EUROPEAN UNION

Committee of the Regions

Climate change adaptation: Empowerment of local and regional authorities, with a focus on their involvement in monitoring and policy design

This report was written by Local Governments for Sustainability, European Secretariat (ICLEI) and CEPS (Centre for European Policy Studies). It does not represent the official views of the Committee of the Regions.

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List of abbreviations

CoM	Covenant of Mayors
CoMO	Covenant of Mayors Office
CoR	Committee of the Regions
COSME	Programme for the Competitiveness of enterprises and SMEs
EARDF	European Agricultural Rural Development Fund
ERDF	European Regional Development Fund
EBRD	European Bank for Reconstruction and Development
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ELENA	European Local Energy Assistance
ESF	European Science Foundation
ETS	Emission Trading System
EU	European Union
GHG	Greenhouse Gas
ICT	Information and Communications Technology
IEEP	Institute for European Environmental Policy
IMS	Integrated Management System
LRAs	Local and Regional Authorities
MFF	Multiannual Financial Framework
NGOs	Non-Governmental Organisations
SEA	Strategic Environmental Assessment
SEAP	Sustainable Energy Action Plans
SMEs	Small and Medium Enterprises
TA	Technical Assistance
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
JESSICA	Joint European Support for Sustainable Investment in City Areas

Summary

The severe impacts of climate change are being felt all across Europe in terms of gradual changes in temperatures and precipitation patterns but also in the frequency and intensity of extreme weather events. To tackle the severe impacts of climate 0change calls for immediate action at multiple levels of governance. Cities are already facing both physical stresses such as the obsolescence of existing infrastructure as well as socio-economfic stresses. Climatic impacts are adding an additional pressure on cities endangering their operational systems and the well-being of their populations, rendering them even more vulnerable. To reduce the vulnerabilities of cities to the various effects of climate change, adaptation action at the local and regional levels is much needed. Adaptation in terms of awareness as well as planning for and implementation of measures is currently gaining momentum in Europe and many cities are already taking action.

However, despite efforts by many cities the picture with regard to climate change adaptation in Europe remains diffuse, uncoordinated and heterogeneous. While some pioneering cities have already developed and implemented adaptation strategies – often in the aftermath of extreme weather events that caused severe damages to their territory – many European cities that are aware of the urgency to adapt are still struggling to even commence or structure their work on adaptation.

Cities understand the urgency to adapt but are often experiencing obstacles to getting started or progressing beyond the initial steps towards implementing a fully integrated adaptation strategy. Such obstacles are presented both in the management and in the governance aspects of urban adaptation. To enable effective adaptation cities need to reach beyond their boundaries to fully comprehend their vulnerabilities to the impacts of climate change in order to successfully plan for relevant adaptation measures. It is therefore crucial that adaptation is pursued in accordance with the regional level to create a clear interface enabling local and regional actors to communicate and cooperate effectively. To further address existing barriers to urban adaptation such as lack of awareness, lack of local data and knowledge, and limited funding for adaption measures, it is crucial that support is also provided at the European level.

In light of these considerations, this report analyses the situation with regard to climate change adaptation in European cities and regions. It aims to identify priority support needs with regard to successful urban adaptation and suggests suitable responses based on the preferences of European cities. Furthermore, it

seeks to point out concrete solutions that could be provided by the European level in the form of a European wide urban adaptation initiative.

The EU Adaptation Strategy[1] recognises the need for action at all levels of government while placing emphasis on action at the local level. This is suggested to be supported by an approach in line with that of the Covenant of Mayors[2] (CoM). It would aim to support cities in gaining political commitment on adaptation and to offer technical assistance in developing urban adaptation strategies.

In order to gain a first-hand insight into which factors are crucial in providing support to cities on adaptation, semi-structured phone interviews were conducted with seven European cities of different geographical locations and sizes. As stated above, the EU Adaptation Strategy references the CoM as a suitable framework according to which support can be structured. Therefore, interviews have been conducted with CoM signatories to