and who are now showing commitment to implementation of adaptation (e.g. Gibraltar, Burgas, Vilnius).

With the knowledge and awareness gained by representatives of the local administrations during the project, and by leveraging the political support of local decision makers and leaders; an important foundation has been laid for developing adaptation strategies in cities. The adaptation strategies, planned or developed in the participating cities, are paving the way forward for sustainable businesses and society, as recognized by cities like Sfantu Gheorghe.

The project identified that key drivers at city level for action on adaptation are the links to broader policy issues including sustainable urban development and improvements to quality of life – this may be an important lever given the current economic challenges faced by many European cities. However, national and regional requirements and recommendations are essential to provide a 'policy push' to encourage the development of city level adaptation strategies so that cities are able to gain local political commitment and establish a mandate to develop an adaptation strategy, as well as justifying and building the required resources to follow this through.

At an individual city level, participation in the project provided a good starting point to initiate the thinking and discussion amongst key stakeholders on adaptation and positioned adaptation on the local government agenda for the first time in many cities (e.g. Vilnius, Zadar, Albertslund, Burgas). This was initiated by the project requirement for the city leaders to sign a declaration of commitment to the capacity building programme provided by the project. This was followed through by the formal commitment provided by European Commission backing of the project, and embodied by a comprehensive approach to capacity building. In particular, the provision of expert coaches provided many cities with the catalyst to make significant progress. Participation in the project made it possible for climate adaptation to emerge as a clear and visible theme in the policies of the city decision makers (e.g. Ghent, Lahti), to bring together both actions which are already under development and newly proposed actions by the municipalities. An initial impetus was provided to create a collective vision for climate readiness (e.g. Zadar), develop clear and consistent adaptation strategies and mainstream adaptation into high level policies, instruments and projects such as spatial plans, green space strategies, emergency response plans, and economic development strategies (e.g. Sfantu Gheorghe).

### Improving the Knowledge Base

The project delivered an improved understanding of the state of play of adaptation in European cities. Key reports have been uploaded to Climate-ADAPT for wider dissemination. A framework considering three dimensions to climate risks in cities (hazards, vulnerability and adaptive capacity) provided a useful structure for cities to consider in analysis, engagement and training in adaptation. All three aspects show strong variations across Europe and even within cities.

Review and analysis identified that geographical differences in adaptive capacity exist (with cities in the north and west of Europe generally having higher levels of adaptive capacity than those in the south and east). This implied that tailored programmes to enhance adaptive capacity would be most effective to address specific needs and contexts. The experiences from coaching different cities also reinforced that adaptive capacities and barriers seem to vary greatly. There is no single "best practice" approach to the development of adaptation strategies and each city has to identify their specific strategic objectives and develop their adaptation strategy accordingly.

The project brought together a range of vulnerability analysis tools, which were presented across the coach visits and which helped to:

- Assess climate change hazards and impacts in the short, medium and long-term
- Communicate local scale data on extreme weather and climate change to relevant decision makers and stakeholder group
- Highlight current and future vulnerable sectors / service areas in participating cities and access meteorological data from national weather services.

A city adaptation toolkit was developed during the project, which provides an inventory of tools and resources generated in or used during the course of the project, and recommended as useful for cities in the development of their adaptation strategies. It also explains how the different resources and tools available on Climate-ADAPT can be linked together and presented in the future. This toolkit is a key deliverable to help ensure the legacy of the project and to share the learning and experiences of the cities which have been directly involved.

### Capacity Building in the Cities

Twenty-one cities from across Europe were selected to participate in the capacity building and training phase of the project. They were selected using criteria based on the knowledge review and clustered into three groups which face similar climate change challenges:

- Northern, Northern-Central & Northern-Western Europe which were merged into one due to their closeness in character and similarities in anticipated climatic impacts
- Southern-Central Europe including landlocked cities within the European mainland
- Mediterranean Europe, including coastal or near coastal cities in Southern and South Eastern Europe.

Each group comprised five training cities and two peer cities, to provide support and share experience of adaptation practice. Representatives from these cities took part in workshops, peer reviews, e-training and received two personal coaching visits in situ.

During the project, adaptive capacity has been built in all of the participating cities. Both training and peer cities have benefited. Some of the cities were completely new to adaptation and have made the first steps along the journey. Some of the cities have progressed their initial efforts into new sectors or have used this project to underpin other projects to support adaptation. For many, the project served as an important opportunity to build capacity among wider authorities and stakeholders.

Finally, the discussions with the cities helped to investigate the challenges and barriers to the sustainability of adaptation projects and programmes in the cities. The key challenges to adaptation most commonly reflected upon during the coach visits were:

- The lack of awareness or understanding of adaptation
- Lack of baseline information
- Dispersed data and lack of co-ordination across departments
- Greater emphasis on mitigation as opposed to adaptation
- Ineffective internal communication
- The lack of adequate political commitment or funding.

### Progressing the EU Adaptation Strategy

The project has demonstrated that if the framework for capacity building and information exchange on adaptation can be provided by the EU or an overarching network, then cities will engage and can be supported and coached to make quite rapid progress in the development of strategies. The project has also shown there is a role for the EU to provide coherent methodologies and create and support political commitment to participate in the process (e.g. by means of Mayoral declarations). This is a very important outcome for progressing implementation of the EU Adaptation Strategy.

The development of Climate-ADAPT provides an appropriate platform to support dissemination and use of the rich array of tools, support and guidance available to cities for



the different stages of the adaptation journey. There has been an increasing awareness of Climate-ADAPT through the lifetime of the project and participating cities recognise the potential for much greater use of the platform in sharing information. New resources and content have been provided by the project for use in future.

There is scope for future initiatives to learn from the experience of this project in linking research and capacity building. From the perspective of cities, the training and coaching elements seemed to have the greatest impact, and there would be scope to integrate the research and analysis elements more closely with the interaction with participating cities to enable research insights focused to the cities.

### **Conclusions and recommendations**

Conclusions and recommendations based on our experiences, and those of the participating cities and coaches are provided in Section 6 for consideration in two areas, first in relation to future programmes to support capacity building on adaptation among European cities, and second in relation to policy development.

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# 1 Introduction

This is the final report for the project 'Adaptation Strategies for European Cities' (reference 071201/2011/609697/SER/CLIMA.C3), which is submitted in accordance with Ricardo-AEA's proposal dated 31 August 2011.

Adaptation Strategies for European Cities was carried out on behalf of the European Commission, Directorate General for Climate Action, (DG Climate Action) to help provide capacity building for cities in developing and implementing a climate change adaptation strategy. The project aimed to help better equip cities across Europe to adapt to climate change through a structured and focussed support package, building on existing networks of stakeholders and drawing upon peer learning.

Chapter 1 provides the background and context to the project along with an overview of the project team and the approach to delivering the project. The results for each of the tasks are provided in the following chapters:

**Task 1:** Build a typology of the climate change vulnerabilities risks and adaptation of cities and urban areas. (See Chapter 2: Typology and Assessment).

**Task 2:** Raise awareness, set up information and knowledge sharing and organise stakeholder dialogues on adaptation to climate change in cities. (See Chapter 3: Stakeholder Engagement).

**Task 3:** Training and capacity building on adaptation to climate change for city authorities. (See Chapter 4: Training and Capacity Building).

**Task 4:** Organise a final conference on cities and adaptation and produce a final report. (See Chapter 5: Building the Legacy).

Chapter 6 provides conclusions and practical recommendations for the next steps. The appendices provide some of the key outputs from the project.

## 1.1 Background

### 1.1.1 The Challenge Facing Cities in Europe

Cities in Europe are vital centres of economic activity, innovation, employment and population. They are the cornerstone of Europe's economic strength and wealth and key to Europe's future prosperity. Cities are therefore a key focus for adaptation action.

Many European cities face problems and challenges from pressures such as overcrowding, ageing infrastructure, increasing congestion and competition for services. Such pressures can lead to social problems including the concentration of deprivation and unemployment in urban neighbourhoods, and environmental problems such as pollution from transport and industry. These problems can often affect a much broader area than the city itself, as demands for energy, waste management and other resources such as water reach far beyond the administrative boundaries of the city.

Many of these challenges are expected to increase in the future as cities continue to grow in size. For example, the Urban Audit<sup>3</sup>, a collection of quantitative information on the quality of life in European cities, shows considerable population growth across all European cities and this trend is projected to continue. The European Environment Agency (EEA) in its 'State of the Environment 2010' report suggests that around 80% of Europe's population will live in

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<sup>3</sup> <http://www.urbanaudit.org/>

urban areas by 2020. Cities will not only be bigger; they will also experience demographic changes such as ageing populations. These changes will lead to increased vulnerabilities and threats to the quality of urban life, economic competitiveness, health and urban biodiversity.

Climate change is an additional challenge for European cities. The major threats to European cities are the impacts resulting from flooding, heatwaves, and water scarcity (or drought), coupled with coastal impacts for those cities in vulnerable locations. In addition, climate change can magnify the pre-existing socio-economic challenges that cities face<sup>4</sup>. Climate change will exacerbate existing risks and lead to novel hazards and threats. In some cases, climate change will also present economic, social and environmental opportunities; however, evidence from the Inter-governmental Panel on Climate Change (IPCC) suggests these opportunities are unlikely to be evenly distributed across Europe. This is increasingly a focus for research and policy initiatives across Europe. Based on a review of available literature,<sup>5</sup> the main impacts from climate change for European regions and cities can be summarised as follows:

- Southern Europe: more heat waves, droughts and water scarcity.
- Central and Eastern Europe: more droughts, heat waves and river floods.
- Northern Europe: more damage by winter storms and floods.
- Mountainous areas: more natural hazards, including floods and rock falls.
- Coastal areas: sea level rise and increased frequency of storm surges.

However, the particular nature of the city itself will lead to specific vulnerabilities that in turn will require tailor-made action to suit its distinctive and particular needs.

An important criterion for the selection of adaptation measures should be that the measure is consistent, or even complementary to adaptation or mitigation efforts in other sectors (Smit and Pilifosova, 2001<sup>6</sup>). Analysis of the inter-relationships between adaptation and mitigation may reveal ways to promote the effective implementation of adaptation and mitigation actions together. However, such synergies provide no guarantee that resources are used in the most efficient manner when seeking to reduce the risks to climate change (Klein *et al.*, 2007<sup>7</sup>).

The synergies between adaptation to climate change and mitigation action are of particular interest in urban environments. In some instances the two can be in direct opposition as it may be difficult, for example, to combine green roofs and solar panels on one building. However, in many cases adaptation and mitigation are compatible. Building insulation allows energy-saving for heating but also maintains lower temperatures in hot periods. Green infrastructure solutions in particular can address both the root cause and the impacts of climate change. Vegetation provides a carbon sink whilst at the same time lowering temperatures in the city (EEA, 2012<sup>8</sup>).

### 1.1.2 Adaptation of European cities to climate change

In terms of adaptation, Europe's resilience to climate change depends largely on local action. Cities are in a unique position to develop locally tailored responses to the impacts of climate change because they have first-hand knowledge of local conditions and can develop proactive strategies, generate buy-in for ambitious targets, and build networks with their

<sup>4</sup> EU Adaptation Strategy 2013, 16/04/2013 - SWD (2013) 132 - [Impact Assessment Part 2](#)

<sup>5</sup> This summary is taken from a scoping study undertaken for the EEA by the European Topic Centre on Air and Climate Change (ETC/ACC) on 'Vulnerabilities, Vulnerability Assessments by Indicators and Adaptation Options for Climate Change Impacts'. The authors include staff from AEA and ICLEI

<sup>6</sup> Smit, B. and Pilifosova, O., 2001: Adaptation to climate change in the context of sustainable development and equity. Contribution of the Working Group to the third assessment report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge.

<sup>7</sup> Klein, R.J.T., S. Huq, F. Denton, T.E. Downing, R.G. Richels, J.B. Robinson, F.L. Toth, 2007: Inter-relationships between adaptation and mitigation. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 745-777.

<sup>8</sup> European Environment Agency 2012. Urban adaptation to climate change in Europe Challenges and opportunities for cities together with supportive national and European policies,



peers. However, this adaptation also requires higher-level coordination as cities are ultimately nested within a legal and institutional context established by national governments and the European Union (EU). These institutional settings and the interactions between different levels of government and other stakeholders are important in inhibiting or facilitating local adaptation.

According to earlier survey work by the EEA, and evidenced by the new Climate-ADAPT platform<sup>9</sup> it is clear that adaptation is progressing across Europe, but this is patchy, uncoordinated and of varied quality.<sup>10</sup> The same is true for adaptation across Europe's cities (e.g. EEA, 2009<sup>11</sup>; International Council for Local Environmental Initiatives (ICLEI), AEA and the Regional Executive Committee for the Committee of the Regions, 2010<sup>12</sup>; ICLEI, 2010<sup>13</sup>). While some cities are pioneers, acting above and beyond their respective national governments, there are also cities that clearly need more support and guidance in order to adapt effectively. One aim of this project was to help ensure that there is a greater balance in adaptation across Europe's cities through support and facilitation.

Adaptation remains a new policy area for many city administrations and important questions asked by such organisations will be "What does an adaptation strategy look like?" and, "How should it be developed?"

While the process and needs of adaptation vary across the diverse range of European cities, in previous work by AEA and the ICLEI for the Committee of the Regions on adaptation in European cities, we identified a number of high-level principles that emerged as being important for the development of an adaptation strategy in a city. These include five 'success factors' essential to effective adaptation strategy planning and implementation:

- **Leadership** - strong leadership is critical for adaptation planning in cities as a lack of political commitment is a key challenge to overcome when developing a city adaptation strategy.
- **Stakeholders** - adaptation requires dialogue between different and diverse stakeholder groups and this should be maintained at all times. Early involvement of stakeholders and residents is important for best practice adaptation in cities.
- **Information and knowledge** - climate and non-climate information must be available to cities to create knowledge about the risks and opportunities of climate change.
- **Adaptation-as-learning** - adaptation is an iterative process requiring space and time for innovation, training of staff and stakeholders and a learning atmosphere where honest reflection is encouraged.
- **Tools and guidance** - central to the development of city-level adaptation strategies is the availability of tools and guidance documents to help decision-makers prepare to adapt to the impacts of climate change

## 1.2 How this project addresses the challenges

Our vision for this work was that through the life of the project and beyond, cities across Europe would be better equipped to adapt to climate change through a structured and focused support package that builds on existing networks of stakeholders and draws on peer learning to maximise efficiencies and ensure longevity.

Specifically, the project sought to:

<sup>9</sup> <http://climate-adapt.eea.europa.eu/>

<sup>10</sup> <http://www.eea.europa.eu/themes/climate/national-adaptation-strategies>

<sup>11</sup> <http://www.eea.europa.eu/articles/cities-of-the-future-2013-how-will-european-cities-adapt-to-new-climate-conditions>

<sup>12</sup> <http://www.cor.europa.eu/pages/DocumentTemplate.aspx?view=detail&id=29ccc402-ca21-466e-9859-4e9203d9b9ae>

<sup>13</sup> <http://www.lne.be/en/2010-eu-presidency/events/climate-adaptation-conference/agenda/conference-day-2/background-ws-4-adaptation-in-cities-quality-of-life>

- **Expand the knowledge base** of the likely impacts of climate change facing cities and their capacity to adapt to them.
- **Engage cities across Europe**, raising awareness throughout Europe on the importance of preparing for climate change in cities.
- **Facilitate capacity building for selected cities**, exchanging knowledge and good practice between cities.
- **Share the lessons learned**, including the tools developed during the project and guidance for cities on adaptation.

To facilitate adaptation in Europe, the EU has provided advice and a framework for action through the 2013 EU Adaptation Strategy. The outputs from this project contributed to the urban dimension of the Strategy. The planned outcome was that a greater number of cities would be better able to adapt to climate change by drawing on the assembled evidence, web-based tools and the training and capacity-building provided by our consortium and city peers. The 21 cities involved with this project will set an example for the c90,000 sub-national authorities in the EU-27.

In order to achieve the strategy objective of 'Promoting action by Member States' at the city-level, the Commission is providing LIFE+ funding (the EU's funding instrument for the environment) to support capacity building and step up adaptation (Action 2), including within cities, and introducing adaptation in the Covenant of Mayors framework (Action 3) as a direct incentive for cities to engage with adaptation. This project provides a demonstration and learning point to support both of these. This project also contributes to the EC's role in knowledge transfer for adaptation, indicated by the objective for 'Better informed decision-making' and the project is the city-level starting point for Action 4: bridge the knowledge gap.

To ensure that actors at all levels, including city-level, have access to reliable data on the likely impacts of climate change, the associated socio-economic aspects and the costs and benefits of different adaptation options, the Climate-ADAPT platform was developed. This is a web-based information system that became operational at the end of March 2012, and is a key mechanism of the 2013 EU Adaptation Strategy that will be updated and improved going forward. It maintains a wide range of information at European, national, regional and sectoral levels on climatology and impacts, vulnerability assessments, good adaptation practices and policy frameworks.

Climate-ADAPT is particularly relevant for adaptation at the city level:

- By enhancing information structuring and sharing, the platform facilitates the collection and dissemination of case studies about climate change impacts and vulnerability, scientific information and data. These are directly relevant to city administrations as they start the process of adaptation and review and update existing strategies in light of new information.
- Climate-ADAPT will lead to a greater level of coordination among the EC's relevant sectoral policies and national planning efforts, which will act as enablers or barriers to adaptation at the city level.

This project supports Climate-ADAPT: it has provided added value to the content of the website itself and will act as a demonstration/pilot for other themes, stakeholder groups, users and sectors to come under Climate-ADAPT. The outputs from this project provide an excellent source of information that have been fully or partially integrated into the platform.

The EC is the only organisation with the resources and influence necessary to kick-start practical action on the ground across Europe, particularly through knowledge transfer and sharing best practice but also in its role as facilitator and liaison between cities across Europe. Cities require tailor-made advice to suit their distinctive characteristics. But it is also important to learn from the 'early movers' and to share best practice.

The EC can engage parties across Europe and bring actors together, including local governments, non-governmental organisations (NGOs) and the private sector. All these stakeholders play a vital role in adaptation and help to provide practical support to build a critical mass. This project is the start of a new vision for European progress in adaptation. It has enabled and encouraged peer-to-peer learning, the sharing of experience, and partnership working to find and implement the most effective solutions to climate challenges. The EC underpins and holds together these activities, building capacity among service providers and city officials to accelerate practical steps to address climate vulnerabilities in accordance with good principles for adaptation, the latest scientific evidence, targeted guidance and accessible tools.

We recognise that this project has been an excellent opportunity for the EC to demonstrate its critical role in adaptation by providing the resources and European-wide approach to support and facilitate adaptation on the ground. A critical success factor is that, by the end of the project, there are more cities included in the network, the relationship between cities is flourishing and there is continued knowledge sharing to obtain the necessary 'critical mass'.

### 1.3 The project team

This project was conducted by a consortium of partners led by Ricardo-AEA Ltd in partnership with ICLEI, the University of Manchester, adelphi, Arcadis and Alexander Ballard Ltd.

- **Ricardo-AEA** is at the forefront of efforts by businesses and governments at all levels to understand the implications of climate change and to develop effective strategies and policies to adapt to climate change.
- **ICLEI – the Local Governments for Sustainability, European Secretariat** is an international association of local governments as well as national and regional local government organisations, which have made a commitment to sustainable development. ICLEI provides technical consulting, training, and information services to build capacity, share knowledge and support local governments in the implementation of sustainable development at local level.
- **The University of Manchester**, represented by the renowned Centre for Urban & Regional Ecology, has technical expertise on cities and climate change impacts, vulnerability and adaptation.
- **Adelphi** is experienced in developing adaptation strategies and decision-making aids and helping cities to integrate these demands into sectoral and regional programmes.
- **Arcadis** is an international consultancy that provides technical expertise in the urban environment, focusing on infrastructure, water and buildings.
- **Alexander Ballard Ltd** has expertise and experience in helping organisations and institutions assess how well prepared they are for climate change and then planning through the tried and tested Positive Achievement Change Tool (PACT).

### 1.4 Project tasks and outputs

The project started on 21 December 2011 and was completed in June 2013. Table 1 lists the project tasks.

**Table 1: Project Tasks**

Task	Sub-task	Title
Task 1	<b>Build a typology of the climate change vulnerabilities, risks and adaptation of cities and urban areas</b>	
	1.1.1	Launch, survey & state of play
	1.1.2	Closer Look
	1.1.3	Review good practice

Task	Sub-task	Title
	1.1.4	Design typology
	1.1.5	Approve typology
	1.1.6	Apply typology (categorisation)
	1.1.7	Review classification of cities
<b>Task 2</b>	<b>Raise awareness, setup information and knowledge sharing and organise stakeholder dialogues on adaptation to climate change in cities.</b>	
	1.2.1	Construct web-based platform
	1.2.2	Populate the platform
	1.2.3	Awareness raising (other media)
	1.2.4	Stakeholder dialogue
	1.2.5*	Design and organise training
<b>Task 3</b>	<b>Training and capacity building on adaptation to climate change for city authorities</b>	
	1.3.1	Identify target cities
	1.3.2	Identify 3 sub-groups
	1.3.3	PACT self-assessment
	1.3.4	Web-based tutorials and training:
	1.3.5	Training workshops
	1.3.6	City adaptation coach
	1.3.7	Peer review process
<b>Task 4</b>	<b>Organise a final conference on cities and adaptation and produce a final report</b>	
	1.4.1	Conference on cities and adaptation
	1.4.2	Final delivery

In summary, the project outputs were:

### **Task 1: see Chapter 2: Typology and Assessment**

The aim of Task 1 was to build a typology of the climate change vulnerabilities, risks and adaptation of cities and urban areas. This task involved producing the following:

- A literature review assessing the impacts, vulnerabilities and risks that cities face (Appendix 1).
- An initial survey that received 196 responses from cities across Europe. It was originally intended that the survey would be closed, but it was agreed to leave it open until later in the project. The key findings are provided in the survey report attached as Appendix 2.
- A typology (Appendix 3). This provided a tool which will enable users to answer questions relevant to the project team, city planners and policy makers. It was used to inform the activities carried out for Tasks 3 and 4.
- A review of good practices which illustrated examples for identifying adaptation options, adaptation strategies and guidance tools (Appendices 4-6).
- A State of Play Report (see Appendix 7) which described how cities are adapting to climate change. During the implementation of this task greater emphasis than anticipated in the proposal was placed on preparing this document than the typology.
- A Task 1 report which summarised all of the work carried out for this task.

### **Task 2: see Chapter 3: Stakeholder Engagement**

The aim of Task 2 was to raise awareness, set up information and knowledge sharing and organise stakeholder dialogues on adaptation to climate change in cities. This was an on-going task to maintain awareness of the project during its lifetime. Activities included:

- Development of a web-based platform. As of 10 June 2013 the site received 4,806 visitors (unique visitors: 2,512), visits from 98 countries and 19,499 page views.
- Awareness raising activities such as the development of a flyer and postcards before the launch of the project during the launch of the Climate-ADAPT platform at the

European Environment Agency. Initial launch emails were sent to a wide range (over 5,000) of city and non-city contacts identified by the Project Team. This was followed by targeted emails and a monthly e-newsletter sent to recipients who had expressed interest in receiving news about the project.

- Two stakeholder dialogue meetings were held at Aalborg (Denmark) and Ancona (Italy). These were attended by 65 participants from 40 cities across Europe. In addition to these meetings the project was represented at 9 other events across Europe (Appendix 8).

### **Task 3: see Chapter 4: Training and Capacity Building**

Task 3 involved training and capacity building on adaptation to climate change for city authorities. The aim was to develop and implement intensive training and capacity building for the 21 selected cities on developing and implementing adaptation strategies. The following activities were undertaken:

- The development of a training plan.
- The confirmation of criteria for selection of the cities that participated in this phase of the project.
- The selection of 21 cities to participate in this phase of the programme, including 15 training cities and six peer cities. These were clustered into three groups with similar climate vulnerabilities.
- The PACT self-assessment, surveying the capacities of the selected cities to adapt to climate change was carried out. The results of this survey were fed back to individual cities at the first training workshop, and were used to guide the training and capacity building which was carried out during the remainder of this task. (Appendix 9)
- Delivery of an initial webinar, three initial training workshops and coaching sessions with individual cities (Appendix 10).

### **Task 4: see Chapter 5: Building the Legacy**

Task 4 involved organising a final conference on cities and adaptation and producing a final report. The aim of this task was to provide the basis for the legacy including:

- Delivery of a final conference (Appendix 11)
- Final delivery package including a toolkit on adaptation to climate change for city Authorities (Appendix 12).

## **1.5 Overview of approach**

The methodological approach used in this project was founded on our belief that the sharing of practical experience in adaptation is as important as the transfer of conceptual and scientific information on impacts, vulnerabilities and adaptation. The web-based platform was the central hub for the tasks in this project, providing the foundation for knowledge transfer activities and a focal point that can be built upon and extended well beyond the project's lifetime.

We used the consortium's broad experience in adaptation policy (at city, national and EU levels), city governance, European research, design and implementation of tools and guidance, development of both hard and soft adaptation measures, and our existing networks of European cities to develop a comprehensive, technically excellent, and practically feasible approach to the delivery of the project tasks.

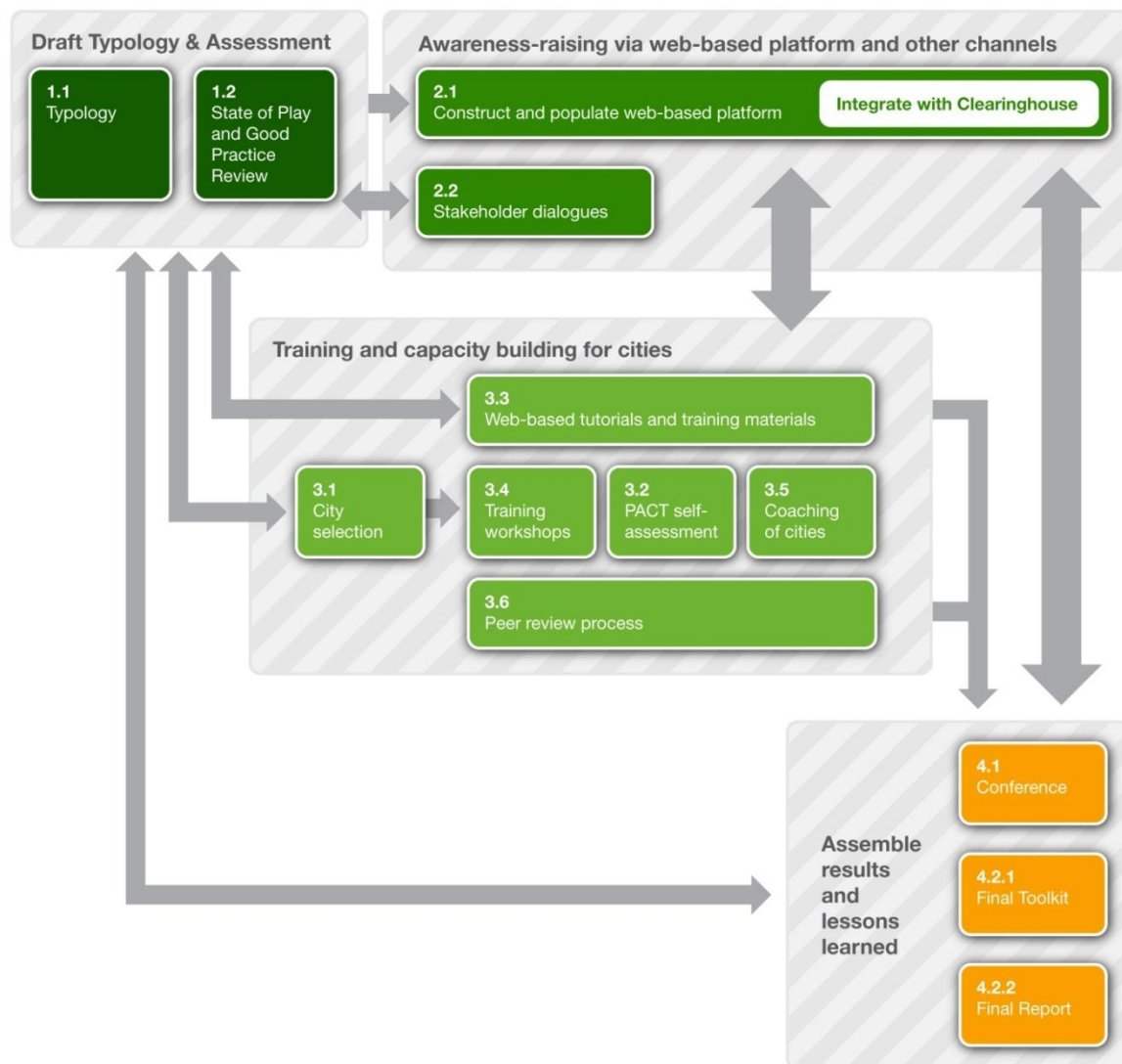
The approach we used to deliver this project is summarised in Figure 1, which shows the inter-relationships between the Tasks and Sub-tasks. This highlights the iterative nature of some aspects of the work: Task 1 provided the starting point, with the development of the



Typology and Assessment, but importantly, these findings were reviewed and updated as the project proceeded on the basis of learning acquired by the consortium and feedback received from stakeholders and experts.

We defined four Work Packages (WP1 to WP4), which aligned with the four Tasks of the initial scope of work, plus an additional Project Management Work Package (WP0) for the coordination and oversight of the project.

**Figure 1: Schematic representation of our methodological approach**



## 1.6 Glossary of Terms

A glossary of terms was developed as part of Task 1 to assist participating cities at the first set of training workshops. This was as follows:

**Adaptation:** Adjustment in natural or human systems (e.g. urban areas) in response to actual or expected climatic stimuli or their effects. Adaptation aims to moderate the potential negative consequences of climate change, or exploit opportunities. Adaptation can be anticipatory, autonomous or planned. In this project, we also include those actions or activities which bring climate adaptation benefits, even if those actions were not initially undertaken as a response to the changing climate.

**Adaptive capacity:** The potential of an individual, system or organisation to design and implement effective adaptation strategies to adjust to information about potential or actual climate variability and extreme weather, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences of climate change. Adaptive capacity is an important prerequisite to city stakeholders planning for climate change and undertaking adaptation.

**City:** There are many definitions of a city. 'City' can refer to an administrative unit or a certain population density. A distinction is sometimes made between towns and cities (the former being smaller). 'City' can also refer to the administrative city, and/or the morphological city, and these do not necessarily correspond. For analytical purposes, a city definition based on a minimum density and number of inhabitants (more than 50,000) has been developed jointly by the EC and the Organisation for Economic Cooperation and Development (OECD). However, in the political agenda concerning urban matters, 'cities' broadly stands for 'cities and towns', therefore also including urban areas of fewer than 50,000 inhabitants. An area that contains one or more municipalities (or LAU2); where half of the residents live in an urban centre, and the urban centre has a minimum of 50,000 inhabitants (DG REGIO, 2011).

**Climate (change) scenario:** A plausible, simplified representation of a possible future climate, based on an internally consistent set of climatological relationships and assumptions of radiative forcing, typically constructed for explicit use as input to climate change impact models. A 'climate change scenario' is the difference between a future climate scenario and the current climate.

**Hazard (here: Climate Hazard):** Weather events to which a city is exposed, with the potential to cause harm, such as heat waves, heavy rainfall. Climate hazards include both extreme weather events and long-term changes in average climate variables such as temperature. In the project, we consider both those hazards which can be observed or experienced now, and those which are projected to occur in future (often with greater severity or frequency). Climate hazards can be small in geographical extent (such as cloudbursts and flash flooding affecting a small part of a city) or large (such as pan-European heat waves and regional droughts). The occurrence of a hazard leads to impacts on sectors, systems, groups or individuals.

**Impact (here: climate impact):** The effect of a climate hazard on an urban system. For example, heat waves (hazard) can cause impacts on urban air quality, human health, energy use, function of transportation, etc. Impacts can be positive or negative, and the size of the impact experienced depends upon the system's exposure to that hazard, and its sensitivity. In this project, hazards and impacts can often be grouped together.

**Resilience (here: Urban Resilience):** The ability of an urban system to cope with climate and other disaster risks and sustainability challenges, while maintaining the current form and function of that area. A resilient city is attractive to investors and inhabitants alike and can turn challenges into opportunities through harnessing synergies, multiple benefits and fostering collaboration.

**Risk (here: Climate Risk):** The combination of the probability of an impact occurring with the magnitude of its consequences. Risks can be understood as both downside (negative) and upside (positive opportunities). The level of climate risk facing an urban system or area at any given time depends upon the magnitude of climate hazards and impacts, the underlying vulnerability of the urban system to the potential hazards, and the capacity of that urban system to adapt. Climate risk therefore varies between and within cities, and over time, influenced by differences in hazards, vulnerability and adaptive capacity.

**Strategy (here: Adaptation Strategy):** A general plan of action for addressing the impacts of climate change, including climate variability and extremes. It may include a mix of principles, policies and measures. There is no single definition for what an adaptation strategy for a city should contain; there are many different styles and levels of detail in

adaptation strategies in Europe. A strategy may be refined through the use of tools and guidance. In this project, the term is used in its broadest sense.

**Town:** an area where the urban centre has between 10,000 and 50,000 inhabitants (DG REGIO, 2011).

**Urban area:** a broad term to describe cities, towns or parts of them.

**Vulnerability:** A variety of definitions exist in a wide variety of different contexts. In this project, we see the vulnerability of city residents, urban infrastructure and systems as the state or context, which establishes their potential for harm from climate hazards (whether or not the hazard actually occurs). Vulnerability is determined by the contextual characteristics of a city such as demographics, size, economic characteristics etc. Vulnerability is influenced by social and economic pressures, which have the potential to exacerbate the biophysical impacts of climate change, combined with a system's adaptive capacity.

This understanding is therefore closer to that of the United Nations International Strategy for Disaster Reduction (UNISDR), which defines vulnerability as “the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard”, than that of the IPCC, which defines vulnerability to climate change as “the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.”

## 2 Typology and Assessment

This chapter of the report provides the final assessment of climate change vulnerabilities, risks and adaptation in European cities and urban areas (Task 1). It is a synthesis of the Task 1 findings, as a record of the evidence base that was used to define and inform the subsequent project activities.

The project specifications refer to the Typology (and sometimes the 'Typology and Assessment') almost interchangeably with reference to the whole of Task 1. Within our project proposal, we identified several distinct activities. These subtasks were:

- Prepare a Literature review of impacts, vulnerabilities and risks (Appendix 1)
- Carry out a Survey (Appendix 2)
- Design and apply a Typology (Appendix 3)
- Review Good Practice: 'Early mover' adaptation strategies (Appendix 4)
- Review Good Practice: Adaptation options and measures (Appendix 5)
- Review Good Practice: Adaptation tools and guidance (Appendix 6)
- Prepare a State of Play Report (Appendix 7).

The Project Progress Reports record how the sub-tasks were undertaken, including ways in which the scope and approach evolved in response to experience gained in the project. All sub-tasks were completed, and individual technical reports are provided as Technical Appendices to this report. Individual components from the review tasks are published on the project website in case study or fact-sheet formats and are in the process of being transferred into Climate-ADAPT (this applies to the document summaries from the literature review, and the summary sheets on options, strategies and tools/guidance produced in the good practice reviews). The State of Play report is a standalone document, and provided in Appendix 7.

### **Box 1 Evolution of the State of Play Report**

The Specifications emphasised that "providing a state of play on how advanced cities are in adapting to climate change, identifying best practices, training and technical assistance and existing guidance tools for cities will be of key added value", but did not provide detail on expectations or structure of a standalone deliverable. Sub-task 1.2.4 in the Proposal responded to this line in the Specifications and set out the intention to collate and incorporate outputs from the Survey and Good Practice Reviews into a "State of Play Report" for the Commission. However, in order to support other DG CLIMA activities (namely, the development of the European Adaptation Strategy), DG CLIMA requested an enhanced and expanded State of Play report with structure and content defined by the requirements of the support for the European Adaptation Strategy. A full draft of the State of Play Report was provided to DG CLIMA in May 2012, and further updates and revised drafts were developed iteratively in response to comments and feedback from DG CLIMA. The first final version of the State of Play Report was provided as an appendix to the Second Progress Report (October 2012).

Further comments on the State of Play Report were provided by DG CLIMA following the Second Progress Meeting and in subsequent emails. Small amendments were made to the State of Play report to address comments where it was possible to do so within the scope and resources of the project. The topic of urban adaptation potentially has a very wide scope, and there are several strands which could warrant further exploration and documentation in the future. Some of these strands have been identified in comments on the State of Play report, and include: private sector vs public adaptation within cities; adaptation of infrastructure and utilities and the complex role of city administrations in this; the EU financing streams and innovative financial instruments which can be tuned to urban adaptation; mechanisms for valuation of (and payment for) urban adaptation benefit from rural environmental services; approaches for adapting interdependent urban systems. These were recommended as areas for future work, but could not be adequately addressed within this project. The final version of the State of Play Report was provided as an appendix to the Third

Progress Report (March 2013) and this is also provided as Appendix 7 to this Final Project Report.

Further support to the development of the European Adaptation Strategy was requested by DG CLIMA in September 2012, under the State of Play sub-task of this project.

- A summary of the State of Play report, following a prescribed template provided by DG CLIMA, was provided as an appendix to the Second Progress Report.
- The development of descriptions and assessments of 4 policy options (selected by DG CLIMA) relating to the local / city level was provided as an appendix to the Second Progress Report.

An overview of the national level policy frameworks explicitly targeted to adaptation to give an indication of the nature of the MS support and requirements for cities to address adaptation was provided as an appendix to the Second Progress Report.

### **Box 2 Evolution of the Typology**

The purpose of the typology was to provide justifiable answers to a number of practical or policy questions, such as:

- Which cities can be grouped together for training?
- Which cities are more advanced in adaptation?
- Which cities face similar climate impacts?

The challenge was addressed from two directions. The literature review sub-task (see Appendix 1 to this Final Project Report) cross-compared pan-European datasets characterising city types with spatial data on climate hazards to provide a large-scale top-down view of European groupings of cities facing climate impacts. Findings are considered in section 2.1.7, but this approach is limited by the relatively small proportion of European cities currently included in pan-European datasets (such as Urban Audit). At the same time, we developed a prototype data-driven tool populated with available city-level indicator sets. This can be considered a bottom-up approach to grouping individual cities according to selected climate or vulnerability characteristics. The quality of output from the tool depends on the quality and availability of comparable data on individual cities, which is currently limited..

The findings from these typology considerations were presented for discussion at stakeholder dialogue meetings in Aalborg and Ancona. The typology work was used to inform the selection of cities for inclusion in the project, and to help identify the most appropriate sub-groups for peer exchange and capacity building.

As a consequence of additional effort diverted to the State of Play tasks, the typology was not revised during the final stages of the project. With further development and refinement, and inclusion of additional sources of city-level indicators, the data-driven tool could potentially be useful beyond the lifetime of the project and could help answer questions for city planners and policy-makers. The Typology is reported in Appendix 3 to this Final Project Report.

Many of the activities in Task 1 were able to use the recent comprehensive work of the EEA to assess urban adaptation across Europe, as presented in the report “Urban adaptation to climate change in Europe” (EEA Report No 2/ 2012, European Environment Agency) as a foundation. That report provided a detailed consideration of the impacts, vulnerabilities and adaptation needs of cities in Europe, and some clear recommendations for European level action. It drew together many of the pan-European datasets on impacts, vulnerability and adaptive capacity. This chapter acknowledges figures, data and major findings from that report, and sets these in the context of some other European literature and additional reviews of activities at city-level, a survey and analysis undertaken in the project.

Section 2.1 of this chapter offers a synthesis of the project findings on hazards, impacts and vulnerabilities of cities in Europe. In Section 2.2 we have drawn together findings on the practical approaches to adaptation that cities are undertaking. Section 2.3 offers a synthesis of what the project understood about the current picture of adaptive capacity across Europe’s cities. A digest of the aforementioned State of Play Report in Section 2.4 leads up to the



application of the Task 1 findings to the rest of the project in Section **Error! Reference source not found.** and the final recommendations of the analysis in Section 2.6.

## 2.1 Hazards, impacts and vulnerabilities

This section draws upon the literature review and survey sub-tasks to outline the latest understanding on hazards, impacts and vulnerabilities. A conceptual framework for understanding climate change risks in cities was identified as a basis for the remainder of the project.

Climate change is emerging as one of the most prominent threats to sustaining and enhancing quality of life and economic competitiveness in European cities. Given the challenges of reducing greenhouse gas emissions in a timely manner, some climate scientists now warn that global mean temperatures are climbing towards 4°C above pre-industrial levels, potentially as soon as the 2060s (Betts et al., 2011). Extreme weather events already exert a huge cost on economies and societies. Over the last thirty years, the majority of Europe's catastrophic events have been weather-related, bringing huge social and economic costs (EEA, 2010). Given these issues, it appears to be essential for cities to develop adaptation strategies and responses to extreme weather and climate change.

### 2.1.1 Information on climate hazards across Europe

There is a wealth of existing research and knowledge relevant to understanding climate change hazards, impacts and vulnerabilities in Europe. Reports continue to build upon one another by identifying gaps in knowledge or by incorporating the latest data and information. Many of these focus on the implications of climate change for different sectors (e.g. critical infrastructure), environmental resources (e.g. water) or landscapes (e.g. mountain areas). Several reports commissioned by European agencies have integrated large amounts of knowledge to improve understanding of issues linked to climate change adaptation in cities (EEA, 2010, EEA, 2012, Schauser et al., 2010). The report from the EEA on Urban Adaptation to Climate Change in Europe (EEA, 2012) represented an important step forward for adaptation in cities. While reports on climate change in Europe's cities and urban areas provide relevant background information, local data to support cities in assessing and responding to climate change risks are limited.

Data on climate change hazards are available at European scale. Significant contributions include a chapter on Europe within the IPCC's 4th Assessment report (Alcamo et al., 2007), modelling work undertaken within the ClimateCost project (Christensen et al., 2011), and modelling work undertaken within the ENSEMBLES project (van der Linden and Mitchell, 2009). Key findings of these studies are highlighted in Box 3.

#### **Box 3 European scale climate science: key research findings**

##### **IPCC's 4<sup>th</sup> Assessment Report. Report of Working Group II (Alcamo et al 2007)**

Working Group II of the IPCC's 4<sup>th</sup> Assessment Report provides an overview of climate change impacts, vulnerabilities and adaptation responses for Europe. The report highlights that Europe is already experiencing climate change impacts (e.g. to the cryosphere and ecosystems), and that recent observed changes are indicative of the direction of future trends. A key IPCC message is that incidence of climate hazards will vary spatially across Europe, for example, related to greater risk of droughts, fires and heat waves in the Mediterranean, central and southern Europe. Spatial differences concerning future precipitation patterns (e.g. increase in mean annual precipitation in northern Europe and a fall in southern Europe) are also noted.

##### **ClimateCost Project (Christensen et al 2011)**

This project built on the results of climate modelling work for Europe, in the context of global climate change projections. Three greenhouse gas emission scenarios provided a basis for the modelling work; a medium-high emissions non-mitigation scenario (A1B), a mitigation scenario (E1); and a high

emissions scenario (RCP8.5). Projected changes in temperature and precipitation patterns for Europe over the course of this century differ according to which emissions scenario is considered and which climate model output is selected. The briefing focuses on winter and summer temperature and precipitation projections for Northern, Southern, Eastern and Western Europe. Key messages include:

- Warming is projected across Europe, with the greatest increases over land in Southern Europe (particularly the Iberian Peninsula).
- There are marked differences in projected precipitation change within Europe and across the seasons. Summers in Southern Europe could bring around half the current levels of rainfall by the end of the century. Increases in winter precipitation are projected for Northern and North Eastern Europe.
- There is considerable uncertainty in climate projections depending on the emissions scenario, climate model and time horizon chosen.

#### **ENSEMBLES project (van der Linden and Mitchell 2009)**

The climate projections generated by the ENSEMBLES project emphasise the significance in the shift in Europe's climate over the course of the 21<sup>st</sup> century. The ENSEMBLES projections offer detailed data on the future climate under several greenhouse gas emission scenarios. At the European scale, projections are provided for climate variables (temperature and precipitation) and for extreme events (e.g. heavy rainfall, droughts, heat waves). Statistical downscaling of projections for European regions and some case study countries is also provided. Key conclusions emerging from the ENSEMBLES project include the following:

- As the century progresses the projected climate moves increasingly farther away from its current state, so that by 2100 the climate of Europe will be very different than from today (van der Linden and Mitchell, 2009).
- An increase in temperature extremes in the Mediterranean, with temperatures increasing by as much as 0.5°C per decade between 1950-2100 (90<sup>th</sup> percentile projection for maximum temperature).

Extreme weather events are expected to cause some of the most harmful and costly climate change impacts. Relevant findings for European cities include projected increases in extreme wind speeds in northern areas of central and western Europe.

Detailed city-scale climate hazard data are sporadic and, where they exist for European cities, tend to be the product of either a research enquiry or a municipal planning process. Examples of research outputs include a study of Greater Manchester's (UK) past and potential future climate (see Carter and Lawson, 2011 for a summary and relevant links), a study of the relationship between climate change-induced heat stress and human health in Cracow (Poland) (Piotrowicz, 2009); and an analysis of the impacts of climate change and urbanisation on drainage in Helsingborg (Sweden) (Semadeni-Davies et al., 2008).

Some cities, including London and Copenhagen, have already published adaptation strategies informed by an understanding of locally relevant climate change hazards (Greater London Authority, 2010; City of Copenhagen, 2011). In both of these cases, public environmental agencies, consultancies and academic institutions either directly supported the process of assessing climate change hazards, or their previous work was drawn upon by municipal officers.

Organisations, including ESPON and the EEA have also produced climate change hazard data at the scale of European regions. In the case of the EEA, this relates to seven European biogeographic regions that include the Mediterranean, north-western Europe and mountain areas. A high-level overview is provided of key climate change hazards that are most prevalent in each biogeographic region (EEA, 2010: 39).

ESPON took a similar approach and identified key climate change hazards at the scale of broad European regions (ESPON Climate, Greiving et al., 2011). This includes five different areas identified on the basis of cluster analysis. The report notes that each of these areas, termed 'climate change clusters', consists of NUTS 3 regions that are similar in terms of projected future changes to a series of climate stimuli.

The project survey found that cities perceived vulnerability, impacts and climate projections data to be more prevalent at the national level, and less available at the local level. Between 11-15% of cities reported that there were no data available to them at any levels.

### 2.1.2 Climate hazards affecting European cities

Cities surveyed for the project were aware of evidence relating to extreme events that had occurred in their city over the past 30 years. The top three reported past extreme events affecting European cities were:

- Periods of very hot weather or heat waves (81% of cities surveyed).
- Flooding from heavy rainfall (78% of cities surveyed).
- Storms (69% of cities surveyed).

Looking at evidence relating to a potential increase in the frequency or severity of extreme events in the future, the top three expected future events were:

- 86% of cities expected an increase in periods of very hot weather or heat waves
- 73% expected flooding from heavy rainfall to increase over the next 30 years
- 71% expected periods of reduced water availability, scarcity or drought.

These top three past and future hazards, identified by the cities who took part in the survey, align well with those identified in the literature review.

#### 2.1.2.1 The impacts of heat on cities

Heat waves have been the most prominent climate hazard causing human fatalities in Europe over the past decades (EEA, 2010). Evidence suggests that it is very likely that the length, frequency and/or intensity of warm spells, or heat waves, will increase (IPCC SREX, 2011). The rate at which temperature increases over future years may be more significant than the absolute values of minimum or maximum temperatures experienced.

The impact of heat waves is particularly strong in cities and towns because of the Urban Heat Island (UHI) effect, which describes the increased temperature of urban air compared to rural surroundings. The UHI is particularly stark at night, which increases the potential for serious health effects during heat waves. Hot days, without the recovery period provided by cool nights, lead to exhaustion and cumulative adverse health impacts (Grize et al., 2005; Kovats and Hajat, 2008; Dousset et al., 2011). In addition to health impacts, such events can also adversely affect productivity as shown by a study in Germany, which suggested that heat reduces work performance, resulting in an estimated output loss of between 0.1% and 0.5% of GDP (Hübner et al., 2008).

A range of secondary effects has also been experienced during heat waves, which raise further challenges for urban centres, such as changes in energy supply and the timing of peak demand, diminishing air quality, and sub-optimal performance of key infrastructure. High temperatures can combine with other adverse conditions, such as drought, to impact further on infrastructure. In 2009, over 180 water pipes were reported to have burst in Nicosia, Cyprus, due to high temperatures and extreme differences in pressure during water cuts, thus exacerbating water shortages (Cyprus News Report, 2009<sup>14</sup>).

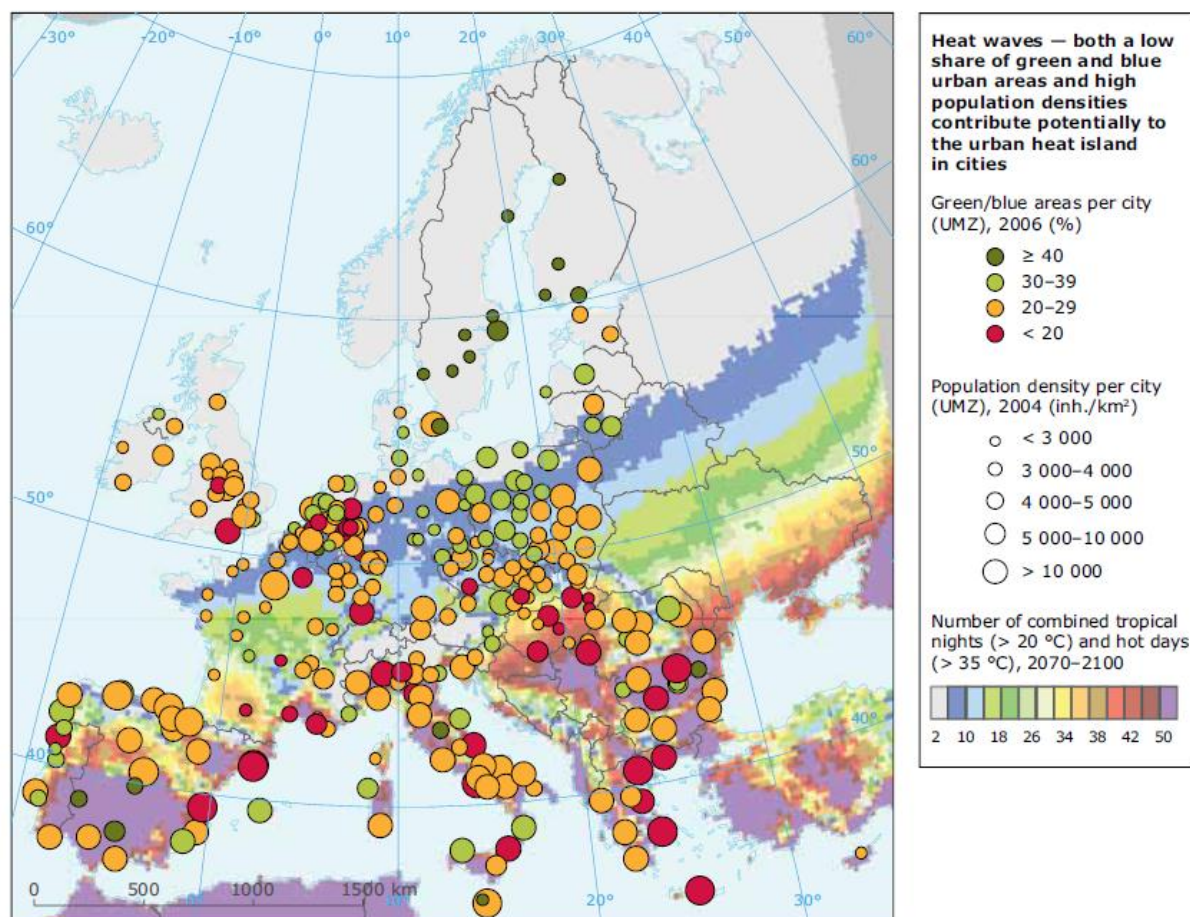
The UHI arises from the characteristics of urban centres (e.g. little green space and a large proportion of artificial surfaces, human activities and the release of additional heat from

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<sup>14</sup> <http://www.cyprusnewsreport.com/?q=node/65>

buildings, reduced advection of heat due to the form and structure of built-up area, etc.) . Possible future heat impacts on European cities are shown in Figure 2 (from EEA, 2012), which is a temperature scenario map overlain with population density and the proportion of green/blue areas in major European cities (both provide a proxy for the UHI effect).

**Figure 2: Share of green and blue areas in cities, combined with population density** source: EEA (2012)



**Note:** The background map presents the projection for the period 2071–2100. Values for the earlier periods are presented in Map 2.4.

City data for Bulgaria and Ireland are from 2001; the concept of city is defined uniquely by the urban land-use areas within its administrative boundary.

**Source:** Eurostat, Urban Audit database, 2004; EEA Urban Atlas, 2006.

Cities in Northern Europe are potentially as much exposed to the human health effects of heat waves as are cities in Southern Europe, given the different heat thresholds and levels of acclimatisation of local populations.

#### **Box 4 Case study: European Heat Wave of 2003**

The severe European heatwave in 2003 resulted in a rise in summer temperatures of 3 to 5°C in most of southern and central Europe (IPCC, 2007). It caused up to 70,000 excess deaths over four months in Central and Western Europe (Brucker, 2005; Robine et al., 2007; Sardon, 2007), and struck the elderly in cities disproportionately hard: the daily mortality rate of the population over 65 years old rose by 36% in Barcelona, 44% in London and 105% in Paris. The 2003 heat wave prompted a number of countries to develop national and municipality-level heat wave strategies and warning systems including in France, Hungary, Italy, Portugal, Spain and the UK.

Source: EEA, 2012



### 2.1.2.2 The impacts of flooding in cities

In terms of economic losses, flooding and storms are the most significant natural hazards in Europe. Floods can result in loss of life, loss and damage to infrastructure, residential and commercial property and also increase the risk of pollution and disease spread through flood water. Flooding is a potential risk across all European regions and is shaped not only by long-term changes in climate, but by topography, characteristics of the built environment, weather variability and extreme event occurrences.

The nature of flood impacts is also the result of existing vulnerability within a particular city (which may be influenced by socio-economic and demographic characteristics) and the type of flooding. Flooding in urban areas may be fluvial (river flooding), pluvial (often the result of heavy downpours which can lead to flash flooding) or coastal (often linked to storm surges). Pluvial flooding can be experienced as urban drainage flooding (where insufficient capacity of piped systems leads to excess water during extreme precipitation events), and prolonged periods of high precipitation can lead to groundwater flooding. Since a complex set of meteorological, hydrological and human factors combine to influence the flood impacts that occur, local city characteristics tend to be more significant than regional characteristics (EEA, 2012).

Projections of river flows show that climate change is expected to increase the likelihood and intensity of river flow flood hazards for large parts of Europe (EEA, 2012). Some scenarios indicate that between 250,000 and 400,000 additional people per year in Europe will be affected by river flooding by the 2080s, most of them in cities (Ciscar et al., 2011). Trends such as urbanisation increase the risk: most people who could be affected by severe floods will be in areas with a high population density. The projected increase in intense precipitation events across Northern Europe may increase the frequency and severity of flash flood and urban drainage flood events in cities, if other urban factors do not improve.

Flooding is an issue with which many cities have contended for centuries, and flood risk management has been in place in urban centres for many years. However, climate change may act to change both the frequency, type, and severity of future flood events, and existing flood management approaches may need to be updated and adapted to respond to a changing picture of flood risk.

Factors which can increase the risk of urban flooding (EEA, 2012) include:

- Location of city in flood plain, along rivers or low-lying coastal areas
- Relative proportion of impervious surfaces (amount of soil sealing)
- Old drainage and sewage infrastructure, which has not kept pace with demands of urbanisation
- Conventional approaches to rainfall and waste water in urban areas, which tend to carry water away as quickly as possible via underground pipes/sewers
- Inadequate maintenance of drainage channels to clear debris and solid waste
- Inadequate discharge of excess water into regional water systems, especially in delta areas.

#### **Box 5 Case Study: Surface water flooding in Hull, UK**

June 2007 was the wettest month recorded in Yorkshire, UK, since 1882. The month was characterised by a number of heavy downpours and on 25 June over 100mm fell in the area around the city of Hull. The intensity of this rainfall was such that road gullies, sewers and drainage ditches were soon overwhelmed, a situation worsened by the City's low-lying position, which limited the speed at which floodwaters could disperse. On 25 June, flood waters flowed from the more elevated land to the west into Hull, inundating a large area of the city and resulting in over 8,600 homes and 1,300 businesses being flooded and one person being killed. Flood damage to Local Authority property alone, including schools and council houses, was estimated to exceed £200 million. The extent of the flooding was such that only eight of Hull's 99 schools escaped



flooding, affecting over three quarters of the city's 36,000 school children (Coulthard *et al.*, 2010). Yet it was during the long recovery period that followed that the social impacts of such an event became apparent (Whittle *et al.*, 2010), including difficulties in finding alternative accommodation, receipt of timely insurance pay-outs and making repairs. Valuable lessons were learnt with regards to the improvement of co-ordination of the flood response between key organisations and the handling of impacts experienced during the flood recovery process.

Source: Adapted from UK Environment Agency, 2007 and Whittle *et al.*, 2010.

### 2.1.2.3 The impacts of water scarcity and droughts on cities

Fresh water is a basic requirement for any society and its availability at all times and in sufficient volume, is a social and economic necessity. As areas of high population density and economic activity, cities exhibit high levels of demand for water and consequently often rely on other regions to supply their water. Water scarcity and droughts are not exclusive to the drier areas of Europe but have become an issue in many other regions too. Water resources are expected to decrease in Europe as the result of a growing imbalance between water demand and availability (EEA, 2012). Such an imbalance is determined by both availability (e.g. from precipitation, groundwater storage, glaciers) and use, shaped by a combination of social, economic, environmental and behavioural drivers. Drought occurs when there is a temporary decrease in water availability and can be considered in terms of meteorological drought (rainfall), hydrological drought (river-flow), and agricultural drought (soil moisture content), which can be exacerbated by high temperatures and high evapotranspiration rates. Seasonal drought can intensify longer-term water stress.

Water stress is already a serious issue in the summer months, especially in Southern and Eastern Europe, and projections suggest that the water stress will worsen, increasingly affecting more northerly latitudes. Research has shown a trend towards drier conditions in much of the Mediterranean (Sousa *et al.*, 2011) while the total area affected by water scarcity and droughts across Europe has increased from 6% to 30% in the last 30 years (EC, 2007).

This increase in water scarcity, alongside a range of socio-economic drivers such as population growth, is likely to worsen water stress in cities. Drought events and water scarcity can have significant economic impacts including adverse impacts on tourism (often resulting from limited public water supply), energy production (where cooling water is required) and health (where costs of treatment increase); indeed, European drought in 2003 was estimated to have cost €8.7 billion (EEA, 2010). Water stress is likely to generate increased competition between uses including public supply, agriculture, industry and the natural environment.

#### **Box 6 Case Study: Drought and water scarcity in London, UK**

The amount of water available per capita in London is the lowest in the UK, due to a relatively low annual average precipitation and the large population. Even in comparison with much hotter and drier countries, it is strikingly low and comparable to countries such as Israel.

London experienced water shortages in 2003 and 2006. Changes in precipitation patterns will increase the likelihood of such an event occurring. The principal water sources for London — the rivers Thames and Lee and a chalk aquifer underneath the city — are rain-fed. Climate change projections show that rainfall will become more seasonal with wetter winters (10 to 20% more precipitation by 2050) and drier summers (20 to 40% less precipitation by 2050). Despite higher winter precipitation, groundwater recharge might be reduced due to increasing evaporation and public water demand.

Since the 1970s, water consumption has increased from 110 litres to 161 litres per person per day, which is above the UK average of 150 litres. Furthermore, 25% of the water distributed does not reach its destination due to network leakages. London's water network is more than 100 years old in many areas, and often in poor working condition. At present, there are no incentives to reduce water spillage.

A water management strategy for London has been proposed with the following priorities:

1. Reduction of losses through better leakage management.
2. Improvement in water efficiency.
3. Grey water recycling and rain water harvesting for non-potable uses.
4. Development of water resources with the least environmental impact.

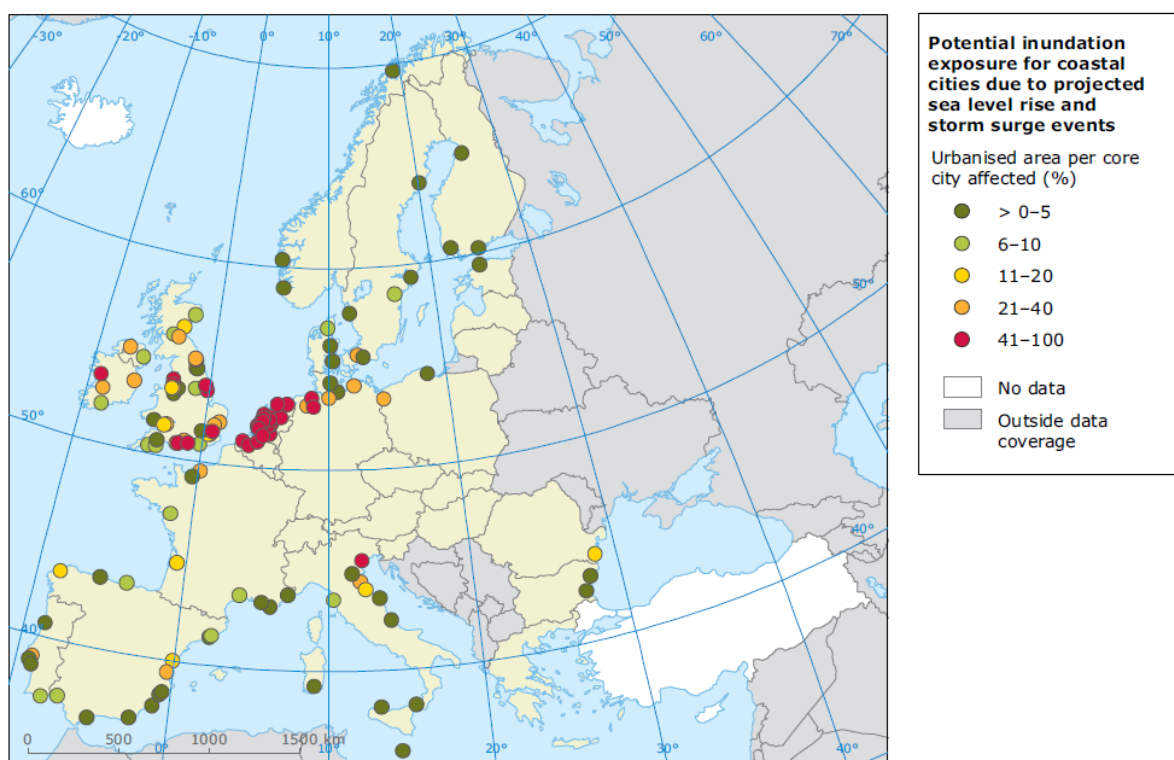
Source: Greater London Authority, 2010, London Climate Change Partnership, 2002, EEA, 2012.

### 2.1.2.4 Coastal impacts on cities

Recent sea level rise projections taking into account the impact of arctic ice melt, suggest that increases of between 0.9 to 1.6 metres above the 1990 level could be expected by 2100 (AMAP, 2011). This is supported by the work of Vermeer and Rahmstorf (2009) who apply the IPCC-balanced development high emissions scenario (IPCC A1B) in their work. Future projections suggest a decrease in the total number of storms but an increase in the strength of the heaviest storms, with a significant increase in storm surge levels for South East-England and the continental North Sea.

Figure 3 shows projected change in potential inundation for coastal cities due to a combination of sea-level rise and storm surge events. Increased sea levels have the potential to interact with storm surges to present a serious flood threat to Europe's coastal area, where large cities and urban centres are located. Cities along the coast of the Netherlands, Germany, Belgium and northern Italy are most affected (EEA, 2012).

**Figure 3: Potential inundation exposure for coastal cities due to projected sea level rise and storm surge events** Source: EEA (2012)



**Note:** This calculation includes the change of inundation height due to coastal storm surge events generated by the DIVA project. A potential sea level rise of one metre has been calculated.

**Source:** Greiving et al., IRPUD 2011, © ESPON 2013 (Inundation); EEA (Urban Atlas, UMZ).

Coastal city centres play an important role in maritime trade and the supply of goods and services between cities and nations. Many are experiencing rapid increases in population

and so the impacts and risks faced will be influenced not only by sea-level rise and the occurrence of extreme storm surge events, but also by land use planning decisions. As with pluvial and fluvial flooding, the nature of flooding impacts will be spatially variable and shaped by the characteristics of each city, including the existing vulnerability of the population. Coastal erosion, resulting from sea-level rise and storm surges, presents an economic risk to some cities. In addition to flooding and erosion, sea-level rise can present other risks for coastal cities, such as salination of groundwater aquifers.

**Box 7 Case Study: Potential costs of coastal impacts in Copenhagen**

The city of Copenhagen in Denmark faces the threat of sea level rise and, consequently, higher storm surges. If the city is not protected, it is estimated that total damage costs will amount to DKK 15-20bn (€2bn to €2.7bn) over the next hundred years, while the current cost of security against this risk is estimated to be just DKK 4bn (approximately €0.5bn) over the same time period. The onset of the most significant impacts of coastal flooding in Copenhagen are currently projected to be in 30 years' time; however, the city Adaptation Plan recognises the need to begin preparations now, including a proposal to build dykes at North Harbour (Nordhavn) and Kalveboderne and raising the coastline at Øresund.

### 2.1.2.5 Interdependencies and indirect urban impacts

A further trait of cities which can reinforce vulnerability to climate change is their dependency on other cities and regions for provisioning services, including basics such as food, energy and water (EEA, 2012). Access to such services is mediated through a complex web of interdependent infrastructure, which itself can be vulnerable to the impacts of increased climate variability and change, including extreme events.

Failure of such infrastructure, either within a city or a region upon which it is dependent, can have a significant impact on the provision of these essential services to citizens. Such system failures, however small, can have indirect impacts on other aspects of urban life. For example, a flooding event could result in loss of earnings hundreds of kilometres away should a supply chain fail. Because of the extent to which cities depend upon their hinterlands, locally and globally, for food, water and other natural and human resources, cities encounter some knock-on effects from the impacts of climate change on most non-urban sectors too.

### 2.1.3 Non-climate pressures in the urban context

The Urban Audit shows considerable population growth across many European cities, with this trend expected to continue. The EEA in its State of the Environment 2010 report suggested that around 80% of Europe's population will live in urban areas by 2020 (EEA, 2010). However, DG REGIO in its second State of European Cities report recognises that some European cities are declining in population and/or facing industrial decline (DG REGIO, 2010). In fact, DG REGIO (2011) identified three kinds of European cities in terms of socio-economic and demographic change:

- Economically dynamic cities which experience strong population increases through the inflow of both highly skilled and less qualified migrants, attracted by the cities' sustained economic power and wealth. These are mainly larger Western European cities closely connected to the world economy.
- Cities with a strong economic background and stagnating or gradually shrinking populations. Most of the small and medium-sized European cities will be in this category. In these cities, the gradual shrinkage of the city does not necessarily cause serious difficulties, and it may even be an advantage as the density of the urban environment decreases.
- Cities within urban areas of complex shrinkage, where both demographic and economic decline can be experienced. These urban areas are mostly located in the

Central and Eastern part of the EU, although some peripheral areas of Western Europe are also affected.

Whether growing or shrinking, cities will face greater challenges in the future, including demographic change such as ageing populations. Cities already face issues such as overcrowding, ageing infrastructure, increasing congestion and competition for services. These pressures can exacerbate or provoke social problems including the concentration of deprivation and unemployment in urban neighbourhoods, and environmental problems such as pollution from transport and industry. In many cases, changes in socio-economic factors, even in the absence of climate change, can change the city's vulnerability to climate hazards, because they increase or decrease the populations, assets or systems at risk.

### ***Box 8 Key non-climate trends affecting European cities***

There is significant variation in the socio-economic trends affecting different European regions. Many of these potential changes affect vulnerability to climate impacts.

#### ***Population and demographic change***

The UN projects an increase in the urban population in Europe of just under 10% between 2009 and 2050; however, the European population as a whole is predicted to decrease from around 2025. The number of Europeans living in urban areas is set to increase from the current figure of around 75% to around 80% in 2020. In the short term, most of the increase will be due to rural to urban migration, but increasingly urban areas will experience immigration triggered by the effects of climate change. Cities with the fastest population growth are those with the smallest elderly populations.

By 2065, almost one-third of the European population will be aged over 65 according to a forecast published by Eurostat. The combination of trends in fertility, life expectancy and migration will leave the total population size largely unchanged by 2050, but will transform Europe's population structure. The number of those aged 80 and over will sharply increase, doubling every 25 years. In the next 30 years, this age group will represent more than 10% of the population in many European cities, with implications for increasing health impacts from climate hazards (since elderly are particularly vulnerable).

There is also a trend towards smaller families and therefore more households. Household size is smallest in northern Europe (1.6 people per household in Stockholm), slightly larger in Central and Eastern Europe and highest in Southern Europe (up to 3.4 people per household). One-person households gravitate towards urban centres, while in most cities, families with children are settling in the surrounding suburbs.

#### ***Diversity***

In many European cities, the number of inhabitants with foreign backgrounds now exceeds 20% of those under 25 years old<sup>15</sup>. Projections at city level indicate that the share of people with foreign backgrounds will further increase as a result of large waves of young immigrants.

Urban growth also affects the spatial organisation of cities. Typically, suburbanisation and urban sprawl have promoted segregation and polarisation along ethnic or socio-economic lines. For example, in the United Kingdom in 2004, 20% of those in the lowest income groups lived in poor quality environments compared to 11% of those in the highest income groups<sup>16</sup>. This may result in increasing inequalities in vulnerability to climate hazards, and also brings implications for the ways in which cities engage different groups to raise awareness and build adaptive capacity.

#### ***Urbanisation and urban sprawl***

Urban land use has expanded nearly everywhere in Europe, even in areas with a declining

<sup>15</sup> Analysis of Urban Audit 2001 and 2004 data collection; data from the CLIP network of cities. Presented in DG REGIO 2011.

<sup>16</sup> UK Office for National Statistics, 2007

population. Between 1990 and 2000, urban land in Europe expanded by three times the size of Luxembourg, an average 5.5% increase in built-up areas. Urbanisation is evident in many different forms, sometimes in concentrated compact centres, but typically in low density developments associated with planned or spontaneous urban sprawl. Much of this urban expansion occurs in flood plains or areas at potentially higher risk from flooding or coastal erosion.

### **Consumption and urban lifestyle**

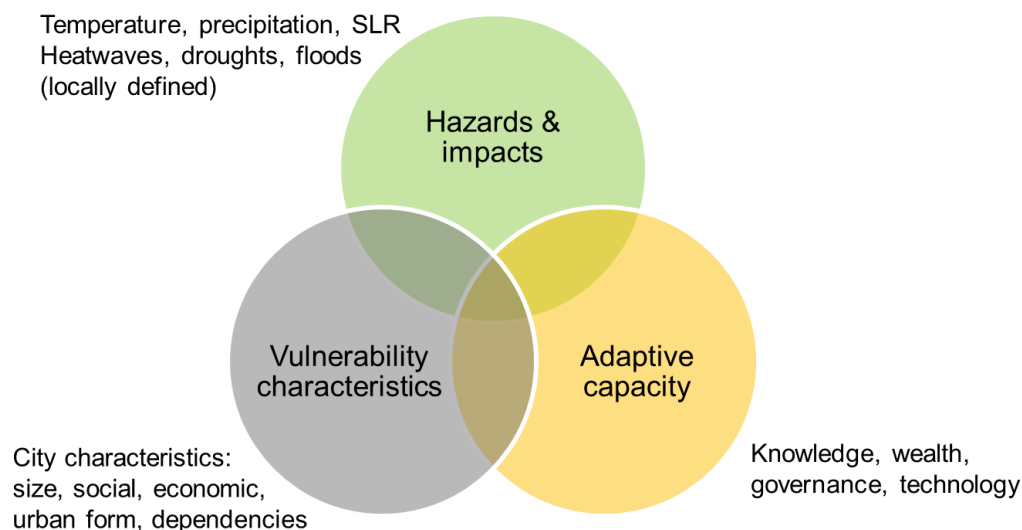
Consumption in urban lifestyles is a socio-economic driver that significantly influences the possibilities for a more sustainable quality of life in cities, but inappropriate consumption can also undermine quality of life. European consumption is rising as measured in terms of the expenditure of households and public entities on goods and services: across the EU-15, expenditure rose from approximately \$13,000 p.a. in 1995 to just under \$16,000 p.a. in 2005. Rising consumption may also indicate an increase in the value of assets at risk in flood-prone areas.

Source: EEA, 2009 (QoL: report No 5 / 2009)

## **2.1.4 A framework for understanding climate risk**

The Urban Climate Change Research Network released its first assessment report on Climate Change in Cities in 2011 (Rosenzweig et al., 2011). It supports a multi-dimensional approach to risk assessment and proposes an ‘urban climate change vulnerability and risk assessment framework’ as the most appropriate method for developing adaptation strategies and responses. We adopted a slightly modified version of this framework to help cities in this project to understand climate risks. The framework (see Figure 4) is composed of three elements, which relate to climate hazards, vulnerability and adaptive capacity.

**Figure 4: Framework for understanding Urban Climate Change Vulnerability and Risk.** Modified from Rosenzweig et al., 2011; after Mehrotra et al., 2009.



- *Hazards and impacts*: such as more frequent and longer duration heat waves, greater incidence of heavy downpours, sea level rise (SLR) and increased and expanded coastal or riverine flooding.
- *Vulnerability characteristics*: due to a city's social, economic, or physical attributes such as its population size and density, urban form, social and economic structures.
- *Adaptive capacity*: factors that relate to the ability of a city to act, such as availability of climate change information, resources available for adaptation and institutions and governance.



The benefits of this framework for the project included:

- Specific focus on city-scale climate change risk assessment.
- Applicable to cities in all parts of the world (transferable).
- Separating adaptive capacity from vulnerability to enable these two issues to be considered discretely, which fits with the project's explicit focus on building adaptive capacity in European cities.
- Providing a basis for the typology to differentiate between European cities according to climate hazard and city characteristic.

The usability of this framework for the city training in Task 3 was consulted on through the stakeholder dialogues in Task 2.

## **2.1.5 Data and knowledge gaps**

### **2.1.5.1 Spatial data at the city scale**

Available data and reports provide a basis to make broad statements about the future climate of Europe and the spatial variability of climate hazards at this scale. For example, it appears that a city in the Mediterranean is more likely to be exposed to extreme temperatures in the summer months than a city in north-western Europe. Similarly, a city in north-western Europe appears more likely to suffer from winter flooding or localised surface water flooding from high intensity rainfall events than a city in the Mediterranean.

Beyond this, drawing on publically available data sets, it is difficult for cities to make more locally-specific statements about the climate change hazards that they face. This issue is made more complex by the fact that exposure and sensitivity to climate change hazards differ at a fine scale within a city. There is a role for European agencies and organisations to support the development of more comprehensive city-scale spatial data sets on issues linked to climate change hazards and the exposure and sensitivity of European cities to these hazards. This would provide a stronger basis for the development of targeted adaptation responses at the city-scale.

### **2.1.5.2 From cities' perspective**

The top knowledge/ capacity need in the cities surveyed during this project is help with developing adaptation options (63%). The other types of knowledge/ capacity requiring training and development include:

- Implementing adaptation measures (58%)
- Involving the community (56%)
- Assessing impacts (55%)
- Prioritising risks (52%)
- Creating organisational support (44%)
- Knowledge on climate impacts (49%)
- Communicating climate change (37%)
- Understanding of climate change (31%).

The review of 'early mover' adaptation strategies identified the following areas as gaps or areas where there was a lack of knowledge and data:

- A clear allocation of responsibilities (relevant city departments; stakeholders at the city, district and neighbourhood level) and timelines facilitates the implementation as well as the process of monitoring adaptation actions, however, the latter two aspects were not well adopted among the selected early mover cities. Adaptation actions were usually presented in a list or table at the end of the document. Sometimes the actions were assigned different levels of priority or labelled important for short and long-term respectively but this was not done consistently.



- Cost-benefit analyses of adaptation actions were rarely conducted and thus not included in the strategies. Reasons could be the complexity of such an analysis and/or the lack of reliable data.

### 2.1.6 Towards a typology of European cities

Different European cities not only face varying climate hazards, but also display different levels of vulnerability and capacity to adapt to them. It is difficult to imagine, barring a catastrophic reduction in the availability of capital, that large cities such as Amsterdam, Rotterdam or London will fail to maintain and enhance coastal protection schemes in the face of rising sea levels and increased frequency of coastal storm surges. The risks associated with not acting would be simply too great, whilst their capacity to invest is relatively high.

Adaptation responses may not be as forthcoming, however, in cities that are less economically aware and prosperous, or where political motivation to respond to climate change is lacking. This emphasises the clear need to move beyond treating cities as one homogeneous group when considering climate change adaptation policies, strategies and actions.

The literature review underpinning this element of the project established that although there is an emerging body of research on European climate change hazards, vulnerabilities and impacts, this rarely offers data at the city-scale. A pan-European overview of the position of cities in the context of projected climate change hazards does not exist. In response to this gap, a synthesis of data sets on projected climate change hazards (drawing on ESPON's climate change clusters) and European city types (based on the 2010 Urban Audit city typology) was undertaken. This approach encompasses the core elements of the Urban Climate Change Research Network conceptual framework: hazard, vulnerability and adaptive capacity. Hazards are considered using ESPON data and the Urban Audit city typology provides a basis for considering vulnerability and adaptive capacity in cities.

The analysis of different types of European cities according to their position within distinct climate clusters raised several broad issues concerning the spatial diversity of the urban adaptation agenda in Europe. A picture of a north-south split emerges. Whilst the Mediterranean and Southern Central Europe are particularly threatened by severe climate change hazards, especially those linked to heat stress and drought, they are also areas that have high concentrations of smaller and less prosperous cities. In effect, climate change hazards are high, yet capacity to adapt is hampered by factors including limited resources to commit to adaptation strategies and responses.

Although projected climate change hazards are significant for Northern and Western Europe areas, cities in these areas are generally larger and better resourced than their southern counterparts; so, in effect, their adaptive capacity is higher. ESPON's assessment of adaptive capacity across Europe's regions highlights this point, finding that capacity levels in Northern and Western Europe are higher than in the Mediterranean for example (ESPON Climate, 2011). Patterns of climate change risk appear to match spatial socio-economic imbalances at the European scale, and may act to worsen these disparities. Nevertheless, caution must be exercised in making overly simplistic conclusions. Cities across Europe are at risk from extreme weather and climate change in different ways, and adaptation strategies and responses across the continent are needed.

What this analysis does demonstrate is the value of developing an adaptation typology for European cities. Understanding similarities between cities in respect of issues such as current and projected climate hazards and overarching socio-economic characteristics can support adaptation planning and policy making. In addition, adaptation policy responses and resources can be more effectively allocated to address risks to certain groups of cities where the need is high.

This approach also sets out a framework for selecting candidate cities for comparative work on the development of adaptation strategies and responses. Other European cities could be

placed into a broad ‘type’ based around Urban Audit city types and ESPON Climate clusters. The value of this approach lies principally at the strategic level, for policy makers and practitioners working at European, national and regional scales. The findings are not intended to directly inform city-scale planning and development, although cities may benefit from understanding their relative degree of climate risk and could be encouraged to learn from similar peer cities with complementary adaptation challenges.

### 2.1.7 Key messages on Hazards, Impacts and Vulnerabilities

The following key messages have been identified from the synthesis of the latest understanding on hazards, impacts and vulnerabilities faced by European cities. The main hazards posed by climate change (heat waves, flooding, water scarcity and coastal impacts) are known, and some have been experienced by cities across Europe already.

- Detailed information on projected climate hazards, including flooding and heat stress, is available at the pan-European scale, produced by organisations including the European Environment Agency and ESPON.
- City-scale climate hazard data is sporadic, and where it does exist for European cities, it tends to be the product of either a research enquiry or a municipal planning process.
- With their heavy reliance on infrastructure networks, high population densities, large numbers of poor and elderly people and major concentrations of material and cultural assets, cities are particularly vulnerable to climate change (EEA, 2010, Schauser et al., 2010).
- Socio-economic data sets offer decision makers a useful resource for understanding vulnerability to climate change hazards in European cities. European level sources include the Urban Audit and EUROSTAT.
- Climate change hazards, vulnerabilities and impacts show strong spatial variation across Europe.

Multiple pressures are already faced by cities, and this exacerbates their vulnerability to climate hazards; therefore, effective adaptation should fit in with solutions that address other urban challenges, and adaptation may in some cases present additional opportunities or benefits for broader sustainability advances.

Understanding the context of vulnerability independently from climate change hazards is needed, alongside looking at the complex vulnerability issues side-by-side.

The framework with the three dimensions of climate risk is a useful structure, which was carried through into the engagement and training phases of the project (Tasks 2 and 3).

Areas identified as gaps, mainly with regard to adaptation actions, from the detailed assessment of early mover cities adaptation strategies were lack of clear allocation of adaptation actions and lack of cost-benefit analyses for adaptation actions listed. There seems to be a consensus that the protection, modification and increase of green and blue infrastructures have great potential to reduce multiple risks, but it is not clear how best to go about this or who should take on the responsibility in this area.

## 2.2 City-level approaches to adaptation

Based on the survey and review of good practice, this section outlines the latest understanding on city-level approaches to adaptation. In particular, it considers the drivers for cities to engage in adaptation planning. Many cities are still at an early stage in their adaptation planning, however, the adaptation measures already being employed at city level are summarised. Appendix 4 reports on the review of ‘early mover’ adaptation strategies. Six European cities were reviewed in detail (London, Rotterdam, Malmö, Copenhagen,

Kalamaria, Schmallingenberg), and two cities from outside Europe (Melbourne, Santa Cruz) were also reviewed because of the learning points which were transferable from them.

## 2.2.1 Drivers and motivation for action

Before exploring the approaches employed by European cities in developing adaptation responses, it is helpful to consider the drivers of such action. Understanding these drivers can help to identify the most appropriate policy levers and support mechanisms to improve city-level adaptation. The survey provided useful insight in this area, asking the question 'What are/were the main reasons for developing your city's adaptation strategy?' The responses are shown in Table 2.

**Table 2: Adaptation Strategies for European Cities Survey**

Reasons for developing a city adaptation strategy		
<i>What are/were the main reasons for developing your city's adaptation strategy?</i>	<i>Count<sup>17</sup></i>	<i>%</i>
Vision of a sustainable city	146	81%
Objective to improve the quality of life for citizens	121	67%
National/regional government requirement or recommendation	80	44%
Exposure to extreme weather	76	42%
Cost of business as usual versus action now	59	33%
Other	10	6%

### 2.2.1.1 Policy drivers

#### **Adaptation Policy Drivers**

The survey results indicated that 'policy push' factors play a role in encouraging adaptation strategy development, with 44% of respondents identifying national or regional government requirements or recommendations as a main reason for developing their strategy.

The existence of 11 (now 14) national level strategies adopted across Europe may have helped to encourage city-level efforts; however, our research to date has not established a clear connection between national and regional policy and city-level progress.

Experience from the USA suggests a causal link cannot be assumed; action on climate mitigation in US cities has often occurred in response to a lack of national level action rather than positive national policy being the catalyst. Our analysis of eight adaptation strategies does highlight that being in the vanguard of adaptation policy can be a motivating factor itself. Some cities deliberately intend to act as regional/national or international pioneers (e.g. Schmallingenberg, Kalamaria) and offer to export their knowledge, expertise and, if applicable, technology to other cities (e.g. Copenhagen, London, Rotterdam, Santa Cruz).

#### **Box 9: The drivers for Kalamaria to adapt to climate change**

In the creation of the "Adaptation Action Plan and Political Statement" by Kalamaria, Greece, the city took the opportunity to act as a pioneer at a national level. The document provides information on climate change impacts and adaptation actions in Greece including hazard identification, whilst strengthening the decision making process in regard to prioritisation of adaptive action. The Action Plan is an important component of the general Municipality of Kalamaria Strategy and is aimed at the improvement and protection of quality of life from the effects of climate change and extreme weather events, while supporting the sustainable development of the city.

Kalamaria has about 90,000 inhabitants and is the second largest municipality of the Central

<sup>17</sup> From a total of 180 possible respondents

Macedonia Region. It is situated on the coast, 7 km southeast of Thessaloniki and its economy is mainly driven by tourism and commerce.

### ***Adaptation within broader policy objectives***

However, the survey of 180 respondents found that the main reasons for developing a city-level adaptation strategy were associated with the broader policy context of city-level development or improvements to quality of life. For example, 81% of those surveyed identified 'a vision of a sustainable city' as a main reason for their adaptation strategy work, while 67% were working on a strategy 'to improve the quality of life for citizens'.

Exploring the role of adaptation in the achievement of wider societal and political goals may therefore lead to the identification of effective policy levers. This could be an important message for those developing support for adaptation at city-level; after all, adaptation is not an end in itself. Framing adaptation in terms of assisting municipalities, businesses and citizens to achieve broader socio-economic and environmental objectives in a changing climate may help to generate broader acceptance and 'buy-in' to the strategies being developed.

The review of early mover adaptation strategies supported links to wider socio-economic goals. A number of common themes for adaptation objectives emerged which help to reveal the motivations behind the development of adaptation strategies:

- *The improvement of each individual city's ability to cope with climate change and the challenges at local level.* This appeared as an overarching objective in many of the strategies reviewed, and accordingly, the strategies provide a knowledge base regarding potential climate change impacts, hazards and risks and enable the identification of adequate adaptation options.
- *To protect and increase the quality of life and thereby enhance the city's attractiveness for its citizens.* In this context, it is recognised that adaptation to future climate change leads to better living conditions in the long run. The majority of early mover cities emphasise the ambition to promote urban sustainability (exemplified in the adaptation strategies of London, Copenhagen, Malmö, Schmallerberg, Rotterdam and Santa Cruz).
- *The creation of positive effects for the local economy and the attraction of (international) investment.* The aim of a number of the strategies reviewed is to keep (future) expenses down while improving the current situation.

#### **Box 10: Malmö's, commitment to adaptation**

Malmö, Sweden, is renowned for its commitment to environmental and social goals and represents an important economic (commerce, IT) and educational hub. It is the third largest city in Sweden with a population of about 270,000.

The need for an adaptation strategy was identified in the City of Malmö Environmental Programme 2009-2020. The Strategy outlines key actions to improve the quality of life and make the city more sustainable. The document follows a clear structure, serving as an insightful overview aimed at local politicians and public servants. The overall strategy pursues a general green approach (focussing on green and blue areas – green spaces and water bodies) that constitutes a synergy between climate change mitigation and adaptation.

### **2.2.1.2 Climate impacts and extreme weather as drivers**

The survey found that 42% of the 180 respondents felt that 'exposure to extreme weather' was one of the main factors behind their adaptation strategy work, a characteristic supported by the review of adaptation strategies. All the cities reviewed in detail identified several

climate change impacts that are addressed within their strategy. Extreme precipitation and flash flooding are key concerns at city level and are covered by all of the eight ‘early mover’ adaptation strategies. Not surprisingly, all cities located on the coast (seven) consider sea-level rise as a key climate change impact. Heat waves, drought and river floods are covered by six strategies, while extreme wind events are considered by only three, and bushfires by two. The reason for the latter seems to be previous experience with such events, highlighting how past experience can often be a driver for action. Initial analysis of completed strategies indicates that coastal cities appear to be more likely to have an adaptation strategy. It can be hypothesised that their location and the immediate threat from sea-level rise might create a greater awareness and lead to active engagement with the issues of climate change and adaptation, although further interviews would be needed to confirm this. This would again suggest that the decision to develop a strategy is shaped by the actual or perceived level of climate impact faced by a city.

In considering climate impacts as a driver for city-level adaptation action, it is important to recognise that climate change itself should not be viewed as the only (or even primary) driver of impacts and risks in cities. Rather, it is the way that the changing climate interacts with a wide range of other non-climate drivers (i.e. social vulnerability) that results in significant and varying impacts in urban areas.

While past experiences of extreme weather or fears concerning future impacts do appear to be drivers for action, the best adaptation city-level strategies developed to date acknowledge this more nuanced understanding of climate impacts and vulnerability. This is underpinned by an understanding of the local social, economic and environmental context.

### 2.2.1.3 Economic and cost drivers

The survey identified that a third of respondents felt ‘the cost of business as usual versus action now’ was a main reason for adaptation action in their city. This is an interesting finding given the limited emphasis placed on costs and benefits within the strategies examined by the project team. Only Copenhagen used cost-benefit analysis in the prioritisation of adaptation actions within its strategy, while Malmö and London planned to carry out cost-benefit analyses but wanted to concentrate on specific aspects such as eco-system services or, as is the case for London, flooding.

The review of early mover city adaptation strategies found that only a few cities specifically consider the impacts on economic sectors of local importance, such as forestry and/or tourism (Schmallenberg, Santa Cruz) or cross-cutting issues, e.g. human health, state of the environment, general economy and infrastructure (London). This suggests that while the ‘economic case’ for adaptation is often cited, cities may be unsure of how best to gather or present appropriate data. Further investigation of this issue may be beneficial.

#### **Box 11: The risk drivers for Copenhagen’s adaptation strategy**

Driving the detailed and systematic evidence and risk based assessment in the Copenhagen ‘Climate Adaptation Plan’ is the threat of sea level rise and, consequently, higher storm surges.

Risk in this context is understood as the probability of an event happening multiplied by the resulting costs of the event. To allow the calculation of risk to be used to prioritise action, it is normalised and provides categories for a ten-year risk in DDK million (Low risk: 0-500, medium risk: 501-1500, High risk: >1500). If the risk assessment shows that the risk is so high that it cannot be tolerated, actions will be chosen that would prevent a climate-induced accident from happening (level 1 adaptation). If this cannot be done – for either technical or economic reasons – actions to reduce the scale of the accident are preferred (level 2). The lowest priority goes to measures that are only capable of making it easier and/or cheaper to clean up after the event (level 3). Cost-benefit analyses were conducted (on flooding) and necessary climate change projections were provided by the Danish Meteorological Institute.

An economic risk-based assessment has been applied to the city and findings show that if Copenhagen is not protected the estimated total damage costs will amount to DKK 15-20bn (€2bn to



€2.7bn) while the current cost of security against this risk is estimated to be just DKK 4bn (approximately €0.5bn) over the same time period.

#### **2.2.1.4 Networks as drivers**

The assessment of early mover city adaptation strategies found that a city's national or international (economic) importance and participation in EU-funded projects (e.g. GRaBs) or city networks (e.g. ICLEI or Climate Alliance) are other important factors for early action. Therefore, both the EU and city networks play an important role regarding the exchange of knowledge and experience on climate change adaptation. This reinforces the potential of this project to act as a driver for adaptation action.

#### **2.2.1.5 Who is adapting?**

In general, the project confirmed that most adaptation strategies have only been published recently and are at an early stage in terms of their implementation. Our research suggests that central, northern and north-western Europe are most advanced in the process of adaptation strategy development, with coastal cities often 'early movers' in terms of strategy development.

### **2.2.2 Approaches to strategy development**

Within the group of early mover cities considered in the project, a wide range of different approaches to the development of adaptation strategies was observed. Adaptation strategies at city level are diverse and vary in terms of their thematic focus, format, layout, design, page length or impetus, each aiming to fulfil specific strategic purposes. This variety can make defining an 'adaptation strategy' challenging. For the purposes of the project, the term 'adaptation strategy' includes a range of strategies, action plans and other documents which set out a strategic approach to addressing adaptation challenges within a specific city or urban centre.

The majority of the eight selected early mover cities produced standalone adaptation strategies (London, Rotterdam, Malmö, Melbourne) or adaptation (action) plans (Copenhagen, Kalamaria, Santa Cruz). In contrast, the municipality of Schmollenberg has developed an integrated mitigation and adaptation concept. Usually, adaptation strategies take the shape of reports, but they vary in design and length. Kalamaria and Malmö produced shorter documents, they developed their strategies within the Interreg IV C GRaBs project – and in the case of Malmö the document specifically targets local politicians and municipal authorities.

Schmollenberg geared the contents of its strategy towards external requirements as it served as an entry to a public competition for winning the title of "climate (conscious) municipality". Some cities emphasised the foundation for their strategy and pursued a distinct scientific approach (London, Copenhagen, Melbourne, Santa Cruz) which resulted in more extensive documents. All the strategies were produced by the individual cities usually assigning the development process to an internal sustainability or adaptation team. Such an approach is consistent with the tendency to embed adaptation responses within the cities' general sustainability efforts.

#### **2.2.2.1 Procedural stages followed**

Most strategies provide information on the procedural stages that were followed during the development of the strategy documents. However, some kept this section fairly short or referred to brief information in the appendix (Copenhagen, Malmö, Melbourne). Others describe the development process more prominently and transparently (Schmollenberg, Kalamaria, Santa Cruz). Santa Cruz, for example, describes the whole process from the formation of an adaptation team, the preparation of a vulnerability study, formulation of potential actions and timelines, to the decision of the adaptation team on adaptation actions and the development of a draft strategy. Within the document a full list of meetings and dates is provided highlighting the transparency of the chosen approach.



The consultation and involvement of stakeholders generally starts early in the process, encompasses regular meetings or workshops and plays a major role regarding the development of the evidence base and/or prioritisation of risks and actions. The development process in Rotterdam is characterised by several multi-level meetings. The core team of Rotterdam Climate Proof meets twice a month and regular meetings are held within the national Knowledge for Climate Programme with national and city representatives as well as knowledge institutes. Twice a year, the Rotterdam Climate Proof Recommendations Committee meets with representatives from the city, water boards, research institutions and the economic sector.

### **2.2.2.2 Document structure**

The structure and content of the early mover city adaptation strategies vary; however, some common features can be identified. These characteristics provide useful pointers to the priorities and features which underpin city-level adaptation strategies.

#### **Introduction**

General aims and objectives regarding the strategies are often disclosed in an introductory part or executive summary. Some cities provide a political statement by the mayor to underline the importance of adaptation at the beginning of the document and/or devote a separate chapter to the description of aims and objectives (Copenhagen, London, Kalamaria, Santa Cruz).

#### **Evidence base**

One major component of urban adaptation strategies is the development of an evidence base, usually providing general information regarding climate change, (local) climate change projections on the basis of different emission scenarios, and a risk or vulnerability assessment. Some cities keep this section relatively short and refer to, or summarise, external studies and reports (Schmallenberg, Kalamaria, Malmö, Santa Cruz); others present this section very prominently (Copenhagen, London, Melbourne).

#### **Box 12: The evidence base for Melbourne's adaptation strategy**

Melbourne's Climate Change Adaptation Strategy provides a very detailed and systematic academic evidence base including climate projections, mainly by CSIRO, as well as a detailed urban system assessment (water, transport and mobility, building and property, social health and community, businesses and industry, energy and telecommunications, emergency services).

Climate change projections are often presented for 2070 and 2100 and some cities present projections for 2030 (Melbourne), 2020 and 2050 (London) or 2060 (Copenhagen). Some cities provide an analysis of their urban system's status quo and enclose population, demographic and economic data (Schmallenberg, Kalamaria) or focus on important economic sectors (London, Melbourne). In the case of Melbourne, for each climate change impact 'cascading consequence diagrams' highlight complex consequences within the urban system. The assessment of risks is partly done through SWOT (Strengths-Weaknesses-Opportunities-Threats) or comprehensive risk analyses and modelling approaches – as is the case for Copenhagen, London and Melbourne – where risk is determined by the probability of an event happening and the consequence. Melbourne assigned a rating of 1-5 for each of the two indicators and critical risks were deemed those with a combined rating of seven or more. The issue of costs is incorporated in Copenhagen's approach to risk assessment, where risk is the probability of an event happening times the costs of the event.

#### **Adaptation actions**

A further common component of the strategies examined is the identification of adaptation actions, which are most commonly presented in one or several tables. They cover a wide range of activities, among them:

- Individual constructions measures, e.g. flood barriers, improvement of the drainage system
- The promotion of several research projects to improving knowledge of city staff
- The development of specific risk management or heat-wave plans to a change in certain (planning) standards
- More public communication efforts or the strategic use of green and blue infrastructure (green spaces and water bodies).

The presentation of actions is often combined with details on implementation or assigned responsibilities (London, Kalamaria, Malmö, Santa Cruz) and/or the provision of a clear timeline until respective actions are to be implemented (Copenhagen, London, Rotterdam, Santa Cruz). Usually, the identified adaptation actions are prioritised. Some cities define strategic/lead projects in addition to actions (Schmallenberg, Rotterdam) or group adaptation actions according to certain levels of priority (Copenhagen, Santa Cruz, Melbourne). Regarding the prioritisation of adaptation actions, only Copenhagen has chosen and applied a cost-benefit approach.

### ***Approaches to stakeholder engagement***

All of the selected early mover cities involved a wide range of stakeholders in the strategy development process. These include relevant city authorities and departments (mainly urban planning, economic development and environment), representatives of public health, community or fire services, private companies (including banks or insurance companies), representatives from research institutes, citizens' organisations, NGOs and the energy, water and transport sectors. Stakeholder involvement and participation early on in the process assists in shaping the evidence base and defining adaptation actions. It is important not only to include relevant municipal and public institutions, but also research institutions, and representatives from the private sector and NGOs to increase the document's integrity.

Observations from the analysis indicate that more profound and detailed strategy evidence bases came from the bigger metropolitan areas where more stakeholders and research institutions were involved. Many times, vulnerability assessments were conducted by research institutions on behalf of city authorities with the results presented in the strategy. Sometimes, more complex risk approaches were chosen and risk ratings were applied. Smaller cities were less likely to carry out comprehensive vulnerability assessments but referred more often to existing (national) studies and often performed SWOT-analyses.

Public participation is recognised as important in increasing the general level of acceptance and awareness of a strategy within a municipality and this is included in the strategy development process in a number of cities. In the early mover cities, this varied from the draft documents or draft lists of adaptation measures being published for (public) consultation to more innovative approaches, for example, Kalamaria gained input from the wider public by conducting a web poll and organising a social network with meetings of local community stakeholders (unions) while London created a web platform for Londoners to upload ideas and cast their votes on which paths to pursue. Santa Cruz placed an initial list of prioritised actions on the city's website along with a mechanism for the community to respond to them.

### ***Approaches to support provision***

There are now a range of tools and guidance documents to make adaptation planning more manageable for adaptation practitioners. The review of good practice in adaptation support tools and guidance identified 50 resources, which offer different perspectives and are focussed on a range of sectors and stages in the adaptation process. They also vary in the way in which they seek to engage users and communicate information, varying from web-based tools, written reports and guides.

The appropriateness of each tool or guidance document often depends on the local context, local needs, individual learning preferences and professional background. For example, what may seem pertinent to a local authority planner may not appear useful to an inner city

community leader. The range of approaches to support adaptation planning for cities can be viewed as positive and negative; it provides diversity to meet the different needs of users but can make it difficult for users to navigate their way to the most appropriate tool.

## 2.2.3 Overview of options and measures

Adaptation options and measures (also termed actions) were considered in the review of early mover city adaptation strategies (and also a specific review of adaptation options). Both elements of research identified a diversity of options either planned or being employed. The review of adaptation options considered over 200 individual adaptation options, which was consolidated into 26 different types of options (see Table 3) covering hard, technical based, adaptation options; hard, system based, adaptation options; and soft options (e.g. governance, regulation, legislation). The research found that these options sought to address five main climate impacts, namely:

- Impacts of marine flooding (11 options)
- Impacts of river flooding (13 options)
- Impacts of pluvial flooding i.e. storm water runoff (13 options)
- Impacts of heat stress (12 options)
- Impacts of drought (6 options).

Adaptation options identified within the review of adaptation strategies were similarly diverse and spanned research, increase of knowledge, public communication and awareness raising and urban planning (including construction measures, changes to standards and procedures, or the preparation of other strategies and plans, e.g. a heat wave plan). Regarding urban planning, there is a growing emphasis on the protection, modification and increase of green and blue infrastructures which have great potential to reduce multiple risks. Adaptation actions and options were grouped and presented differently in different strategies. For example, Melbourne differentiates between short, medium, and long-term adaptation measures and Malmö categorises actions as relevant for the city, district and neighbourhood level.

**Table 3: Summary of reviewed adaptation options**

No	Type of adaptation option	Heat stress	Drought	Flooding (Marine)	Flooding (River)	Storm water run off
1	Construction and design of buildings	x				
2	Orientation of buildings and open spaces	x				
3	Green roofs and walls	x				x
4	Raise albedo	x				
5	Provide shading	x				
6a	Reinforce flood protection infrastructure (River)				x	
6b	Reinforce flood protection infrastructure (Sea)			x		
7	Flood proof infrastructure			x	x	x
8a	Innovative flood protection options (River)				x	
8b	Innovative flood protection options (Sea)			x		
9	Enhancing capacity of water storage				x	x
10	Geothermal heating and cooling	x				
11	Public green areas	x				x
12	Urban farming and gardening	x	x			x

No	Type of adaptation option	Heat stress	Drought	Flooding (Marine)	Flooding (River)	Storm water run off
13	Land use planning to reduce flood risks			x	x	
14	Flood forecasting and warning systems			x	x	x
15	Heat health warning system	x				
16	Improve regulations for building			x	x	x
17	Evacuation and contingency management plans	x		x	x	x
18	Water saving measures		x			
19	Crisis management		x	x	x	x
20	Extend water supply services	x				
21	Floating and amphibian housing				x	
22	Public education and awareness campaigns	x	x	x	x	x
23	Reduce hardened surfaces					x
24	Compartmentalization			x		
25	Water management plans		x	x	x	x
26	Water retention		x		x	x
	<b>Total</b>	12	6	11	13	13

## 2.2.4 Key messages on city-level approaches to adaptation

### 2.2.4.1 Drivers

There is a range of drivers, which appear to motivate cities to act on adaptation. The project highlighted the following:

- National and regional requirements and recommendations can provide a ‘policy push’ and encourage the development of city level adaptation strategies
- Action on adaptation is often linked to the broader policy context of city-level development or improvements to quality of life – this may be an important lever given the current economic challenges faced by many European cities.

Cost-benefit analyses of adaptation actions have only rarely been conducted and included in strategies. The reasons could be the complexity of such an analysis and/or the lack of reliable data. Given that the ‘costs of early action versus business as usual’ is often cited as a driver for action, it would appear further work is required to make the economic case, especially given the current financial pressures on many municipalities.

### 2.2.4.2 Adaptation strategies

Due to the multitude of approaches, there is a variety of structures and components of adaptation strategies. However, regarding structure, content and procedural stages the following conclusions can be drawn:

- Policy statements or general aims and objectives at the beginning of the document set a clear focus for the strategy and demonstrate a high level of political buy-in, thus enhancing awareness and acceptance within the city administration and the public, respectively.
- Stakeholder involvement and participation early on in the process assists in shaping the evidence base and defining adaptation actions. It is important not only to include relevant municipal and public institutions but also research institutions,

representatives from the private sector and NGOs, to increase the document's integrity.

**Box 13 Case Study: Re-developing communities to adapt to the impacts of climate change, Malmö, Sweden**

EcoCity Augustenborg is the collective name for a programme to make Augustenborg, Malmö into a more socially, economically and environmentally sustainable neighbourhood. It is one of Sweden's largest urban sustainability projects.

The city is using blue and green infrastructure (e.g. roof gardens and innovative surface water systems) to meet the needs of neighbourhood communities faced with the challenges of future climate effects. It is already planning for the future and involving the residents in formulated solutions.

The EcoCity is working within the residential area of Augustenborg in Malmö, as well as with the school, industrial area and other local businesses to bring climate change adaptation measures into urban planning at an early stage. Another key aim of the project is to enable residents to take a leading role in the ideas, design and implementation of the project.

Both the survey results and analysis of 'early mover' city adaptation strategies indicate that strategies are often presented in the context of broader city-level development or improvements to quality of life. Further support for cities in developing adaptation strategies should consider links between adaptation and other social, economic and environmental objectives.

With respect to monitoring, all cities emphasise that their strategies will be revised regularly and, if details on review and evaluation cycles are specified, they often range between three and five years. However, this issue is rarely covered in a standalone chapter (except for Kalamaria and Santa Cruz) and it would seem that greater efforts need to be made to detail how city-level adaptation progress will be tracked.

### 2.2.4.3 Options and measures

A broad range of urban adaptation options were identified in response to flooding (marine, fluvial and pluvial), heat stress, and to a lesser extent, drought. 'Softer' options can be categorised into three groups: research and increase of knowledge; public communication and awareness raising; and urban planning.

Regarding the support of cities in starting or proceeding with adaptation activities, decision support tools (online or offline) are often mentioned. However, there is generally a lack of information on how the tools developed to date have been tested with user groups and little or no monitoring information on how these tools are perceived and used by practitioners. Further testing and review would help practitioners to understand which tool might best meet their needs. It would also help to understand which areas require additional support tools and where further or more complex tools are not needed.

## 2.3 Adaptive capacity

None of the Task 1 sub-tasks had a specific objective to review the adaptive capacity of European cities. However, several sub-tasks of Task 1 highlighted points that shed further light on urban adaptive capacity. The survey included some relevant questions, the review of strategies and tools and guidance touched on adaptive capacity, and the enhanced State of Play report covered some relevant ground. The project team developed a working understanding of adaptive capacity and the 'big picture' of urban adaptive capacity across Europe in order to develop and target subsequent project activities, including the appropriate use of training and peer exchange. A substantial analysis of organisational aspects of civic adaptive capacity is included in Section 4.3 and Appendix 9. This draws on the survey and also on the in-depth PACT analysis of the 21 cities that participated in the workshops.

### 2.3.1 Understanding adaptive capacity

The broad concept of adaptive capacity can be relatively easily understood within the framework of climate change impacts, vulnerability and adaptation. All definitions recognise that enhancing the adaptive capacity of cities can decrease their vulnerability to climate impacts by increasing the likelihood that useful adaptation measures will be identified and adopted.

For the purposes of the project we have explained adaptive capacity to participating city representatives as:

*“The potential of a system to design and implement effective adaptation strategies, to adjust to information about potential or actual climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences<sup>18</sup>. Adaptive capacity is seen as the enabling conditions conducive to all city stakeholders taking adaptive action”.*

There are a number of different approaches to measuring adaptive capacity. Typically, capacity has been measured through proxy indicators, such as levels of literacy and behaviours supporting social cohesion. These have been shown to correlate well with recovery from natural disasters. However, there is no particular reason to suppose that these measures correlate equally well with the capacity to adapt to future impacts and the need for understanding to evolve to incorporate more of the process element of adaptation has been noted, for instance by West and Gawith (2005).

One approach to understanding adaptive capacity (taken, for example by the EEA, 2012, and depicted in Figure 5) is to consider ‘awareness’ (the role of knowledge and access to information), ‘ability’ (such as access to technology and infrastructure), and ‘action’ (including economic resources and appropriate institutions).

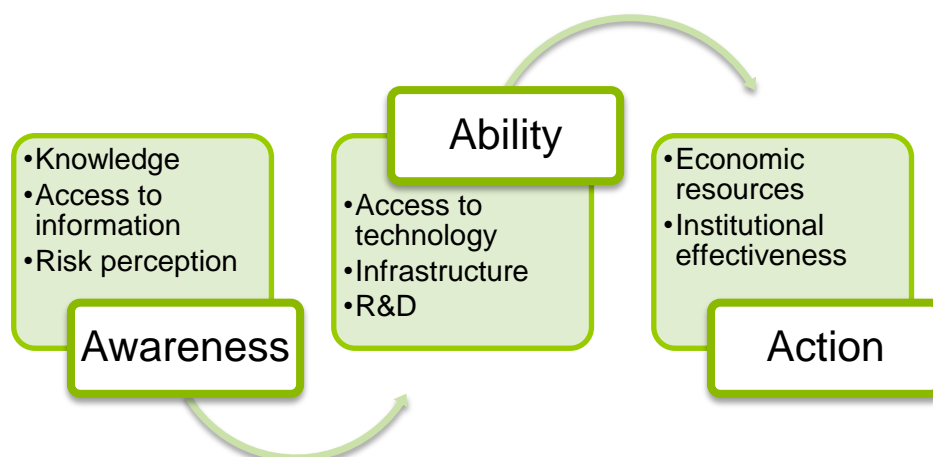
Another approach, used in the UK’s first Climate Change Risk Assessment (Ballard et al., 2013) is to distinguish between ‘organisational capacity’ (the capacity of institutions and other organisational forms to formulate and take appropriate actions), ‘structural capacity’ (the extent to which the structural context, including existing infrastructure and sector structure, is conducive to change or may be ‘locked-in’ so that change is very hard) and ‘framework capacity’ (the existence of appropriately enabling regulations, information, incentives and co-ordinating bodies to support and encourage change).

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<sup>18</sup> This part of the definition is a development of the IPCC definition made in the UK’s first Climate Change Risk Assessment (2012). The amendment stresses the need for strategies to be developed to take account of information about uncertain but likely future climate impacts.



**Figure 5: Adaptive capacity can be considered under three categories of Awareness, Ability and Action (after EEA, 2012)**



As the process of adaptation over time is increasingly adopted as a focus, it becomes clear that improving adaptive capacity (e.g. through improved information about climate impacts, better organisational arrangements, new research or access to targeted funding) can be likened to a journey. This developmental aspect of adaptive capacity (from early stages to more mature forms) has been used to some extent by the UK Climate Impacts Programme (e.g. in the UK Government's National Indicator 188) and it underpins the PACT methodology for assessing organisational adaptive capacity used within this project.

Within the project, we have recognised that the level of adaptive capacity needed by an actor or organisation in the city context can be extremely varied, depending on each situation and competing priorities. Higher capacity is likely to be needed, for example, when:

- The development of a programme of adaptation is required, e.g. across the city or region, or within urban sectors, rather than only a single adaptation project
- Decisions are likely to be of long duration (e.g. 10 or more years)
- Changes are needed to the system around decisions, and not just to the decisions themselves
- Stakeholder systems are very complex
- A problem is encountered for the first time, needing creative responses
- Changes to complex systems such as ecosystems or human social systems are likely to be required.

The concept of adaptive capacity offers some indication of how that journey is progressing i.e. the stage or status that the city has reached. This is crucial to benchmarking methodologies such as PACT, and also enables the identification of where appropriate learning from peers may be found.

## 2.3.2 Current levels of adaptive capacity in Europe's cities

### 2.3.2.1 Evidence from the project survey

Valuable inputs on the level of adaptive capacity in European cities were gathered in an extensive survey conducted in an early phase of the project. Here we asked a range of questions designed to understand features and characteristics of the city, where they assessed themselves on a scale of adaptation progress from:

- a) Not yet begun work on climate adaptation – either planning or not planning to do so in the near future
- b) Very early stages
- c) Well on the way
- d) Moving ahead of the field
- e) Our climate adaptation programme is far advanced

This self-assessment question was correlated with [PACT](#). PACT is an [evidence-based framework](#) for assessing and improving an organisation's response to the challenges posed by climate change. It has been widely tested in many types of organisation in different countries and is backed by a growing evidence base and robust statistical analysis. PACT has been used to assess the adaptive capacity of the 21 cities involved in the project.

The survey also went on to explore the other elements of adaptive capacity (as referred to in Figure 5) that also help reality check the respondents self-assessment adaptive capacity level. A full list of the questions asked in the survey and the statistical output are given in Appendix 2. Box 13 below gives an overview of the survey and its findings.

### **Box 13 Survey of European Cities**

The concept for a Europe-wide city survey was to provide a high-level assessment on the 'state of play' on adaptation across European cities and their capacity to plan for the impacts of climate change expected to affect their city. The survey was aimed at informing the design of the Typology in Task 1, the selection of cities for Tasks 2 and 3 and to start building the evidence base for the final deliverables. In particular it was designed to provide the following information:

- State of play of cities in preparing for adaptation.
- An overview of adaptive capacity, including cities' awareness.
- An overview of training needs.

At the request of DG CLIMA, the survey was developed using the EC's IPM tool 'Your Voice in Europe'.

The final questions were developed in consultation with the consortium partners and the DG CLIMA Project Officer, and these are provided in Appendix 2.

The survey was activated on 20 April 2012 and was accompanied by a launch letter from DG CLIMA to the Adaptation Steering Group Members. A launch email was sent by ICLEI using its mass mailing service. The initial expected closure date of the survey was 29 May 2012, but this was later extended to allow the survey to remain open until the second Stakeholder Dialogue event (11 July 2012).

The following steps were carried out to complete this task:

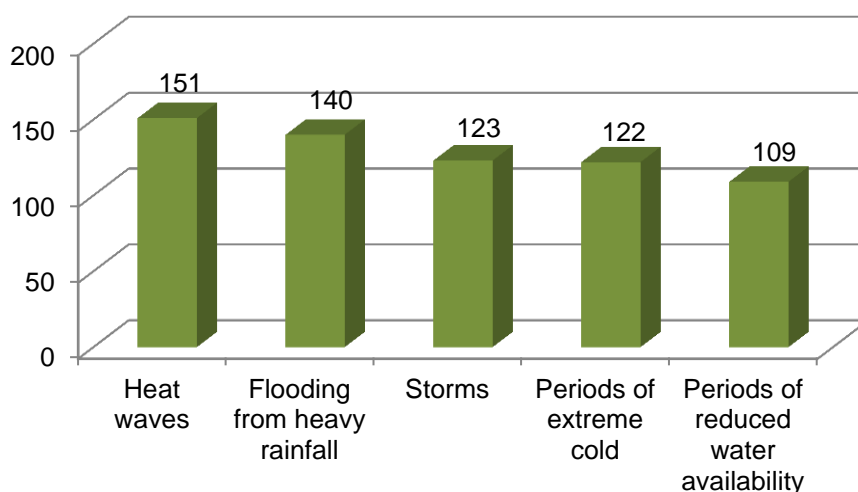
- Weekly tracking of completions of questionnaire, Member State and bio geographical coverage. Based on the results of this tracking, efforts were made to boost respondent levels in under-represented areas as required.
- Mass mailing reminder to encourage cities to complete the survey.
- Preliminary analysis of the results to inform the stakeholder dialogues using the automated IPM tool analytics, as well as providing initial assessments where needed on the questions that related specifically to the stakeholder dialogues.
- Full analysis of the results following the extension of the survey deadline to after the Ancona Stakeholder Dialogue meeting (11 July 2012). The draft analysis was completed by AEA by 24 July for inclusion in the Task 1 report and then the final analysis was completed for the final report using responses captured by 17 July 2012.

### **Survey results**

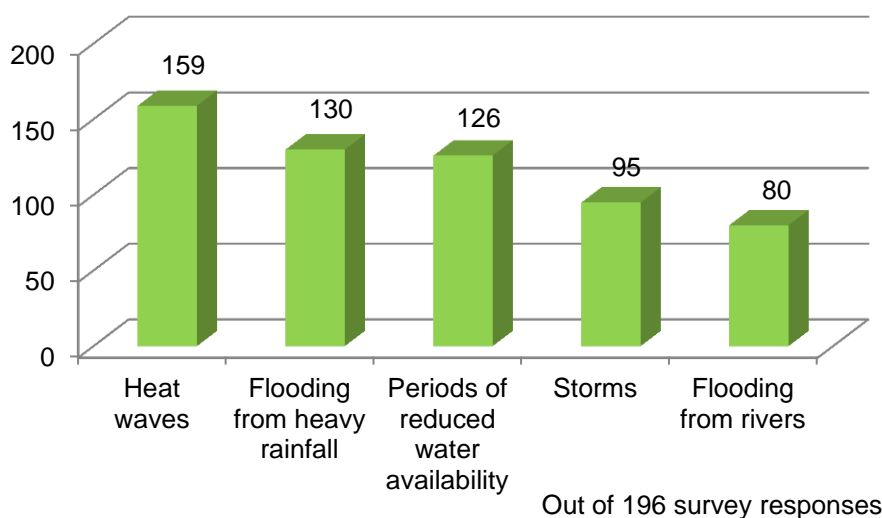
By 17 July 2012, 196 responses to the survey had been received from cities across Europe, the majority of which were from the Mediterranean (41%) and North-western Europe (23%). Analysis of the responses revealed the following headline results. For more detail on the survey results and the questions asked please see Appendix 2.

- 81% of the cities surveyed have experienced periods of hot weather and heat waves and expect this to be the main impact over the next 30 years that they will have to deal with as part of their adaptation strategies. Looking ahead, 71% of cities surveyed expect increases in periods of reduced water availability over the next 30 years. The top five hazards experienced and expected in the future are given below:

### What top 5 hazards have cities experienced?



### What top 5 hazards do cities expect to increase in the future?



- Around a third of the cities do not believe that there is sufficient funding or support in the form of networks and task forces, specific adaptation guidance or tools for adaptation planning in their cities. Lack of budget and resources (20% of the 196 cities surveyed do not have resources allocated yet to implement their strategy, 1% have resources fully allocated beyond the current budgeting period), guidance and tools at all levels and political commitment are considered the main barriers.
- 14% of cities have an adaptation strategy, which is mandatory due to a legal obligation; others (34%) have a required policy document due to the city making a public commitment to voluntarily

produce an adaptation strategy.

- The characteristics that would most influence the choice of peer city with which to engage on adaptation are climate impacts, vulnerability and geography. Language was not identified as a major inhibitor to engagement.

In interpreting these results, it is important to note that stakeholders at a lower level of capacity are likely to believe that less relevant support is available than stakeholders in the same system that have reached a higher level of capacity. Also the understanding of barriers to change is often very unsophisticated amongst stakeholders who have taken no action, or who are at a very early stage in the process of acting.<sup>19</sup> The data above, supported by the in-depth analysis in Section 4, strongly suggests that this is the case amongst the large majority of European cities, including those that responded to the survey.

As yet, in comparison to the other timescales for risk assessments, only 2% of the cities surveyed have undertaken risk assessments for key issues/city sub-sectors (such as buildings, water supplies, health etc.) over the next 50 years or longer (of these, the focus is on water supplies and sewage). From the respondents surveyed, cities tend to be focusing more on risk assessments over the next 10 years, predominantly for sewage, city-owned buildings, energy supplies, and water supplies.

Regarding the engagement with different groups on plans for their adaptation strategies, the most common form of engagement is via workshops. Activities identified to increase capacity include sharing information and experience via web portal (67%) and bilateral exchange with another city (48%). Respondents identified the two top training needs as help with developing adaptation options (63%) and help with implementing adaptation measures (58%).

Appetite for participating in the project was very high; 54% were keen to participate in workshops and stakeholder dialogues.

The full details of the survey method, headline results and statistical output are provided in the sub-task report, which is available on CIRCA and provided as Appendix 2 to this report.

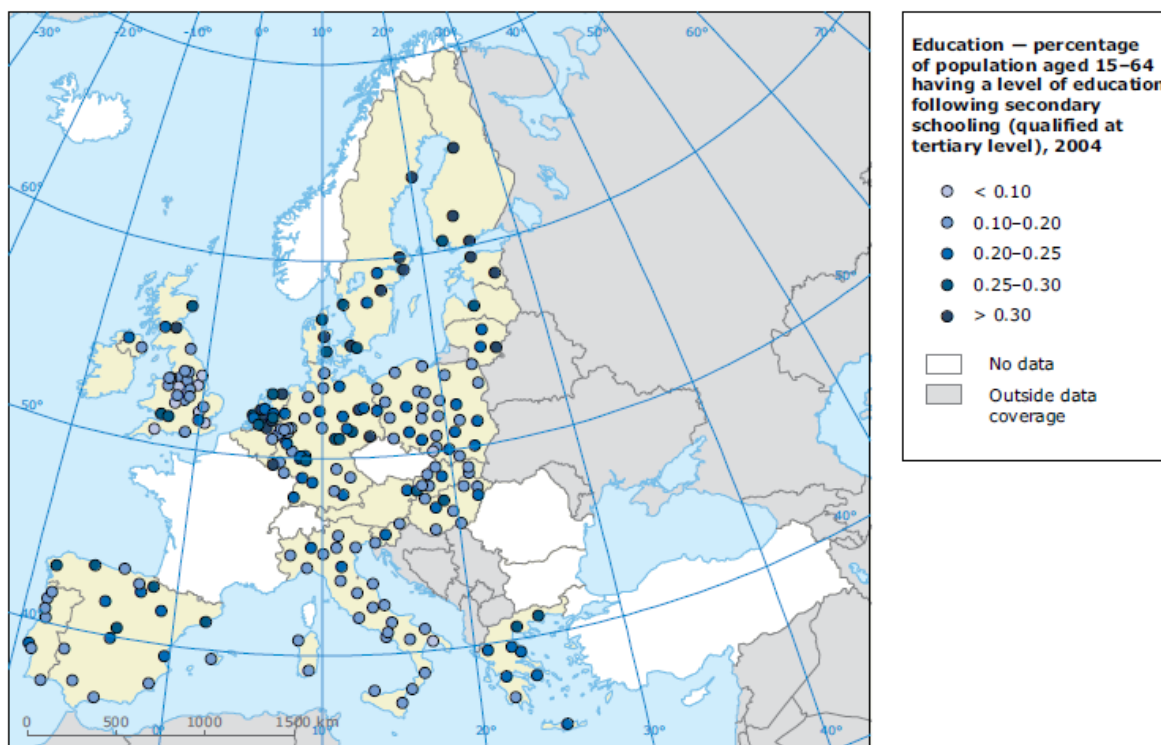
The results of this survey, correlated with the in-depth analysis from the PACT survey of the 21 participating cities undertaken during this project, provides the largest survey of organisational adaptive capacity yet undertaken. The analysis of the survey results is in Section 4 and Appendix 9.

### **2.3.2.2 Context for organisational adaptive capacity at a city level**

The EEA grouped the determinants of adaptive capacity in terms of awareness (knowledge, including perception of risks and human and social capital), ability (the potential of a society to design and implement adaptation measures) and action (the potential for implementing the adaptation solutions) (EEA, 2012). In the absence of agreed indicators of adaptive capacity, and severe limitations on the collection of relevant pan-European city-level data, the EEA made use of what was available to give some proxy indication of elements of adaptive capacity. For example, Figure 6 and Figure 7 offer examples of indicators that could be considered as proxies for the awareness dimension of the adaptive capacity of Europe's cities.

<sup>19</sup> Ballard, Bond, et al (2003) (PREPARE report for Defra).

**Figure 6: Education levels, as a proxy on the 'awareness' dimension of adaptive capacity in EU cities** Source: EEA (2012)

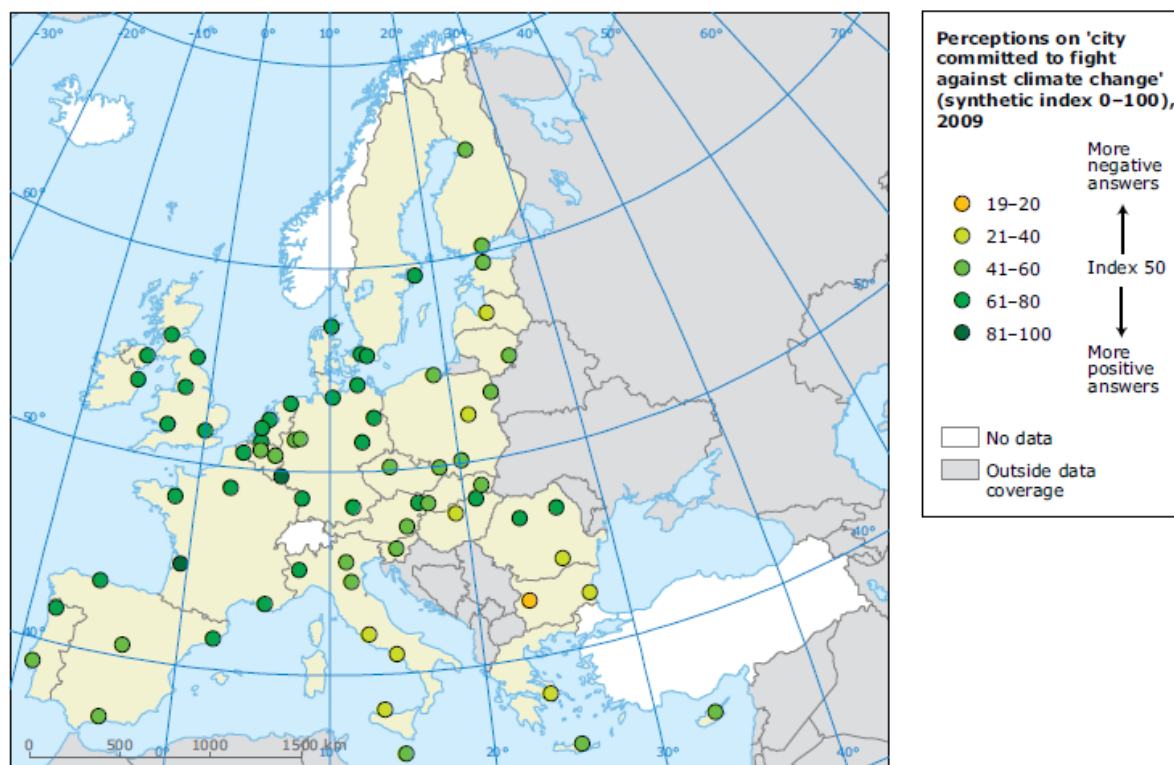


Statistics on urban education (Figure 6) present a rather patchy picture of educational experience, although there is some indication that those cities with the highest percentage of people educated beyond secondary schooling are in the north and west of Europe.

Another aspect of awareness relates to perceptions. Figure 7 shows some data available on citizens' perceptions of their city's commitment to address climate change. Although the data are sparse (highlighting the problem of data limitation), there appears to be some discernible trend with perceptions of greater commitment among the cities in the north and west of Europe.

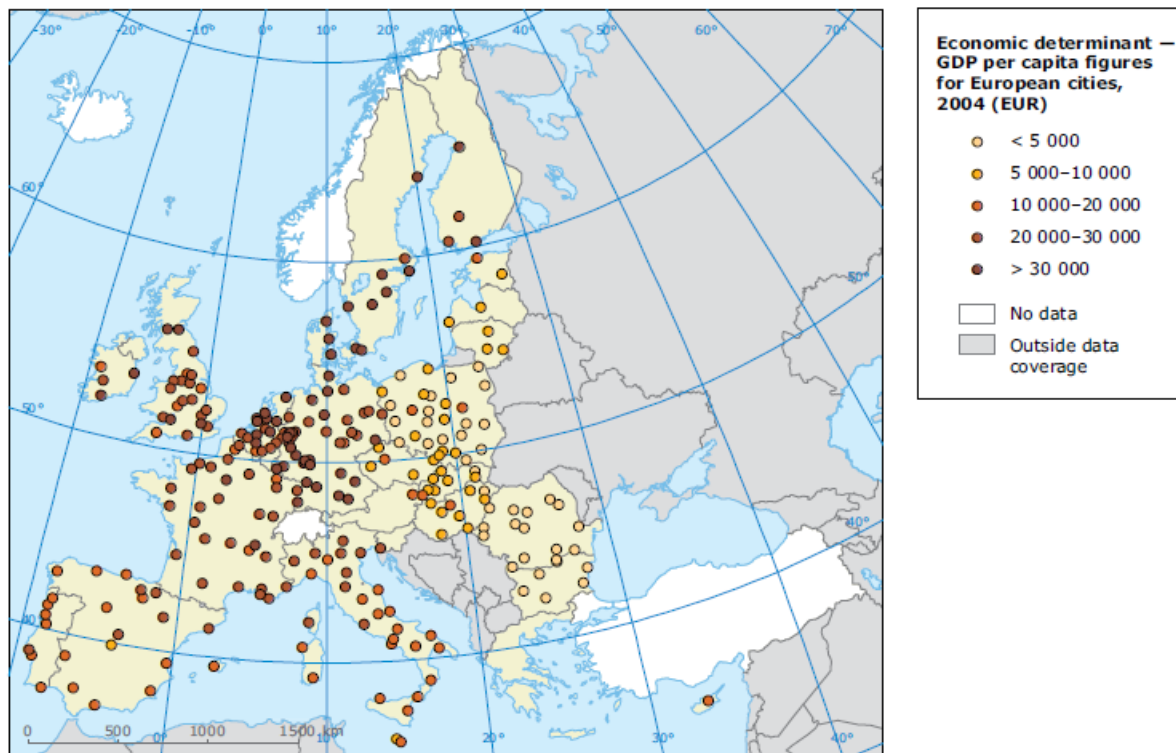


**Figure 7: Data on perceptions of city commitment to address climate change, as a proxy on the “awareness” dimension of adaptive capacity in EU cities** Source: EEA (2012)



Economic resources, capital assets and financial means are important components of adaptive capacity (categorised in the dimension of action). Gross Domestic Product (GDP) could be considered a proxy indicator for this dimension of adaptive capacity, and data on GDP per capita for urban audit cities is shown in Figure 8. This shows a marked divide in wealth between cities in eastern and western Europe, and a less obvious distinction between northern and southern European cities. In addition, there are wealth disparities between different cities in some countries. In general, it seems that the eastern and southern European cities are likely to be much more limited in terms of their economic capacity to take action on adaptation.

**Figure 8: GDP per capita, as a proxy on the “action” dimension of adaptive capacity in EU cities** Source: EEA (2012)



The project confirmed some emerging messages on the background for developing urban adaptive capacity across Europe, as follows:

- Current adaptive capacity appears to vary among European cities, both within and between countries. While some components of adaptive capacity are dependent on national or regional circumstances, there are other components which relate more uniquely to individual cities.
- Adaptive capacity comprises several components (e.g. knowledge, equity, access to technology and infrastructure; economic resources and effective institutions) which need to be supported through longer-term development of structural conditions. Short-term promotion of coping capacity measures in response to specific risks will also be required.
- Some geographical trends indicate that cities in northern and western Europe are characterised by higher levels of some factors that may be expected to support a higher level of adaptive capacity (including education, access to knowledge and technology, effectiveness of the government, and economic resources) than cities in the east or south.
- Such geographical differences support some regional-tailoring of programmes to enhance adaptive capacity to address specific needs and contexts.
- The differences between European cities present an excellent opportunity for exchange of experiences and peer learning. However, this needs to be undertaken in the context of the level of development of specific cities, and it should not be assumed that geographical proximity is sufficient to drive learning strategies.

The project’s review of city adaptation strategies confirmed many of these themes. At this stage, central, northern and north-western Europe seem most advanced in the process of adaptation strategy development. Most cities in east, south and south-east Europe seem not to have produced or finished adaptation strategies (or these were not mentioned on official websites or available for download).

In the same way that adaptive capacity varies across Europe, so too the most appropriate approaches to support adaptation in European cities may vary, with greater or lesser emphasis, for example, on awareness-raising, fostering levels of commitment by municipal government and the facilitation of bottom-up action. The immediate needs for capacity building for urban adaptation are different in different parts of Europe. EU level adaptation policies directed towards cities therefore need to have some flexibility to ensure that the right kind of support is targeted into different regions.

It is important to note that specific interventions should be made based on analysis of needs at the city level – the PACT approach described in Section 4 offers this analysis at a macro-level. However, the above analysis suggests that, in general, it is likely that awareness-raising activities might be more usefully targeted in the south and east where education levels and perceptions of city action on climate change are lower. Options that incentivise local government to tackle climate change could also be targeted in these areas. Conversely, initiatives, which promote bottom-up action by cities on adaptation, are more applicable in the north and west, where commitment, knowledge and wealth are already higher.

It may be appropriate to make more direct investment of funds for adaptation into the south and east of Europe where GDP per capita is relatively low. Across the EU, however, capacity building can be enhanced through the exchange of experiences, and city stakeholders engaged in this project testify to the value they place on learning from real good practice examples from other cities.

### 2.3.3 Building adaptive capacity in Europe's cities

#### 2.3.3.1 Tools & guidance

A range of tools and guidance to support adaptation planning is now available across Europe, and many are relevant to cities. The Task 1 sub-task which reviewed tools and guidance identified more than 50 different tools and undertook a preliminary screening of these (see Sub-task Report, Appendix 6). Most available guidance and tools for urban adaptation emphasise the importance of building adaptive capacity as the crucial starting point in addressing climate risks. Many also emphasise the importance of case studies and real practical examples, which can enhance awareness and capacity.

The reviewed tools and guidance vary in the way in which they seek to engage users and communicate information, including through web-based tools, written reports and guides. It is difficult to identify from the outside which of these tools will be most relevant to individual cities as this will also depend on the local context (including available resources), local needs, individual learning preferences and professional backgrounds. For example, what may seem pertinent to a local authority planner may not appear useful to an inner city community leader. Despite this complexity, the project has confirmed that a rich array of support and guidance is available to cities at various stages on their adaptation journey.

Existing tools and guidance could be better promoted and their use supported. The challenge is how to help users find and apply the tools, which best meet their needs. The European Climate Adaptation Platform<sup>20</sup> (Climate-ADAPT) provides the appropriate platform to support dissemination and use of these tools, but further work is needed to evaluate comprehensively the relevance and potential application of these existing tools in order to advise cities, identify any remaining gaps and to consider the need for designing further tools or guidance.

Tools, guidance and training can help build capacity through the introduction of concepts and frameworks, and increasing knowledge. However, in order for this knowledge to take effect in practice, real examples and experiences are required. This is where exchange, peer-learning and the use of networks are invaluable to build capacity.

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<sup>20</sup> <http://climate-adapt.eea.europa.eu/>

### 2.3.3.2 Networks and peer learning

As identified by the EEA (2012), knowledge exchange can play an important role in raising awareness and building adaptive capacity. The importance of such exchange is reflected in the design of this project, and the different elements of the training phase (Task 3), which promoted peer exchange and learning between cities with differing levels of adaptive capacity.

The EC has a number of financial instruments that can support cooperation, knowledge development and best practice exchange on a range of topics, including urban adaptation. For example, the INTERREG IVB programme<sup>21</sup> has supported the Future Cities Project (see Box 15 below), and several other projects related to urban adaptation are being undertaken across Europe. Through this process of exchange, such projects have been able to enhance the knowledge base regarding climate change impacts, vulnerabilities and adaptation options and inform the development of tools for active information exchange and continuous learning. In many cases, such projects also co-fund the implementation of real practical adaptation measures in cities across Europe. Many of these projects have been developed with European funding. Such projects and initiatives highlight several important factors:

- The importance of bringing together cities and municipalities to share knowledge and experience on adaptation.
- The value of additional capacity building opportunities from engagement with academic, research and consultancy communities to enhance technical expertise and the knowledge base.
- The crucial role of the EU in providing funding and facilitation of such networks and exchanges.

#### **Box 15 Example of EU funding enabling peer exchange and capacity building – the Future Cities Project**

The Future Cities project was a transnational partnership of local authorities, municipalities, public utilities, and urban designers in Belgium, France, Germany, the Netherlands and the UK working on 'joint solutions for the adaptation of urban structures to the impacts of a changing climate'.

In its drive to build 'climate proof cities', the partners of the Future Cities project shared their expertise in areas of necessary action – green structures, water systems, and energy efficiency – to develop holistic local action plans which addressed all these concerns. These plans were developed into specific pilot projects and demonstration activities, which were carried out at regional, public space/city level, business site/quarter level, and building level. Based on this shared experience, the Future Cities project developed a guidance tool for developing climate-proof city regions<sup>22</sup> that will help other cities and municipalities check the vulnerability and assess the adaptation options of key sectors.

The Future Cities project was funded by the European Commission's INTERREG IVB Programme, and is part of the Strategic Initiative Cluster 'SIC-adapt!'. In February 2013, the project hosted its final conference at the Sussex Exchange<sup>23</sup> in Hastings, England, where over 110 delegates shared lessons and insights on practical measures for cities to adapt to climate change in the future.

**Source:** <http://www.future-cities.eu/>

#### **Box 16 Feedback from project stakeholder dialogues – peer learning**

Based on the discussions and observations at stakeholder dialogues (in Task 2) the following factors were identified as preferred options with regard to exchange and mutual learning on adaptation:

- Learning is best undertaken on a regional scale.
- Exchange will be beneficial if cities experience similar climate hazards.

<sup>21</sup> <http://www.nweurope.eu/index.php>

<sup>22</sup> <http://www.future-cities.eu/project/adaptation-compass/>

<sup>23</sup> <http://www.sussexexchange.co.uk/dev/>

- Sharing of good practice is easier among similar sized cities.
- Learning and benefiting from adaptation case studies will depend on the level of capacity of cities. It was noted that the capacity of smaller towns is generally lower than that of larger cities.

In the discussions on adaptive capacity, cities stressed the importance of learning from other cities that were more advanced in adaptation planning and implementation. In particular, cities could learn about opportunities, success factors, challenges encountered and barriers to developing the adaptation framework. It was noted that to secure political commitment, the ability to provide real examples of win-win options for adaptation is crucial. There was also an identified need to learn from cities on how to deal with issues such as uncertainty in climate projections and how case study cities dealt with these discussions for the purpose of adaptation planning. In short, case studies and expertise were highlighted as important because they showcased:

- Adaptation measures (practical and local):
  - Win-win options and no-regret measures.
- Development of adaptation strategies:
  - How to deal with uncertainty
  - Understanding complex and interactive vulnerabilities and certain vulnerability elements such as poverty.

### EU-level role

The project review of city adaptation strategies confirmed that a great number of strategies have been developed within the context of EU-funded projects (e.g. GRaBs) and/or city networks (e.g. ICLEI or Climate Alliance). Therefore, both the EU and city networks play an important role in building adaptive capacity, specifically through the exchange of knowledge and experience on climate change adaptation, and provision of some of the financial capacity needed to help cities move to the next stage on their adaptation journey (and in some cases, to get started at all).

Regarding future capacity building efforts for cities, there is a need for the EU to support cities in the development of adaptation strategies and action plans and to mainstream adaptation within existing city-level service delivery mechanisms and stakeholder groups. This support can take various forms covering various aspects of the adaptation planning process, including:

- Provision of climate change data at spatial scales appropriate for city planning. The uncertainty associated with climate change remains an obstacle to planning and financing of adaptation.
- Development of tools and databases synthesising the data and information needed for development of adaptation plans.
- Training for cities to ensure that the tools and databases available are used effectively.
- Exchange of experiences between cities – learning from others, showing examples of adaptation (see below).
- Development of legislative tools at regional, national and EU level (e.g. directives) that would provide clear guidance on adaptation planning.
- A performance framework, or indicators, which would allow cities to measure the progress they have made in adapting to climate change.
- Support from the EU in the countries without national legislation/guidelines relating to adaptation (e.g. Italy).

#### **Box 17 Feedback from Project Stakeholder Dialogues – EU-level role**

Cities identified the need for national frameworks on adaptation to ensure political commitment at the local level and to potentially receive financial support. According to cities, the EU can support this process by incentivising adaptation at the national level by providing European-level directives. Another means of supporting cities on adaptation is the creation of European-scale networks that aim to encourage knowledge exchange and partnerships. Funding of adaptation projects and processes and exposing adaptation cases studies are other ways for the EU to support local-level action on



adaptation. In short, the role of the EU would be to:

- Provide funding of adaptation projects
- Support the exposure of existing adaptation case studies
- Provide EU level laws, regulations and directives
- Support the collection of climate related data at the EU level
- Support the creation of adaptation networks on a European scale.

The State-of-Play Report elaborated the arguments for an EU level role in urban adaptation, and these are summarised below:

### **2.3.3.3 Arguments for EU level role in urban adaptation linked to the actions in the 2013 EU Adaptation Strategy (condensed from the State of Play report)**

The number of Europeans living in urban areas is set to increase from the current figure of around 70% to around 80% in 2020, due mainly to rural to urban migration, but in the longer term from increasing immigration. Considering the social, economic and environmental significance of cities within Europe, it is clear that Europe's adaptation is (or will be) – to a major extent – urban. Therefore, a European policy framework for adaptation must critically include the urban dimension. Cities are the places where adaptation measures will be planned, implemented and maintained. Local governments are the organisations that facilitate adaptation processes involving citizens and stakeholders and coordinate adaptation measures taken by various actors in all sectors represented in their territory to design, implement, monitor, evaluate and progress effective adaptation, and these have been linked to the objectives and actions of the 2013 EU Adaptation Strategy.

Urban planning per se is not a European policy competence. However, there are a number of key justifications for an EU level role in urban adaptation, and these have been linked to the objectives and actions of the 2013 EU Adaptation Strategy.

#### **EU Adaptation Strategy objective: Promoting action by Member States**

Urban adaptation to climate change in Europe is a task that concerns all governmental levels, from local to European. Events outside cities can have major effects on urban areas. Certain cities, for example, face flooding due to inappropriate land use and flood management in upstream regions. Similarly, the adaptation choices in some of Europe's megacities could have major regional effects. Urban adaptation to climate change therefore requires regional, national and European approaches to work together. The EU Adaptation Strategy Actions 1, 2 and 3 with the accompanying guidelines for formulating adaptation strategies under the promoting action by Member States strategy objective will help with enabling the multi-level governance needed for adaptation. This will be aided by encouraging all Member States to adopt comprehensive adaptation strategies (Action 1), providing LIFE funding to support capacity building and step up adaptation action in Europe (Action 2), and introducing adaptation in the Covenant of Mayors framework (Action 3). Seeking EU-wide cooperation and coherence, the Commission will support the exchange of good practice between Member States, regions, cities and other stakeholders.

The EEA's urban adaptation report emphasised the concept of multi-level governance for adaptation. This brings with it challenges of co-operation and collaboration. While municipalities and regions focus on the implementation of place-based adaptation measures, national and European governments have a crucial supporting role (EEA, 2012). Cities and regional administrations can establish grey and green infrastructures and soft local measures themselves. National and European policy frameworks can enable or speed up local adaptation thus making it more efficient.

The top-level institution can provide structure and the reference framework for all governance levels (from community/local to city to regional to national to EU) to support the development of adaptation across Europe. Supportive frameworks could comprise of:

- Sufficient and tailored funding of local action

- Mainstreaming adaptation and local concerns into different policy areas to ensure coherence (this may include mainstreaming adaptation into regulations, public management procedures, standards and norms, as well as guidance)
- Making the legal framework and budgets climate-proof
- Setting an institutional framework to facilitate cooperation between stakeholders across sectors and levels
- Providing suitable knowledge and capacities for local action.

The EU has an important role to play when climate change impacts cross individual Member State boundaries. Such transboundary impacts may commonly be experienced between neighbouring cities, including cities within the same river catchment, but in different Member States. Cities in different European countries already have very strong links with each other through trade, transport and social links, and these links will also provide the architecture for adaptation. Action (or lack of action) in adaptation at city level can have significant effects on other cities that share similar resources (e.g. water management at the catchment level and energy infrastructure). Coordination is required at the European level to maximise opportunities, exploit efficiencies and reduce the potential for maladaptation.

The EU will provide financial support for adaptation through the proposed LIFE instrument, which includes a climate action sub-programme (Action 2 of the EU Adaptation Strategy). Priority will be given to adaptation flagship projects that address key cross-sectoral, trans-regional and/or cross-border issues.

Cities and city-level stakeholders express some uncertainty about the spatial level at which the responsibility for climate change adaptation should most appropriately lie (Resilient Cities Congress, 2012, pers.com). For example, in the Netherlands, the demand on limited water supply during droughts can cause tensions between cities and the agricultural areas surrounding them, and potentially across boundaries. Collaboration across national boundaries and different spatial levels is required to support urban adaptation in this context, and European-level coordination and facilitation is likely to be helpful.

### ***EU Adaptation Strategy objective: Better informed decision-making***

The EU has a role to play in demonstrating leadership to European cities (including those in the Outermost Regions). One aspect of this is in facilitating coordination, good practice exchange and knowledge transfer between cities in different European Member States to inform better decision-making. Actions 4 (Bridge the knowledge gap) and 5 (Further develop Climate-ADAPT) will make progress in these areas. Specifically for cities and local action, the EU has the resources and influence necessary to promote practical action on the ground across Europe, particularly through knowledge transfer and sharing good practice but also in its role as facilitator and liaison between cities across Europe, enabling learning from the 'early movers', making up-take and replication much more efficient, and helping to link up technical competencies for adaptation measures. Exchange may also be formalised in the development and sharing of common frameworks, tools and/or guidance to support urban adaptation. Furthermore, cross-national mutual learning and city-to-city exchange of experiences can help the up-take of successful adaptation approaches and measures, providing additional benefit to the EU.

In addition, the EU can provide leadership and an example to follow, which can help cities outside Europe adapt to climate change. This could bring benefits for European trade and economies.

It is not only knowledge transfer, but also the development of the knowledge base for climate impacts and adaptation, and filling knowledge gaps, that demands a European role. Again, Actions 4 and 5 under the Better informed decision-making objective of the EU Adaptation Strategy will aid development of the knowledge base, specifically for cities. This is particularly important in sectors of common concern with basic climate-related knowledge available (e.g. health). While there is always a need for the generation of some local level information to support urban adaptation strategies, underpinning research can often be best

organised at higher levels. Firstly, there is a lack of resources available in many cities to undertake critical research in this field, leaving a large proportion of cities with less access to data, particularly on climate change hazards. Secondly, when cities act independently, the potential for duplicating effort exists.

***EU Adaptation Strategy objective: Climate-proofing EU action: promoting adaptation in key vulnerable sectors***

Coordinated EU adaptation action will be necessary in certain sectors that are closely integrated at EU level, including health, agriculture, water, biodiversity, fisheries and energy networks. These sectors represent a common European interest, with implications for urban populations. This is reflected in Actions 6 to 8 in the EU Adaptation Strategy. Frequently, it is in urban areas that such multiple sectors meet and interact, either through markets and consumers, or competition for land and other resources. In order to integrate adaptation into multiple areas of existing EU policy (perhaps notably the Common Agricultural Policy (CAP), cohesion and the single market), the EU is unlikely to be able to avoid engaging with the urban dimension.

For example, as the EU plays a key role in the renewal and coordination of new infrastructure affecting cities, so it can foster improved adaptation through its policies. Planned proactive adaptation as infrastructure is being renewed can save a major overhaul of infrastructure as the impacts of climate change increase in the future. In addition to hard measures, the EU can also enhance the adaptive capacity of cities so that they are better able to develop their own locally appropriate responses across multiple sectors and overlapping policies.

Perhaps the most compelling argument for EU engagement in urban adaptation is in relation to **cohesion policy**. Economic, social and territorial cohesion already has a strong urban dimension. Cities are a focus for European regional and cohesion policies and are a key area for knowledge exchange and shared learning, particularly in the areas of sustainability and planning (both of which are closely linked to adaptation). However, the effects of future climate change, and the degree to which adaptation is undertaken (or not), all have the potential to exacerbate existing inequalities.

The EU has had a growing impact on the development of cities over recent decades, particularly through cohesion policy. Many studies have shown that the economic growth of cities is frequently embedded in national economic systems and is often strongly related to the development of the latter. Around 74 % of the differences in growth (in GDP) between individual cities in Europe is accounted for by differences between the growth rates of different countries (DG REGIO, 2011). There is therefore an argument for an EU-level role in adaptation to ensure that adaptation can be tackled by all cities, not just those supported by growing national economies.

In some instances, the adaptation plans that are being developed by cities are far ahead of the national legislation (e.g. Copenhagen), thus they exist in a policy/legislative vacuum and have little support from the national level. In other countries, such as Germany, adaptation is not required by a legal act; it is 'softly mainstreamed' in planning, but not necessarily in spatial planning. In Latvia, adaptation is included in spatial planning. In both cases, structured support at EU level may help to provide coherence and consistency.

The legal and policy situation across the EU Member States for cities working on adaptation is varied. The preliminary survey findings from the ASEC project showed that only 14% of the respondents' adaptation strategies are, or will be, mandatory due to a legal obligation. Approximately 34% of the respondents state that their city's adaptation strategy is a non-legal but required policy document due to a public commitment to produce a voluntary adaptation strategy. This leaves a majority of cities which may need additional support to engage with adaptation where there is some lack of commitment to the topic at Member State or other political levels.

Adaptation across European cities is currently inconsistent. Solidarity among EU Member States and between cities in different Members States is needed to ensure that the regions likely to be most disadvantaged by climate impacts are capable of introducing the adaptation measures necessary. Indeed, lack of adequate adaptation in some regions may fundamentally undermine cohesion across the European territories. The principles of solidarity, social and territorial cohesion and EU cooperation should require that all cities are able to take the measures needed to adapt. The EC can help this process by facilitating knowledge transfer and experience sharing.

### 2.3.4 Key messages on adaptive capacity

Adaptive capacity is not precisely defined, and cannot be easily measured. In addition, the datasets, which are collected at the city level across Europe, are limited both in coverage (i.e. relatively few of Europe's cities and towns are included) and in relevance to different aspects of adaptation. It is therefore, currently, very difficult to be sure about the big picture of adaptive capacity in European cities.

A working understanding of adaptive capacity recognises a number of critical components (the dimensions of awareness, ability and action) and contexts (organisational, structural and framework capacities). Different situations and stakeholders will require different levels of adaptive capacity.

Based on the project survey results, it seems that more than three-quarters of European cities have, as yet, done little or nothing to prepare for climate change. Perhaps 90%<sup>24</sup> or more of European cities are likely to lack the adaptive capacity to be able to make resilient decisions with a lifetime of a decade or more, where the social, economic or environmental consequences of such decisions are potentially at risk from climate impacts.

Current adaptive capacity varies among European cities. Geographical differences in adaptive capacity (with cities in the north and west of Europe generally having higher levels of adaptive capacity than those in the south and east) imply that regionally-tailored programmes to enhance adaptive capacity may be most effective to address specific needs and contexts. The survey was expected to show this adaptive capacity divide however there is insufficient data to statistically make this link. The strength of a national adaptation framework in the country shows there is some potential correlation but further research would be required (see Appendix 9 – Section A2 Influence of a national adaptation framework).

A rich array of tools, support and guidance to enhance adaptive capacity and support adaptation planning is now available across Europe, much of it relevant to cities at various stages on their adaptation journey. It is difficult to identify from the outside which of these tools will be most relevant to individual cities as this will also depend on the local context, but Climate-ADAPT provides an appropriate platform to support dissemination and use of these tools.

Across the EU, capacity building can be enhanced through the exchange of experiences, and city stakeholders engaged in this project testify to the value they place on learning from real good practice examples from other cities. This was reflected in the design of the training phases of this project. Given the patchy nature of current capacity across Europe, even some of the so-called 'peer cities' engaged in the training phases of the project had gaps in their adaptive capacity.

A great number of city-level adaptation strategies have been developed in the context of EU-funded projects and/or city networks. This highlights that a crucial role for the EU in building adaptive capacity in cities is to provide funding and facilitation of such networks, projects and exchanges. There are already several European financial instruments, which can support cooperation, knowledge development and knowledge and best practice exchange on a range of topics, including urban adaptation.

<sup>24</sup> The survey respondents were asked to self-assess their current status of adaptation progress as the main adaptive capacity question asked, this was followed by further dedicated questions to qualify their response. Further detail can be found in section 2.3.2.1 and in Appendix 2.

## 2.4 State-of-Play Report

The State-of-Play Report is available as a standalone document, provided in Appendix 7.

The original intention was for the State of Play Report to draw together all of the Task 1 work. However, in order to meet the needs of DG CLIMA to support the development of the European Adaptation Strategy, the State of Play Report was redefined to focus explicitly on EU policy development and supporting evidence. To an extent, this overlooked some of the additional work undertaken on Task 1.

The structure of the report is summarised as:

1. Context, problem definition (i.e. why is climate change a problem in cities, what are the major impacts to be expected, etc.)
2. Objectives (i.e. what is the overall adaptation aim of European policy)
3. Options (i.e. highlight adaptation options, activities to respond to impacts)
4. Evidence base (research, initiatives, practical examples)
5. Meetings and consultations
6. Issues to discuss
7. References.

In order to develop the report, we were dependent on outputs from other sub-tasks, including the survey and the review of good practices. We:

- Produced a first draft version, incorporating information from sub-task 1.1.1 ‘review of impacts’
- Updated the report to incorporate analysis from the review of good practice and the survey
- Sought additional input on policy recommendations via the Resilient Cities 2012 session.

The report identified five key areas for actions on adaptation at EU level:

1. Supporting the implementation of technical measures for adaptation,
2. Mainstreaming into EU policies and strategies,
3. Exploring the potential of the market
4. Providing capacity-building and exchange of good practice
5. Filling knowledge gaps by nurturing research.

Since it is a cross-cutting area, the topic of urban adaptation potentially has a very wide scope, and there are several strands which could warrant further exploration and documentation in the future, including:

- Private sector vs. public adaptation within cities
- Adaptation of infrastructure and utilities and the complex role of city administrations
- The multitude of available EU financing streams and innovative financial instruments, which can be tuned to urban adaptation,
- mechanisms for valuation of (and payment for) urban adaptation
- benefit from rural environmental services, interdependent urban systems and adaptation, etc.

These are recommended as areas for future work, but could not be adequately addressed within this project.



## 2.5 Applying learning from Task 1 in the project

The findings of Task 1 informed the development of subsequent tasks in this project. These lessons are also of interest to anyone developing a similar project in the future.

### 2.5.1 Development of training groups

The outcomes of Task 1 were vital in informing Task 3 with regard to the selection of participating cities and their clustering in training sub-groups.

The findings from the literature review showed how to cluster cities to maximise their exchange on adaptation. This emphasised clustering cities according to geography and therefore according to climate hazards as well as according to city type. The survey results was also in agreement with this suggestion and indicated that climate hazards, population size, and level of adaptation planning were preferred ways to cluster cities together, as shown in Table 4.

**Table 4: Preferences for clustering of cities for exchange of adaptation experience**

Characteristic	Number of respondents	Percentage
Climate change impacts or vulnerability	133 out of 196	68%
Geography	123 out of 196	63%
Level of adaptation planning	97 out of 196	49%
Population size	61 out of 196	31%

With regard to the different levels of adaptive capacity in European cities, it seems that central, northern and north-western Europe are most advanced in the process of adaptation strategy development. Most cities in east, south and southeast Europe seem to have not produced or finished adaptation strategies. The review of adaptation strategies emphasised that population size and/or available resources are crucial aspects for developing an adaptation strategy since often the budget determines how much research and planning time can go into the development of a strategy.

#### 2.5.1.1 Selection of training cities and inclusion of peer cities

The main challenge was that of securing both variety and similarity among the selected cities. While the selected cities should share enough similar features to provide a meaningful common basis for the sharing of knowledge and experiences, a range of situations and features should also be covered within the participating cities.

Selection criteria identified:

- Hazards
- Geographical spread
- Economic situation
- Level of adaptation work
- Willingness & ability to share and participate (commitment)
- Size.

A presumption for the identification of potential peer cities, in line with the findings of the literature review, was that larger cities will be more advanced on adaptation, i.e. with an implemented adaptation strategy due to their resource capacity. Peer cities should be considered as those with some prior experience in adaptation processes and strategy development. Their role in the project was that of a supporting character, to provide the training cities with valuable input in terms of setting up adaptation processes, share lessons learnt and provide real case study examples on adaption options and measures taken.

### 2.5.1.2 Clustering of participating cities

The training and peer cities were grouped into three clusters, each including five trainee cities plus two peer cities supporting them. Reflecting the learning from Task 1, we clustered the cities according to geographical criteria such that the different climate regions could facilitate the identification of one to two priority impacts for each region.

In general, to cluster cities according to geography should reflect similarities within the climate regions in terms of experienced and projected climatic impacts as well as regional processes and framework conditions. This should enable cities to identify points for continuous exchange in current and future challenges and realistic opportunities and adaptation solutions. This should also foster a sustainable approach to the project beyond the end of the training with future collaboration and exchange more likely between cities in the same climatic region.

For each sub-group in this project, there were two more advanced cities that as far as possible had similar experiences in terms of impacts and/or processes and could support each sub-group as peer reviewer and provide advice and city case studies on adaptation. However, due to the early stages of adaptation in the cities, the peer cities did not necessarily come from the same climatic region.

## 2.5.2 Training and engagement

The Task 1 activities were vital in informing the design of the training activities that took place under Task 3.

### 2.5.2.1 Aims of peer exchange

The review of adaptation strategies indicated that there is willingness and potential for peer exchange. However, such knowledge transfers may have been limited to date because of the novelty of the topic, there have been only a couple of years to gain the practical knowledge that could be shared. The outcomes of the review of adaptation options emphasised the need for peer cities to offer concrete insights into their key success factors on adaptation and also to identify the barriers to adaptation in practice. The review of tools and guidance also confirmed that practitioners like inspiration (e.g. case studies), but this must cover the 'how' as well as the 'what'.

The outcomes of the Task 1 sub-tasks emphasised the need for cities to learn from other city experiences and knowledge on adaptation strategies, including adaptation options and case studies. To mirror these needs and preferred learning options of cities on adaptation, the training elements in Task 3 were centred around the support of cities in developing their adaptation strategies with an emphasis on city-to-city exchange. Focus was placed on coaching and peer reviewing to guide cities through the process of establishing an integrated adaptation strategy, supporting the development of a holistic management framework to form the basis of a long-term adaptation approach.

Therefore, the aims of the peer exchange were to:

- Provide cities with a critical 'friend' to support and facilitate the improvement of the quality of the processes of each city
- Strengthen the working relationships between all participating cities to yield mutual benefits that encourage cities to enter into more long-term partnerships beyond the end of the project.

Moreover, the peer exchange materialised through a number of opportunities such as the training workshops, the webinars, and the coaching, including coach visit and peer visits. It consisted of face-to-face elements as well as dedicated training on the project's website.

To identify adaptation success factors as well as barriers, the training included more advanced cities on adaptation who could share their experiences and knowledge with the training cities.

### 2.5.2.2 Training materials

There is now a wide range of tools and guidance available. These offer different perspectives on adaptation depending on:

- Sectoral focus
- Means of engagement and presentation (web-based tools, guides, reports etc)
- Geographic coverage
- Target audience (e.g. BalticClimate Toolkit targets policy makers, spatial planners and business people).

Some tools and guidance cover the whole adaptation process (e.g. the 'Future Cities Adaptation Compass') while others tend to focus on one particular aspect (e.g. GRaBS case studies focus on adaptation options). The review suggested there are a range of approaches to adaptation; this is potentially both helpful (providing different ways and entry points to consider adaptation) and challenging (how can users identify the tool which is best for them?).

Project training materials made use of existing resources. However, the expert coaches also helped cities to understand where they need support and directed them to appropriate tools and guidance. Part of the challenge is that different tools and guidance frame the adaptation problem slightly differently (or at least approach it from different angles), this can be confusing for people who are new to the topic.

Some strategies have a significantly more scientific and profound evidence base than others. To find an 'appropriate' balance, the training elaborated on how much, and what kind, of data were needed to develop a robust adaptation strategy. Given the budget constraints in many cities, the training touched on ways to acquire and use data that did not require modelling or extensive primary collection of data points.

The training was about developing an urban adaptation strategy, therefore the material or toolkit elaborated on the different purposes or multiple purposes such a strategy could have and ensured that the design was fit for the purpose in mind.

The majority of strategies provide an overview of adaptation actions that will be implemented and list responsibilities. Sometimes, actions are assigned different levels of priority or labelled important for short and long-term, respectively. However, the issue of monitoring is hardly covered and more detailed timelines are generally not disclosed. Thus, (apart from issues regarding the formation and content of the evidence base) the training also stressed the importance of allocating clear responsibilities, the inclusion of timelines and how to monitor progress.

### 2.5.3 Integrated approach to the urban adaptation process

Appreciating the flexible multi-dimensional nature of urban adaptation, the recommendation for the training phase of the project was to enable cities to view the components of the process of building an adaptation strategy through a more general integrated sustainability management approach, rather than promoting one adaptation tool or resource over another. For the purposes of the project<sup>25</sup>, we adopted the Integrated Management System (IMS), which provides logical steps that can easily be understood by city administrations, regardless of their familiarity with adaptation and technical language, terms and concepts associated with adaptation. This cycle is shown in Figure 9.

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<sup>25</sup> This is adopted as a pragmatic approach to facilitate interactions on adaptation planning and management with the range of cities participating in the training phase of the project: there is a wide range of experience in adaptation (from none at all through to very advanced) and this generic cycle offers a common framework that can be understood by all. For the final deliverables of the project (including final toolkit) we will review the effectiveness of this approach, and also consider alternative structures, in order to draw together project materials in an accessible way, bearing in mind other constraints, such as consistency with other materials presented on the Climate-ADAPT platform.

**Figure 9: The Integrated Management System to be used to structure the urban adaptation journey**



The advantages of the Integrated Management System are that it:

- Holds together an emphasis on knowledge development and evidence building with stakeholder engagement and communication
- Makes clear an explicit priority to achieve political commitment to the development and implementation of the strategy (which can be lacking in some adaptation frameworks)
- Can incorporate all of the good practice elements recommended in other adaptation guidance (such as the Climate-ADAPT Adaptation Support Tool), within a more generic framework (thereby avoiding bias towards one adaptation resource over another)
- Can be viewed as a journey with one step following the other, where cities can have different starting points
- Includes pre-existing checklists which can be modified for application to adaptation challenges, specifically.

The project survey identified that cities need more guidance on developing, assessing and assigning responsibility for carrying out adaptation options in order to aid more cities to produce adaptation strategies and to move to implementation of existing strategies. Situating adaptation strategy within the broader context of the IMS (with its emphasis on involvement, communication and political commitment) should particularly help in these steps.

The Task 1 activities therefore led to four key priorities for the implementation of the engagement, training and coaching phases of the project:

1. Helping each city find an appropriate framing of adaptation to support development of their adaptation strategy

2. Looking at peers defined by similar European climate regions for experience and practical learning
3. Identifying possible tools/guidance and aid with selection of appropriate ones
4. Moving the city on to the next step in their adaptation journey.

## 2.6 Recommendations

A series of recommendations for the EC and those developing city-level adaptation policies and programmes were drawn from the Task 1 findings.

### 2.6.1 Framing of the adaptation process

The various aspects of the (literature) review clarified an overarching conceptual framework for understanding urban adaptation, which includes considerations of climate hazards, adaptive capacity, and city vulnerability characteristics. This framing was recommended for use in the course of the project and by others conducting related work. This combination of factors implies that the experience of climate impacts is different in every European city, and therefore that we should not expect adaptation strategies and measures to be the same in different cities.

The review of practical experiences (strategies and measures) reinforced the point that there are many different approaches to adaptation, governed by the specific local context of each city (including political and cultural contexts, as well as climate risks). However, **stakeholder engagement is essential**: all early mover cities consulted several stakeholder groups during the development process for their strategies, particularly with regards to the formulation of the evidence base. Relevant stakeholders include not only the municipal and public institutions but also research institutions, representatives from the private sector, NGOs and citizens' organisations. Their consultation serves to increase the document's integrity and acceptance.

The review of existing tools and guidance demonstrated the **breadth of support available** for urban adaptation. Depending on the context of each city, including its national context, geographic location, and preferences in sustainability planning and management, some resources will be found more or less helpful at different stages in an adaptation process. However, while the various tools and guidance can differ in their style, presentation, specific content and detail, there is fundamental agreement that urban adaptation is viewed as an on-going process with cross-cutting implications, and needs to be integrated into multiple aspects of urban planning and management.

Each aspect of Task 1 has therefore confirmed the **flexible multi-dimensional nature of urban adaptation**, which means that the training phase of the project had no single preferred approach to promote. Instead, the role of coaches was essential to support individual cities to identify the most appropriate tools and resources for making progress on the adaptation journey in their specific local context. The experiences of the coaches and cities working through this process to find the most appropriate next steps are summarised in Chapter 4 and provided in detail in Appendix 10 reports. A flexible toolkit or portfolio is needed that can allow for the multi-dimensional nature of adaptation (no single approach to promote adaptation) and the unique local context each city faces. Therefore, rather than providing another new tool or resource, the project looked to develop a gateway to the portfolio of materials available to support urban adaptation, grouping them in a way that facilitated the comparison and selection of alternative building blocks available at each stage in the adaptation process – this is explained in Section 5 and Appendix 12 (Toolkit Report). This approach enabled a fairly smooth transition of final products into Climate-ADAPT.



## 2.6.2 Potential for European action to support urban adaptation

While the project did not focus on the policy level, the adjustment of the State-of-Play Report provided the opportunity to also discuss the regulatory frameworks within which cities are to adapt to climate change.

One key area of action for supporting cities lies in **mainstreaming adaptation** into EU policies and strategies, especially the 'climate-proofing' funding programmes. Entry points for adaptation could be established or enlarged within the evolving cohesion policy (especially the Innovation & Environment Regions of Europe Sharing Solutions (INTERREG), URBACT and LEADER programmes) or adaptation could be included more explicitly within the Multiannual Financial Framework or in existing urban sectoral initiatives of the EC.

Mainstreaming needs to be flanked by **capacity building, awareness-raising and exchange of good practice** so that the ultimate beneficiaries of mainstreaming efforts – i.e. decision-makers in municipalities – can benefit from them. The survey showed that support in finding data, developing adaptation strategies or measures and implementing them is needed. There are on-going or recently concluded activities (including this project) that facilitate these needs. To address them further, support can take various forms, including

- training for cities to ensure appropriate procedural structure for adaptation management or for the use of existing tools and databases
- providing supervised and long-term exchange of experiences between cities with similar challenges
- the establishment of a performance framework with indicators which would allow cities to measure the progress they have made in adapting to climate change.

Support seems to be most desired in those countries without national legislation, guidelines or online portals on climate change adaptation.

To provide effective capacity building, **existing knowledge gaps need to be closed**. The literature review and the survey pointed at research areas such as projections of climate impacts at a spatial resolution suitable for city planners, the international implications of climate change for European cities, costs and benefits of adaptation options and the potential for behavioural adaptation responses at the individual and organisational level. Research activities could unfold in different ways and include key actors like the EEA, DG RESEARCH, ESPON, Eurostat and of course Member States.

Such efforts in mainstreaming, capacity building and research usually develop their fullest potential when the private sector is taken on board as well. Across European cities, the private sector plays a key role as landowner, developer and user of the urban fabric at risk from adverse climate impacts, placing the private sector at the heart of effective adaptation responses. While there are a number of apparent barriers to engaging private sector organisations (e.g. short-term planning horizons), the problem-solving knowledge and private capital are most promising for dealing with climate change impacts at the urban level. Thus, it seems desirable to continue the discussion of market-based options at European level (e.g. public private partnerships, water markets, payment for ecosystem services).

## 3 Stakeholder Engagement

This chapter of the report outlines the approach taken to stakeholder engagement including awareness raising activities, setup information, knowledge sharing and organising stakeholder dialogues on adaptation to climate change in cities.

### 3.1 Introduction

The impacts of climate change, their importance, and how they should be addressed will vary considerably depending upon the location and the perceptions, experiences and needs of different stakeholders. A number of activities were undertaken to engage with a broad range of stakeholders in different locations across Europe to support the work of the project, specifically to:

- Build capacity.
- Identify best practice and share knowledge.
- Develop tools.

### 3.2 Web-based Platform

The web-based platform was developed as a tool for sharing knowledge about the project. The objectives of the platform were:

- To harness the existing broad body of knowledge.
- To increase access to and use of adaptation knowledge and information.
- To present best practice cases of adaptation strategies.
- To deploy user-friendly tools that deliver personalised information.
- To extend the contacts of users into new areas.
- To build communities to resolve information needs by sharing knowledge.

In summary the website contained the following pages:

**‘EU Cities Adapt’** – which provided a simple but clear introduction to the project and the platform and informed users as to the progress that had been made to date. This page also signposted users to new information (e.g. on the training events)

**‘News’** – which was regularly updated with news relevant to the project stakeholders, including project news (e.g. notices of future project events)

**‘Events’** – which provided an events calendar. This focussed on European-based adaptation events (conferences, meetings, seminars etc.)

**‘Knowledge Bank’** – this area of the website enabled users to upload good examples of adaptation strategies and was categorised into ‘case studies’, ‘publications and reports’, and ‘guidance’. It was initially populated with documents from the project. A search function was developed which was consistent with the layout of a similar function on the Climate-ADAPT website.

**‘Links’** – which provided links to key organisations and activities relating to adaptation and cities, predominantly at European level.

**‘Forum’** – which provided a shared space where users could exchange views concerning adaptation strategies, the impacts faced by cities and the responses they had developed.

**'Get involved'** – This section was developed as the number of engagement activities increased (survey, stakeholder dialogues, decisions on training cities etc.).

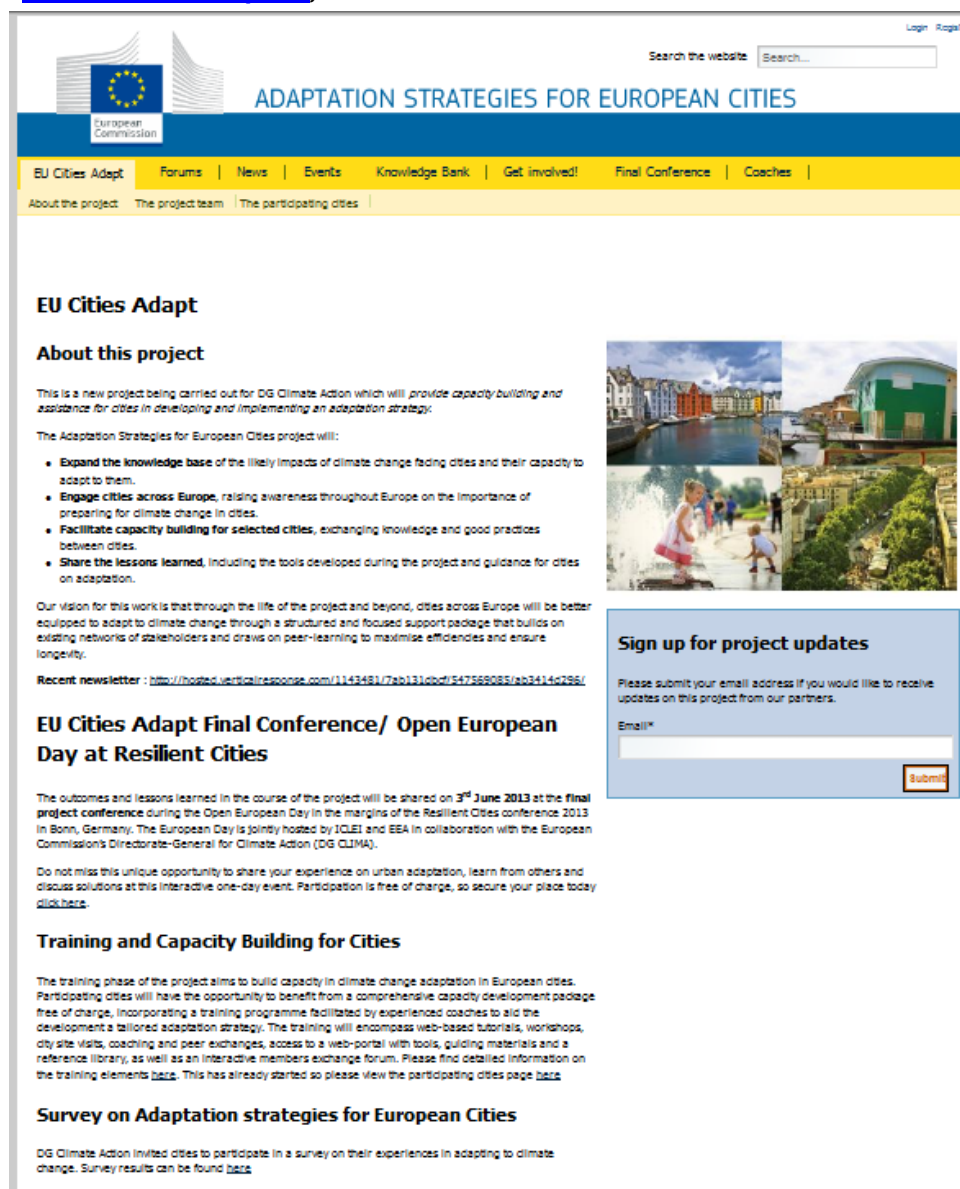
**'Final Conference'** – This section provided details of the Final Conference for the EU Cities Adapt project which was held on 3 June 2013 as part of the Open European Day.

**'Coaches'** – This page introduced the team of coaches who worked with the participating cities.

**'Training'** – This section contained details of the training and coaching sessions and provided access to training resources, including webinars, presentations and tools.

Figure 10 shows the home page of the platform.

Figure 10: [www.eucities-adapt.eu](http://www.eucities-adapt.eu), June 2013



### 3.2.1 Platform Use

As of 10 June 2013 the site had received 4,806 visitors (2,512 Unique Visitors), with visits from 98 countries and 19,499 page views. The home page ('EU Cities Adapt') had the most views followed by 'Events' and 'News'.

Table 5 shows the countries where the most visits came from. This confirms Europe as the main target group and demonstrates a good geographic spread across Northern, Southern, Central, Western and Eastern European countries, including new member states.

**Table 5: Top visits to the website by country**

Country/Territory		Visits	Pages / Visit	% New Visits
<b>TOTAL</b>		<b>4806</b>	<b>406</b>	<b>52.27%</b>
1.	United Kingdom	1,371	5.85	34.79%
2.	Germany	506	3.69	37.35%
3.	Netherlands	370	3.77	66.49%
4.	Italy	345	3.01	61.74%
5.	Belgium	330	3.65	55.76%
6.	France	194	2.53	77.84%
7.	Spain	192	3.57	77.60%
8.	Denmark	142	3.33	45.07%
9.	Bulgaria	115	1.95	25.22%
10.	Finland	113	4.17	57.52%
11.	Croatia	113	3.21	38.94%
12.	Sweden	98	3.57	71.43%
13.	Slovakia	86	2.47	40.70%
14.	United States	75	2.08	93.33%
15.	Portugal	72	7.33	51.39%

The most frequently viewed page was the homepage with 4,232 visits. This page was most frequently linked to in mass mailings. The next most popular pages were the 'Events' and 'News' pages with 1,195 and 1,118 visits respectively. The Knowledge Bank received 638 visits.

Our conclusions were that:

- The website provided a useful platform for raising awareness of the project, particularly in the initial stages.
- The website provided a useful platform to build the knowledge bank and to share information (including large presentations from the training events) with participants of the project.
- The stakeholders, including the participating cities, were less engaged when it came to interactive uses of the website, including the forum. For example, the project team posted several discussion threads on the forum during the training phase and these were not taken up by the project participants, despite raising awareness of these during the first Peer Reviews. This could have been due to factors such as the relatively short timescale of the project, the time pressures on the city representatives and the preferences of the participating cities for face to face and email correspondence with the coaches.
- Generating engagement with and traffic to a web-based platform is a significant task. For a project of this type, careful consideration needs to be given to the ways in which the project participants prefer to communicate with one another and the project team.

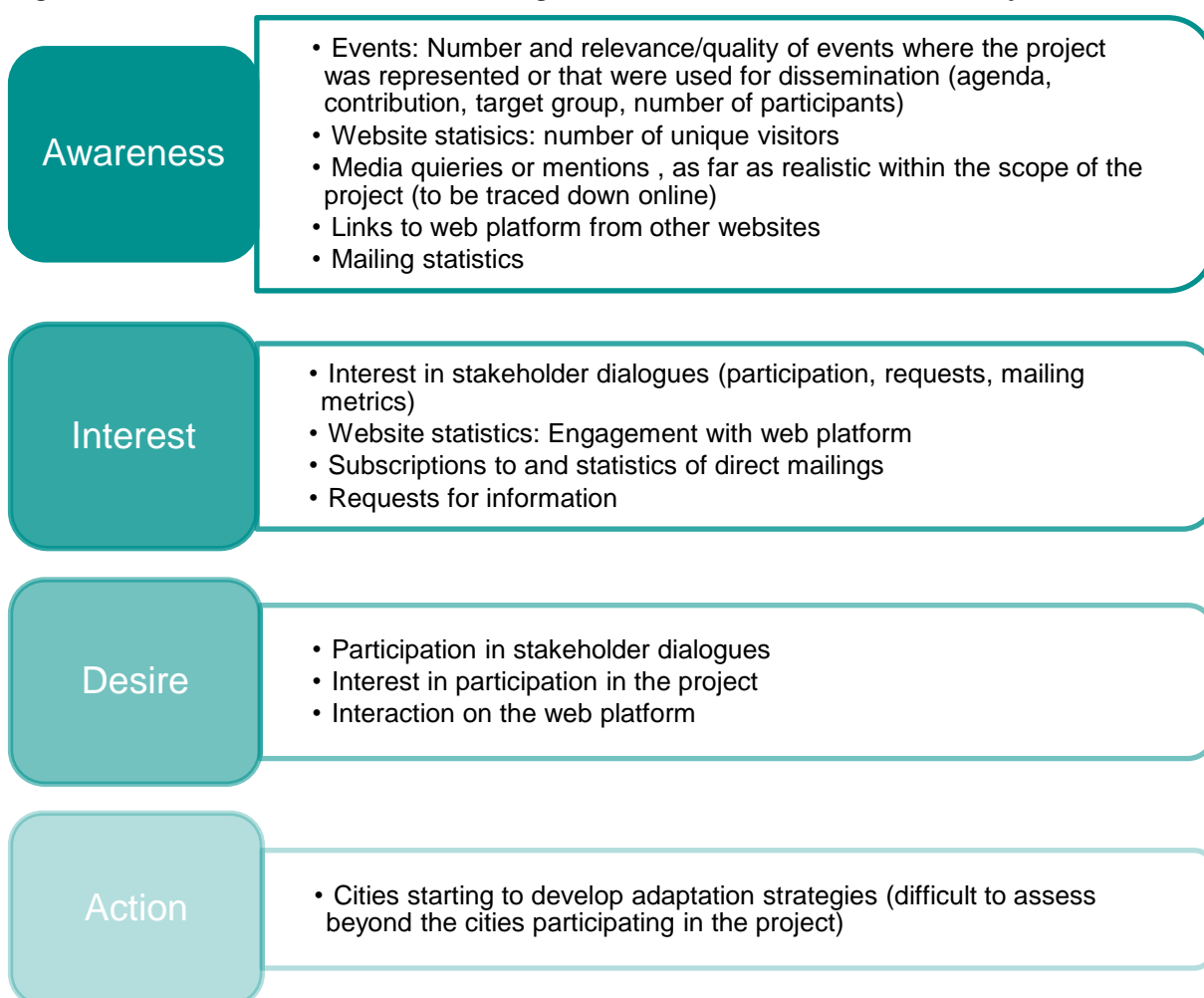
### 3.3 Awareness Raising and Dissemination Activities

The awareness raising and dissemination activities followed a communication strategy that was developed at the start of the project and comprised:

- communication objectives
- an assessment of the challenges and how these would be addressed
- a definition of target groups, key messages and branding
- an overview of dissemination channels (web platform, e-newsletter, events, etc)
- an overview of products (leaflet, postcard, roll-up banners, audio-visual podcasts).
- indicators to evaluate the awareness raising activities.

A thorough evaluation would have required quantitative and qualitative research, starting with a baseline review before the beginning of the project. Since the time and resources for this were not available for this project, evaluation of the communication activities was based on the indicators shown in Figure 11 for the stated objectives, in decreasing importance, with a focus on awareness raising and data that were obtainable in a resource-efficient way. Intermediate evaluations helped to monitor progress and set benchmarks.

**Figure 11: Evaluation of awareness-raising activities in relation to the stated objectives**





### 3.3.1 Communication products

Based on the communication strategy, promotional materials were developed and awareness-raising activities were undertaken using various channels. The leaflets and postcards (see Figure 12) were sent to all partners, DG CLIMA, EEA and Eurocities for dissemination to their contacts and at events.

**Figure 12: Post card**



In addition, two sets of two roll-up banners (see Figure 13) were produced. These were used at the Stakeholder Dialogues and the Resilient Cities conferences.

**Figure 13: Roll up banner designs**



A concept for an audio-visual product was also developed.

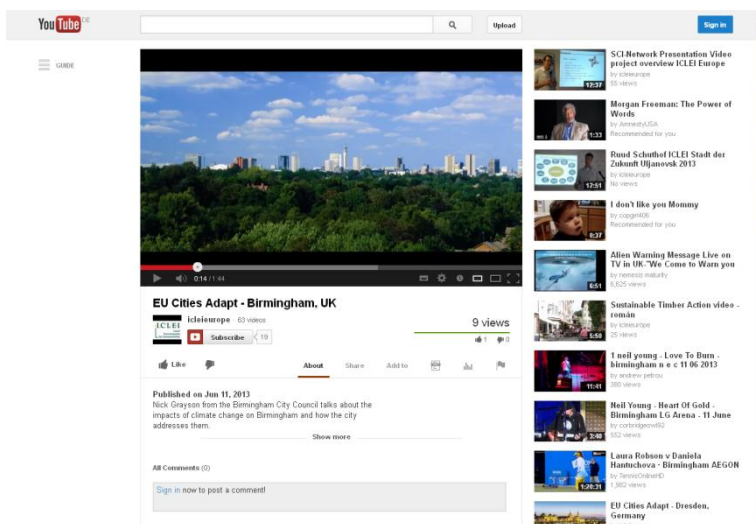
Soft appeals, such as visual elements, can foster engagement. They can also considerably raise visibility by standing out from the large amount of written materials that people are confronted with on a daily basis. The leaflet and postcard primarily served to raise awareness and to provide information. While the provision of information can increase

awareness, it was not sufficient by itself to make cities take a positive stance towards adaptation and convince them to take action.

The postcard and leaflet were supplemented with a tool that made use of city representatives as credible messengers. They tell their story in their own voice supported by related visuals (emotional appeals). The target group needed to relate to the issue not only in a rational way but also emotionally. When city representatives talk about how climate change will affect their city, why climate adaptation is important and how their city is implementing an adaptation strategy, they are more credible messengers than when a third party conveys the message. Their credibility was enhanced when they appeared as individuals and people heard their voices and saw their faces. Moreover, these city representatives act as role models and provide practical case studies that can inspire action.

A series of three short audio-visual slideshows – or podcasts were produced. Each podcast lasts around 90-120 seconds, show-casing a representative of a city involved in the project talking about adaptation from their local and personal perspective. The series covers stories from different cities with different motivations, facing different threats and at different stages on their adaptation journey. The podcasts were uploaded on the ICLEI Europe YouTube channel, posted on the web platform and promoted through social media, partners' communication channels and featured in electronic mailings.

**Figure 14: Podcasts**



### 3.3.2 Communication channels

The web-based platform (described earlier in Section 3.2) was a key communication channel. This was supplemented by direct electronic mailings, events and other dissemination activities.

#### 3.3.2.1 Direct electronic mailings

The electronic mass mailings detailed in Table 6 were sent by ICLEI through a mailing service tool called Vertical Response. This had the advantage that emails were sent out in html format. Secondly, the tool provided evaluation statistics on the total number and percentage of recipients who opened the email and the percentage of recipients who clicked on links in the email.. It has a detailed procedure to ensure the delivery of emails and prevent spamming.

**Table 6: Statistics on electronic mass mailings**

Date	Subject	Recipients	Open rate	Click
23/04/12	Launch mail (ICLEI city contacts)	4,069	13%	6%
23/04/12	Launch mail (non-city contacts)	1,677	15%	12%

Date	Subject	Recipients	Open rate	Click
09/05/12	Announcement stakeholder dialogues (ICLEI contacts)	4,768	12%	33%
15/05/12	Invitation Aalborg stakeholder dialogue (targeted list)	111	41%	15%
05/06/12	Update about stakeholder dialogues (project mailing list)	242	39%	9%
18/06/12	Invitation Ancona stakeholder dialogue (English)	623	13%	1%
18/06/12	Invitation Ancona stakeholder dialogue (Portuguese)	95	16%	10%
18/06/12	Invitation Ancona stakeholder dialogue (French)	172	16%	5%
18/06/12	Invitation Ancona stakeholder dialogue (German)	859	19%	3%
18/06/12	Invitation Ancona stakeholder dialogue (Italian)	203	19%	9%
18/06/12	Invitation Ancona stakeholder dialogue (Spanish)	311	19%	10%
27/06/12	Update (project mailing list)	303	33%	3%
28/06/12	Invitation Ancona stakeholder dialogue (ICLEI contacts in the Alps)	79	34%	11%
02/07/12	Call for applications training programme (project mailing list)	299	41%	122 %
04/07/12	Call for applications training programme (ICLEI contacts)	278	34%	80%
12/07/12	Reminder applications training programme (project mailing list)	331	34%	27%
13/09/12	Cities for training programme selected	383	38%	18%
02/10/12	Back-to-back workshops on climate adaptation in European cities	384	34%	11%
18/10/12	The state of urban adaptation in Europe	390	35%	18%
08/11/12	Resilient and sustainable cities through adaptation	520	33%	n.a. <sup>26</sup>
17/12/12	Cities learn from each other at interactive workshops	535	33%	18%
21/3/12	Learn from European cities' experience on climate adaptation	547	37%	27%
15/5/13	First EU Adaptation Strategy launched	561	36%	43%
27/5/13	Learning from cities' real-life experience	555	33%	142%

<sup>26</sup> No link included in email

Two additional mass mailings were sent out following the final conference. These drew attention to the audio slideshows and highlighted some key results the project had achieved.

The 'open' rate gives the percentage of recipients who viewed the email. However, when emails are viewed as plain text or images are 'turned off' due to email settings for instance, these were not counted in the tracking. The open rate for the mailings listed ranged between 12 and 41 per cent. The average open rate was around 28 per cent. This was a very good result compared to the range generally quoted by marketing experts. Vertical Response, for example, records an average open rate of 15 per cent in the non-profit sector.

For a second indication of the effectiveness of the mailings, the click-through rate tells us how many recipients clicked on links in the email. While this figure does not say how many recipients read the email, it circumvents the problematic tracking of the open rate and also gives an indication of the level of engagement of the recipients. The click-through rate in this reporting period ranged from 1 to 142 %. The average click-through rate is 28 %. This is an exceptionally good score. Vertical Response records an average click-through rate of around 4 % for non-profits' mailings.

These statistics indicate that the project has built up a well-targeted and engaged contact list.

In addition, ICLEI used the following mailing lists to raise widespread awareness of:

- a) the launch of the project and survey
- b) the stakeholder dialogue in Ancona (see Section 3.4)
- c) the call for applications for the training and capacity building programme

Mailing lists used by ICLEI:

- IISD Climate-L list
- Cities for Climate Protection mailing list
- Cities for Climate Protection – Adaptation mailing list
- Local Government Action mailing list
- LinkedIn AdaptAbility group.

### 3.3.2.2 Events

The project team promoted EU Cities Adapt at a total of 17 events as specified in Table 7 below.

**Table 7: Events attended by the Project Team**

Date	Event	Location	Activity
16 Feb 12	Urban Forum	Brussels, Belgium	Holger Robrecht (ICLEI) participated and presented on the project
26 Feb 12	Conference: Adapting for Tomorrow. Opportunities and risks of climate-resilient growth	Brussels, Belgium	Holger Robrecht (ICLEI) participated and presented on the project
22-23 Mar 12	CoR conference: The European urban fabric in the 21st century & launch of European Climate Adaptation Platform (Climate-Adapt)	Copenhagen, Denmark	Wolfgang Teubner, ICLEI executive director on panel at launch of Climate-Adapt platform



Date	Event	Location	Activity
12-15 May 12	Resilient Cities 2012	Bonn, Germany	Workshop, presentation, dissemination (ICLEI and Arcadis) <sup>27</sup>
22-25 May 12	Green Week	Brussels, Belgium	ICLEI participated with a stand to promote the project and disseminated postcards and leaflets
23-24 May 12	Daxam Sustainability Services Workshops: Tackling Sweden's climate change challenge by addressing organisational and systemic capacity	Gothenburg and Stockholm, Sweden	David Ballard presented and promoted the project
29-30 May 12	First Dialogue Café on Urban Climate Resilience	Glasgow, UK	Astrid Westerlind-Wigström (ICLEI) held a workshop on EU Cities Adapt
18-20 Jun 12	The North Sea Region conference	Bremerhaven, Germany	Astrid Westerlind-Wigström (ICLEI) held a workshop on EU Cities Adapt
28 Jun 12	Adaptation Scotland: Climate Ready Clyde Workshop	Glasgow, UK	University of Manchester mentioned project in a presentation
25 Sep 12	20th anniversary of 'Region Köln/Bonn e.V.'	Brussels, Belgium	Peter Defranceschi (ICLEI) gave a presentation on EU Cities Adapt
2 Oct 12	7th Meeting of the Group of Experts on Biodiversity and Climate Change, Council of Europe	Strasbourg, France	Holger Robrecht (ICLEI) presented on DRR, adaptation and EU Cities Adapt
9 Oct 12	Workshop: Climate Change Adaptation and EU Cities at Open Days: 10th European Week of Cities and Regions	Brussels, Belgium	Workshop chaired by Holger Robrecht (ICLEI)
10 Oct 12	Workshop: "Community Action for Disaster Resilience and Climate Change Adaptation" in the context of the 10th European Week of Regions and Cities	Brussels, Belgium	Holger Robrecht (ICLEI) represented EU Cities Adapt on the panel at this workshop organised by DG CLIMA and UNISDR
10-12 Dec 12	Climate risk management in Mediterranean cities workshop	Cairo, Egypt	Astrid Westerlind-Wigström (ICLEI) presented EU Cities Adapt
31 Jan 13	Lebenswerte Stadt im Klimawandel	Hanover, Germany	Astrid Westerlind-Wigström (ICLEI) presented EU Cities Adapt
26-27 Feb 13	Future Cities Final conference	Hastings, UK	Lisa Horrocks (Ricardo-AEA) participated to represent the project in discussions and Alexander Ferstl (DG CLIMA)

<sup>27</sup> At the Resilient Cities conference ICLEI held a presentation from 11:30-13:00 on 15 May. The topic of the workshop was 'Cities and the EU Adaptation Strategy. How can the urban dimension be anchored in the EU Adaptation Strategy'. Arcadis mentioned the project in a presentation and also included in a flyer that was disseminated.



Date	Event	Location	Activity
			made a presentation..
18-20 Mar 13	European Climate Change Adaptation Conference 2013	Hamburg, Germany	Astrid Westerlind-Wigstroem (ICLEI), Lisa Horrocks (Ricardo-AEA), Alfonso Gutiérrez Teira (DG CLIMA) and representatives from three participating cities (Ghent, Almada, Rotterdam) <sup>28</sup>

### 3.3.2.3 Other dissemination activities

Project partners have promoted EU Cities Adapt on their websites since the start of the project as detailed below:

**Table 8: Promotion through partners' websites**

Partner	Date	Details
Ricardo-AEA	Press release	AEA helps European cities to adapt to climate change
	10 Dec '12	<a href="#">Ricardo-AEA leads first coaching session for the EU Cities Adapt project in Gibraltar</a>
	14 Feb '13	<a href="#">Ricardo-AEA to lead a workshop in Ancona, Italy to help European cities adapt to climate change</a>
Adelphi	18 May '12	<a href="#">Städte stellen sich dem Klimawandel</a>
Alexander Ballard	17 Jul '12	<a href="#">Adaptation Strategies for European Cities (ASEC) Stakeholder Dialogues Workshop Ancona, Italy, 11th July 2012</a>
ICLEI Europe	23 Apr '12	<a href="#">European resolution 'Making cities resilient' adopted</a>
	24 Apr '12	<a href="#">Call for cities to join ICLEI-led climate adaptation project</a>
	16 May '12	<a href="#">Stakeholder dialogue to help cities prepare for climate change challenges</a>
	24 May '12	<a href="#">Innovative measures in Rotterdam for climate change adaptation</a>
	2 Jul '12	<a href="#">Successful exchange at Aalborg Stakeholder Dialogue paves the way for Ancona meeting</a>
	10 Jul '12	<a href="#">EU Cities Adapt invites cities to take part in climate adaptation training</a>
	12 Jun '12	<a href="#">'Adaptation Strategies for European Cities' project (ASEC) now launched</a>
	13 Sep '12	<a href="#">Back to back workshops focus on climate adaptation in European Cities</a>
	20 Dec '12	<a href="#">Training workshops on adaptation build capacity among European cities</a>
	13 Sep '12	Back to back workshops focus on climate adaptation in European Cities

<sup>28</sup> The project, represented by Astrid Westerlind-Wigstroem, facilitated a workshop within the science-practice and practitioner sessions on 19 March 2013. 35 attendees from a range of research and practitioner backgrounds attended. Three representatives from participating cities (Ghent, Rotterdam, Almada) presented on their experiences of adaptation and the project, followed by a panel discussion led by Alfonso Gutiérrez Teira and Lisa Horrocks.

Partner	Date	Details
	20 Dec '12	Training workshops on adaptation build capacity among European cities
	13 May '13	News article: Open European Day to present approaches to climate adaptation
	6 Jun '13	Open European Day recognises the role of cities in adapting to climate change
	Permanent	Events calendar: Open European Day
University of Manchester	12 Jun '12	'Adaptation Strategies for European Cities' project (ASEC) now launched

Project partners promoted EU Cities Adapt through their newsletters since the start of the project as detailed below:

**Table 9: Promotion through partners' newsletters**

Newsletter	Date	Details
ICLEI in Europe e-news	May '12	<a href="#">Call for cities to join ICLEI-led climate adaptation project</a>
ICLEI in Europe e-news	Jun '12	<a href="#">Stakeholder dialogues to help cities prepare for climate change challenges</a>
ICLEI in Europe e-news	Jul '12	<a href="#">Registrations open for Ancona Stakeholder Dialogue</a>
Connections (ICLEI print newsletter)	Jul '12	Article 'EU Cities Adapt helps cities prepare for climate challenges' plus EU Cities Adapt postcard
ICLEI in Europe e-news	Aug '12	<a href="#">Successful dialogue on cities' adaptation challenges in Ancona</a>
ICLEI in Europe eNewsletter	Jan '13	<a href="#">Training workshops on adaptation build capacity among European cities</a>
ICLEI in Europe eNewsletter	Mar '13	<a href="#">Adaptation capacity building at Open European Day</a>
ICLEI in Europe eNewsletter	Jan '13	Training workshops on adaptation build capacity among European cities
ICLEI Europe website	Feb '13	<a href="#">Adaptation capacity building at Open European Day</a>
ICLEI in Europe eNewsletter	Mar '13	<a href="#">Adaptation capacity building at Open European Day</a>
ICLEI in Europe	Mar '13	Adaptation capacity building at Open European Day
ICLEI in Europe	May '13	Open European Day to present approaches to climate adaptation
ICLEI in Europe	June '13	Open European Day recognises the role of cities in adapting to climate change

The project was also promoted via various third party channels, as summarised in Table 10.

**Table 10: Promotion through third party channels**

Organisation	Date	Details
UKCIP e-news (8,000 subscribers)	May '12	Adaptation Strategies for European Cities - project now launched
Newsletter 'Verein Alpenstadt des Jahres'	May '12	Project Announcement

Organisation	Date	Details
UNISDR	3 May '12	<a href="#">UNISDR backs European cities climate adaptation project</a>
Prevention Web	3 May '12	<a href="#">UNISDR backs European cities climate adaptation project</a>
Website 'Verein Alpenstadt des Jahres'	8 May '12	<a href="#">Folgen des Klimawandels: EU unterstützt Städte</a>
EUROCITIES website	15 May '12	News item: <a href="#">Climate change: how prepared is your city?</a>
Adaptation Scotland e-newsletter	31 May '12	Promoted project including link to website
CIPRA Alp e-newsletter	Jun '12	Announcement Stakeholder Dialogues
CIPRA Alp website	20 Jun '12	<a href="#">Announcement Stakeholder Dialogues</a>
ICLEI World Secretariat	11 Jul '12	<a href="#">EU Cities Adapt invites cities to take part in climate adaptation training</a>
<a href="#">European Mobility Week Facebook</a> account	Jul '12	Post about call for applications for training and capacity building programme

In addition, the project was promoted through the [ICLEI Europe Twitter](#) account on an ongoing basis. ICLEI also posted a [Wikipedia](#) entry about the project. ICLEI mentioned the project (including a link to the website) in a guest article on the IISD Climate Change Policy and Practice website titled '[The future of Europe depends on smart and resilient cities](#)' (13 June 2012). Arcadis issued a [press release](#) (in Dutch) on 16 May 2012 highlighting its involvement in the project.

Other third party promotion of the project was as follows (some of which was the result of active outreach primarily by ICLEI):

- On 1 May 2012, the European Environment Agency sent the project announcement to the participants of the launch of the Adaptation Clearinghouse in Copenhagen (13-14 March 2012).
- EUROCITIES disseminated information about the project including postcards and leaflets at the Environment Forum and EUROCITIES Working Group on Climate Change in Prague on 13 June 2012.
- Eva Banos De Guisasola, Senior Scientific Manager at the Euro Mediterranean Centre on Climate Change disseminated leaflets at the Mediterranean City conference in Los Angeles from 15-27 June 2012.
- The ACT (Adapting to climate change in time) project published a [news bit](#) with a link to the project website about the workshop in Rotterdam.
- There was a reference to the project in the Newsletter '[global to local](#)' on 20 February 2013, which included a link to the project websites.
- On 21 February 2013, the project was featured in the [Resilient Cities February Update](#) announcing the final project conference.

### 3.3.2.4 Summary evaluation

The table below provides an overview of the outcomes on the indicators towards the objectives of the project.

**Table 11: Outcomes on indicators on communication objectives**

Objective	Indicator	Outcome
Awareness	Events	17 events were attended to promote the project. The focus and target groups of all events were relevant.

Objective	Indicator	Outcome
	Website statistics	See Section 3.2.
	Media	As media was not a priority within the communication strategy there was little coverage; but mentions by a few specialised websites has been obtained (see Section 3.3.2.3 - other dissemination activities).
	Mass mailings	There was a very good open rate of the mass mailings with an average score of 28 percent compared to an average open rate of 15 percent <sup>29</sup> .. This indicates a good level of awareness among the recipients of the mailings.
Interest	Interest in Stakeholder Dialogues	Interest in the Stakeholder Dialogues varied. A fairly high number of requests for information were received following mailings. A frequently cited barrier to attending events was budget constraints. More details are outlined in Section 3.4 on Stakeholder Dialogues.
	Website statistics	See Section 3.2.
	Mailing list subscribers	The click-through rate in the reporting period was exceptionally good with an average of 28 percent compared to an average of 4 percent <sup>30</sup> .. By the end of the project 555 subscribers were on the project mailing lists.
	Requests	Following updates to mailing lists such as the Climate-L list, requests for information were received regularly.

As well as raising awareness and generating interest, the objective of the project was to trigger the intention among local governments to act. Based on the indicators, there was clearly a lot of intention to become active with regards to climate change adaptation as reflected in the positive reception to the Stakeholder Dialogue and the great number of participants at events, particularly the Ancona event. There was also a lot of interest in involvement with the project, demonstrated by the high number of applications (48) for the training and capacity building programmes.

To sum up, the indicators are positive on the objectives to raise the importance of urban adaptation and awareness of the project. There was a good level of interest in the project. The extent to which the project achieved an intention to act or even led cities to develop adaptation strategies beyond the cities directly involved in the project is difficult to assess, especially since tracking indicators for these outcomes were not prioritised as the main focus of the communications was awareness raising.

## 3.4 Stakeholder Dialogue Events

### 3.4.1 Introduction

The aims of the stakeholder dialogues were to:

<sup>29</sup> Vertical Response records for mailings by non-profits

<sup>30</sup> Vertical Response records for mailings by non-profits

- Further identify the current and future needs cities have for dealing with adaptation challenges and for taking advantage of the potential benefits of climate change.
- Revise and further develop the typology (produced under Task 1).
- Provide operational outcomes to feed into the training and capacity building process (Task 3).
- Provide insight for participating cities into ongoing cutting-edge research and results on climate change adaptation in Europe.
- Offer participating cities a direct discussion channel with high-level Europe-wide stakeholders on adaptation.
- Provide networking opportunities for participating cities.

The expected results of the stakeholder dialogues were:

- Enhanced knowledge for the consortium partners to further build on the typology developed under Task 1.
- Reviewed and confirmed typology.
- Development of an ad hoc nucleus of cities working on adaptation (which would later develop through communication facilitated by the web platform).
- Identification of, and access to, cities that could potentially become training or peer cities, or that could provide relevant input and knowledge to the consortium.

**Figure 15: Stakeholder Dialogues at Aalborg and Ancona**

The first Stakeholder Dialogue hosted by the City of Aalborg, Denmark was held at the Department of Environment on 6<sup>th</sup> June 2012 with ten participants and four representatives of the project consortium. Two of the participants represented more than one municipality (Adaption Scotland and Greater Glasgow came on behalf of about 14 cities in total). The second stakeholder dialogue was hosted by the city of Ancona, Italy, on the 11<sup>th</sup> July 2012 and held at the Ancona NH Hotel. The dialogue saw over 60 participants from various European countries with a focus on Italy.



There was a good mix of stakeholders including representatives from city and national governments, researchers, scientists, and private sector professionals. A few cities such as Milano, Bologna and Ancona came in delegations, including stakeholders from various administrative departments as well as civil society.

Appendix 8 has in-depth reports on the organisation and implementation of the two Stakeholder Dialogues.



### 3.4.2 Method – Aalborg

The programme had two main sessions. The day started with a brief introduction to the EU Cities Adapt project to provide the context for the stakeholder dialogue, to emphasise the connection with the EU Adaptation Strategy and to highlight the overall benefits of participation. The morning session focused on climate change hazards and impacts, city vulnerabilities to climate change, and the adaptive capacities of cities to deal with climate



change. Interactive discussions were led by a presentation from Ricardo-AEA. This covered the themes above, how to frame and analyse these themes, how to visualise them through mapping exercises, and how to identify similarities and/or differences between cities to allow grouping of cities within the EU to maximize learning and exchange opportunities in relation to adaptation.

The afternoon session focused on practical city case studies with a presentation of Aalborg's adaptation strategy and a *Talkshow* style interview session with the cities of Copenhagen and Rotterdam on adaptation activities and strategies. This was followed by in-depth discussions on sector vulnerabilities to climate change and the interface between city and sector administrations. A brief presentation was given on the planned training phase to introduce the concept, the application process, selection criteria, basic elements, timeline, benefits and necessary commitments.

### 3.4.3 Outputs & results – Aalborg

Summary of observed results:

- Participants enjoyed the intimate setting and the exchange opportunity that a small number of participants enabled.
- The expectations of the participants of the dialogue were in general fulfilled, emphasising exchange with and learning opportunities from similar sized cities and cities more advanced on the adaptation journey.
- Participants were eager to engage with and comment on city case studies.
- Participants enjoyed the interactive environment and discussion techniques and the opportunity for information exchange.

Participants appreciated:

- The networking opportunities
- Receiving information on the overall project
- Meeting with peers to discuss issues in depth
- Interacting within a small group
- Receiving information on the EU process
- Learning from practical real city examples on adaptation work
- That the structure was flexible to suit the group.

Participants found the following skills and knowledge most critical in supporting their adaptation work:

- Knowledge on finance and budgetary arrangements
- Project leadership skills
- Tools to help understand complex and interactive vulnerabilities
- Education and involvement of stakeholders in the development of adaptation strategies
- Knowledge on how to link different sectors
- Knowledge on developing public-private partnerships

Participants emphasised the following aspects with regard to capacity building needs:

- Training on awareness raising
- Training on how to conduct vulnerability assessments
- Training on how to monitor and evaluate adaptation work
- Peer reviewing and exchange.

### 3.4.4 Method – Ancona

A similar approach and programme was used for the Ancona dialogue. The morning focused on identifying, defining and discussing climate hazards, city vulnerabilities and adaptive

capacities. The group discussions that followed the introductory presentation and the *Gallery Walk*, where participants could freely comment on the slides from the previous presentation, emphasised the importance of communication between city departments as well as between policy makers, citizens and researchers. Knowledge management and the identification of real city case studies and no-regret measures were also shown to be important. A presentation on the capacity development and training phase of the project was held at the end of the morning session, outlining the objectives, benefits, expectations and how to get involved.



**Figure 16: Presentation on hazard assessment**

The afternoon started off with an interactive *Talkshow* with the city of Ancona (Italy), London (UK), Burgas (Bulgaria), Zadar (Croatia) and Ghent (Belgium), where topics such as adaptation triggers, barriers and financing were discussed and different experiences were compared and shared between the cities. After an interesting presentation by Birgit Georgi of EEA on multilevel governance aspects of urban adaptation and the interface between the European and the local levels, and a presentation by Mariana Osihn from UNISDR on disaster risk reduction for an urban context, the participants moved to more

in-depth discussions on different sectors. Here they discussed sectors such as green spaces and nature, waste management, water management, tourism, energy and mobility. The emphasis was on identifying specific vulnerabilities and options that are strengthening adaptive capacity for each of the sectors taking into account the management and governance as well as the hard measures such as infrastructure. The discussions were lively and yielded many interesting conclusions in terms of sector and city collaboration and how and where to take action.

### 3.4.5 Outputs & results – Ancona

According to the feedback given participants enjoyed the interactive setting that made the event a true dialogue, the various discussion techniques and the balanced mix of presentations and group discussions. The discussions, especially in the afternoon, enabled the participants to go into details on vulnerabilities and adaptation options. Interesting conclusions on the training and capacity development needs of cities that fed into the planning of Task 3 were identified.

Summary of observed results:

- Participants enjoyed the interactive setting and the exchange opportunities that the meeting enabled and encouraged
- Participants were eager to engage with and comment on city case studies and experiences presented in the *Talkshow*

Participants appreciated:

- The interaction with peers to discuss issues in depth
- Knowledge exchange between stakeholders
- The introduction of the overall project
- The interaction in small groups and the overall dynamic session methods
- The information on the EU process and the multi-level governance perspective
- The practical city examples on adaptation work
- The presentation on disaster risk reduction and the linkage to adaptation.

Participants would like to learn more about:

- City experiences and lessons learnt on adaptation
- Themes such as insurance with regard to climate change hazards
- Communication strategies to involve stakeholders
- Technical adaptation measures
- Existing urban adaptation strategies and processes.

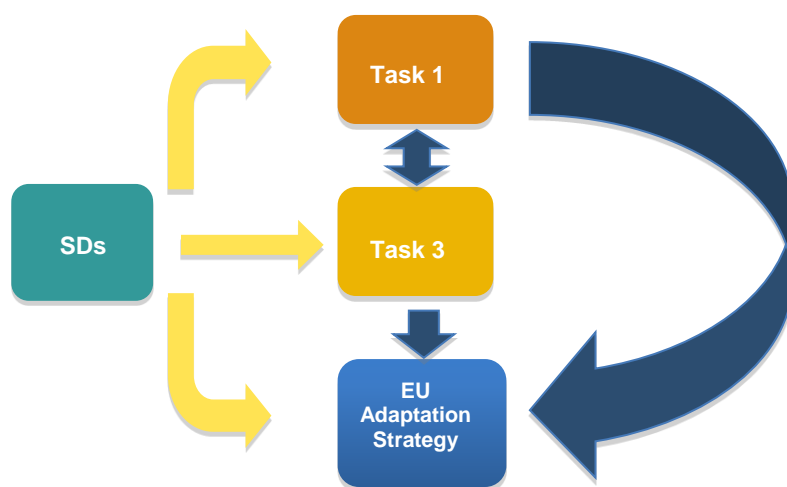
Participants emphasised the following capacity building needs with regard to supporting their adaptation work:

- Data management and collection
- Sectoral integration and collaboration
- Communication between scientists and policy makers
- Economic overview of adaptation (cost-benefit analysis)
- Knowledge on finance and budgetary arrangements
- Involvement of stakeholders in the development of adaptation strategies.

### 3.4.6 Conclusions

The observations of, and the participants' feedback on, the interactive discussions are analysed in the following section according to the objectives of the sub-task, with the aim of identifying information that informed and confirmed the outcomes of Task 1, while also identifying capacity development gaps and needs that informed the training phase of Task 3.

**Figure 3.6: Stakeholder dialogue (SD) outcomes related to overall project**



The discussion outcomes of the stakeholder dialogues identified specific elements that informed:

#### **Task 1 – Creating clusters (typology)**

The documented outcomes of the discussions and the observations from the Aalborg and Ancona stakeholder dialogues emphasised aspects that informed Task 1 of the project.

The introductory presentation on *hazards, vulnerabilities and adaptive capacity* that was held in the morning sessions of the dialogues introduced the concept of “clustering”. “Clustering” here refers to the preferred grouping of cities to maximise exchange and learning with regard to climate change adaptation.

Based on the discussions and observations the following cluster characteristics were identified as the cities' preferred options with regard to exchange and mutual learning on adaptation:

- Learning is best undertaken on a regional scale.
- Exchange will be beneficial if cities experience similar climate hazards.
- Sharing of good practice is easier among similar sized cities.
- Learning and benefiting from adaptation case studies will depend on the level of capacity of cities and it was noted that capacity of smaller towns is generally lower than that of larger cities.

The outcomes of the discussions relating to the cities' preferred cluster characteristics also informed the selection process of participating cities for the training – Task 3.1. The selection process took into consideration cities' preferred clustering options with regard to city-to-city exchange on adaptation.

### **Task 3 – Training programme**

The organisation of the discussion methods and the content of the stakeholder dialogues were partly tailored to inform the development of Task 3 of the project. These included the selection of participating cities, their clustering into training sub-groups, and the main elements and content of the training programme. To this end, the role of the observer was established to consider the discussions during the stakeholder dialogues in relation to questions that would inform Task 3. The observations and the moderation discussion summaries were then analysed through a clustering exercise to identify sub-themes that reflected the needs and knowledge gaps of cities with regard to developing an adaptation strategy.

The sub-themes identified below formed the main foundation of the training framework and informed training elements and focus themes:

**Local framework** - refers to the overarching process and structure of how to integrate climate change adaptation into city planning. Aspects and foundational elements to successfully develop an adaptation strategy were highlighted in the discussions among the participants. In summary cities wished to gain a better understanding of the following issues:

- Adaptation process overview and understanding
  - What level of detail is needed to start an adaptation process/take the first steps to develop an adaptation strategy?
  - What is “need to know” and what is “nice to know”?
- Integrated knowledge to develop a holistic approach for adaptation
- Tools and guidelines for a step-by-step approach to development of an adaptation strategy
- Communication strategies to include stakeholders
- Integrated vulnerability assessments
- Monitoring and evaluation of adaptation plans and activities
- Mainstreaming of adaptation through the integration of adaptation planning in legal and city planning frameworks and processes.

**Governance** - refers to the internal city governance and management structures as well as the city administration's external governance structures with regard to collaboration and communication with relevant stakeholders for the adaptation process. Cities stressed the importance of internal cross-departmental communication on adaptation issues as well as creating linkages between adaptation planning and existing policies. Also, emphasis was placed on how to involve stakeholders that should be engaged early on in the adaptation process as well as how to gain general acceptance of the citizens with regard to climate change and the implementation of adaptation measures. In short the following main points were highlighted:

- Internal cross-departmental collaboration
  - Awareness
  - Communication
  - Linkages to existing policies and planning
- External collaboration
  - Stakeholder involvement
  - Public (citizen) awareness and acceptance of climate change and adaptation measures
  - Partnerships to develop adaptation options, i.e. public-private.

**Political commitment (buy-in)** - singled out as a major challenge for progress on adaptation or to start the process of developing an adaptation strategy. Although recognised as being part of the general governance issue it specifically highlights the economic aspects of climate change and adaptation strategy preparations. The following elements were pointed out as important in order to gain political commitment:

- Economic assessment of climate change impacts
- Social cost-benefit analysis of adaptation
- Additional benefits of adaptation measures/options.

**Financing** - cities expressed the need to learn more about funding options to finance adaptation activities. This was especially highlighted during the *Talkshows* of the dialogues where cities which were more advanced with regard to their adaptation work were asked to clarify how they financed their adaptation strategy development and, later on, the implementation of adaptation measures. This aspect will be crucial for the long-term success and sustainability of the adaptation strategies of cities. Cities wish to learn more about the following components:

- Funding of the adaptation strategy development with a focus on budgetary arrangements
  - Partnerships
  - Involvement of private sector as investors
  - Insurance
  - Public-private collaborations.

**Data management** - cities are in general uncertain as to the level of detail of data needed to assess vulnerabilities and on how to interpret collected data. This is an important issue that cities will need to overcome in order to be able to conduct vulnerability assessments, which is an important step in the development of an adaptation strategy. The following are some of the issues raised:

- Lack of data and need for more detailed data
- Managing existing data in a more pragmatic way
- Connecting, combining and interpreting data collected on different scales
- Level of data detail to include in vulnerability assessments.

**Case studies & expertise** - cities stressed the importance to learn from other cities that were more advanced with regard to adaptation. In particular cities could learn about opportunities, success factors, challenges encountered and barriers to developing the adaptation framework. It was noted that to secure political commitment the need to provide real examples of win-win options for adaptation is crucial. In short, case studies and expertise were highlighted as important because they showcased:

- Adaptation measures (practical and local)



- Win-win options and no-regret measures
- Development of adaptation strategies
  - How to deal with uncertainty
  - Understanding complex and interactive vulnerabilities and certain vulnerability elements such as poverty.

**EU level support** - cities identified the need for national frameworks on adaptation to ensure political commitment at the local level and to potentially receive financial support. According to cities, the EU can support this process by incentivising adaptation at the national level by providing European level directives. Also other means to support cities on adaptation are the creation of European scale networks that aim to encourage knowledge exchange and committed partnerships. Funding of adaptation projects and processes, as well as exposing adaptation cases studies, are further ways for the EU to support local level action on adaptation. In short the role of the EU is to:

- Provide funding of adaptation projects
- Support the exposure of existing adaptation case studies
- Provide EU level laws, regulations and directives
- Support the collection of climate related data at the EU level
- Support the creation of adaptation networks on a European scale.

### 3.1 Recommendation Summary

From the early interaction with and involvement of stakeholders, including city representatives, through the Stakeholder Dialogues as well as from continuous awareness raising and communication through the website and other dissemination tools and activities the project developed a strong link to cities, thereby creating and deepening a city network on adaptation. The project also gained considerable insight into a number of issues that helped shape a solid understanding of the state of play of adaptation in European cities, existing knowledge gaps and priority needs as well as methods and support to overcome such gaps and to build adaptive capacity in cities.

The outcomes of the Stakeholder Dialogues showed that:

- Cities' preferred clustering options are similarities in regional characteristics, similarities in experienced and future climate hazards, and similarities in size of populations. This relates to cities' preferred grouping with regard to maximising learning and exchange on adaptation.
- Cities' expressed capacity development needs emphasise city-to-city exchange on adaptation case studies and expertise on the integrated management of a holistic adaptation process. Cities stressed the need for peer-to-peer exchange where they can share not only best practices, but also identify barriers that are common within the adaptation process. Relevant themes on the development of a successful adaptation strategy were identified, including an emphasis on a step-by-step approach.
- Cities see the need for EU directives and regulations to create enabling conditions for both national and local levels to take action on adaptation. Although action on adaptation will mostly take place at the local level, the EU has a major role to play in order to create the enabling conditions for cities to start their adaptation processes. Apart from direct financial support to develop adaptation activities, EU level directives will support the establishment of national frameworks on adaptation leading to local commitment and action.

## 4 Training and Capacity Building

This chapter of the report outlines the training phase of the project (Task 3 activities). This includes the approaches taken, and the record of experiences and progress made through the project engagement with training and peer cities.

This chapter provides a brief overview of the inter-linkages between the Task 3 sub-tasks including conclusions from a needs flow analysis, and gives a summary of each sub-task including concluding remarks on major lessons learnt.

### 4.1 Overview and approach

The aim of Task 3 was to develop and implement training and capacity building for the 21 selected cities on implementing an adaptation process and developing adaptation strategies. The training activities were supported by the project website and the Climate-ADAPT website. Figure 17 depicts the flow of major training elements carried out under Task 3.

The detailed objectives and results of the sub-tasks of Task 3 are listed below. These are presented in aggregate (and not per sub-task) in line with the integrated perspective of managing adaptation within the city's operations, and as a natural consequence of all the sub-tasks being complementary to each other.

**Figure 17: Developing local adaptation capacity (work-flow of task 3: July 2012-May 2013)**



The objectives for Task 3 were to:

- Support cities in developing an action framework for a city adaptation strategy and related measures.
- Base the training and assistance on key thematic areas, identified in the typology and assessment and the outcomes of the stakeholder dialogues.

- Build capacity within the 15 participating training cities and help them prepare their internal management and decision-making structures to ensure the development of an adaptation strategy that is carried on beyond the life of the project.
- Develop an integrated and cyclical management framework for a local adaptation process.
- Build long-term partnerships and knowledge sharing groups / networks for adaptation that go beyond the duration of the project.

#### 4.1.1 Organisation of sub-tasks and roles of the project partners

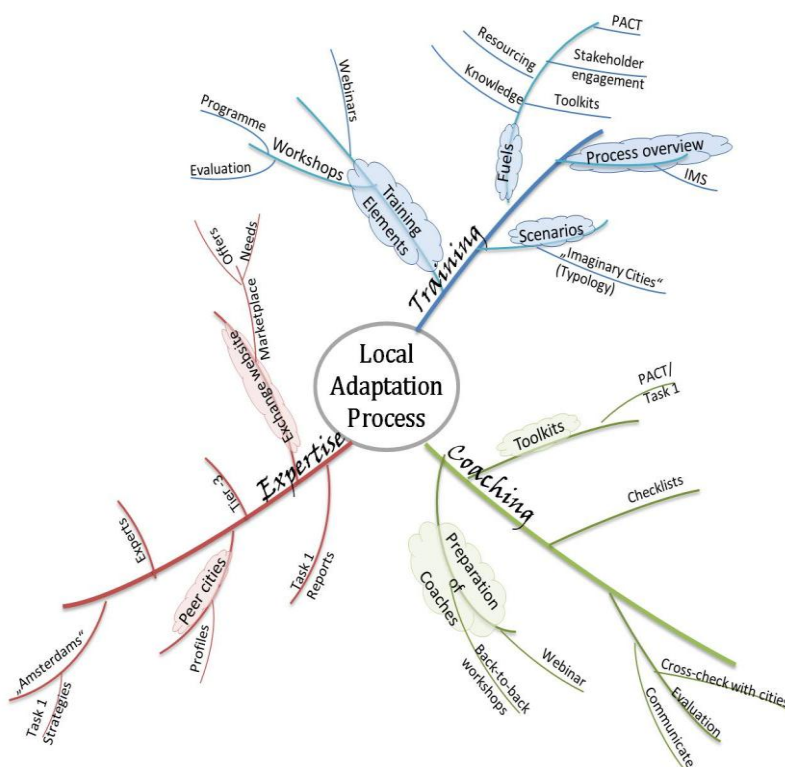
The sub-tasks under Task 3 varied from face-to-face training workshops, personal coach visits, thematic webinars and peer evaluation visits. ICLEI coordinated the training activities with the support of the project partners. Both the peer and the training cities in their roles as hosts were closely involved in the organisation of both the training workshops and the peer review visits.

**Table 12: Overview of training elements, city participation and partner involvement**

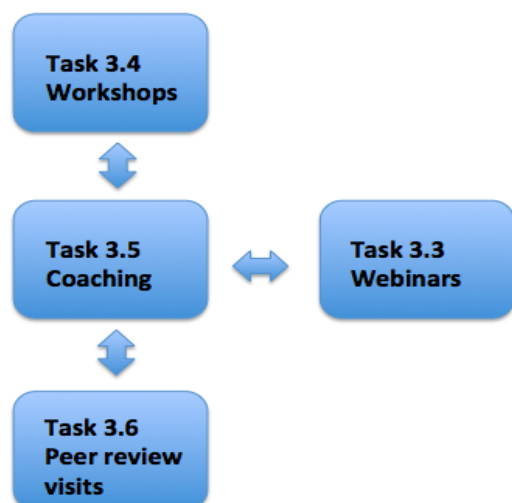
Training element	Sub-task	Number of participating cities	Timing	Type of involvement	Partner involvement
<b>PACT</b>	3.2	21	July-October	Web-based	ABL, ICLEI
<b>1<sup>st</sup> Webinar (all sub-groups together)</b>	3.3	21	1 <sup>st</sup> week of October	Web-based	ICLEI, Ricardo- AEA
<b>Workshops (one for each sub-group)</b>	3.4	21	Mid-October to November (2.5 days each)	Face-to-face	ICLEI, ABL, and assigned coaches for each sub-group
<b>1<sup>st</sup> Coach visits (one for each training city)</b>	3.5	15	End of October to mid-December (3 days)	Face-to-face	Assigned coaches
<b>2<sup>nd</sup> set of Webinars</b>	3.3	21	March- April	Web-based	ICLEI, Ricardo-AEA, Arcadis, UoM, Adelphi
<b>2<sup>nd</sup> Coach visits (one for each training city)</b>	3.5	15	End of January (3 days)	Face-to-face	Assigned coaches
<b>Coaching</b>	3.5	15	Mid-October - April	Web-based	Assigned coaches
<b>1<sup>st</sup> Peer-review visits (according to sub-groups)</b>	3.6	21	End of February	Face-to-face	Ricardo-AEA, ICLEI
<b>2<sup>nd</sup> Peer-review visits (according to each sub-group) &amp; 3<sup>rd</sup> coach visits</b>	3.5, 3.6	21	End of April	Face-to-face	Ricardo-AEA, ICLEI and assigned coaches

A major element of the training, aimed at guiding and supporting cities in their development of adaptation strategies, was the identification of specific themes that cities needed expert advice on – key themes that are crucial for the success of the adaptation process. In Figure 18, where a mind map of the training overview is depicted, training themes identified are called “fuels”. The “fuels” were based on the analysis of the outcomes of the Stakeholder Dialogues and included issues such as how to increase inter-departmental collaboration and communication, how to involve stakeholders, how to create general awareness on adaptation, how to ensure political commitment, how to finance adaptation measures, and how to manage climate data and the challenge of uncertainty.

**Figure 18: Training mind-map**



**Figure 19: Inter-linkages of the training sub-tasks**



Throughout the training phase a flexible approach was adopted to allow for improvements and changes with regard to which topics to highlight, as well as the most appropriate structure and design of planned training elements. Each of the Task 3 training sub-tasks informed and influenced each other in terms of knowledge needs and focus areas. Evaluation of workshops and coaching activities from the participating cities as well as feedback from coaches on their coaching experiences were analysed on a continuous basis to improve the training activities and to respond to cities' needs on adaptation. Needs analysis exercises also informed the appropriate response mechanisms.

## 4.2 Selection of cities

### 4.2.1 Introduction

The aim of this sub-task was to recruit and select European cities to take part in the training phase of the project. 21 cities were selected according to two different types of categories:

- 15 Training Cities: These cities formed part of the training group and received training and coaching. They were split into three sub-groups of five cities, whose composition were determined based on the findings of cities' preferred 'clustering' options.
- 6 Peer Cities: These cities were advanced in terms of knowledge and practice of adaptation to climate change and they were therefore expected to contribute lessons learnt from the approaches developed and implemented in their own local context. Two peer cities were matched with one training group consisting of five training cities.

### 4.2.2 Method

Following the tender specifications and the Proposal, 21 cities were selected from over 40 received applications to take part in the training and coaching phase aiming at supporting the development of climate adaptation strategies in the participating cities. 15 cities were at the early stages of an adaptation process, meaning that they had not yet developed adaptation strategies. In addition, 6 supporting peer cities were selected that were further advanced in their adaptation processes. A presumption for the identification of potential peer cities based on research supported by the arguments of the European Environment Agency (EEA) was that larger cities are more advanced on adaptation, i.e. with an implemented adaptation strategy due to their resource capacities. To this end we viewed peer cities as those who possessed experience with adaptation processes and strategy development. Their role in the training was that of a supporting character to provide training cities with valuable input in terms of setting up adaptation processes, sharing lessons learnt and providing real case study examples on adaption options and measures taken.

The 21 cities were compiled in three cluster groups including 5 training cities each plus 2 peer cities supporting them. With regard to the conclusions and learning from the Task 1.1.1 report we clustered the cities according to geographical criteria where the different climate regions facilitated the identification of one to two priority impacts for each of these regions. The recommended regions were based on the EEA identified climate regions and were adapted to suit the context (EEA Report, Urban Adaptation to climate change in Europe, 2012, p. 14). The EEA identified climate regions Northern-central Europe, Northern-western Europe and Northern Europe will in general experience wetter and milder winters with more intense flooding. The climate region Southern-central Europe will experience more frequent heat waves and droughts. The Mediterranean climate region will experience more frequent heat waves, and droughts due to a strong decrease in annual mean precipitation in the summer months with the coastal cities also impacted by projected sea- level rise.

### 4.2.3 Outputs & results

For the purpose of, and relevance to the project the climate regions Northern, Northern-Central & Northern-Western Europe were merged into one due to their closeness in character and similarities in experienced climatic impacts and future projections. The second climate region includes landlocked cities in Southern-Central Europe, whereas the third climate region, Mediterranean Europe, includes coastal or near coastal cities in Southern and South Eastern Europe.

Cities were clustered according to geography, reflected similarities within the climate regions in terms of experienced and projected climatic impacts, and processes and framework conditions being similar within a region. This enabled cities to identify similarities with each other and benefit from continuous exchange with regard to current and future challenges and realistic opportunities and adaptation solutions.



To cluster cities according to the three climate regions, facilitated learning and exchange between the project organised training activities in terms of geographical similarity. This also fostered a sustainable approach to the project beyond the finalisation of the training, where continuous collaboration and exchange is more likely between cities in the same climate region.

**Figure 20: Cities selected to participate in the project**



**Table 13: Cities by climate region**

	Northern, Northern-Central & Northern-Western Europe	Southern-Central Europe (landlocked)	Mediterranean Europe (coastal)
Training cities	Albertslund (Denmark) Ghent (Belgium) Lahti (Finland) Stirling (UK) Vilnius (Lithuania)	Alba (Italy) Bratislava (Slovak Republic) Padova (Italy) Sfântu Gheorghe (Romania) Vitoria-Gasteiz (Spain)	Almada (Portugal) Barcelona (Spain) Burgas (Bulgaria) Gibraltar (UK) Zadar (Croatia)
Peer cities	Malmö (Sweden) Dublin (Ireland)	Dresden (Germany) Birmingham (UK)	Ancona (Italy) Rotterdam (Netherlands)

## 4.2.4 Conclusions

The selection of the 21 cities, the division of these cities into three training groups, and the composition including training and peer cities proved to be a successful concept with regard to learning and capacity building. The interaction within the training groups fostered peer-to-peer learning and created a network that both formally and informally continued to exchange throughout the project.

The involvement of peer cities in the project proved to be vital in the learning and capacity building process. Real experiences in setting-up and running adaptation activities and developing adaptation plans and strategies were highly appreciated and supported the training cities in setting their own goals, developing their adaptation plans and avoiding challenges and risks that the peer cities had encountered along the way. Exchange between the peer cities themselves, and between training cities that were more advanced and peer cities, also proved fruitful in advancing their adaptation processes and facilitating learning from the experiences of other cities.

Within the training groups, similar sized cities appreciated the exchange of experiences and challenges since finding solutions to these were correlated to the size of the city, including the size and collaboration opportunities within the city administration.

The results and preferences observed throughout the training phase with regard to the clustering of the cities confirm that grouping cities according to main climate hazards is a valid starting point. In addition, similar sized cities within a certain cluster benefit from exchange in terms of setting-up an adaptation process. However, the mix of advanced and beginner cities proved to be crucial for both training and peer cities to learn from adaptation experiences and measures, to avoid downfalls and to share lessons learnt.

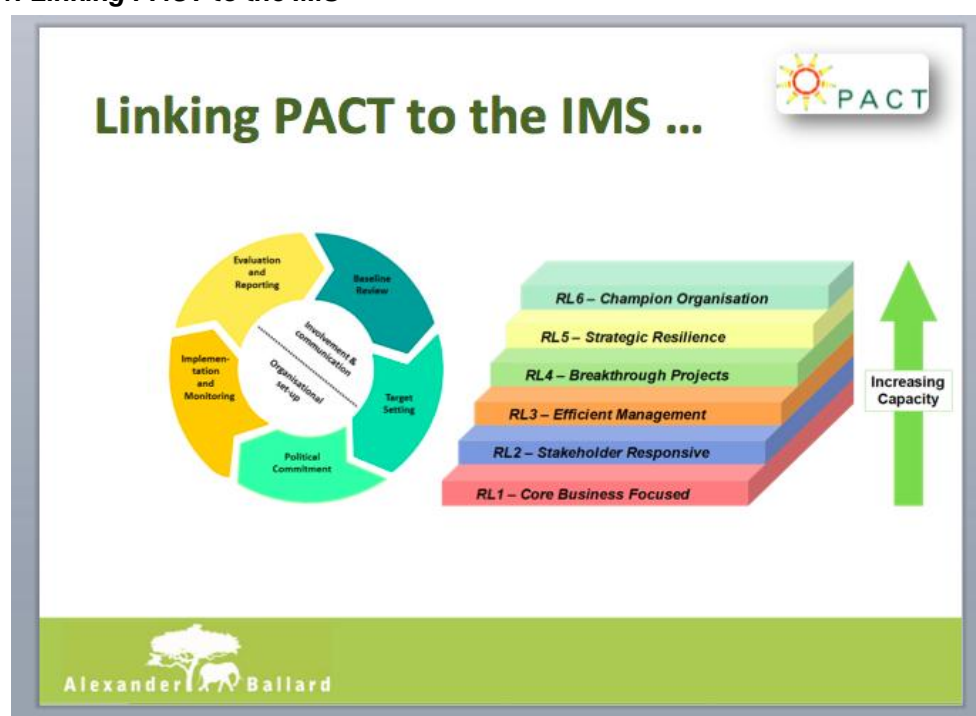
## 4.3 PACT assessment

### 4.3.1 Introduction

The PACT Framework is a leading approach for assessing organizations' capacity to respond to the impacts of climate change. The full PACT Analysis Report can be found in Appendix 9.

The customized PACT activities and questionnaire followed the structure of the Integrated Management System (IMS) for climate change adaptation. This enabled the harmonization of the two approaches in preparation for the training programme. It was identified that the IMS symbolizes the vehicle and PACT the journey.

**Figure 21: Linking PACT to the IMS**



At an individual city level, the PACT framework was used in this project to:

- Help develop the baseline review of where cities stand in terms of adaptation planning and strategy development within the IMS framework. With baseline review we refer to the vulnerability assessments of cities including assessing and predicting current climate hazards, future projected risks and the city's ability to cope with these.
- Detect the different levels/starting points for each participating city.
- Provide context suitable activity recommendations to move forward within the IMS both vertically (increase the capacity level) and horizontally (widen the scope).

Each city received a PACT report based on the PACT questionnaire that the cities completed. These reports included a detailed report for managers responsible for the adaptation programme, which identified specific 'activities' (e.g. risk assessments, conducting training) that were being done, or not, in the programme. The PACT reports provided the cities with a solid understanding of the status of their administration, highlighting crucial activities that needed to be completed to move to the next possible level. This corresponds to a baseline review of the city administration.

Virtually all cities took up the offer to be briefed on their results and appropriate next steps. The results within these reports were also presented at the workshops, enabling coaches and cities to use the reports to support improvements. A detailed assessment of the 21 cities' PACT scores led to four groups being defined and selected for comparison through detailed PACT reviews:

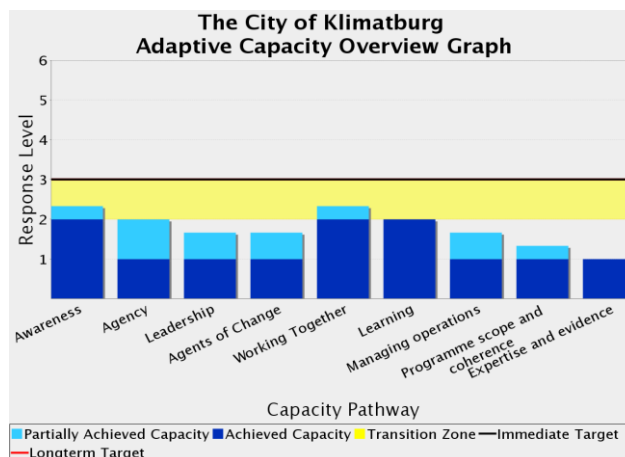
**Table 14: City Groupings for PACT analysis**

Group	Description	Average PACT score <sup>31</sup> (min – max)	What does this imply?
<b>Training: low</b> (77% of main sample)	A group of nine training cities self-assessing at 1 or 2	2.21 (1.78 – 2.67)	The majority of these cities are indeed at the very earliest stages of their programmes. None has yet established a solid programme to handle current climate impacts.
<b>Training: medium</b> (22% of main sample)	A group of six training cities self-assessing at 3 or 4	2.77 (2.07 – 3.22)	Only one of these cities has a solid programme to handle current climate impacts, others are close to doing so. One city is very significantly over-estimating its own capacity.
<b>Peer: medium-high</b>	A group of four more mainstream peer cities	3.44 (3.18 – 3.70)	All of these cities are taking action to prepare for future climate impacts, though generally for one or two impacts only. There are often significant gaps in their programmes.
<b>Peer: high</b>	Two considerably further advanced peer cities.	4.13 (4.07 – 4.19)	While some gaps remain in their programmes, these cities are acting resolutely to prepare for likely future impacts. They could quickly develop capacity to lead wider programmes.

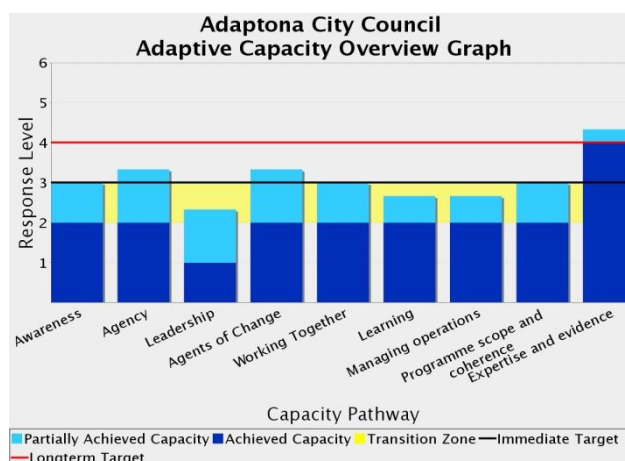
The results of the analysis of cities was aggregated with responses from the survey of 196 cities. This exercise allowed us to identify the current 'capacity gap' that exists in European cities and identify where efforts to improve might pay particular dividends for policy makers.

<sup>31</sup> These scores are an average of scores in each PACT pathway and do not take account of gaps in a programme. For instance, a city with performance that was either very strong or very weak on different pathways might score the same as another city that is more consistent – but the overall capacity would be greater in the second city. See Appendix 9 for more details.

The following examples demonstrate the wide range of capacities that were present in the workshops. All results were confidential to the particular city and only shared with the coaching team. These names are therefore anonymised but represent participating cities; however the graph for 'Resilio' was slightly amended to make the identity of that city less obvious. However, it remains very typical of capacity profiles in advanced organisations such as these cities.

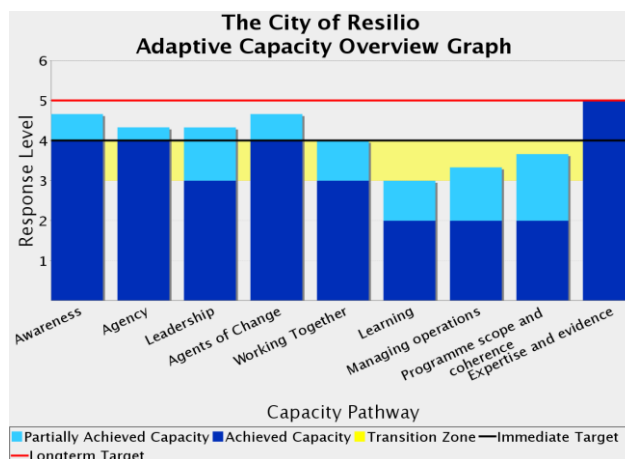


This graph is typical of an organisation (in this case one of the participating cities that we called 'Klimatburg') that is at the very beginning of its work on climate adaptation. The levels of climate adaptation expertise are exceptionally low (a score of 1 indicates that no capacity is evident at all), but no aspect of this city's programme has been developed very far as yet. This city needs extremely clear guidance and support (in this project, from coaches but perhaps from national governments) as it takes its first steps in a discipline that is completely new to it.



The second example is from one of the training cities (here called 'Adaptona') that undertook PACT analysis. It is putting a comprehensive programme in place to respond to current impacts of extreme weather (e.g. current flooding risks). However, it has not yet done enough of the necessary work (typically at level 4 and above) that would be required to take future climate change into account. This makes it very unlikely that longer term decisions can yet be taken in a climate-resilient way. While its programme is reasonably well developed across the capability pathways, there is a significant problem with leadership, whose support for the programme is clearly very doubtful. On the other hand, it already has access to very great sources of expertise (e.g. to a university's research department) and should resist the temptation to devote still more resources to this element of capacity, since the wider programme has not yet developed to the point at which it could make use of that expertise.

A city like this could be ready to move onto work on future climate change impacts reasonably quickly – e.g. within a year – if the leadership support can be unblocked. As it does so, it will be able to take increasingly resilient long-term decisions. A coach can use information such as this to discuss longer term ambitions with city leaders and to help focus a detailed programme for the next period.



The final example (here called the City of Resilio) is amended slightly from the results of one of the furthest advanced cities. This is among the highest capacity organisations yet identified through PACT analysis. Its programme is very far advanced, with its expertise in particular being at world-leading levels. It has a strong understanding of risks of future climate change for decades, perhaps even centuries, into the future and can reasonably aspire very quickly to complete the transition to a very strong and integrated programme for resilience.

As it does so, the scope of its programme needs to move beyond the organisation's boundaries and to take account of strategic learning from the difficulties that it, and partners, face in adapting. This learning will typically be about barriers, e.g. in the wider context of the organisation. It is these areas of the programme, which are significantly under-developed, that need the most attention. For more detailed analysis on the PACT results and the comparison to the survey results please see Appendix 9.

### 4.3.2 Conclusions from the PACT Analysis

By carrying out detailed analysis of all 21 cities participating in the training workshops, both training cities and peer cities, using the validated PACT assessment process, we provided the following:

- **Reports** to participating cities outlining their particular capacity development needs. All cities received a report outlining (a) the current status of their adaptation programme vs. the need (i.e. a gap analysis), (b) the nature of the transition they are making, and (c) the specific 'activities' upon which they need to focus to make that transition. These reports will be directly actionable by the cities.
- **Analysis** of the status of cities participating in the training events. We provided data to workshop trainers highlighting the specific needs of participating cities, including of the two 'peer cities' in each workshop.
- **Overall analysis of capacity** in the selected cities. The PACT reviews provided considerable further information on capacity needs in cities in Europe that is likely to be of interest to policymakers. While the results were indicative only, they may highlight some conclusions and areas for further investigation.



- **Information** on the status of participating cities in terms of the IMS as applied to adaptation to climate change. Although the two tools have been designed to meet different objectives, and differ in some ways, there is considerable overlap between the IMS cycle and PACT activities.<sup>32</sup> The PACT activities and self-assessment questionnaire were amended to increase the consistency of the PACT activity database with the IMS checklist activities.

The PACT analysis and reporting process made it clear that cities at different levels of capacity need very different types of intervention and support in order to progress climate adaptation. Our conclusions are as follows:

- The great majority of European cities (significantly in excess of 90% from the survey results) have insufficient capacity to take long-lasting and potentially climate-impacted decisions with confidence that the important economic, social and ecological objectives will be achieved. Most cities take many such decisions, which therefore presents a significant risk until the capacity gap is closed.
- In around 77% of cities the capacity gap is sufficiently wide that autonomous improvements are extremely unlikely to close it sufficiently quickly: considerable support is likely to be needed.
- A few rare cities, however, have very high capacity and there is a small but important nucleus of others that could approach these levels quite quickly (i.e. within two years) if given appropriate focused support. This could provide a potentially vital resource to support capacity building both within and between cities.
- Capacity-raising is therefore an appropriate and important goal for policymakers at all administrative levels involved in responses to climate change. The nature of the support that is required will vary by country (depending for instance on the status of national adaptation programmes), as well as by the internal capacity of the cities themselves.
- The nature of the support required for cities, and for groups of cities, varies as follows:
  - Support to address 'gaps' in programmes: these gaps can be clearly identified using the PACT approach used in this project.
  - Support to raise capacity from one PACT 'response level' to the next.
- Support is most urgently required where capacity is very low and where major decisions with long lifetimes are being taken.
  - The ability of lower capacity cities even to identify the particular decisions they are taking that need to consider climate change is low.
  - Even where lower capacity cities recognise which decisions will be impacted, their capacity to deal with them is insufficient.
  - Programmes of change external to the lower capacity cities will be necessary: Moving cities from inaction to initial action requires different types of intervention (e.g. incentives or penalties) than sustaining actions (e.g. through guidance and regulation). The use of standards can also play a valuable role in bringing slightly more advanced programmes to the cusp of breakthrough innovation.
  - Peer to peer learning can help those charged with developing climate change programmes that are at early stages (through normalising behaviours and spreading useful practice/experience).

<sup>32</sup> This was established during a project co-ordination visit to ICLEI's Freiburg office in April 2012 and later confirmed by detailed in June / July.

- Since capacity at the required levels is currently very scarce in cities, there is a limit to what can be achieved through peer to peer learning processes:
  - As there are far more cities at lower levels of capacity, peer to peer learning processes are likely to be very helpful in beginning and sustaining a programme to the 'efficient management' level required to handle current extreme weather.
  - However, they will be much less helpful in moving beyond 'business as usual' and promoting the breakthrough innovation that is required to handle the likely impacts of future climate change.
  - Different development processes (e.g. elite learning programmes) will therefore be needed to build capacity in high-performing cities.
- PACT analysis was effective in assessing levels of capacity both in individual cities and in the wider population of cities. It provides a useful tool for policymakers aiming to build the capacity of cities to respond to climate impacts.

## 4.4 Webinars

### 4.4.1 Introduction

The aim of the webinars was to further strengthen the ability of the (training) cities to translate knowledge gained in the training workshops to their own realities. In addition, the topics identified for the webinars reflected some of the specific needs of the cities as identified during coaching activities. All training and peer cities, and their coaches, were encouraged to participate in at least one of the webinars.

In total four webinars were organized throughout the training phase of the project. The first webinar was held over two days in October 2012 and served as the initial introduction of, and welcoming to, the project to the selected cities. It introduced the objectives of the training and provided cities with a detailed training outlook. The first webinar also focused on levelling the playing field in terms of climate change knowledge. Presentations covered concepts such as climate change hazards, impacts, vulnerabilities, and adaptive capacities.

The second set of webinars were organised in April 2013 and focused on bridging the knowledge gaps on specific topics identified by the cities and the coaches. To this end three further webinars were organised and implemented tapping into the topical expertise of the project consortium.

### 4.4.2 Method

In the organisation of the webinars a flexible approach was taken to allow for the inclusion of information from both the feedback reports of the coaches as well as the city evaluations of the first coach visits. The evaluations of the workshops were also taken into account to identify relevant webinar topics that spoke directly to the needs of the cities. To allow for an in-depth analysis of relevant topics, as well as identifying suitable contributors and at the same time finding an appropriate time to avoid overlap with both the peak of the second coach visits or the first peer visits, it was decided to plan the webinars for April 2013. Instead of only organising one webinar in addition to the first webinar held in October 2012 (which focused on welcoming the cities to the project and introducing the training activities), three webinars were identified to support the adaptation processes of the cities and to respond accurately to their needs and wishes. Each webinar covered different topics, which linked to different aspects of the adaptation process (and the IMS cycle). The overarching topics of the webinars were:

1. Vulnerability Assessments and their practical implementation.
2. Green and Blue Spaces as urban adaptation solutions.

### 3. Adaptation Financing options.

Each webinar was around 2 hours, including discussions with the participants on the topic presented. All webinars were hosted via Web-Ex. The table below provides detailed descriptions of the webinar topics.

**Table 15: Overview of April 2013 webinar topics**

	Title	Presenters	Description
Webinar 1 2 April	Vulnerability assessment applied in practice	Main presenter: Efrén Feliu (Tecnalia)  Host: (ICLEI)	<p>The practical experience of undertaking vulnerability assessment (VA) in Vitoria-Gasteiz.</p> <p>In advance, the presenter circulated examples of materials used (worksheets, tools, etc) to registered delegates. Delegates were invited to post specific questions about the application of VA in response.</p> <ol style="list-style-type: none"> <li>1. (20 min) Presentation part 1 – explain how VA was applied in this situation, describing the process (e.g. tools used, who was involved, what data, scope) and results.</li> <li>2. (10 min) Q &amp; A – presenter responds to any specific questions received in advance; questions are put to him by the host of the session.</li> <li>3. (12 min) Presentation part 2 – explain the outcomes arising from the VA, how it led to next steps and particular actions. This could be a dialogue between presenter and delegate from Vitoria, or a straight presentation</li> <li>4. (10 min) Presenter responds to any questions / comments posed via the live Web-Ex chat during the course of the webinar – host to pick out questions and ask them to presenter.</li> </ol>
Webinar 2 15 April	Green (and blue) spaces as an urban adaptation solution	Main presenter: Jeremy Carter (UoM)  Host: (ICLEI)	<p>Tutorial on the importance of green space to adaptation in urban contexts, and some real examples.</p> <p>In advance, presenter circulated select number of GRABS (or other project, e.g. Future Cities) case studies of green space adaptation to registered delegates. Delegates invited to post specific questions about the green space &amp; urban adaptation in response.</p> <ol style="list-style-type: none"> <li>1. (15 min) Presentation part 1 – tutorial explaining / justifying how and why green space functions as a key urban adaptation response.</li> <li>2. (15 min) Presentation part 2 – a few real examples described, including the process of how they were implemented. (This could be run as an interview between Host and Presenter.)</li> <li>3. (15 min) Presentation part 3 – policy and delivery context: how to make it happen, with a focus on spatial planning as a delivery mechanism</li> </ol>
Webinar 3 23 April	Money Talks	Host: (ICLEI)	This webinar brought together two topics related to adaptation finance. The first half was a tutorial on cost-benefit analysis (CBA) in urban adaptation. The

	Title	Presenters	Description
		<p>Main presenter (part 1): Ron Vreeker (Arcadis)</p> <p>Part 2 panel:</p> <p>a) Jeremy Carter (UoM)</p> <p>b) Nikki Kent (R-AEA)</p> <p>c) Dave Steinbach (R-AEA)</p> <p>d) Holger Robrecht (ICLEI)</p>	<p>second half was a set of short interventions on possible funding routes for cities to progress work on adaptation.</p> <p>In advance, presenter (part 1) circulated relevant links or worksheets.</p> <ol style="list-style-type: none"> <li>(20 min) Presentation part 1 – tutorial explaining contexts in which CBA is relevant to urban adaptation, identifying methods / tools and principles for application of CBA in adaptation, and providing worked examples / case studies (if possible).</li> <li>(5 min) Q &amp; A – Presenter responds to any questions / comments posed via the live Web-Ex chat during the course of the webinar – host to pick out questions.</li> <li>(4 x 5 min) Short panel presentations (2 slides). The four short slots will be: <ol style="list-style-type: none"> <li>DG RESEARCH opportunities - city involvement in FP7 / Horizon 2020 – and other research routes</li> <li>DG ENV funding opportunities – the LIFE+ programme</li> <li>DG REGIO funding opportunities – INTERREG IV</li> <li>DG REGIO funding opportunities – URBACT</li> </ol> <p>In each case, suggest slide 1 gives context and facts about the funding route and how to access it, and slide 2 provides an example.</p> </li> <li>(10 min) summary by Host or selected Q &amp; A.</li> </ol>

In addition to the three webinars, moderated forum discussions on the website took place in April 2013. The moderated forum discussions were developed from the needs analysis based on the city evaluation of the coaching and training activities as a response to certain challenges and gaps cities are experiencing in their adaptation work. It was decided to organise two moderated discussions taking place over one week, facilitated by experts within the project consortium. This was to encourage a wider exchange between the training and peer cities beyond the borders of their sub-groups as well as presenting the opportunity to share experiences and best practices between each other. The role of the expert moderator was to spur on the discussions and provide expert input. The forum discussions focused on climate hazards: heat waves, droughts, and flooding (pluvial, fluvial and storm surges).

### 4.4.3 Outputs, results & conclusions

#### 4.4.3.1 First Webinar

The first webinar held in early October 2012 saw the participation of all but one of the participating cities (due to technical issues to connect to the webex tool).<sup>33</sup> The webinar was organised as two, one hour sessions over two days. The webex tool was used to host the webinars, which proved to be an excellent and straight forward way to communicate, share slides and documents, and to interact with the participants. Different types of interactive elements were tested such as using the 'comment' function for the Q&A sessions as well as

<sup>33</sup> This was addressed by a one-one discussion with the city representatives.

a 'polling' function. The polling function was used to get an impression of the expectations of the cities for the training phase of the project. Cities could choose from different types of statements correlating to their perception of why they choose to take part in EU Cities Adapt and what they expected from the training to come. The polling function is an interactive element that works really well where there are quite a few participants and where it proves difficult to give everyone 'the floor' to share impressions and expectations.

During the organisation of the first webinar with regard to the presentations on climate change concepts and terminology it was realised that there was little understanding of the general level of adaptation in European cities. Also due to the wealth of information on adaptation and the different terminology used in the literature it proved to be vital to dedicate half a day in the workshops to introduce climate change and adaptation to the cities to be consistent with the language and approach used throughout the training phase.

#### **4.4.3.2 Second Webinars**

The second set of webinars held in April 2013 focused on specific adaptation topics. Each webinar attracted 17 to 20 participants. Not all cities participated in each webinar, depending on their availability and whether they were interested in the particular topic. Some cities also participated with several representatives to include staff from different departments. In general interaction with the participants was quite high. The webinars allowed for extensive Q&A sessions, where the cities throughout the presentations could use the comment function of the webex tool. The main facilitator kept track of the comments and summarised these in the Q&A sessions and posed questions based on these to the presenters.

These webinars identified the relevant topics for cities just starting their adaptation processes and the cities that were slightly further along on their adaptation journey. In particular, cities showed interest in learning more on vulnerability assessment - both in terms of methods that can be applied and how it has been realised in practice. Moreover, green and blue infrastructure with regard to adaptation measures were emphasised as preferred adaptation options as these presented multiple benefits to cities. With regard to adaptation financing, cities were keen to learn more about European funding streams and how to apply to and access these. In general there was a high interest in learning from city case studies and to receive practical advice on methods and funding streams.

#### **4.4.3.3 Overall recommendations**

Drawing from the experience of organising webinars as a whole, it is recommended to ensure that the webinar is no longer than two hours. In order to maintain interest it is important to clearly divide the webinar into several presentations, allowing for Q&A sessions in between presentations and/or parts of presentations. The introduction of other types of interactive elements such as polling encouraged high attention levels throughout the webinar. Participants were encouraged not to pose questions directly to presenters but rather use the comment function where the facilitator summarises the comments and questions. For complex technical and novel topics it is recommended to share the presentations or other preparation materials to the participants in advance of the webinar to the participants to develop appropriate comments/questions and therefore enable a more structured discussion.

## **4.5 Training workshops**

### **4.5.1 Introduction**

The training workshops served as the foundation for the training phase, where they acted as the key element of the capacity development and set the basis for the local adaptation process. The aim of the workshops was to provide cities with the necessary foundational elements with regard to process overview and integrated adaptation management as well as to inject the essential information for cities to realise adaptation in their own contexts with regard to overarching themes such as knowledge, resourcing, stakeholder engagement, and tools and resources to take action.



Three training workshops of two and a half days were organized in October to November 2012 according to the three training groups.

**Table 16: Overview of training workshops**

Host cities	Number of days	Training sub-group	Number of representative s from training cities	Number of representative s from peer cities	Total number of participant s (excluding coaches)	Partner involvement
Rotterdam	2.5	Mediterranean	10	6	16	ICLEI, AEA, ABL, Arcadis
Dublin	2.5	Northern, Northern-central, Northern-western	12	6	18	ICLEI, ABL, UoM, Adelphi, Arcadis
Dresden	2.5	Southern-central	10	4	14	ICLEI, Arcadis, ABL

## 4.5.2 Method

Content-wise, the training focused on the local adaptation process, its management and key elements. Building on the first webinar (introduction to climate change adaptation and related concepts and terminology), the face-to-face workshop zoomed in on the concrete steps for implementing an adaptation management process in an urban context.

Conceptually, the workshop programme has been based on the IMS Cycle. Each of the five IMS steps formed a building block of the programme.

The overarching aim of the programme was to translate the theory of local climate adaptation management into the specific local situations that cities face. While the consortium members were in charge of delivering theoretical content and presenting on the addressed thematic areas, the training workshop participants engaged in interactive group activities, which added practical learning experiences to the theory presented and diversified and enriched the workshop activities.

**Table 17: Workshop programme (example Dresden)**

Session	Activity
<b>DAY 1 - afternoon</b>	
Welcome	Welcome and introduction by project consortium and host city representatives.
How to get adaptation started?	Adaptation management framework and vulnerability assessment.
Create it!	Creation of an example (fictional) city archetype
Adaptation in action	Presentations by peer cities; Discussion with participants on their cities
PACT Assessment	PACT Assessment – example city report
Facing the challenge!	SWOT analysis based on PACT and Organisational Set up
Status update	Where do we stand?
Reality check I	Discussion between coaches and cities
<b>Day 2 – all day</b>	
Presentation	Implementation examples
Site visit	Site visit organised by the host city
Get politicians on board. Get the public interested	Presentation on political commitment and public engagement
Catch me, if you can!	Role play on how to argue for climate adaptation work

Session	Activity
How to keep the overview?	Presentation on monitoring, evaluation and reporting
Status update	Where do we stand?
Reality Check II	Discussion between coaches and cities
<b>Day 3 - morning</b>	
Is example city responsive?	Presentation of the example city by participants
Next steps	Presentation on the next steps of the training
Reality Check III	Discussion between coaches and cities
Evaluation and expectations	Interactive Evaluation
Closing	Wrap-up: Backtrack & outlook

For a more in-depth account of each of the exercises carried out in the workshops as well as a summary of the participants' evaluations please see Appendix 10a for the Rotterdam, Dublin and Dresden Workshop reports.

### 4.5.3 Outputs & results

The personal interaction between core team members of each participating city provided added value to the mutual learning between them and gave them motivation to stay in touch and assist each other while setting the groundwork for developing their individual strategies. The two and a half day workshops thus also provided a significant contribution to the peer exchange described in more detail under Sub-task 3.6.

Training workshop participants benefited from their exposure to the approaches taken and the experiences of the two advanced peer cities in their sub-group, in particular the one that was hosting the workshop. A technical tour provided participants with some evidence of the practical measures taken in the city that directly responded to its climate challenges.



The training workshops presented the first opportunity for city representatives to meet their coaches in person. This greatly facilitated the development of a functioning working relationship for the subsequent months of the coaching support.

The cities were given a broad understanding of climate change adaptation and how to address it at the local level.

Cities took advantage of the networking opportunities,

**Figure 22: Participant involvement during a training workshop** discussing possible cooperation strategies and data exchange.

A positive learning curve could be observed throughout the three workshops, starting from "information absorption" on the first day and continuing with a more conscious understanding and mastering of the framework approach presented. In general, this was particularly clear during the presentation of the case city on the third day, when participants independently sketched adaptation measures according to the approach and correctly identified needs and resources necessary to reach their objectives.

The participants at the three workshops appreciated:

- The variety of training techniques applied (presentations / role plays / Case city /Site visit);

- The participative approach and peer to peer exchange;
- Working with a case city, to be used as an example to transfer concepts to reality;
- Having the opportunity to exchange with different cities in different countries;
- The site visit and the best practices of the hosting peer city;
- The opportunity to discuss their PACT reports and better understand how it could help them identify their strengths and potential for improvement;
- The application of the IMS including knowledge gained on the importance of continuous learning in order to involve stakeholders and agents of change in the process and the importance of a monitoring and evaluation framework.

In addition participants expressed the wish to receive further support on:

- Getting to know the practices in the other cities in detail in order to make linkages with each other.
- Benchmarking adaptation strategies in Europe.
- Specific internal organisational examples.
- Sharing of regional/local data.
- Use of models for adaptation plans and strategies.



**Figure 23: Interactive session during workshop**

#### 4.5.4 Conclusions

The training workshops proved to be an essential starting point for the training phase of the project. Whereas the first webinar had introduced the topic of adaptation, the workshops provided hands-on exercises on adaptation management and a step-by-step approach to set-up and maintain an adaptation process.

**Figure 24: Mind mapping during a workshop**



In addition the workshops fostered exchange between the cities within the same training group, which allowed the cities both to learn from each other with regard to previous experiences on adaptation, and to realise common difficulties and challenges. This realisation resulted in a common identity and fostered an environment of finding common solutions.

One of the major lessons was the understanding and internalisation of adaptation as a process, which needs not only to be integrated into urban plans and processes, but also to be inclusive in terms of collaboration between departments and sectors, and communication with and inclusion of the public in plans and processes to raise awareness and gain acceptance of adaptation. Furthermore, with the support of the more advanced peer cities, the training cities gained an understanding of what adaptation means in practice, from planning to implementing measures. A general outcome from the discussions and the exercises was the importance of gaining political commitment on adaptation. Cities see the need to learn how to develop a business case on adaptation where policy-makers not only feel ownership of the issue but also realise the relevance of not lagging behind in comparison to other cities.

Finally, all of the cities expressed the wish to continue a city network that allows for a continuous exchange of information and case studies on process and measure development and that could also function as a support to convincing policy-makers to act on adaptation.

## 4.6 Coaching & expert advice

### 4.6.1 Introduction

The aim of the coaching activities was to support the set-up, the continuation and the development of the local adaptation process of the cities being coached. Specifically to develop capacity and provide guidance on planning the cities' work on adaptation with regard to organisational set-up, awareness raising, stakeholder involvement, adaptation measures, strategy, action plan development and sourcing of relevant expertise and reference material and tools.

The coach supported the training cities by helping to identify challenges, weaknesses and strengths relevant to adaptation relevant to their local context. The coach helped develop adaptive capacity by supporting the channelling of relevant expertise needed and by introducing tools that could support the development of the city's adaptation process.

### 4.6.2 Methods

Coaches visited the training cities twice over a period of 6 months (from November 2012 to April 2013), spending a total of up to six days in each city. The first and second coach visits were individual visits to each city by the assigned coach, whereas the third coach visit coincided with the second peer review visit. Here the assigned coaches for each sub-group accompanied the cities at the peer review visits. Apart from these personal visits, the coaches liaised with the cities through regular interactions through phone calls and email communication. Each of the coach visits were evaluated by the training cities to provide feedback on the quality of the visit and to give feedback on additional content to cover.

Supporting material was prepared for the coaches. This included:

- guidelines for the coaches
- coach visit programme
- coaching exercises
- overview table of tools according to the Integrated Management System
- feedback reporting templates for coaches

These documents can be found in Appendix 10b. As each city had a different starting point, and different strengths and weaknesses with regard to their adaptation work, the supporting materials that were developed were only used as guidelines and were adapted to the local circumstances as well as used selectively depending on each city's current capacity needs.





As part of the preparation activities and support to coaches, a feedback webinar was organised and carried out in January 2013. This discussed the first coach visits and analysed the feedback from the coaches and the first coach visit evaluations of the cities. In addition each coach received targeted feedback summarising the main points of the evaluations of their coach cities to help prepare for the second coach visits. The training cities also received targeted feedback to follow up on planned activities in response to their evaluations. The training cities, with the support of their coaches have developed final city reports. The city report includes a summary and evaluation of the

cities' experiences of the training and coaching including lessons learnt and next steps. It also includes an elaborated structure for a local adaptation strategy identifying existing and missing elements, a vision for their adaptation work including wider adaptation objectives and an outline of an action plan including short-, medium-, and long-term milestones. The cities also included their work plans that were developed and updated throughout the training and coaching phase, outlining immediate to short-term activities related to their adaptation processes.

### 4.6.3 Outputs & results

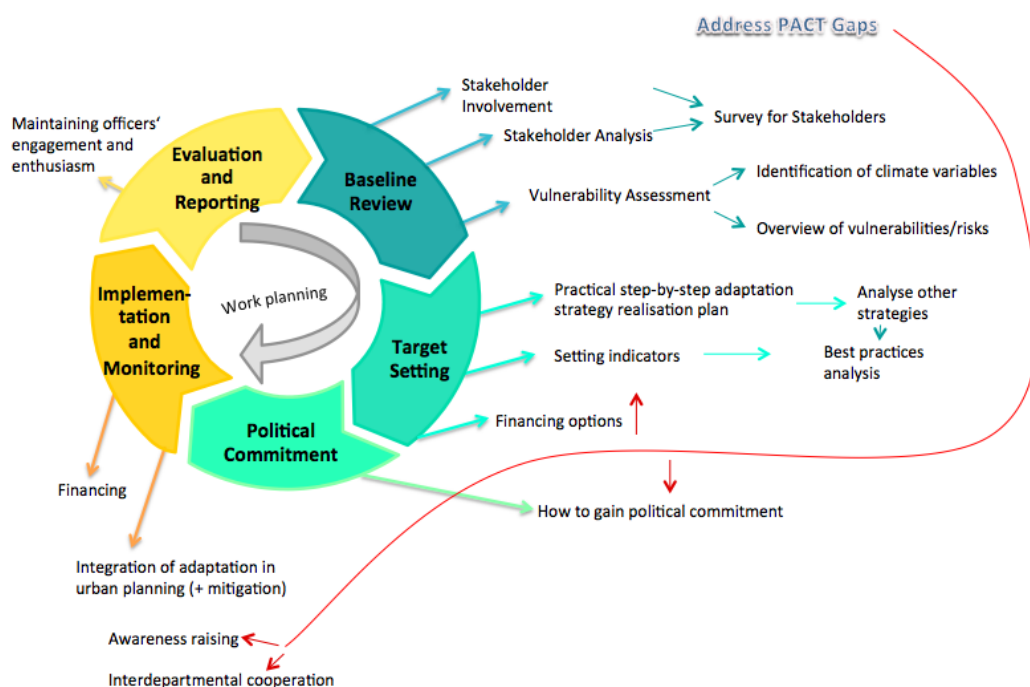
To respond to the aim of providing the training cities with accurate support to their adaptation processes it was crucial to identify and confirm the support needs of the cities on a regular basis. This was made possible by a systematic evaluation and feedback framework, which allowed for cities and coaches to emphasise topics and elements to be highlighted throughout the training process.

Below is a visual summary conclusion of a needs-analysis exercise carried out in the follow-up from the workshops and the first coaching visits, based on information deduced from workshop evaluations, coach visit evaluations by the training cities and feedback reports of the coaches.

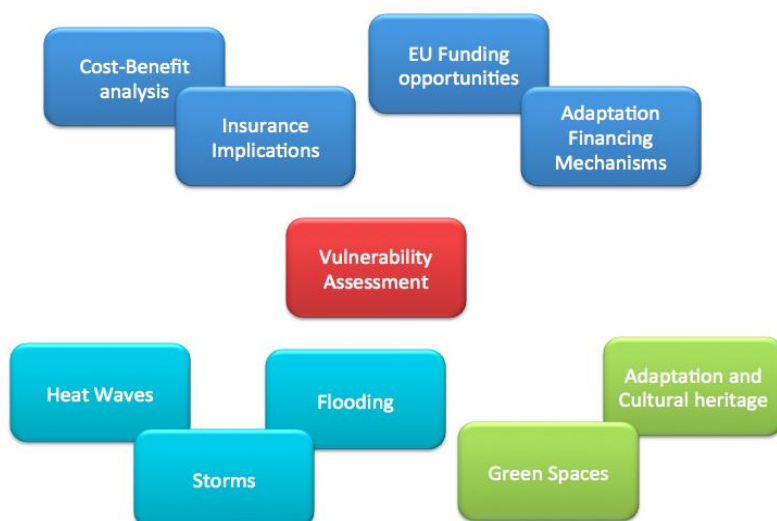
**Figure 25: Providing expert advice to the cities**





**Figure 26: Analysis of knowledge gaps and follow-up**

The needs analysis of the workshops and coach visits identified 'hot' topics that cities wished to discuss further and get more support on. Within the analysis, these topics were structured according to the Integrated Management System (Figure 26) to allow for a clear overview of the needs of the cities in relation to their adaptation processes. The majority of the needs identified by the cities were mainly focused on the *Baseline Review* as this step presented, for most of the training cities, the entry point for working on adaptation.

**Figure 27: Feedback on topics to be addressed from coaches and cities.**

Based on the support needs, according to the adaptation process visualised above, major topics were identified that cities in general wished to learn more about and get more support on (Figure 27). The topics were drawn from both the coach feedback reports, including the needs table, and from the city evaluations of the workshops and the first coach visits. These topics were then included in the implementation of the various sub-tasks under Task 3.

#### 4.6.4 Conclusions

The systematic identification of support needs and accurate responses, either through personal coaching activities, coach visits, webinars and/or peer review visits, presented a comprehensive support framework that facilitated the progress of the local adaptation work. The coaching proved to be, although time-intensive, an effective mechanism to understand the local context, tailor-make exercises and activities according to the specific situation and

adaptation level, and to guide cities to systematically introduce adaptation into their urban management and planning structures and then to implement a structure that would be long-lasting beyond the time-span of the project.

The coaching activities presented a window of opportunity for cities to introduce the topic of adaptation, to create a momentum for adaptation and/or to keep adaptation on the political agenda. In general training cities expressed the importance of an external expert to give exposure and weight to the topic of adaptation, to mediate and kick-start collaboration between departments, and to provide advice and access to information and further guidance.

For an in-depth overview of the coaching experiences from the coaches and the cities, please see Appendix 10d for the individual coach and city reports. These reports, as discussed above, present an overview of the learning within the project, the experiences of the coaching activities, the achievements of the cities to date, and the outlook of their adaptation work beyond the life-span of the project.

## 4.7 Peer Review visits

### 4.7.1 Introduction

The aims of the Peer Review meetings were to strengthen the working relationships between the cities belonging to each sub-group and to encourage the cities into longer term partnerships extending beyond the end of the project. For each sub-group two Peer Review visits were arranged. As well as informal discussions the reviews enabled the host cities to provide technical site visits, practically demonstrating their approaches to implementing adaptation strategies.

The first review was hosted by one of the Peer Cities in the sub-group and was timed in the middle of the training programme. The second Peer Review was timed towards the end of the project and coincided with the final coaching visit in order to involve the coaches assigned to each of the cities respective sub-groups. In summary:

The first three Peer Review visits were held in:

- Ancona (Mediterranean Europe Group), 19-21 February
- Malmo (Northern, North-Central and North Western Group), 5-7 March
- Birmingham (South-Central Europe, Landlocked), 12-14 March

The second Peer Review visits were held in:

- Gibraltar (Mediterranean Europe Group), 7 – 8 May;
- Stirling (Northern, North-Central and North Western Group), 14 – 15 May
- Sfantu Gheorghe (South-Central Europe, Landlocked), 21-22 May

Appendix 10c provides a summary of the participants, agendas and points arising from each of the review meetings

### 4.7.2 Method – First Peer Review visits

The focus of these reviews was for each of the cities, including the peer cities to present their progress in identifying the needs and development of an adaptation strategy. Each city made a short presentation to several of the others using a format based on the five step IMS, under the headings:

- City overview

**Figure 28: First Peer Reviews at Ancona (top), Malmo and Birmingham**



- Baseline review
- Target setting
- Political commitment and engagement
- Implementation and review
- Monitoring and review

The reviewing cities were then given the opportunity to question the city making the presentation and provide feedback under the headings of:

- Turning points
- What has the city done well?
- What could the city improve on?
- What can other cities learn from this city's experience?
- Final comments

### 4.7.3 Outputs & results – First Peer Review visits

Clearly each city had reached different stages of the process and made presentations reflecting this. However a number of common lessons could be drawn.

Turning points included:

- The recognition that extreme weather events had occurred, or could occur, posing significant impacts to the cities.
- The effect of political change (e.g. following elections) that change the context to environmental issues at a local level.

It was also noted by a number of cities in this and subsequent meetings that this project had been a catalyst for gaining political and stakeholder engagement.

Best practices (What has the city done well?) included:

- Early identification and engagement of key stakeholders within the city administration and outside (for example, other regional and national governmental departments and private sector organisations, and the establishment of a stakeholder working group).
- Some cities had been able to gather strong evidence bases of relevant data and future trends concerning the likely impacts of climate change, justifying the need for adaptation strategies.

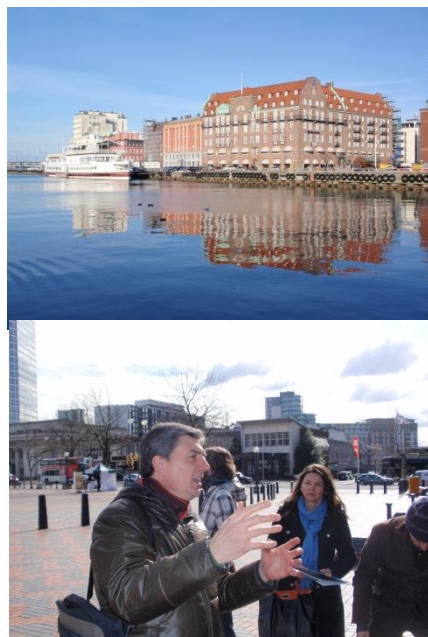
Improvement areas included:

- The development of partnerships and alliances with external organisations and, in particular, research institutes. In particular the relationships with scientific research institutes need to be established such that the cities define the research requirements to ensure that the research is focused on specific requirements.
- Development of communications plans using language and examples that stakeholders can relate to and understand.

Lessons learnt (What can cities learn from each other?)

- Some cities have been successful in embedding adaptation to climate change into their existing processes. For example Stirling has identified extreme weather events due to climate change in its risk register, so that the potential impacts and actions have to be regularly reviewed as part of the risk governance process.

Climate change adaptation policies can be integrated into local regulations, enforcing, for example, investments to be resilient. In general, the cities found the opportunity to learn from each other to be a rich experience. The brainstorming approach enabled some cross



fertilisation of ideas and practical actions that could be taken back to the cities for implementation.

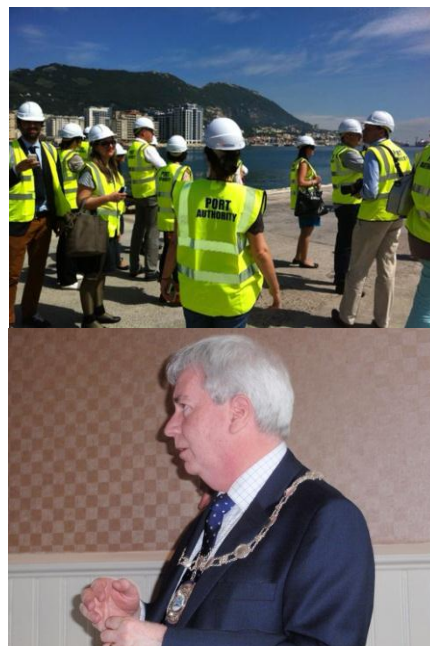
#### 4.7.4 Method – Second Peer Review visits

The second Peer Review visits focussed on the development of draft adaptation strategies, providing the coaches and peer cities to provide feedback. They also provided opportunities for the cities to reflect on the ways in which they could continue to make progress following the completion of the project and lessons learnt from the project.

#### 4.7.5 Outputs & results – Second Peer Review visits

All of the cities had made significant progress since the previous Peer Reviews. Common themes included:

- The need to engage across many departments in the local administrations and respecting the local political environment.
- The support of the project had given many of the cities the opportunity to obtain strong engagement with stakeholders, both within the local administration and with organisations outside of the administration, and had therefore provide a kick start to raise adaptation up the local agenda.
- The cities where adaptation had not been a key issue before being involved in the project had also established working groups and adaptation champions in order to develop and implement action plans. The importance of working from a firm foundation was seen as key to ensuring that adaptation strategies are developed and included in the mainstream policies of the local administration.
- A key element for some cities was the establishment of climate change as a local issue, and the need to adapt to it as one of the risks in the administrations risk register (e.g. Stirling). Once established in the risk governance process of the city this will ensure that it is one of the issues that needs to be addressed and regularly reviewed irrespective of political changes.



**Figure 29: Second Peer Reviews at Gibraltar (top) and Stirling**

#### 4.7.6 Conclusions from the Peer Reviews

The following key conclusions were drawn from the Peer Reviews:

- Nine months was not long enough to provide the support and training for the adaptation policy development process, or for all of the training cities to have developed adaptation strategies.
- EC funding will be critical to the delivery of adaptation measures because climate change is one of many local issues and does not have the same priority and urgency attached to it as some other issues, even though it may be included in part of the decision and investment process (mainstreaming).
- Key city knowledge gaps identified included:
  - Economic evaluation of environmental services provided by ecosystems
  - Comparative studies on investments and cost benefit analyses
  - Financing adaptation measures
  - Uncertainties in regional climate models
  - Identifying limits for adaptation – what are tolerable risks?



For the future, cities feel they need more data, information, benchmarking studies and sharing of practical solutions that are tested and found reliable. They also felt that it will be important to maintain and reinforce the EU Cities Adapt network, and to give a wider group of cities across Europe the “business case” for adaptation measures, and to address cost-benefit analysis in different European regions. Specific suggestions coming out of the meeting included:

- Establishing direct contact with other cities worldwide with similar dimensions and complexity, and facing similar challenges (e.g. San Francisco, Sydney, Copenhagen).
- Having the opportunity for exchange programmes at a technical level with such similar cities
- Economic resources for vulnerability assessment
- Partnerships with research centres
- Continuing to provide international visibility to maintain political commitment
- EU funds for the education system/field – to increase knowledge
- Encourage local students to work on adaptation projects
- Q&A for climate sceptics – why adapt?
- Technical visits – exchange at professional level e.g. EC to fund one week exchanges
- Covenant of Mayors integration of adaptation plan – could be risky, how will it be integrated, need 3-4 years to make a plan, therefore looking at 2020 onwards?

## 4.8 Conclusions and Recommendations Summary

The city and coach reports from the 15 training cities are provided in Appendix 10d. The key achievements for each of the training cities participating in the project are highlighted in Table 18 (at the end of this chapter).

The outcomes of and the conclusions drawn from the this task provide a solid picture, not only of the major capacity and support needs of European cities with regard to their adaptation processes; they also offer relevant insights into the preferred and most effective mechanisms to bridge these identified knowledge gaps. The conclusions of the training and the close interaction with the 21 cities that participated in the EU Cities Adapt project provide information on what the focus should be with regard to urban adaptation, and how this could be realised in practice.

The capacity and support needs can be clustered according to three major categories:

- Urban adaptation management
- Knowledge management
- Governance & financing

The methods to bridge these capacity gaps should preferably be mainstreamed to create a common approach, allowing for a more efficient exchange and comparison between cities. In summary it would be recommended to:

- Provide cities with support on how to secure political commitment on adaptation to facilitate the development of long-term visions.
- Uphold and maintain a network of cities to enable the exchange of practices and information.
- Provide cities with technical support with regard to specific topics on adaptation (elaborated on below).

### ***Urban Adaptation Management***

For effective and efficient adaptation in urban Europe, cities need to have a solid understanding of how to organise an adaptation process within the administration as well as across the city. This includes the integration of adaptation into existing and future city plans and processes, thereby supporting the mainstreaming of the issue across departments and



sectors. The process should have an inclusive character, highlighting inter-departmental collaboration and stakeholder involvement, including different sector representatives and the general public to create a common ownership of the topic as well as realising its relevance across plans and processes.

A step-by-step approach is recommended to map the current activities of cities with regard to adaptation, and for cities to be able to identify current gaps. Here, using the IMS as a backbone for the training proved to be helpful not only for beginner cities, but also for more advanced cities with different starting points.

As part of a step-by-step approach on adaptation, developing and understanding the city's baseline is of utmost importance. This includes conducting an integrated vulnerability assessment that looks into priority sectors, specific vulnerable areas and social groups. Cities are not only looking for a good practice method on how to develop vulnerability assessments, but there is also a need to support cities in dealing with uncertainties in practice.

Guidance material for the urban European context is also needed for cities to develop adaptation strategies, preferably building on existing urban adaptation strategies including examples for different adaptation measures. More emphasis should be placed on highlighting win-win measures outlining the co-benefits of certain measures. Many of the existing adaptation measures in Europe have a focus on green and blue infrastructure that are providing other benefits such as increasing the quality of life of the citizens in general. This speaks to one of the major challenges that European cities are facing with regard to advancing on adaptation, namely the lack of political commitment. A more solid understanding of adaptation measures and a focus on creating co-benefits will help gain political commitment on adaptation.

For cities to integrate adaptation into urban planning it is essential that they develop a monitoring and evaluation framework to assess the adaptation process and activities implemented. To this end, different sets of adaptation indicators are needed that can support the evaluation of the process and the adaptive capacity of the public as well as the city administration.

### ***Knowledge Management***

There are numerous tools and guidance with regard to adaptation. These were analysed in Task 1 and provided useful information that was translated into supporting material for the coaching activities. However, it is recommended to collect and cluster information sources and references including tools and guidelines, as well as to provide support to cities on how to use these and for which stage of the adaptation process.

In addition, to bridge the current gap of both access to, and how to appropriately use, data to inform the vulnerability assessments more effort should be directed to target cities' needs. This refers to the availability of appropriate data for the local level and how cities can deal with the uncertainties of the available projections on climate change impacts.

Many of the gaps identified with regard to knowledge management are closely related to the existing challenges with the science-policy collaboration and interaction. It is recommended that research results are aligned with the needs of cities, and research results are made available for cities to benefit from. Improved collaboration between research and policy-making will present benefits to both sides and will support cities in strengthening their adaptation work and arguments for long-term dedication to adaptation.

### ***Governance & Financing***

Considering the economic situation of many European municipalities, the topic of adaptation financing is high on the agenda. In addition to a more centralised information approach to available EU funding streams on adaptation the role of insurance in funding adaptation measures should be elaborated on further. Transferable methods and tools on how to calculate and develop cost-curves for adaptation measures and to conduct cost-benefit

analyses will not only support the technical staff within the city administration to plan for the most appropriate measures, but also very much speaks to securing political commitment. A better understanding of the costs of adaptation and the costs of inaction provides solid arguments that will speak to policy-makers.

Although adaptation in Europe will mostly be realised at the local level, to appropriately respond to various contexts there is a need to develop a multi-governance approach to support local adaptation action. This includes regional and national cooperation and exchange as well as promoting the role of the EU in supporting networking activities and exchange of information and guidance.

**Table 18: Summary of the key achievements of the training cities**

Training cities	Key Achievements resulting from the project	Documents
<b>Northern, Northern-Central &amp; Northern-Western Europe</b>		
Albertslund (Denmark)	<p><b>Before the project:</b> In 2009, Albertslund established a climate plan for urban development, 2009-2015, but adaptation solutions have not been on the agenda since the municipality had not witnessed significant impacts from extreme weather events.</p> <ul style="list-style-type: none"> <li>The municipality is perfectly equipped to deal with climate change. With climate change not having a real direct impact, climate adaptation is well integrated in the municipality plans.</li> <li>Project helped Albertslund to reconsider the wider impacts of climate change, confirming that they were not neglecting impacts they should be aware of now.</li> <li>Sharing results and insights from other cities.</li> <li>Now a focus for urban designers as well as mitigation as they now see adaptation as value propositions.</li> </ul>	<ul style="list-style-type: none"> <li>No adaptation strategy is needed for Albertslund currently. Adaptation is already considered in their published Climate Plan 2009-2015 for future urban development in Albertslund.</li> <li>Recently the draft of the new municipality development plan has been finished. Climate change agents have delivered their input and have been able to integrate climate change impacts during the process, resulting in a holistic approach.</li> </ul> <p><a href="http://www.albertslund.dk/Service/English.aspx">http://www.albertslund.dk/Service/English.aspx</a></p>
Ghent (Belgium)	<p><b>Before the project:</b> Adaptation issues were on the agenda but lacked visibility and commitment among key stakeholders, particularly the politicians. Ghent wanted to accelerate the process of developing and implementing their adaptation strategy, understand the available tools to do this and learn from other cities.</p> <ul style="list-style-type: none"> <li>The cross-departmental working group became a real ambassador for climate adaptation within the city organization of Ghent: they see their role and look for ways to integrate climate adaptation in their policies, instruments and projects</li> <li>Climate adaptation was introduced as a new topic on the agenda, just in time to have it picked up in the “strategic and financial planning for the current legislation period (BBC 2013-2018)” currently taking place</li> <li>Climate adaptation measures (with a focus on integrated water management) were implemented in the local building legislation by January 2013.</li> <li>An extensive study on the urban heat island effect and heat stress for Ghent was carried out, in cooperation with the Flemish Institute for Technological Research and the University of Ghent.</li> </ul>	<ul style="list-style-type: none"> <li>Vision for a climate proof Ghent by 2030, but targets by 2018 was produced.</li> <li>Draft Adaptation Strategy outline alongside short term (2013) and Mid-term (2014-2018) milestones prepared and signed off by all Adaptation Working Group members.</li> </ul> <p><a href="http://www.gent.be/">http://www.gent.be/</a></p>

Training cities	Key Achievements resulting from the project	Documents
Lahti (Finland)	<p><b>Before the project:</b> Lahti had established programmes addressing storm water and climate change mitigation. While key leaders had a sound commitment to climate change issues there was little appreciation concerning adaptation to climate change.</p> <ul style="list-style-type: none"> <li>Working Group to develop city strategic adaptation documents established.</li> <li>Increased awareness on climate change threats and other adaptation related issues.</li> <li>Identified stakeholders; Meetings with internal and external stakeholders (staff from different departments, representatives of Helsinki University (Department of Environmental Sciences), private organisations responsible for relevant city services) to gather information on on-going projects relevant for adaptation, adaptation measures already being implemented, also to raise their awareness and gain their commitment.</li> <li>Gained political commitment to develop adaptation strategies (through meetings with the Mayor and City Council members).</li> <li>Review of internal documents (quality and management books, operational directives and working instructions) in order to find out how best to integrate adaptation issues into internal processes and improve coordination among different departments.</li> <li>Potential climate change hazards, their impacts to city services, preliminary adaptation actions identified (list drafted by the Working Group, which was sent to relevant departments for revision).</li> </ul>	<ul style="list-style-type: none"> <li>List with potential climate change hazards, their impacts to city services, preliminary adaptation actions.</li> <li>Draft Adaptation Target Programme (in preparation).</li> <li>Inclusion of adaptation issues in the renewed City Strategy, approved by the City Council in April 2013.</li> <li>Vision of further adaptation process (Adaptation Roadmap in summer 2013, Adaptation Target Programme in August-September 2013, Adaptation Action Plan by autumn 2014).</li> </ul> <p><a href="http://www.lahti.fi/www/cms.nsf/pages/indexeng">http://www.lahti.fi/www/cms.nsf/pages/indexeng</a> Green city: <a href="http://www.greencity.fi/en">http://www.greencity.fi/en</a></p>
Stirling (United Kingdom)	<p><b>Before the project:</b> Stirling had taken steps to plan for climate change (in e.g. local development plan, emergency planning and flood risk management plans), but a more strategic approach was required to address adaptation to climate change.</p> <ul style="list-style-type: none"> <li>Strategy development: Stirling now has a draft adaptation strategy, and has plans to take this forward to the development of a final strategy within 2014. Very few Scottish cities have made this amount of progress on climate change adaptation to date.</li> <li>Awareness raising: Meetings, presentations and online communication involving staff have raised awareness of climate change impacts and adaptation responses in Stirling Council.</li> <li>Establishing a task group: An adaptation task group has been established as part of the ASEC project, which brings together staff</li> </ul>	<ul style="list-style-type: none"> <li>A draft adaptation strategy 'Climate Ready Stirling' has been produced.</li> <li>Action plan of actions against the strategies objectives has been produced to help deliver the strategy.</li> <li>A draft resilience plan for Stirling is included in Appendix 10d</li> </ul> <p><a href="http://www.stirling.gov.uk/">http://www.stirling.gov.uk/</a> Climate Change: <a href="http://www.stirling.gov.uk/services/planning-and-the-">http://www.stirling.gov.uk/services/planning-and-the-</a></p>

Training cities	Key Achievements resulting from the project	Documents
	<p>from different departments including risk and resilience, planning, biodiversity and transport.</p> <ul style="list-style-type: none"> <li>Data gathering: To inform the development of the draft adaptation strategy, data on issues including levels of flood risk to different community groups and the incidence of and costs associated with extreme weather events was gathered.</li> </ul>	<p><a href="#">environment/sustainable-development/climate-change</a></p> <p>Adapting to climate change  <a href="http://www.stirling.gov.uk/services/planning-and-the-environment/sustainable-development/climate-change/adapting-to-a-changing-climate">http://www.stirling.gov.uk/services/planning-and-the-environment/sustainable-development/climate-change/adapting-to-a-changing-climate</a></p>
Vilnius (Lithuania)	<p><b>Before the project:</b>  Vilnius had a good knowledge of climate change mitigation issues but there was little awareness of the need to adapt to climate change among key stakeholders.</p>	
	<ul style="list-style-type: none"> <li>Established Working Group to develop Adaptation Strategy.</li> <li>Raised awareness on climate change adaptation issues among Working Group members.</li> <li>Gained political commitment for adaptation work through involving heads of the relevant departments of the municipality administration as Working Group members.</li> <li>Working Group identified strengths, weaknesses, opportunities and threats of the city of Vilnius.</li> <li>Internal and external stakeholders involved. As a result, climate change projections for the city of Vilnius for the twenty-first century have been developed by the Lithuanian Hydrometeorological Service.</li> <li>Vulnerable service areas, adaptation actions, responsible departments identified.</li> <li>Plans to develop and implement a demonstration project demonstrating synergy of adaptation and mitigation measures (to raise awareness beyond city municipality).</li> </ul>	<ul style="list-style-type: none"> <li>SWOT Analysis</li> <li>Projections for the city of Vilnius for the twenty-first century (to be included in the Adaptation Strategy of the city of Vilnius).</li> <li>Table with projected climate change risks, impacted service areas, adaptation actions and responsible departments (to be refined by the relevant departments and included in the Adaptation Strategy).</li> <li>Draft Adaptation Strategy (in preparation).</li> </ul> <p><a href="http://www.vilnius.lt/">http://www.vilnius.lt/</a></p>
<b>Southern-Central Europe (landlocked)</b>		
Alba (Italy)	<p><b>Before the project:</b>  Alba was aware of climate change issues and seen as a leader, in Italy, in addressing them (e.g. implemented plans for waste management and recycling as flood protection), but lacked a strategic approach to adaptation. They needed the incentive and thinking time to kick start the development of this strategy.</p>	
	<ul style="list-style-type: none"> <li>Identified vulnerable urban systems and critical infrastructure.</li> <li>Established two Working Groups (internal and external) to support the development of the adaptation strategy of Alba. The external group</li> </ul>	<ul style="list-style-type: none"> <li>Vision for the Adaptation Strategy of Alba prepared and signed off by the Deputy Mayor</li> <li>Draft structure of the Adaptation Strategy prepared.</li> </ul>



Training cities	Key Achievements resulting from the project	Documents
	<p>includes among others representatives of Ferrero (chocolate factory), Coldiretti (Agriculture), Associazione consumatori (Union of consumers), University for Enology and Vineyards, Egea-Agency for energy, Agency dealing with urban parks maintenance, ASL- Local Agency for Health.</p> <ul style="list-style-type: none"> <li>• Resolution setting out the purpose of the groups agreed by all members of the Adaptation Working Groups and signed by the Council.</li> <li>• Inclusion and coordination of some adaptation measures already foreseen in the context of natural hazards prevention, energy planning (SEAP), traffic planning, health protection and link them to the local master plan of the municipality.</li> <li>• Gained political commitment to develop adaptation actions and measures.</li> <li>• Developed draft Adaptation Strategy structure of the city of Alba.</li> <li>• Improvement of internal communication within the administration.</li> </ul>	<ul style="list-style-type: none"> <li>• Climate change risk and the requirement for adaptation added to the Civil Protection Plan</li> <li>• Climate change risk and the requirement for adaptation added to the local master plan of the municipality.</li> <li>• Actions and measures to achieve the vision defined and assigned to responsible departments and organisations (part of the internal and external working groups).</li> </ul> <p><a href="http://www.comune.alba.cn.it/">http://www.comune.alba.cn.it/</a></p>
Bratislava (Slovak Republic)	<p><b>Before the project:</b> Bratislava Regional Environment Agency was a partner in the European GRABs project which stimulated green and blue infrastructure development. However, Bratislava was unclear about what the most significant likely climate change impacts will be for them and there was little awareness of adaptation issues at the political and administrative levels.</p> <ul style="list-style-type: none"> <li>• Established working group to establish adaptation strategy, wherein most relevant departments within the city authority participate.</li> <li>• Identified climate risks in city.</li> <li>• Gained commitment of Mayor to work on climate adaptation.</li> <li>• Engaged External Stakeholders including NGO's and the meteorological institute.</li> <li>• Developed draft Adaptation Strategy.</li> </ul>	<ul style="list-style-type: none"> <li>• Draft Adaptation Strategy prepared.</li> </ul>
Padova (Italy)	<p><b>Before the project:</b> Padova were in the early stages of identifying the climate risks and impacts, but there was a low level of awareness of the need to adapt to climate change amongst key people within the municipal administration.</p> <ul style="list-style-type: none"> <li>• Increase of political commitment to establish a working group and develop an adaptation strategy by the city council.</li> <li>• Engaged internal and external stakeholders after stakeholder assessment including local utility company, other city departments, NGOs and the regional government.</li> </ul>	<ul style="list-style-type: none"> <li>• Mission statement, setting out the purpose of the groups, agreed upon.</li> <li>• Vision document for Padova outlined.</li> <li>• Draft Adaptation Strategy outlined.</li> <li>• Actions plan to achieve the vision and for the development of a</li> </ul>

Training cities	Key Achievements resulting from the project	Documents
	<ul style="list-style-type: none"> <li>Identified vulnerable urban systems and critical infrastructure.</li> <li>Established cooperation with internal and external stakeholders.</li> <li>Establishing an organisational setup with different tasks and duties as part of adaptation working structure.</li> <li>Developed a structure for the Adaptation Strategy, which has been discussed by the adaptation working group.</li> <li>Strengthen the national cooperation between cities but also organisations active in climate adaptation.</li> </ul>	<p>draft Adaptation Strategy.</p> <ul style="list-style-type: none"> <li>Positioning paper with the cities of Ancona, Bologna, Alba, Venezia, Modena, the provinces of Genova and Catania, Kyoto Club, Coordinamen to Agenda21 Nazionale Ambiente Italia, Assaica, IUAV Venice, Indica to create a National network on climate adaptation presented to the Ministry of Environment.</li> <li>City of Padova adaptation plan - methodological approach is included in Appendix 10d</li> </ul> <p><a href="http://www.padovanet.it/index.jsp">http://www.padovanet.it/index.jsp</a></p>
Sfantu Gheorghe (Romania)	<p><b>Before the project:</b> There was political understanding of the possible impacts of climate change, but there was a need to move adaptation up the agenda compared to shorter term priority issues including the migration of the working population to Sfantu Gheorghe and an increasingly ageing population.</p> <ul style="list-style-type: none"> <li>Established working group to establish adaptation strategy, wherein most relevant departments within city authority participate.</li> <li>Identified climate risks in city and possible adaptation measures.</li> <li>Vice Mayor attended all meetings with working group</li> <li>Engaged External Stakeholders including NGOs, drinking water company and urban planning bureau.</li> <li>Developed draft Adaptation Strategy</li> </ul>	<ul style="list-style-type: none"> <li>Draft Adaptation Strategy prepared and included in Appendix 10d.</li> </ul> <p><a href="http://www.sfantugheorgheinfo.ro/">http://www.sfantugheorgheinfo.ro/</a></p>
Vitoria-Gasteiz (Spain)	<p><b>Before the project:</b> There was recognition of climate change and mitigation issues, but adaptation had not been sufficiently considered.</p> <ul style="list-style-type: none"> <li>Gained political commitment to develop adaptation strategies</li> <li>Established Internal Working Group to develop Adaptation Strategy</li> <li>Revised impacts; identified and prioritized the current and future key elements of vulnerabilities of the Municipality</li> <li>Developed draft Adaptation Strategy (mission, vision, strategic and sectorial objectives and identified climate risks in city and possible adaptation measures).</li> </ul>	<ul style="list-style-type: none"> <li>Mission, objectives and working plan for Adaptation Working Group</li> <li>Draft Adaptation Strategy prepared – included in Appendix 10d</li> </ul> <p><a href="http://www.vitoria-gasteiz.org/we001/was/we001Action.do?accionWe001=ficha&amp;accion=home">http://www.vitoria-gasteiz.org/we001/was/we001Action.do?accionWe001=ficha&amp;accion=home</a></p> <p>Green capital: <a href="http://www.vitoria-gasteiz.org/we001/was/we001Action.do?idioma=en&amp;accionWe001=ficha&amp;accion=greenCapital">http://www.vitoria-gasteiz.org/we001/was/we001Action.do?idioma=en&amp;accionWe001=ficha&amp;accion=greenCapital</a></p>

Training cities	Key Achievements resulting from the project	Documents
<b>Mediterranean Europe (coastal)</b>		
Almada (Portugal)	<b>Before the project:</b> The Sustainable Environmental Management and Planning Department is responsible for coordination of the local strategy for climate change mitigation and adaptation. There was a requirement to access expert advice on how to implement adaptation principles in to local planning and to learn from other cities on how they implement adaptation policies.	
	<ul style="list-style-type: none"> <li>The Adaptation Working Group has expanded to include further departments and service bodies to create ownership of the issue as well as facilitate mainstreaming of adaptation into plans and processes across the city. It now consists of the Sustainable Environmental Management and Planning Department, the Municipal Water and Wastewater Services and the Municipal Civil Protection Services.</li> <li>The communication and collaboration between the Water and Sanitation Services and the Sustainable Environmental Management and Planning Department has progressed in terms of adaptation and the understanding of the implications of climate change hazards on the water system has been included in the future plans.</li> <li>Outreach and communication on climate change impacts on the city systems and proactive adaptation planning and measures have increased the level of awareness of other departments and have consequently improved the working relationship, opening the door for collaboration and integration of adaptation.</li> <li>Proactive and efficient input into the local land-use plan (described in detail in the coach feedback report) led to the inclusion of climate change considerations and adaptation responses across the local land-use plans, paving the way for mainstreaming adaptation into local plans.</li> </ul>	<ul style="list-style-type: none"> <li>Matrix to inform local land-use plan: Considerations for coastal adaptation including allocation of functions for selected zones, potential hazards, overview of coastal adaptation measures.</li> <li>Draft vision and milestones for adaptation</li> <li>Draft Adaptation Strategy outline.</li> <li>Revision of Municipal Master plan to include recommendations for adaptation action.</li> </ul> <a href="http://www.m-almada.pt/xportal/xmain?xpid=cmav2">http://www.m-almada.pt/xportal/xmain?xpid=cmav2</a>
Barcelona (Spain)	<b>Before the project:</b> There was a strong commitment to climate change issues (e.g. green infrastructure and biodiversity plan 2020) and a good understanding of the risks and impacts Barcelona faces from climate change. They were looking to share experiences and learn from other cities across Europe in order to maintain momentum and commitment from key stakeholders.	
	<ul style="list-style-type: none"> <li>Dedicated team established that will drive the adaptation planning process in the long run; official mandate for process coordination received soon after end of project.</li> <li>Meetings with key politicians and senior-decision makers held and</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary version of vision, mission and values for planning process.</li> <li>Preliminary structure of adaptation strategy and draft strategic</li> </ul>

Training cities	Key Achievements resulting from the project	Documents
	<p>high-level political engagement triggered at city level.</p> <ul style="list-style-type: none"> <li>Existing information on climate change risks and existing policies, plans, programmes and measures to strengthen urban resilience compiled.</li> <li>Preliminary version of vision, mission and values for planning process developed.</li> <li>Preliminary structure of adaptation strategy as well as draft strategic directions developed.</li> <li>Kick-off workshop with internal stakeholders from the City Council planned for October 2013.</li> </ul>	<p>directions.</p> <ul style="list-style-type: none"> <li>Preliminary evaluation of current strategic plans identifying already existing adaptation measures and gaps.</li> </ul> <p><a href="http://w110.bcn.cat/portal/site/Ajuntament?lang=en_GB">http://w110.bcn.cat/portal/site/Ajuntament?lang=en_GB</a></p> <p>Sustainability: <a href="http://www.bcn.cat/agenda21/english/index_eng.htm">http://www.bcn.cat/agenda21/english/index_eng.htm</a></p>
Burgas (Bulgaria)	<p><b>Before the project:</b> Extreme weather events have exposed Burgas to the possible impacts of climate change but they were daunted by the range of impacts and challenges which need to be resolved using adaptation measures along with competing priorities of financial and socio-economic challenges.</p> <ul style="list-style-type: none"> <li>The core team used the opportunity to start taking leadership in the process to adapt to climate change. A small but inspiring and important 'adaptation festival' has been organized.</li> <li>Adaptation had been integrated into some minor plans of greening the city centre.</li> <li>The second coach visit was used as a starting point for dredging the fresh water channel surrounding the saline lakes. While not being dredged after a long period of absence of maintenance, this channel provides the opportunities to deal with extreme rainfall events, preventing fresh water influencing the characteristics of the saline lakes.</li> </ul>	<ul style="list-style-type: none"> <li>No formal draft adaptation strategy has been produced yet, but the city has set out its next steps including the development of a holistic adaptation strategy, integrating climate adaptation into current and expected developments (vision, introduction and organization, impacts, existing adaptation measures, proposed future activities, monitoring and evaluation, stakeholder agreements).</li> <li>Work plan "Burgas Climate Adaptation", included in Appendix 10d.</li> </ul> <p><a href="http://www.burgas.bg/en/index/index/">http://www.burgas.bg/en/index/index/</a></p>
Gibraltar (UK)	<p><b>Before the project:</b> There was a high level of commitment to environmental issues amongst the current (recently elected) administration but climate change adaptation has not been widely considered and they wanted this project to kick start this thinking.</p> <ul style="list-style-type: none"> <li>Gained on-going political commitment to establish working group and develop adaptation strategy from Minister.</li> <li>Minister involved in each coaching visit and the peer review workshop that Gibraltar hosted for the Mediterranean cities group.</li> <li>Identified vulnerable urban systems and critical infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Mission statement, setting out the purpose of the groups, agreed and signed by all members of the Adaptation Working Group.</li> <li>Department of the Environment sent out a data request template for each Adaptation Working Group member to complete.</li> <li>GIS map of the identified vulnerable areas and critical</li> </ul>

Training cities	Key Achievements resulting from the project	Documents
	<ul style="list-style-type: none"> <li>Adaptation Working Group together identified Gibraltar's strengths, weaknesses, opportunities and threats.</li> <li>Electronic central library for the collation of relevant resources was set up across the different organisations.</li> <li>Developed draft Adaptation Strategy that the Adaptation Working Group reviewed and agreed.</li> </ul>	<p>infrastructure was developed.</p> <ul style="list-style-type: none"> <li>Vision document for a Climate Resilient Gibraltar prepared and signed off by all Adaptation Working Group members and Minister for the Environment and Health.</li> <li>Case study for communicating climate risk drafted.</li> <li>Draft Adaptation Strategy outline prepared</li> <li>City report on EU cities project included in Appendix 10d.</li> </ul> <p><a href="http://www.gibraltar.gov.uk/">http://www.gibraltar.gov.uk/</a></p>
Zadar (Croatia)	<p><b>Before the project:</b> Despite recognising the impacts (including financial) of climate change, Zadar had not implemented any activities related to adaptation.</p> <ul style="list-style-type: none"> <li>Established Working Group to develop Adaptation Strategy.</li> <li>Engaged internal and external stakeholders after stakeholder assessment including local utility company, other city departments, NGOs and the regional government.</li> <li>Gained political commitment to develop adaptation strategies.</li> <li>Identified urban system vulnerabilities.</li> <li>Identified possible adaptation options for these key vulnerabilities for further investigation and cost benefit analysis.</li> <li>Adaptation Working Group together identified Zadar's strengths, weaknesses, opportunities and threats.</li> <li>Central library for file sharing in the form of DropBox has been created (information on climate impacts, and adaptation, damage costs, extreme events and associated impacts, etc.).</li> <li>Developed action plan to make progress on development of the Zadar adaptation strategy which will form part of a wider Air and Climate Change Strategy.</li> </ul>	<ul style="list-style-type: none"> <li>Live Local Climate Impacts Profile spreadsheet set up and filled in for Zadar, accessible by everyone in the Adaptation Working Group.</li> <li>Vision for climate change readiness for the City of Zadar signed off by all Adaptation Working Group members and Deputy Mayor.</li> <li>Action plan to achieve the vision and for the development of a draft Adaptation Strategy (as part of wider strategy requirement) completed and actions assigned to responsible departments and organisations.</li> </ul> <p><a href="http://www.grad-zadar.hr/">http://www.grad-zadar.hr/</a></p>



## 5 Building the Legacy

The aim of Task 4 was to provide the basis for the legacy including:

- Delivery of a final conference
- Final delivery package including a toolkit on adaptation to climate change for city Authorities.

### 5.1 Conference on Cities and Adaptation

The EU Cities Adapt final conference was planned to be directly linked to the 2013 Bonn Resilience congress in Bonn - optionally including an adaptation award ceremony. Whilst preparations for organising the conference were targeted at meeting the related contractual agreement, plans for a launching event to publicly present the EU Adaptation Strategy materialised to be held close to the finalisation of the EU Cities Adapt project. Being closely associated with the urban perspective of the EU Adaptation Strategy, DG CLIMA expressed their wish to include parts of the EU Cities Adapt final presentations inside the launch event of the EU Adaptation Strategy. The project consortium welcomed this invitation as an opportunity to provide for greater visibility of the EU Cities Adapt project and spreading its results in a high-level political arena. At the same time, it confirmed the wish to also implement an in-depth technical exchange platform for local climate adaptation coinciding with the Bonn Resilient Cities Conference, to also target adaptation practitioners and meet comprehensively the final conference objectives.

In summary two different events with different target groups were organised to cater for the implementation of the EU Cities Adapt final conference:

1. A panel session at the Launch Event of the EU Adaptation Strategy, carried out on 29 April 2013 at the Commission's Charlemagne Building in Brussels addressing political aspects of local climate adaptation.
2. The main final event formed an Open European Day adjacent to the Bonn Resilient Cities Conference, on 3 June 2013 addressing the technical and practical aspects of local climate adaptation.

Whereas DG CLIMA took responsibility for the organisation of the Launch Event, the project consortium supported preparation by suggesting, contacting, and briefing speakers to represent the EU Cities Adapt project. The session was carried out with approximately 200 participants and four panellists as parallel session II of the event, titled 'The contribution of cities to a climate resilient Europe'.

The EU Cities Adapt Final Event / Open European Day was organised as a joint effort of the EU Cities Adapt project consortium in collaboration with the European Environment Agency and DG CLIMA..

#### 5.1.1 Launch of the EU Strategy on Adaptation – Contribution of cities to climate resilient Europe

The parallel session focused on urban adaptation, challenges, support needs and opportunities. The aim of the session was to explore current barriers for urban adaptation and thus to identify priorities and next steps on how to overcome these in order for cities to progress.

The high-level panel consisted of Walter Defaa, Director General, DG REGIO; Wolfgang Teubner, Regional Director ICLEI Europe; Lari Pitkä-Kanga, Deputy Mayor, City of Malmö;

and Evelyne Huytebroeck, Minister for the Environment, Energy, Urban Renewal and Welfare, Brussels Capital Region. The discussion was moderated by Humberto Delgado Rosa, Director General, DG CLIMA.

**Figure 30: Parallel session II: Contribution of cities to a climate resilient Europe**

Photos: DG Climate Action, European Commission,  
[http://ec.europa.eu/clima/events/0069/index\\_en.htm](http://ec.europa.eu/clima/events/0069/index_en.htm)



A summary of the session is included in the official report on the proceedings developed on behalf of the European Commission. The report, including the chapter on the session, is available online<sup>34</sup>.

The three main outcomes of the session discussions as summarised in the official report were:

- Cities need to be engaged as they are the driving force for adaptation to climate change via the Covenant of Mayors. They need support in the closure of knowledge gaps, encouraging leadership and strengthening coordination and collaboration.
- Cities need to be assisted in the field of knowledge and good practice exchange, provided with financial support to take sound measures on the regional and local level and involve citizens to ensure acceptance.
- Urban adaptation strategies need to be developed in a comprehensive way, taking a holistic, integrative and ecosystem approach to ensure a strategic response.

The outcome of the EU Cities Adapt project did not only inform the discussion of the panelists with Wolfgang Teubner sharing his insights into the project and the learning resulting from it, it also generated reflections from the audience.

Outcome of the “EU Cities Adapt” project:

- Results are already very useful for issues like knowledge sharing and exchange of good practices between areas.

<sup>34</sup> See [http://ec.europa.eu/clima/events/0069/docs/proceedings\\_en.pdf](http://ec.europa.eu/clima/events/0069/docs/proceedings_en.pdf)

- Tools that support cities, in particular also dealing with conflicts between cities and surrounding regions, are very welcome.
- Even though the knowledge basis is often sufficient, political leadership to take decisions is lacking.
- Adaptation needs to be anchored in city authority thinking and planning.

### 5.1.2 Open European Day/EU Cities Adapt final conference

#### Methodological approach

Following the objective of the Open European Day to serve capacity development and city to city learning, the conference was conceptualized as a highly interactive event. To this end, the conference moved beyond the presentation of success stories. It picked up on challenges and offered a discussion platform for solutions to emerge.

To keep coherence, all workshop sessions focused on one particular aspect of developing, managing and implementing climate adaptation strategies and on city-to-city exchange (beginners and frontrunners) and centred around the practical needs of and potential knowledge gaps for appropriately implementing local climate resilience processes. The general rule was: **cities first!**, however, scientists and other experts did act as 'supporting experts'. The experience of the 21 European cities involved formed the backbone of the programme. The cities – in different stages of working on adaptation - were spread throughout the sessions and, thus, ensured provision of practical examples. The experience of these cities on their challenges and solutions were considered a unique source of inspiration.

The workshop sessions were performed as interactive discussions, where the specifically invited contributors together with the facilitator kicked-off the discussion in an interview style with questions and answers. All session facilitators received a comprehensive briefing note in support of this concept. Presentations were included in exceptional cases only. Following this, discussion was extended to all participants. Target groups of the Open European Day included local adaptation managers, local politicians; actors and stakeholders supporting local climate adaptation, such as applied research, infrastructure developing companies, financiers, insurers, framework-setting authorities and NGOs.

The conference concept and programme were prepared by an event storyboard that was developed in collaboration with the European Environment Agency, outlining the main programme elements, identified themes and guiding questions for each session, which drew upon the needs mapping from Stakeholder Dialogues, training events, coaching visits and webinars carried out in EU Cities Adapt. The programme was reviewed and commented on by both the EU Cities Adapt consortium members and external experts including Peter Bosch (TNO), Efrén Feliu (Tecnalia), Lykke Leonardsen (City of Copenhagen), Sandy Taylor (City of Birmingham), and agreed with DG CLIMA.

In order to appropriately document the discussions, a reporting scheme was applied with Aleksandra Kazmierczak, University of Manchester, as the main reporter. The conference report is based on reports from all sessions drafted by members of the EU Cities Adapt project. In addition, assigned observers followed all sessions and shared their observations in the closing plenary. These included Lisa Horrocks (Ricardo-AEA), Peter Bosch (TNO), Efrén Feliu (Tecnalia), Lykke Leonardsen (City of Copenhagen), and Aleksandra Kazmierczak (University of Manchester).

#### Programme overview

The conference included two plenary sessions – opening and closing – and three rounds each of four parallel workshops.

The opening session was to set the scene for the interactive character of the 'European Day' and to introduce the three key topics to be elaborated on in depth by the participants in

parallel workstreams (and related workshops). Following a brief welcome address by Ronan Datec, Vice Mayor of the City of Nantes, linking the conference to the World Mayors Adaptation Forum, the opening session included an interview with Humberto Delgado-Rosa, DG CLIMA, regarding the EU Adaptation Strategy, its links to EU Cities Adapt and its support and impact to European local governments. Following the interactive approach of the conference, the interview was carried out by Lykke Leonardsen, City of Copenhagen. Embedded in the opening session was a ceremonial recognition of the 21 cities participating in the project. This recognition replaced the initially planned adaptation award, which, in agreement with DG CLIMA, was not found appropriate as all cities have been dedicated to implement the project to the best of their capabilities. All cities received a certificate signed by Commissioner Connie Heedegard and handed over by Humberto Delgado-Rosa.

To provide an overview of the three main streams of the conference, a second interview round included introductions to each of the sessions by Robert Bell, Managing Director of Ricardo-AEA, Wolfgang Teubner, Executive Director of ICLEI Europe, André Jol, Head of Vulnerability and Adaptation at EEA, and Marie Bullet, Policy Advisor at the Council of European Municipalities and Regions – CEMR.

The workshops focused on the themes

- Urban Adaptation Strategies
- Knowledge Management
- (Multilevel) Governance and Financing

Four sessions were implemented for each of these three themes. All sessions in the parallel workstreams started from the perspective of an adaptation manager and from questions such as: How can I organise my work coordinating my city's adaptation strategy? Which framework conditions will influence/support my work?

**Table 19: Overview of workshop sessions, themes and guiding questions**

ID	Theme	Sessions
1	Urban Adaptation Strategies	<p>A. How to efficiently organise an adaptation process?</p> <p>B. What are the challenges and how to overcome them when assessing vulnerable systems, sectors and groups in my area?</p> <p>C. Which approaches help to identify and plan appropriate adaptation measures?</p> <p>D. Which potential co-benefits and opportunities of climate adaptation could attract political commitment and buy-in?</p>
2	Knowledge Management	<p>A. What guidance is available to support capacity development of my city and how to use it?</p> <p>B. How to appropriately use data and report on our climate adaptation work?</p> <p>C. How can I access available knowledge and research in support of my local adaptation strategy?</p> <p>D. Special Session: Training – EU Adaptation Knowledge Portal 'climate-adapt.eu'</p>
3	Governance and Financing	<p>A. How to finance and insure adaptation measures</p>

ID	Theme	Sessions
		<p>and projects?</p> <p>B. Why do European cities need standards for sustainability and resilience?</p> <p>C. How does the multilevel governance framework support and mainstream local adaptation?</p> <p>D. Special Session hosted by the Council of the Baltic Sea States (CBSS) - How can inter-regional cooperation support and mainstream local adaptation?</p>

The closing session offered the opportunity for the assigned observers to bring their observations, personal stories, and remarkable statements or surprising solutions etc. of the four work streams to the plenary, providing responses along guiding questions. Observers took up issues /challenges addressed in the opening plenary as well as those formulated in the programming phase. The session did not provide 'conference results', however, observations will be provided as written 'conclusions' in the conference follow-up (authored by Aleksandra Kazmierczak, University of Manchester).

### 5.1.3 EU Cities Adapt Final Conference – Objectives and Achievements

According to the proposal (p. 84-86), the final conference was set to provide for a summation of the project's achievements, bring together training and peer cities, interested stakeholders, relevant organisations and others from across Europe to draw conclusions and solidify lessons learnt. At the outset of the EU Cities Adapt project, success of the final conference was associated with:

- spreading the message of climate adaptation to a wider audience.
- raising awareness on the issue far beyond the project stakeholders.
- disseminating the project results.
- Explaining the benefits and feasibility of adaptation so that others may start the process of implementing measures in their own cities.
- attracting at least 200 participants.

Additionally, the final conference was planned to explore ways to

- Embed training and exchanges in sustainable structures for the future to provide for replication
- Analyse the progress made in each participating city, and
- Feed information on the state of affairs with regard to adaptation in (participating) cities into Climate-ADAPT.

Announcements were made through various channels (see Table 20) including targeted mailings, electronic newsletters to the EU Cities Adapt subscription group, and through dissemination activities at related events. A flyer was produced with information on the main conference themes and questions, venue, date, and registration details.



Figure 31: Cities Adapt Final Conference Flyer



Table 20: Overview of objectives and achievements of the EU Cities Adapt final events

Objective	Achievement
Spread the message of climate adaptation to a wider audience	<p>Spreading the message via promoting the final conference</p> <ul style="list-style-type: none"> <li>✓ Three announcements sent out to several hundred recipients via ICLEI, EEA, DG CLIMA, EU Cities Adapt partners, Eurocities, CBSS</li> <li>✓ Inclusion in general announcements of the Bonn Resilient Cities conference</li> <li>✓ Specific mailings to the members of the ISO TC 268 and mirror committees</li> <li>✓ Announcements on websites of ICLEI, Climate-Adapt.eu, EU Cities Adapt, Bonn Resilient Cities Conference Series</li> <li>✓ Verbal and printed announcements at various conferences including ECCA 2013, 7<sup>th</sup> European Sustainable Cities and Towns Campaign Conference</li> <li>✓ Personal invitations</li> </ul> <p>Spreading the message via the Launch Event of the EU Adaptation Strategy</p> <ul style="list-style-type: none"> <li>✓ The EU Cities Adapt project was represented in the launch event by various members of the project consortium as well as participating cities who spread the messages in sessions and during networking breaks</li> <li>✓ The EU Cities Adapt project was mentioned in presentations and statements of panellists in plenary sessions</li> <li>✓ Panel 2 'The contribution of cities to a climate resilient Europe' was based on and included representatives from the EU Cities Adapt project consortium and participating cities with appr. 200 participants</li> </ul>

Objective	Achievement
	<ul style="list-style-type: none"> <li>✓ Report of Parallel Session 2 as part of the official Launch proceedings, <a href="http://ec.europa.eu/clima/events/0069/index_en.htm">http://ec.europa.eu/clima/events/0069/index_en.htm</a></li> <li>✓ Webstream of Parallel Session 2 at the official event website: <a href="https://scic.ec.europa.eu/streaming/index.php?es=2&amp;sessionno=7f5fc754c7af0a6370c9bf91314e79f4">https://scic.ec.europa.eu/streaming/index.php?es=2&amp;sessionno=7f5fc754c7af0a6370c9bf91314e79f4</a></li> <li>✓ Mailing to EU Cities Adapt mailing list following the Launch,</li> </ul> <p>Spreading the message via the First Open European Day/EU Cities Adapt Final Conference</p> <ul style="list-style-type: none"> <li>✓ Two plenary sessions (opening and closing)</li> <li>✓ One ceremonial recognition</li> <li>✓ 12 parallel workshops including representatives of all EU Cities Adapt participating cities and consortium partners as well as other experts</li> <li>✓ 217 registered participants</li> <li>✓ Conference report</li> <li>✓ Feed-back by participants</li> <li>✓ Spin-offs (preparation of an Italian 'EU Cities Adapt' successor project, preparation of an informal worknet of adaptation practitioners in the Mediterranean)</li> <li>✓ Resilient Cities June Update (mailing to several hundred addresses associated with the Bonn Resilient Cities Conference)</li> <li>✓ Mailing to EU Cities Adapt mailing list following the Final Conference</li> <li>✓ News bit on websites of ICLEI and the European Environment Agency</li> <li>✓ EU Cities Adapt project website</li> </ul>
Raising awareness on the issue far beyond the project stakeholders	<ul style="list-style-type: none"> <li>✓ See above</li> <li>✓ At EU Adaptation Strategy Launch discussion of political aspects of climate adaptation</li> <li>✓ Conference Report</li> </ul>
Disseminating the project results	<ul style="list-style-type: none"> <li>✓ See above</li> <li>✓ Presentation of findings of EU Cities Adapt at EU Adaptation Strategy Launch event and Open European Day</li> <li>✓ Proceedings of EU Adaptation Strategy Launch and Open European Day</li> <li>✓ Webstream of panel 2 at EU Adaptation Strategy Launch</li> </ul>
Explaining benefits and feasibility of adaptation so that others may start the process of implementing measures in their own cities	<ul style="list-style-type: none"> <li>✓ At EU Adaptation Strategy Launch discussion of political aspects and benefits of climate adaptation</li> <li>✓ At EU Cities Adapt Final Conference / Open European Day in-depth technical exchange in each 4 parallel sessions on the topics <ul style="list-style-type: none"> <li>• Local Adaptation Strategies</li> <li>• Knowledge management</li> <li>• Governance and financing</li> </ul> </li> </ul>
Attract at least 200 participants	<ul style="list-style-type: none"> <li>✓ approximately 200 participants at Panel 2 'The contribution of cities to a climate resilient Europe'</li> <li>✓ 217 registered participants at the European Day / EU Cities Adapt Final Conference</li> </ul>

Objective	Achievement
Embed training and exchanges in sustainable structures for the future to provide for replication	<ul style="list-style-type: none"> <li>✓ The Open European Day was set up as a starting point of a series of annual fora to continue in coming years that would provide for a continuous exchange platform for adaptation practitioners. The Bonn Resilient Cities Conference offers a stable platform to have the European Day organised back-to-back with this event and - by that – create synergies in terms of organisation and promotion.</li> <li>✓ Without supporting (project) funding as there has been with the EU Cities Adapt project, financing of future Open European Days is not secured.</li> <li>✓ Participants benefitted from networking and spin-off contacts (eg. informal Mediterranean worknet). EU Cities Adapt cities have expressed strong motivation to remain in contact.</li> <li>✓ The opportunity to establish the Open European Day as a continuous networking platform has been recognised by participants and observers (cf. Final plenary with observers)</li> </ul>
Analyse the progress made in each participating city	<ul style="list-style-type: none"> <li>✓ 12 parallel workshops including representatives of all EU Cities Adapt participating cities and consortium partners as well as other experts</li> </ul>
Feeding information from the conference and the state of affairs with regard to adaptation in (participating) cities in ongoing processes as well as into Climate-Adapt.eu	<ul style="list-style-type: none"> <li>✓ Conference report developed by European Topic Centre on Climate Change in cooperation with the European Environment Agency and ICLEI</li> </ul>

### 5.1.4 Key findings and conclusions

The format and themes chosen for the EU Cities Adapt final conference were highly appreciated by participants and there is an encouragement to continue the event as a platform to exchange between European adaptation practitioners. As an example, Piero Pelizzaro, Kyoto Club and advisor to climate adaptation in the City of Bologna said: *“I think that this Open Day should become an annual event as the Covenant of Mayor annual ceremony and I will definitely go for the 2014 edition with, for sure, a possible cooperation with BlueAP.”*

**Figure 32: Presentation of certificates to recognise the participation of the 21 European cities in the EU Cities Adapt project**



Cities are considered by DG CLIMA as major players in the adaptation process, due to the high concentration of people, infrastructure and value of assets in urban areas. In the opening address, it was observed that if European cities address the adaptation challenge, it will help to adapt the whole of Europe.

The following conclusions form part of the conference report that will be available to all participants and the wider public. The report presents a number of themes emerging from the contributions from the city representatives (both those well advanced in addressing the challenges of climate change and those describing themselves as beginners) and from the lively discussions among the attendees. It thus provides a litmus test of the state of adaptation in European cities in 2013:

### 1. Regarding the state of adaptation in participating cities

- The cities participating in the Open European Day ranged from those considered to be very advanced in climate change adaptation (for example Copenhagen or Rotterdam) to those that described themselves as beginners (e.g. Zadar or Vilnius). The North West – South East divide in Europe in the level of climate change adaptation remains, with the North West leading the way.
- The triggers for starting the adaptation process reported during the Open European Day varied. Many participants, unsurprisingly considering the association of the event with the EU Cities Adapt project, quoted EU-funded projects as important triggers for action; Life+ and Interreg projects, such as Green and Blue Space Adaptation for Urban Areas and Eco Towns were also mentioned. EU funding was described as acting as a catalyst for starting work on adaptation, without needing or getting input from the national level (see section 4.5 for more detail on multi-level governance of adaptation).
- Some cities started their adaptation planning as a result of experiencing a major climate- or weather-related event, such as for example the cloud burst in Copenhagen. It was emphasised throughout the event that whilst such events help to secure political buy in (see also section 4.4), the cities should not wait for them to happen to start planning, as climate events may result in significant economic and social losses.



- Irrespective of the starting point, the cities agreed that maintaining momentum is more difficult. In particular, progressing from the initial adaptation action plans to selecting and implementing adaptation actions was very difficult due to the limited worked examples of implementation; uncertainty of what a 'successful' adaptation looks like and absence of assessment procedures allowing the financial evaluation of the feasibility of the adaptation options.
- The range of different standards available to cities on sustainable development issues can be confusing. Standards are often generic and adaptable, and can help to orientate cities even if they are not applied fully. However, the currently existing ones relate to broad sustainability issues rather than to adaptation specifically.

## **2. Regarding emerging themes: barriers and opportunities for adaptation in European cities**

- A strong evidence base was seen as very important to convince the city authorities to identify the local challenges posed by the changing climate, as they vary from city to city. However, it was observed that for many cities there is still limited availability of evidence at the local level. Data on issues relating to social vulnerability is more readily available at this level than data relating to climate change and its impacts.
- Data is not equal to information; interpretation of data is needed to provide information on the climate change impacts and the required adaptation actions, which may be challenging.
- Whilst the uncertainty of climate projections is often discussed in scientific circles, the cities did not see scientific uncertainty as an important factor stopping them from implementing climate adaptation; the understanding of trends is more important than the actual numbers. They were of the opinion that cities should "work with what you have", rather than wait for the data that would be optimal to be collected or processed. Nonetheless, some flexibility in plans is required to take account of the uncertainty of the future climate.
- Cities need to prepare for all climate impacts that may occur in a given place, not just the ones that have been happening so far, even though they may be easier to understand and communicate and get political buy-in for.
- The use of Geographical Information Systems (GIS) allows for a comprehensive analysis of environmental, social and economic factors. Effective modelling and visualisation of data is a powerful tool for communicating risks and engaging stakeholders and local communities. It also can help to secure political buy-in by presenting the extent of area or communities potentially at risk.

## **3. Regarding guidance**

- A make-or-break factor for successful adaptation was identified as the presence of guidance on adaptation planning and implementation. There is an urgent need for guidelines on adaptation at local level. The resources and tools provided by European projects such as EU Cities Adapt are helpful.
- With regards to international exchanges of knowledge, language is problematic: most of the existing guidance, including that on the Climate Adapt website, is in English. More information is needed in other national languages.

## **4. Regarding funding adaptive actions**



- Adaptation should not be seen as a cost, but as an investment in the future of cities. However, this view is not necessarily shared by local political decision makers, who tend to be more interested in the immediate monetary costs and benefits.
- There is a considerable time lag on the return on the investment into adaptive actions, estimated by some as 20-30 years. The ongoing difficult economic situation in Europe means that budget cuts at the local level limit the possibilities of front-loading investment. In addition, short-term spending for long-term liveability of cities is a tricky political subject due to political cadences not exceeding 5 years in most cases.
- What makes it more difficult is the absence of worked, credible financial assessment frameworks which would allow cost and benefit analysis of adaptation measures; there is no framework for calculation of avoided cost. Some cities use monetary arguments to convince their politicians.
- Small actions can contribute to achieving the ultimate aim of a well-adapted city. There was a wide agreement that, following the mainstreaming approach, adaptive actions should be integrated into the development and improvement of urban infrastructure.
- The European funding provides an extremely valuable contribution to cities' adaptation budgets. However, the funding is predominantly project based and runs out after the project completion date. The lack of continuous funding is an obstacle to implementation of strategies which are being developed during projects. It was agreed that it is important to go beyond the projects' scope but this is when the money usually runs out.

## **5. Regarding gaining political commitment**

- Political buy-in was seen as even more important to successful planning and implementation of adaptive actions than funding. The main difficulty in persuading the local politicians to get on board was to convince them of the existing risks and the financial feasibility of the adaptation measures. It was noted that the nature of short term political cycles means that local politicians are less motivated to act and they are gambling on disasters not occurring. Ultimately, over the medium to long term, the cost of inaction will be greater than the cost of action, and the politicians should be persuaded of this.
- The use of experts from outside the city council can help to communicate the importance of climate change risks and the necessity to adapt. Peer pressure from other cities, for example through involvement in EU-funded projects focused on climate change adaptation, can appeal to the competitive nature of those in charge and promote adaptive action.
- Some cities observed that adaptation may actually be easier to 'sell' to politicians – whilst climate change mitigation is a global issue, climate change impacts occur locally and adaptation can bring local benefits. Presenting adaptation as a means to protect important heritage or landmarks could be persuasive. However, it may be equally effective to present adaptation as an opportunity for the city to provide a liveable, attractive environment.
- One way to strengthen this way of communication with politicians is to remove adaptation from the narrow confines of an environmental issue led by environment departments and to reframe it as a contribution to hot political issues such as

addressing strategic risks, improving public health or raising the economic competitiveness of the city.

## 6. Regarding mainstreaming and reframing adaptation

- One approach to the implementation of the adaptive actions was through mainstreaming adaptation into daily activities.
- Adaptation, in order to be better understood or taken up by the local decision-makers, can be reframed, under many different themes. Adaptation may be seen as more important if climate change is treated as a strategic risk that must be addressed.
- Community resilience was identified as an associated umbrella concept that could promote adaptation to climate change and keep it high on the political agenda. It was observed, that risks such as terrorism (after 9/11), then pandemics (bird and swine flu) precede climate change risk, and that promoting resilience of communities to different shocks may allow for a more holistic approach rather than focusing on the largely environmental theme of adaptation. The resilience concept can be applied to infrastructure or communities. Boosting social capital can be a factor preventing major life, health and social losses during extreme weather events, but more work is needed on the measurements of social capital. Resilience can also be understood in the context of security of food supply and transport routes. Thus the goal of increasing resilience encourages looking outside a city's boundaries for potential sources of risks and adaptive solutions and promotes working with other local authorities or stakeholders beyond the administrative boundaries.
- Improved health and well-being of local residents was seen as a very important, if not the main, co-benefit of adaptation. Thus, public health is another umbrella term that could be used to gain support for short-term investment for long-term goals. The fact that climate change is framed as a health issue by an international organisation such as WHO is important in persuading the politicians of the value of taking action.
- Adaptation could also be reframed as an opportunity to improve the economic competitiveness of the city by making it more attractive to investment: more resilient in the long term, more liveable and greener in the short term. Attractive cities have a higher potential to bring in highly qualified workers; and it was observed that for economic activity "non-action will cost more the longer it goes on". For example, in Copenhagen, the use of green and blue spaces for adaptation is justified with the improvements of attractiveness of the city, and making it more liveable for the residents, under a banner "adaptation as a possibility not as a cost". The understanding of the participants was that for the politicians, the question "why would we not make ourselves more competitive?" is a rhetorical one. It was highlighted in the closing session that the association between adaptation and economic competitiveness of cities could be one of the themes discussed at an Open Day in 2014.
- In line with the need for the comprehensive approach to adaptation, cross-sectoral approaches were emphasised, which called for engaging all relevant departments within the city council on adaptation. One particularly important department, frequently not sufficiently engaged in adaptation was spatial planning. It was emphasised that cities need to be planned and designed in a way that is conducive to sustainable and resilient lifestyle, which falls into the remit of planning. In addition many of the adaptation responses are based around green and blue infrastructure

and the ecosystem services that they deliver. Consistent green and blue frameworks can only be delivered through spatial planning.

## 7. Regarding multi-level governance

- National level was recognised as very important in multi-level governance of adaptation. However, it was observed that detailed regulatory frameworks at the national level tend to impose additional requirements on urban authorities that are not followed by funding.
- The National Adaptation Strategies (NAS) are envisaged as the main regulating mechanisms at the national level. However some tend to have certain deficiencies which limit their value as the main regulatory framework for cities. They tend to focus on broad issues on the national level, rather than delve into local issues and they may omit urban issues and focus overtly on sectoral challenges. Also, it is not clear how NAS relate to regional and local level adaptation strategies; frequently there is a lack of consistency between the levels. Bringing the representatives of the regional and national institutions into the adaptation working group at the city level in order to improve communication and resolve the issue of unclear responsibilities attached to each level might be recommended.
- On the other hand, where there are not national adaptation strategies or other relevant frameworks, cities are working in a regulatory void. This may mean absence of coordination of the activities of different cities, even resulting in maladaptation. In some situations the national level is bypassed by local authorities who take the guidance directly from the EU level.

## 8. Regarding engaging with stakeholders

- There are issues relating to the unclear division of responsibility for adaptation actions or financing adaptation, prevalent in multi-stakeholder contexts. Further, private sector may be able to provide the funding missing from the public sector. It was recognised that private sector companies are important landowners in cities, and this land may need to be utilised for adaptation e.g. sustainable urban drainage systems. Water management and drainage companies were particularly important stakeholders in the context of flood risk, especially as the water management plans were recognised as one potential trigger for starting the adaptation process. The early and frequent engagement with the private sector was seen as one of the means to ensure successful collaborations. Also academia and research institutes are perceived as important stakeholders.
- City residents and local communities need to be engaged on adaptation, but the nature of their involvement was debated. For example, consultation on issues that the communities may not have answers for was considered counterproductive. The urban residents' awareness of climate change impacts and the need to act was seen as crucial. However, the risks need to be communicated in a sensitive manner; the use of GIS was considered effective in communication, as was social networking and the use of external experts or organisations to deliver the message in an effective manner. Using terms like 'adaptation' may be a barrier; in contrast, using local terms, or particular local projects as examples was considered good practice.

Based on the opinions of the participants, the report lists possible actions for local authorities, national governments, European Commission and the European Environment

Agency, research institutions and other organisations that would progress the urban adaptation agenda in European cities.

### **Actions for cities**

- Start developing local-level information databases, at the resolution needed to make decisions: this will take time but it is the only way to systematically assess the situation of the city and choose and apply relevant adaptation measures.
- Use GIS to compile locally sourced data and information for assessment of the level of risk and for communication with stakeholders and engagement of politicians
- Involve stakeholders and relevant departments from the beginning
- Use the ClimateAdapt platform as the knowledge hub: to gain an overview of the ongoing adaptation and best practices in other European cities and to access information on EU policy and national level actions.
- Participate in knowledge exchange events, such as the Open European Day. Further, participation in projects such as EU Cities Adapt was seen as one of the best triggers for starting adaptation; this may help to ensure that the city is not waiting for a big weather event to happen to start working on adaptation. The knowledge-exchange projects and events allow information sharing between cities characterised by similar climate risks, geographical conditions or socio-economic characteristics. A particular value was seen in exchanging good practice on the collection and interpretation of data, working with GIS, and visualisation of risks and vulnerabilities. Working on a project with other cities can encourage and maintain the progress on adaptation, for example through healthy competition between cities or friendly peer pressure.
- Apply for EU funding, including JESSICA (Joint European Support for Sustainable Investment in City Areas) and JASPER (Joint Assistance to Support Projects in European Regions)
- According to the city of Rotterdam, "Don't be afraid of making mistakes". Learning by doing is valuable, and if it is practiced on no-regret adaptation measures such as green infrastructure then potentially costly mistakes can be avoided.
- Implement adaptation measures that are likely to provide additional tax revenue, which can justify spending. For example, investing in green infrastructure can result in higher property prices and therefore higher taxes.
- Include issues such as health and attractiveness of cities in the standard cost-benefit analyses for adaptation measures.
- Monitor the progress on adaptive actions – assess whether the measures are working

### **Action required from national governments**

- Work towards developing the National Adaptation Strategy (NAS) or a comprehensive framework of regulations and guidance, including performance indicators, focused on climate change adaptation. This seems to have worked well in the UK to incentivise local authorities to take action. However, if extra requirements are placed on local authorities' budgets or staff, additional funding should follow the regulations. In addition, the national adaptation strategy should be filtered down to regional and local levels.
- Develop climate change projections data and information on the predominant climate-related risks (such as flooding). Where this data exists, work towards downscaling it to a local level.
- Develop regulations for, or agreements with, the insurance industry that will promote using adaptive measures. For example, properties using flood resilience measures should be subject to reduced insurance premiums.

- Cooperate with other countries in your geographical region in order to develop consistent approaches to dealing with floods (for example, if river systems cross several countries), and to exchange the experiences to date on climate change adaptation.

### Action at the EU level

- Provide more funding for knowledge exchange projects, considering the unanimous consensus on their value for the participating cities. In particular projects matching adaptation leaders and followers were appreciated by the latter.
- Provide funding that focuses on implementation and monitoring of the adaptation actions, rather than adaptation planning as mainly to date.
- Develop or promote mechanisms that could be used by cities to monitor their progress on adaptation. The [www.rfsc.eu](http://www.rfsc.eu) website can be used as a self-evaluation tool for cities to gauge progress, and also as a platform to find peer cities to collaborate with.
- Further develop the ClimateAdapt platform to become the one-stop shop on adaptation for the EU cities, supporting adaptation planning and decision-making.
  - The platform needs to be advertised more widely. It was flagged up that at the moment it is difficult for the practitioners to learn about the existence of the portal.
  - The exchange of knowledge needs to be facilitated by the provision of templates for uploading information. As cities may have limited resources (e.g. staff time) to upload the information, some help may be needed in uploading and sharing data.
  - There is a need for guidance on vulnerability assessments.
  - More justification is needed on why the presented case studies are good practice, especially considering the minimal monitoring of the success of adaptation actions to date. There was also a need for 'bad practices' or bad experiences from cities, which could show how to avoid making mistakes. However, this information may be difficult to collect as cities would not like to be presented in a negative light.
  - Provide more information on implementation of actions, rather than just the planning (many cities have gone beyond that stage).
  - Provide guidance on how to deal with climate change uncertainty, how to identify and assess adaptation measures and how to 'sell' adaptation to local decision makers.
  - Offer more information about the financing aspects of adaptation. For example, cost-benefit analysis of the most common adaptation measures should be provided.
  - There is a need for frequent updating of the website so it is kept relevant.
  - The issue of language was discussed. English as the main language does not work for some countries, for example it was voiced that German local authorities were not keen on reading information in English. On the other hand, in the countries less advanced on climate change adaptation (e.g. CE or S Europe), the cities were resigned to the fact that they need to obtain information in English as none exists in their national languages. Nonetheless, there was an agreement that future developments including provision of information in all EU national languages and summaries in English would be welcome.

### List of actions for other organisations

- Further events offering platforms to exchange experience should be organised; especially follow up meeting(s) for the cities participating in this project to exchange experience and progress made at the later stages of the adaptation process



- Banks and insurance industries need to develop appropriate financial mechanisms to support adaptation.
- The private sector needs to take initiative. For example, the utility companies need to understand the long-term financial benefits of having resilient infrastructure. Developers should take responsibility for climate-related risks to investments located in e.g. flood areas.
- Global organisations, such as WHO, the World Bank or United Nations should continue producing evidence on climate change impacts. Information coming from these sources is credible and can effectively be used in persuading the local decision makers to take action.

### Questions for research

- Share the existing knowledge with cities in order to "Bridge the gap between knowledge institutes and practice"
- Work with cities to develop scaled-down climate change data relevant to local decision making
- Developing straightforward but not simplistic approaches to assessment of vulnerability and risk
- Develop financial assessment methods and mechanisms helping to carry out a cost-benefit analysis of adaptation measures, in particular considering the long term effects, and factoring in the uncertainty of climate change, the costs avoided, and the distribution of costs and benefits among different entities.
- Improve the understanding on how cities work from the ecosystem services perspective and transfer this knowledge to cities.
- Develop indicator frameworks for assessing progress towards adaptation and monitoring the change.

## 5.2 Adaptation Toolkit

### 5.2.1 Introduction

A toolkit on adaptation to climate change for city authorities was a key deliverable to help ensure the legacy of the project and to share the learning and experiences of the cities which have been directly involved. Throughout the project, some tailored resources were developed to support workshops and communication activities, coaching, webinars, and peer exchange. Within Task 1, the literature review and the review of good practice examples (strategies, tools and guidance, and adaptation options) generated factsheets, and additional reports were completed on the results of the survey and on the state of play in city adaptation across Europe. During the coaching phase, individual cities received tailored advice, guidance and direction towards different tools and resources, as appropriate. Following completion of the coaching phase, a number of additional case studies were written up.

In parallel with this project, the development of the European Climate Adaptation Platform (Climate-ADAPT) has continued, with enhancements to content, broader dissemination of and engagement with the platform, and increased profile within the context of the EU Adaptation Strategy. The project website was constructed to reflect closely the structure and content of Climate-ADAPT in order to facilitate the transfer and integration of project web resources into Climate-ADAPT at the end of the project.

**Figure 33: Climate-ADAPT website and Adaptation Support Tool (AST)**

**CLIMATE-ADAPT**  
**European Climate Adaptation Platform**

Glossary | Contact | Sitemap | Legal notice | About

Search the website

Home | Adaptation information | EU sector policies | Countries, regions and cities | **Tools** | Links | Search the database

General | **Adaptation support tool** | Case study search tool | Map viewer | Uncertainty guidance | Guidelines for project managers

**1 Getting started**

**What is the Adaptation Support Tool?**

The aim of the Adaptation Support Tool is to assist users in developing climate change adaptation policies by providing guidance, links to relevant sources and dedicated tools.

The European Commission's [EU strategy on adaptation to climate change](#) includes a [Staff Working Document that provides guidelines on developing adaptation strategies](#). For developers of physical assets and infrastructure [specific guidelines](#) are available on how to incorporate resilience to current climate variability and future climate change within their projects.

[Read more](#)

**Guidance and tools**

- » Adaptation Policy Frameworks for Climate Change
- » Guiding principles for adaptation to climate change in Europe
- » Design of guidelines for the elaboration of Regional Climate Change Adaptations Strategies

**Further reading**

- » IPCC Fourth Assessment Synthesis Report: Climate Change 2007
- » White Paper on Adaptation (July 2009)

**1. Getting started**

- » 1.1. How to use the adaptation support tool?
- » 1.2. Why adapt to climate change?
- » 1.3. How to plan for adaptation?

» 2. Assessing risks and vulnerability to climate change

» 3. Identifying adaptation options

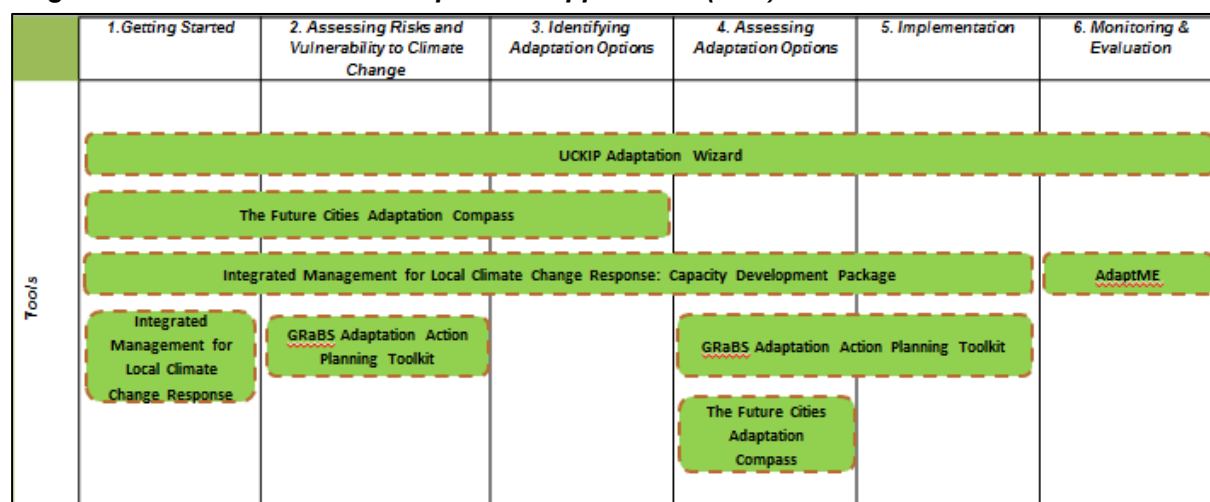
» 4. Assessing adaptation options

» 5. Implementation

» 6. Monitoring & Evaluation

Work across the various project strands has highlighted and confirmed the wide range of existing tools and resources which are available to support cities in adaptation planning, and links with other current projects, which have or will generate tools, have also been made. The increasing emphasis on Climate-ADAPT as the focal point for accessing and sharing tools and resources on adaptation across Europe make it a logical “home” for the legacy toolkit from this project. As discussed in Chapter 2, the weight of evidence from the reviews and stakeholder engagement in Task 2 suggested that rather than creating an additional, “competing” standalone toolkit to add to the large number of products which are already available (and commonly included in the Climate-ADAPT database), the preferred solution for the completion of this project was the integration of project tools and resources into Climate-ADAPT, to bolster the existing urban content of the platform accompanied by recommendations for further development of Climate-ADAPT to enhance accessibility to city-relevant resources.

**Figure 34: An illustration of how tools and resources have been mapped against the different stages of the Climate-ADAPT Adaptation Support Tool (AST)**



In developing the toolkit, we have considered a number of key elements from the original project specification and issues that have arisen through the project;

- Rather than a standalone new “toolkit”, the project toolkit will take the form of a collection and arrangement of resources into Climate-ADAPT with potential for enhancements to the urban pages (and the Adaptation Support Tool, AST)
- All new tools and resources (of suitable quality) should be uploaded into the database of Climate-ADAPT (though many existing tools are already on Climate Adapt). The ID number of key resources is to be recorded in an inventory so that these can all be tagged as “urban” by the EEA at a later date.
- An accompanying document will record what materials have been added to Climate-ADAPT and what is recommended to be included in future. It will set out how new and existing materials and resources should/could be presented, arranged and interlinked, aligning with stages of the AST, and provide an inventory of all of these. This will enable the EEA, in due course, to undertake updates of text, adding new text blocks into Climate-ADAPT pages, interlinking between database items, etc. (noting that major new web developments are not realistic in the near future).
- The document also stands as evidence that the toolkit deliverable is completed for the purposes of auditing the project.
- The material developed or used in the project (both new resources and existing tools) should be reviewed and prioritised to identify what can simply go into the Climate-ADAPT database, and what should be considered as additional content or links for the urban or AST webpages.
- It is unlikely that presentation material from training workshops and webinars can be used as it is in Climate-ADAPT. Ideally content from such presentations should be contained within other items, such as case studies, which have more description and explanation.
- Urban tools and resources should link to the AST as it is (rather than have a duplicate AST or alternative framework on the urban pages). Potential recommendation/options for presentation is for users of the AST to select for urban resources to be displayed in preference to others.

The toolkit is therefore a collection and arrangement of resources such as publications, case studies and links to information portals and other tools that have proved useful in the support to the cities on their adaptation journeys. Many of the resources have been created by the project partners in advance or over the course of the project, though a number have been created by external organisations. Where these resources are from external sources, we have included those considered to be of a good quality and have added value to efforts by

cities to develop their adaptation strategies. The resources have been mapped to the stages of the Adaptation Support Tool (AST) for consistency across Climate-ADAPT. We have also indicated how the resources could be linked to the Cities and Towns page of Climate-ADAPT. Additionally, we recognise that the AST is intended to provide a general approach to adaptation planning rather than specifically for cities. Through the project we have used a number of tools, most notably the Integrated Management System (IMS) framework aimed at integrating climate change and sustainability into city planning. While these tools do not conflict with the AST, they do add an additional level of detail and steps to follow for cities.

To help reconcile this, we have provided within the toolkit recommendations for how the website, and specifically the AST, could be developed in the future to include these additional steps. These have primarily focussed on suggestions for additional steps within the AST, as well as for additional pages within the overall Climate Adapt website.

### 5.2.2 Methods

The toolkit has been designed to help enhance the current information existing on the climate website and AST by providing a more detailed structure for practitioners within cities to follow and additional resources for them to use.

As cities across Europe are at different stages of adapting to the impacts of climate change, the tool will help provide direction to guidance and resources for the stage they are at or are moving towards. This will include case studies from cities at comparable stages of the adaptation process in similar geographical locations.

The Toolkit was created through the following stages of the project:

1. A review of materials and resources external to the project was conducted in the early stages and used within the training sessions. The approach used during the workshops was focused around the IMS approach, and supplemented with other resources.
2. The materials and resources generated within the project for various project purposes, specifically:
  - a. Self-assessments for individual cities of their capacity to adapt to climate change,
  - b. Training workshops and web-based training for cities
  - c. Mentoring by coaches
  - d. Knowledge sharing and dissemination of the project work to cities outside of the project.
3. A project website was developed as a focal point for access to and exchange of resources, helping to compile and categorise them appropriately.
4. A full inventory has been produced and resources prioritised for inclusion in the toolkit to ensure it acts as a legacy for the project.
5. Having identified the priority resources through this process, they were then mapped to the different steps of the AST to provide an additional level of depth and knowledge for cities.
6. The new resources created in the project have been uploaded to the Climate-ADAPT website.
7. A final guidance document (the toolkit report) has been produced at the conclusion of this process.

### 5.2.3 Outputs

The main output for the Toolkit is the Toolkit Report (see Appendix 11) which covers:

- The full inventory of tools and resources developed or recommended in the project
- Priority resources mapped to the stages of the AST
- Recommendations for how these resources and additional content could be arranged and linked within Climate-ADAPT
- Suggestions for potential future enhancements of the Climate-ADAPT portal to aid usefulness and accessibility for cities

In addition, the new resources and materials have been uploaded to Climate-ADAPT.

### 5.2.4 Results

The toolkit is intended to act as a legacy for the project to ensure that the materials developed and experiences of the cities are shared more widely. It will help to ensure that the outputs of the project are effectively disseminated via the Climate Adapt website and made available for other cities across Europe and internationally.

Specifically, the toolkit focuses on extending the content of the AST and the Cities page by providing additional guidance and resources specifically for cities. The toolkit is arranged to follow the six main steps (and sub-steps) of the AST;

1. Getting started
2. Assessing risks and vulnerability to climate change
3. Identifying adaptation options
4. Assessing adaptation options
5. Implementation
6. Monitoring & Evaluation

In each of the steps, we have provided additional text providing further information or context for their application by cities, as well as the relevant resources by category, as defined below.

As previously mentioned, the resources contained within the toolkit have either been created in the project by the partners and participating cities, or have been created by other organisations to support city-level adaptation strategy development. These include

- Publications and Reports,
- Information Portals,
- Guidance,
- Tools,
- Maps, Graphs, and Datasets,
- Indicators,
- Research & Knowledge Projects,
- Adaptation Options
- Case Studies,
- Organisations.

A number of these resources may also provide guidance for cities situated in specific geographical situations, such as coastlands in Northern and Southern Europe and inland areas. On occasion, and where appropriate, we have indicated where text and resources should be shared on other parts of the Climate Adapt website. The structure of each section as it relates to the AST includes:

- An overview of the individual step (1-6), and sub-steps,
- The main activities of this step of the AST and how it relates specifically to cities,
- Additional information for cities arranged by sub-step,
- A summary of how this information should be arranged on the Climate-Adapt website.

At the conclusion of each step of the AST within the toolkit, we have included recommendations for where the AST could be modified to better suit the needs of cities, including additional sub-steps that could be added. This also includes how the information



should be arranged on the relevant pages, and how it could be better aligned with the IMS framework which is being increasingly used for developing mitigation and adaptation strategies within cities.

It is envisaged that the toolkit will also provide a foundation for Climate Adapt to develop more tailored information and guidance aimed specifically at the city level. In the toolkit we have provided recommendations for how this can potentially be achieved with modifications to the website and additional content.

## 6 Conclusions and Recommendations

This section draws together the conclusions formulated by the team from the analysis and experiences of the project, and then offers recommendations for maintaining momentum on urban adaptation in Europe. Section 6.1 provides the key overarching recommendations from the project, section 6.2 highlights the specific achievements of this project and section 6.3 provides more detailed recommendations.

### 6.1 Project Achievements

This section highlights the achievements gained from the very wide range of actions and activities during the project's 18-month lifetime.

#### 6.1.1 Raising the Profile of Urban Adaptation

The profile of the importance of urban adaptation has been raised across Europe beyond the participating cities, many others (cities and city networks) were engaged through the survey, the stakeholder dialogues, the final conference and contributions to related events and processes including Open Days, ECCA and the Launch of the EU Adaptation Strategy. This was reflected in contributions from the project to support the development of the EU Adaptation Strategy, and has helped to shape the forward work programme of the Commission in this regard.

The project has highlighted that there is an appetite and enthusiasm for adaptation at city level, and that cities view adaptation strongly as an opportunity to enhance sustainability and quality of life. City planners and key target groups were able to come to a key realisation that climate change challenges and risks can be transformed into significant opportunities. Through presenting potential non-regret or low regret measures, win-win solutions and good practice examples from other European cities, the political resistance of implementing adaptation measures has significantly lowered (e.g. Vilnius).

The EU Cities Adapt project was able to bring city political leaders like Mayors or Deputy Mayors on board with the importance of climate change adaptation to the city's socio-economic development agenda. The project helped to link adaptation and mitigation agendas (e.g. Lahti) and provided vital encouragement to the political leaders who are prioritising adaptation within the long-term city policies and plans and who are showing commitment to supporting implementation of adaptation plans (e.g. Gibraltar, Burgas, Vilnius).

With the knowledge gained in the EU Cities Adapt project, the awareness raised among representatives of the local institutions and through leveraging the political support of local decision takers and leaders; an important foundation has been laid for developing adaptation strategies in cities. The adaptation strategies, planned or developed in the participating cities are paving the way forward for sustainable businesses and society, as recognized by cities like Sfantu Gheorghe.

The project identified that key drivers at city level for action on adaptation are the links to broader policy issues including sustainable urban development and improvements to quality of life – this may be an important lever given the current economic challenges faced by many European cities. However, national and regional requirements and recommendations are essential to provide a 'policy push' and encourage the development of city level adaptation strategies so that cities are able to gain local political commitment and establish a mandate to develop an adaptation strategy as well as justifying and building the required resources to follow this through. At an individual city level, participation in the project provided a good starting point to initiate the thinking and discussion amongst key stakeholders on adaptation

and positioned adaptation on the local government agenda for the first time in many cities (e.g. Vilnius, Zadar, Albertslund, Burgas). This was initiated by the project requirement for the city leaders to sign a declaration of commitment to the capacity building programme provided by the project. This was followed through by the formal commitment provided by the project, with the backing of EC, and embodied by a comprehensive approach to the capacity building, including in particular, the provision of expert coaches, this provided many cities with the catalyst to make significant progress. Specifically participation in the project made it possible to make climate adaptation a clear and visible theme in the policies of the city decision makers (e.g. Ghent, Lahti) including both actions which are already under development and newly proposed actions by the municipalities. An initial impetus was provided to create a collective vision for climate readiness (e.g. Zadar), develop clear and consistent adaptation strategies and mainstream adaptation into high level policies, instruments and projects such as spatial plans, green space strategies, emergency response plans, and economic development strategies (e.g. Sfantu Gheorghe).

### 6.1.2 Improving the Knowledge Base

The project delivered an improved understanding of the state of play of adaptation in European cities, drawing from the literature review, from the survey – the largest of its kind to be undertaken among European cities – the PACT self-assessments, and the dialogue and experience of cities and coaches. This has provided a baseline for future Commission initiatives, especially the implementation of the EU Adaptation Strategy, and key reports have been uploaded to Climate-ADAPT for wider dissemination.

The coaching sessions helped identify existing strategies and measures that have been undertaken over the years by households, businesses, and the city administration and public sector which, although they have never been identified as climate change adaptation measures, have essentially served as such (e.g. Gibraltar, Vilnius, Lahti). By recognizing and collating projects or initiatives that had been contributing to adaptation by default, the project provided vital encouragement to cities by helping them realise their autonomous adaption potential.

Cities were able to understand that they need not start from scratch, but could start with how their existing projects / initiatives could be complemented and strengthened further to enhance adaptive capacities. For instance, the discussions on how existing guidance and resources linked to adaptation data could be sign-posted have helped cities like Stirling make a head-start with effective data gathering on adaptation.

The project brought together a range of vulnerability analysis tools, which were presented across the coach visits and which helped to:

- Assess climate change hazards and impacts in the short, medium and long-term
- Communicate local scale data on extreme weather and climate change to relevant decision makers and stakeholder group
- Highlight current and future vulnerable sectors / service areas in participating cities and access meteorological data from national weather services.

A city adaptation toolkit was developed during the project, it provides an inventory of tools and resources generated in or used during the course of the project, and recommended as useful for cities in the development of their adaptation strategies. It also explains how the different resources and tools available on Climate-ADAPT can be linked together and presented in the future. This toolkit is a key deliverable to help ensure the legacy of the project and to share the learning and experiences of the cities which have been directly involved.

### 6.1.3 Capacity Building in the Cities

Adaptive capacity has been built in participating cities. Both training and peer cities have benefited. Some of the cities were completely new to adaptation and have made the first

steps along the journey. Some of the cities have progressed their initial efforts into new sectors or have used this project to underpin other projects to support adaptation. For many, the project served as an important opportunity to build capacity among authorities and stakeholders.

A framework considering three dimensions to climate risks in cities (hazards, vulnerability and adaptive capacity) provided a useful structure for cities to consider in analysis, engagement and training in adaptation. All three aspects showed strong variation across Europe and even within cities.

Review and analysis identified that geographical differences in adaptive capacity exist (with cities in the north and west of Europe generally having higher levels of adaptive capacity than those in the south and east). This implied that **tailored programmes** to enhance adaptive capacity would be most effective to address specific needs and contexts. The experiences from coaching different cities also reinforced that adaptive capacities and barriers seem to vary greatly. There is no single “best practice” approach to the development of adaptation strategies and each city has to identify their specific strategic objectives and develop their adaptation strategy accordingly. The experience is that all cities benefitted from the integrated management approach in addressing broader policy issues as well as providing a systematic and coherent process for interdepartmental cooperation and stakeholder buy-in. Consequently the format of the project’s interactive training workshops, tailored to the specific groups of cities, followed by pre-set coaching visits with time between the visits helped mobilise action, kept the pressure up and meant cities made progress rapidly. The Integrated Management System was effectively used as the basis on which to structure this journey of interactive activities. The IMS provides logical steps that can easily be understood by city administrations, regardless of their familiarity with adaptation and the technical language, terms and concepts associated with adaptation.

Specific examples of assistance provided include assistance with identifying key strategic sectoral priorities where adaptation needed to be integrated (e.g. water in Zadar) as well as assessing and prioritising adaptation options (e.g. Vilnius). Commitments were also made to develop detailed adaptation action plans containing concrete measures, timelines, responsible departments and staff. Advice was also provided in the direction of addressing specific challenges for instance advising on availability and access to various funding options across the EU on adaptation especially at the local level (e.g. Lahti). The project helped to identify present or future plans or projects for possibilities to integrate low or no regret measures (e.g. Lahti) and identify areas for additional support (e.g. Albertslund).

The project also achieved action through encouraging **stakeholders to work and learn together**. By grouping cities and via peer-learning, relationships have been created and strengthened. These connections were potentially one of the most valuable outcomes from the project. City stakeholders engaged in this project testify to the value they place on learning city-to-city from real good practice examples from other cities. The project facilitated capacity development for cities through guidance shared in the form of best practice examples in training presentations, peer-cities support in training exercises and well-organized peer review and city exchange visits. Categorising the various EU cities in their inception phase into groups allowed useful sharing of information and lessons learnt from other cities having similar experiences, problems and challenges (E.g. Gibraltar had an opportunity to learn from other similar low-lying coastal cities in the Mediterranean region such as Ancona). The value of peer reviews for the participating cities has been immense as these visits have provided an excellent platform for networking, learning and exchange of experiences, serving as an inspiration for everyone involved. Cities had an opportunity to share experiences on adaptation and how they were engaging in the process of developing adaptation strategies (e.g. the Mayor of Vilnius is considering greening the roof of a city administration buildings based on a green infrastructure best practice example shared during the coach visits). Significantly, the peer review visits have also provided a good base for inter-city cooperation (e.g. Lahti has committed to follow up and engage with Finnish cities

Helsinki and Turku until the end of 2014 and the cities of Alba and Padova have joined a partnership that wishes to replicate the EU Cities Adapt approach for Italian cities).

Stakeholder involvement and participation early on in the process of developing the strategy assists in shaping the evidence base, setting priorities and objectives and defining and implementing adaptation actions. It was important not only to include relevant municipal and public institutions but also research institutions, representatives from the private sector, NGOs and community groups to increase any strategy's integrity. The project supported city administrations to coordinate this engagement. The IMS process ensured that stakeholder involvement and participation was an integrated and continuous element of shaping and implementing strategies.

The EU Cities Adapt project has been instrumental in introducing participating cities to sustainable city networks such as ICLEI and the UNISDR Making Cities Resilient Campaign, creating vital links between municipalities and academia and opening up new avenues for research collaboration (e.g. Zadar learnt about the UK Local Climate Impact Profile tool). The enriching learning experience for participating cities, coupled with the key contacts and networks formed which the cities will seek to maintain and cultivate moving forward, will undoubtedly provide new opportunities for the future. The adaptation strategic planning processes initiated in the EU Cities Adapt project also helped to activate networks with other stakeholders that can not only offer a valuable resource to progress adaptation locally, but also bring in the needed financial resources e.g. Ghent and Stirling are prioritising communication and involvement with stakeholders such as the private sector, as sustainable resourcing and financing are important elements of the adaptation strategy.

The project helped to emphasise the need for a **cross-cutting approach** across key service areas in the participating cities, and helped everyone get a 'first-hand' insight into what progressing climate change adaptation means for different sectors and departments (e.g. in Stirling). Tools including the mapping of potential climate impacts on layers with local infrastructures (roads, residential areas, hospitals industrial areas etc.) proved useful in helping cross-departmental teams and individuals cut the 'silo' mentality, visualize impacts from recent extreme weather events, identify vulnerable areas and systems and collectively reflect on city adaptation options moving forward (e.g. Zadar).

Finally, the discussions during coach visits and workshops helped to investigate the challenges and barriers to the sustainability of adaptation projects and programmes in the cities. The key challenges to adaptation most commonly reflected upon during the coach visits were: the lack of awareness or understanding of adaptation, lack of baseline information, dispersed data and lack of coordination across departments, greater emphasis on mitigation as opposed to adaptation, ineffective internal communication and the lack of adequate political commitments or funding.

### 6.1.4 Progressing the EU Adaptation Strategy

The project has demonstrated that if the framework for capacity building and exchange on adaptation can be provided by the EU or an overarching network (e.g. could be at regional or macro-regional level), then cities will engage and can be supported and coached to make quite rapid progress in the development of strategies. The project has also shown there is a role for the EU to provide coherent methodologies and create and support political commitment to participate in the process (e.g. by means of Mayoral declaration). This is a very important outcome for progressing implementation of the EU Adaptation Strategy.

The EU Cities Adapt project has fuelled the creation of inclusive internal mechanisms and processes for development, implementation and follow-up of the adaptation strategy. This has included the setting up of a cross-departmental **Adaptation Working Group (AWG)** with a formal mandate, roles and responsibilities, action plans, and regular reporting mechanisms, involving representatives of key sectors that are likely to be affected by climate change (e.g. Gibraltar and Ghent). The AWG comprises members from a diverse range of backgrounds and experiences, and has proved to be a valuable source of knowledge and alternative



perspectives on adaptation, besides raising the profile of adaptation in government circles (as observed in Gibraltar). The AWG served as a forum for members to exchange information on existing and proposed projects, ensuring inputs from relevant departments (e.g. Gibraltar).

The development of **Climate-ADAPT** provides an appropriate platform to support dissemination and use of the rich array of tools, support and guidance, and allows individuals to find out which are the most relevant for them at various stages of their adaptation journey. As the project proceeded, there was an increased awareness of Climate-ADAPT and the potential for much greater use of the platform for tools and resources and the sharing of information between cities. New resources and content have been provided by the project for use in future.

There is scope for future initiatives to learn from the experience of this project in linking research and capacity building. From the perspective of cities, the training and coaching elements seemed to have the greatest impact, and there would be scope to integrate the research and analysis elements more closely with the interaction with participating cities to enable research insights focused to the cities.

Finally, a particularly encouraging outcome of the project is that the Italian cities of Ancona, Bologna, Alba, Venezia, Modena, the provinces of Genova and Catania, the “Kyoto Club” Coordinamen to Agenda21 Nazionale Ambiente Italia, Assaica, IUAV Venice and Indica are developing a positioning paper to create a national network on climate adaptation which will be presented to their Ministry of Environment.

## 6.2 Summary of conclusions and recommendations

The conclusions and recommendations have been recorded in each chapter. This section draws together the key conclusions and recommendations for: Awareness raising and training, governance and knowledge development and sharing; and policy.

### 6.2.1 Awareness raising and training, governance and knowledge development and sharing

ID	Chapter Ref.	Conclusion	Type of recommendation	Recommendation	Suggested Ownership (Lead in bold)
1	4.3 and 4.8	Capacity at the required levels is currently very scarce in most cities. Capacity building and support is most urgently required to cities where capacity is very low and where major decisions with long lifetimes are being taken.  Capacity and support needs can be clustered according to three major categories: <ul style="list-style-type: none"> <li>• Urban adaptation management</li> <li>• Knowledge management</li> <li>• Governance &amp; financing</li> </ul>	Awareness raising and training	The methods to bridge these capacity gaps should preferably be mainstreamed to create a common approach allowing for a more efficient exchange and comparison between cities. In summary it would be recommended to: <ul style="list-style-type: none"> <li>• Provide cities with <b>support on how to secure political commitment</b> on adaptation to facilitate the development of long-term visions.</li> <li>• <b>Uphold and maintain a network of cities</b> to enable exchange of practices and information.</li> <li>• Provide cities with <b>technical support</b> with regard to specific topics on adaptation.</li> </ul>	<b>DG CLIMA</b> Member States
2	2.1.7, & 3.5	A detailed typology did not prove helpful in selecting Cities to participate in the project and define training groups.	Knowledge development and sharing	Pragmatic approaches to <b>developing selection criteria and grouping the cities by climate hazards is more effective</b> and therefore recommended for future projects. Cities need to show a high level of engagement and be willing to work together.	<b>EU institutions</b> including DG RES, DG REGIO, DG CLIMA EEA
3	3.4.6	Feedback from the stakeholder dialogues confirmed the conclusion from Task 1 that training groups should be arranged by clustering cities with similar climate hazards, local characteristics and populations.			

ID	Chapter Ref.	Conclusion	Type of recommendation	Recommendation	Suggested Ownership (Lead in bold)
4	2.6.1	While there is an overarching conceptual framework for understanding urban adaptation, practical experiences reinforce that there are many different approaches to adaptation governed by the local context.	Awareness raising and training	<p><b>A flexible, multi-dimension approach to adaptation is required</b> which engages all appropriate stakeholders. The training process needs to be tailored to the specific context of the cities rather than using a specific preferred approach. The role of expert coaches is important.</p> <p>Key themes for the training programmes should include: (see chapter 3.4.6)</p> <ul style="list-style-type: none"> <li>• Local framework</li> <li>• Governance</li> <li>• Political commitment</li> <li>• Financing</li> <li>• Data management</li> <li>• Case studies and expertise</li> </ul>	<p><b>DG CLIMA</b></p> <p>Member States</p> <p>Cities</p>
5	2.1.8	<p>Existing research, data, information and resources provide a valuable platform to progress the adaptation agenda in European cities, yet there are areas where additional intelligence would be useful. Major gaps include studies and research addressing issues such as:</p> <ul style="list-style-type: none"> <li>• The international implications of climate change for European cities, for example disruption to food supplies, population movements.</li> <li>• The potential costs and benefits of different adaptation response options.</li> <li>• The potential for behavioural adaptation responses at the individual and organisational level.</li> <li>• Guidance on communication approaches to integrate adaptation planning with other prominent agendas that command the attention of city governors. The links between climate change adaptation and mitigation is a prominent example.</li> </ul>	Knowledge development and sharing	<p>There is great potential for the European level to provide resources and coordinated action for research to fill existing knowledge gaps in urban impacts and adaptation. Projects which involve several cities can enhance peer learning and exchange of experience and good practice while also seeking to address knowledge gaps. There are a number of options available here:</p> <ul style="list-style-type: none"> <li>(a) Explore with Member States, and with Eurostat, the potential for <b>better and wider reporting of relevant city level data</b> (include a review of the Urban Audit and the plans for the DG REGIO EVDAB update) to support assessments of impacts, vulnerabilities, hazards, etc. .</li> <li>(b) Explore with the EEA and ESPON, alongside JRC, the potential for <b>improved data development for urban adaptation</b>, and <b>joint design of relevant projects</b> which could be included on Climate-ADAPT.</li> <li>(c) Consideration of the inclusion of some degree of <b>urban adaptation data collection under the proposals for the Monitoring Mechanism Regulation</b>.</li> <li>(d) Continued discussion with DG RESEARCH to <b>ensure European level research programmes and projects contribute to pre-identified knowledge gaps for urban adaptation</b>.</li> </ul>	<p><b>European Commission</b></p> <p>Member States</p> <p>Cities</p> <p>EEA</p>

ID	Chapter Ref.	Conclusion	Type of recommendation	Recommendation	Suggested Ownership (Lead in bold)
6	Expert finding	<p>From the experience of interacting with cities on this project, the knowledge gaps seem to be greatest not around how the climate will change, but about how different changes will impact on the complex and ever-changing urban systems. Some of the key topics for knowledge generation include:</p> <ul style="list-style-type: none"> <li>Regional projections on impacts and vulnerabilities, alongside global and European information.</li> <li>Climate change data at the city scale; locally specific information on climate change impacts is acutely needed.</li> <li>Research linking climate change with societal and spatial patterns and future scenarios.</li> <li>Pan-European data on adaptive capacity at city level are completely lacking.</li> <li>Participating cities also identified needs for further advice or access to information to support development of adaptation strategies, in a range of sub-themes including local frameworks and governance, achieving political buy-in, financing and data management. Some of these topics require knowledge generation and sharing across the social and political sciences, as well as environmental science and economics.</li> </ul>	Knowledge development and sharing	<ul style="list-style-type: none"> <li><b>Further work on indicators of urban vulnerability</b> to identify regions and cities facing similar climate impacts, as well as hotspots for adaptation.</li> <li>As in many aspects of adaptation, there is a lack of performance indicators or other benchmarks for measuring progress in adaptation in urban areas, or by city authorities.</li> <li>As in other areas, <b>further research on costs and benefits</b> of urban adaptation would be helpful for stakeholders building the case for action.</li> </ul>	<b>EEA</b> Research by EC and Member States
7	2.1.7	<p>There is a clear need to move beyond treating cities as one homogeneous group in research on climate change adaptation policies, strategies and actions. Different cities face contrasting and in some cases complementary adaptation challenges depending on factors including their geographic location and socio-economic characteristics. It is important to recognise this, and to encourage the development of strategic and local adaptation responses tailored to the specific circumstances facing different groups of cities.</p>	Knowledge development and sharing	<p>We recommend that research should be directed towards developing approaches to <b>increase the provision of city-scale data</b> on climate change hazards, impacts and vulnerabilities. <b>Climate-ADAPT may be used to enhance the visibility</b> of, and access to, existing data on these issues where possible.</p>	<b>EEA</b>

ID	Chapter Ref.	Conclusion	Type of recommendation	Recommendation	Suggested Ownership (Lead in bold)
8	2.1.7	City-scale data on climate change hazards is generally not widespread outside of cities that have engaged the support of a university or knowledge institute, or that have developed data as part of a municipal adaptation planning process. However, data linking to climate change vulnerability is more readily available at the city-scale.	Knowledge development and sharing	As adaptation is in many respects a local exercise, cities would benefit from a better understanding of local hazards, impacts and vulnerabilities in order to develop more relevant and spatially targeted adaptation responses. We recommend that <b>ways to encourage the creation or continuation of peer city groups to share relevant data and knowledge should be explored.</b>	<b>European Commission</b> e.g. via framework of Covenant of Mayors
9	Expert finding	<p>A number of common knowledge gaps were identified by the project including, in particular:</p> <ul style="list-style-type: none"> <li>• Climate hazards, impacts</li> <li>• Vulnerabilities</li> <li>• Adaptation management,</li> <li>• Knowledge management</li> <li>• Financing mechanisms</li> <li>• Cost and benefit analyses.</li> </ul> <p>These will change in the course of the adaptation process and focus on implementation of the strategy and related measures.</p>	Knowledge development and sharing	<p>Regular needs mapping assessments, including surveys and other methods e.g. <b>Stakeholder dialogues should be considered by the EC to track the level of awareness</b> of cities across Europe in the future and identify needs that EC can be addressed through training and technical assistance programmes. This could also be used to monitor the practical success and progress of the EU adaptation strategy.</p> <p>This may be effectively addressed through tailored and coherent training and coaching packages.</p>	<b>European Commission</b> via DG CLIMA EEA



ID	Chapter Ref.	Conclusion	Type of recommendation	Recommendation	Suggested Ownership (Lead in bold)
10	Expert finding	<p>The use of a combination of different methods as part of a professional capacity development programme has been successful in progressing the development of all cities participating in the project. This has included face to face training and coaching, peer exchanges, as well as remote coaching and other digital methods. We found that:</p> <ul style="list-style-type: none"> <li>The development of personal and trusting relationships is key to developing a successful capacity building programme and even in the digital age this is still most effectively done by face to face meetings and workshops</li> <li>The acceptance and use of remote forms of training are best employed following the establishment of these relationships. In particular, for example the use of the forum on the website was not successful since there was insufficient time to establish these relationships and develop strands of common interest to the cities.</li> <li>Remote forms of coaching were successful where they focussed either personally (e.g. coaches working with the cities) or on technical subjects of interest to the cities (e.g. the webinar's on specific technical areas e.g. vulnerability assessment, financing)</li> <li>Even the most developed (peer) cities benefitted from the peer exchanges (for example Rotterdam realised that it could improve its target setting)</li> </ul>	Awareness raising and training	<p>The EC should support the application of capacity development at city level within Member States; this could be done by <b>providing a coherent, comprehensive programme of training, coaching and peer-to-peer learning</b> for them to apply in-country.</p> <p>The EC should support peer approaches to knowledge exchange and capacity building enabling cities to learn from one another. This might include the <b>encouragement of regional clusters of cities</b> facing similar hazards from future climate change beyond Member States.</p> <p>A number of specific opportunities to enhance urban adaptation exist, including:</p> <ul style="list-style-type: none"> <li><b>Exploiting both the new climate-proofing element</b> in urban emphasis and the new adaptation part of the EU Cohesion Policy to support urban adaptation,</li> <li><b>Increasing the take up of urban adaptation projects</b> under, for example, the future LIFE+ programme, <b>extending the urban section of Climate-ADAPT</b> and linking with other urban (sustainability) platforms, such as the Reference Framework for Sustainable Cities or the platform of the European Sustainable Cities and Towns Campaign.</li> <li><b>The European Regional Development Fund (ERDF) theme 6</b> which supports adaptation as a priority – MS's and regions can access this fund specifically to finance adaptation projects, including at city level.</li> </ul>	<p><b>European Commission including DG REGIO and DG CLIMA</b></p> <p>EEA</p> <p>Member States</p> <p>Cities</p>
			Governance	<p>Alongside the specific options, some broader policy issues are fundamental to setting the framework and priorities for urban adaptation and these include <b>continued emphasis on mainstreaming across EU policy, guarding climate funds</b> under the new EU budget for adaptation, and enhancing data collection on urban areas across the EU.</p>	<p><b>European Commission via DG CLIMA</b></p>
			Knowledge development and sharing	<p>Based on the experienced value of face-to-face exchange and knowledge sharing, an <b>annual meeting or conference</b> should be supported by EC to provide a communication platform and exchange mechanism for cities developing adaptation strategies.</p>	<p><b>European Commission via DG CLIMA</b></p>

ID	Chapter Ref.	Conclusion	Type of recommendation	Recommendation	Suggested Ownership (Lead in bold)
11	5.2	A rich array of tools, support and guidance to enhance adaptive capacity and support adaptation planning is now available across Europe, much of this relevant to cities at various stages on their adaptation journey. It is difficult to identify from the outside which of these tools will be most relevant to individual cities as this will also depend on the local context, but Climate-ADAPT can be enhanced to support dissemination and use of available resources by cities.	Knowledge development and sharing	Specific recommendations for <b>additional content in Climate-ADAPT</b> to help cities in the development of their adaptation strategies include updating and extending the information on vulnerabilities and adaptation in those EU-countries that do not have a dedicated national information platform, and enlarging the database of adaptation actions  Additional guidance and recommendations for the enhancement of Climate-ADAPT are provided within the Toolkit report. The project has emphasised the need for a flexible adaptation toolkit which acts as a gateway to the portfolio of materials available to support cities, reflecting the flexible multi-dimensional nature of urban adaptation. The experience of the coaching led to the recommendation that <b>integration of resources into Climate-ADAPT</b> was a longer-lasting and more accessible legacy than the development of another stand-alone adaptation resource.	<b>EEA via Climate-ADAPT</b>
12	Chapter 4	While significant progress was achieved in each of the participating cities, the timescales of this project were challenging both in terms of: <ul style="list-style-type: none"> <li>Establishing the personal relationships and trust required to carry out a robust capacity building project (but it is a credit to the representatives of the cities and the project staff how quickly those relationships were formed in this pilot project).</li> <li>The timescales and internal processes required by the administrations of the cities to develop and adopt strategies.</li> </ul>	Awareness raising and training	<b>Future capacity developing programmes should be developed allowing sufficient timescales</b> to develop strong relationships and consistent with the timescales of local administrations. This may be 1-3 years. Even after this, experiences suggest that it is necessary to continue to maintain appropriate programmes in order to maintain the momentum through to the implementation, monitoring and evaluation stages in order to ensure complete follow through of adaptation measures.	<b>European Commission including DG REGIO research e.g. Interreg and DG CLIMA</b>  Cities

## 6.2.2 Policy Recommendations

We offer the following recommendations to DG CLIMA for consideration in implementation of the EU Adaptation Strategy and development of future policy. These are also of interest to Member States wishing to support adaptation at a local level.

ID	Chapter Ref.	Conclusion	Recommendation
13	4.3 and Appendix 9	<p>The PACT analysis and survey showed that the great majority of European cities (over 90%) have insufficient capacity to make long-lasting change. A few cities have a very high capacity and there is a small core of cities that could reach this high level over a relatively short period (1-2 years).</p> <p>Capacity-raising is an appropriate and important goal for policymakers at all administrative levels involved in responses to climate change. The nature of the support that is required to increase capacity will vary by country (depending for instance on the status of national adaptation programmes), as well as by the internal capacity of the cities themselves.</p>	<p><b>Support for cities is most urgently required where capacity is very low</b> and where major decisions with long lifetimes are being taken. <b>Having a strong external framework</b>, most likely (but not necessarily) at national level, <b>is likely to be crucial</b> in supporting engagement in adaptation in cities.</p> <p>Programmes of change external to the lower capacity cities will be necessary: Moving cities from inaction to initial action requires different types of intervention (e.g. <b>incentives or penalties</b>) than sustaining actions (e.g. through guidance and regulation). The <b>use of standards</b> can also play a valuable role in bringing slightly more advanced programmes to the cusp of breakthrough innovation.</p> <p><b>Peer to peer learning</b> can help those charged with developing climate change programmes that are at early stages (through normalising behaviours and spreading useful practice/experience).</p> <p><b>EC policies, Directives and regulations are required</b> to create enabling conditions for both national and local levels and in particular support the establishment of national frameworks on adaptation to climate change.</p>

ID	Chapter Ref.	Conclusion	Recommendation
14	3.4.6 and Appendix 9	<p>Cities identified the need for national frameworks on adaptation to ensure political commitment at the local level so that cities can effectively develop and implement adaptation strategies. Effective development of adaptation strategies at the city level works most effectively within national and regional strategies for adapting to climate change. This reinforces the encouragement in the EU adaptation strategy for Member States to develop national adaptation strategies. Within that cities can work together to develop their approaches.</p> <p>There appears to be a positive correlation between the strength of the national framework for adaptation and survey respondents' self-assessment of the status of their programme. That is, the stronger the national framework, the higher, on average, the self-assessed programme status. The scoring of the framework in the analysis was necessarily relatively crude and the correlation is not definitive (Spearman's rank coefficient = 0.637) but it is supported by experience from other studies. It therefore appears likely that interventions into the national adaptation framework, whether at national level or through European Framework type legislation, might be effective in supporting further developments in capacity. However, this appears to be an area where further work might be beneficial.</p>	<p>The influence of a national framework on city level adaptation is strong, as a consequence, there is a role for the European Commission here to aid more cities in developing adaptation strategies by <b>helping to fill this national policy gap</b>. Suggestions on ways in which the EU can support cities and help close this policy gap are as follows:</p> <ul style="list-style-type: none"> <li>• Direct support to national government – following on from the actions set out in the 2013 EU Adaptation Strategy, but reviewed in detail during the <b>2017 evaluation of the strategy as to whether a directive is needed</b> (likely to have more influence on cities in those countries where no national framework exists) or through continued voluntary encouragement and provision of guidelines and other needs as identified.</li> <li>• And /or <b>EU co-funding specifically linked to the development of national programmes</b> that encourage building links and provision of support and information suitable for the local level.</li> </ul>
15	2.3.2	<p>The size of cities may affect the capacity and ability of cities to adapt to climate change. Is there a correlation with largest cities having made most progress in adaptation (in general it would seem so – all of the project peer cities were relatively large). This may be due to economies of scale (large dense population), greater resources – financial, administrative and educational, greater vulnerability / impact (e.g. megacities often at coast or river basins, and have much larger assets at risk, and have much larger regional impact if affected by climate hazard</p>	<p>The EC should consider focus on building capacity in the smaller cities which have less capacity to help themselves, and selectively support adaptation measures where the potential risks from climate change may be larger (in absolute terms).</p>

ID	Chapter Ref.	Conclusion	Recommendation
16	2.6.2	A key area of action for supporting cities lies in mainstreaming adaptation in to EU policies and strategies, especially 'climate proofing' funding programmes. Mainstreaming needs to be flanked by capacity building, awareness raising and exchange of good practice.	<p><b>Entry points for adaptation could be established or enlarged</b> within the evolving cohesion policy (especially the Innovation &amp; Environment Regions of Europe Sharing Solutions (INTERREG), URBACT and LEADER programmes). Or adaptation could be considered (e.g. as a form of earmarking) more intensely or explicitly within the Multiannual Financial Framework or in existing urban sectoral initiatives of the EC.</p> <p>Furthermore, urban adaptation will be facilitated by <b>mainstreaming of adaptation into key EU policy areas</b>, as well as the <b>removal of potential policy conflicts</b> at national and European levels. Areas identified as a high priority for mainstreaming include: climate proofing for the EU budget for 2014–2020; cross-compliance requirements; procedural integration and Environmental Impact Assessments; and spatial planning as the key tool for bridging existing governmental levels and sectoral agendas.</p>
17	2.6.2	The literature review and the survey pointed at research areas such as projections of climate impacts at a spatial resolution suitable for city planners, the international implications of climate change for European cities, costs and benefits of adaptation options and the potential for behavioural adaptation responses at the individual and organisational level.	<b>Key knowledge gaps need to be closed:</b> Research activities could unfold in different ways and include key actors like the EEA, DG RESEARCH, ESPON, Eurostat and of course Member States.
18	Expert finding	There was significant recognition of the role that the EU can play at City level. In particular, a number of participating cities told us that this project had been a catalyst in initiating the recognition and development of an adaptation strategy. It provided a breakthrough in engaging with stakeholders and gaining political commitment.	<p>EU can, therefore, play a significant role at city level by providing:</p> <ul style="list-style-type: none"> <li>• <b>Appropriate facilities for sharing knowledge</b></li> <li>• <b>Coherent methods for developing and implementing adaptation strategies</b></li> <li>• <b>Robust capacity development approaches.</b></li> <li>• <b>Support to generating commitment.</b></li> </ul>



ID	Chapter Ref.	Conclusion	Recommendation
19	2	<p>The EEA's report on urban adaptation provides clear and justified recommendations for the EU role to support city-level action on adaptation. Discussions among cities at this project's events reinforced the value that cities perceive in the EU establishing a multi-level governance framework and leading the agenda on adaptation.</p> <p>The interplay between the EU level and the role of Member States still needs further consideration to result in a clear share of tasks and responsibilities in this multi-level governance framework. The critical role for the EU remains that of setting coherent frameworks, with appropriate supporting activities such as knowledge development, while Member States provide the legal basis and standards for urban adaptation and organise knowledge transfer to cities in-country.</p> <p>Much of this is provided for in the EU Adaptation Strategy, and may begin to take effect during the implementation phase.</p>	<p>Some specific recommendations for governance at the EU level arising from the project include:</p> <ul style="list-style-type: none"> <li>• <b>Guidelines</b> for Member State National Adaptation Strategies should <b>reference and highlight the need</b> to provide support for and encourage adaptation at city level.</li> <li>• <b>Continue to engage cities</b>, or city networks, in the development and implementation of related EU policy.</li> <li>• Progress the adaptation mainstreaming agenda across all EU policy areas to <b>ensure consistent adaptation messages</b> and drivers in multiple policies and sectors affecting the city level.</li> <li>• Provide guidance to coherent adaptation management</li> <li>• Provide <b>technical assistance to access funding</b></li> <li>• Provide for <b>facilitation of knowledge and experience exchange at EU level</b></li> <li>• Use EU reputation and <b>reach out to support political commitment</b> at local level</li> <li>• Ensure a pan-European <b>knowledge base accessible to all EU cities</b>.</li> </ul>

ID	Chapter Ref.	Conclusion	Recommendation
20	Expert finding	<p>In those countries currently lacking national efforts on adapting to climate change, projects such as this one provide incentives and the offer of information and support that can keep significant adaptation actors, like cities, actively engaged.</p> <p>It is essential for cities to apply a holistic and integrated framework for adaptation.</p> <p>Across the EU, capacity development can be enhanced through a coherent training and coaching approach and the exchange of experiences. City stakeholders engaged in this project testified to the value they place on learning from real good practice examples from other cities.</p> <ul style="list-style-type: none"> <li>The initial training workshops provided the cities with a common knowledge base and a common language with which to communicate adaptation issues.</li> <li>Cities stressed the need for peer-to-peer exchange where cities can share not only best practices but also to identify barriers that are common within the adaptation process</li> </ul> <p>The coaching has shown that an expert from outside the municipality can provide valuable inputs and start processes via city visits and meetings with adaptation working groups, Mayors, Deputy Mayors and press, that an online-platform or webinar cannot achieve.</p>	<p>We recommend that future EU level project <b>support is targeted where it can provide this benefit for cities in those countries lacking national efforts.</b></p> <p>A clear recommendation is that any training and guidance on urban adaptation should introduce, or be set within, an integrated management framework through which cities can develop an adaptation process with relevant sub-steps and milestones.</p> <p>The following <b>twinning characteristics</b> were identified as the cities' preferred options with regard to exchange and mutual learning on adaptation:</p> <ul style="list-style-type: none"> <li>Learning is best undertaken on a regional scale.</li> <li>Exchange will be beneficial if cities experience similar climate hazards.</li> <li>Sharing of good practice is easier among similar sized cities.</li> <li>Learning and benefiting from adaptation case studies will depend on the level of capacity of cities and it was noted that capacity of smaller towns are generally lower than that of larger cities.</li> </ul> <p>We recommend that future EU resources are not devoted solely to online support and political architecture, but can also facilitate <b>face-to-face coaching at the city level.</b></p>
21	5.2	<p>The project confirmed that a wide selection of tools and resources to support adaptation, including in cities, already exists. In developing the toolkit therefore, rather than provide a new toolkit for specifically for cities it was decided to provide guidance pointing to relevant tools for each stage of adaptation, aligned to the stages of the Climate-ADAPT AST. There has been sufficient attention devoted to the stage of guidance, tools, policy support. Now, the focus should shift towards encouraging real action on adaptation, including using and applying existing tools/guidance.</p>	<p>It is recommended that further work on developing tools should be restricted to ensuring the existing tools are appropriately qualified. EC should consider focussing on undertaking vulnerability assessment and development / implementation of adaptation strategies and encourage the use of the existing tools. (but we might recognise there may be a few gaps where specialised guidance / tools might yet be needed in future – e.g. to help fill common gaps in understanding and in strategies around cost-benefit, monitoring, etc).</p>

## Appendices

Appendix 1	Literature review on impacts, risks and vulnerabilities
Appendix 2	Survey
Appendix 3	Typology sub-task report
Appendix 4	Review of adaptation strategies
Appendix 5	Review of adaptation options and measures
Appendix 6	Review of tools and guidance
Appendix 7	State of Play Report
Appendix 8	Stakeholder Dialogues
Appendix 9	PACT and Survey Analysis Report
Appendix 10	Training & Capacity Building (including City Reports)
Appendix 11	Conference Reports
Appendix 12	Toolkit Report

All Appendices will be supplied as separate documents which are currently saved on CIRCA.

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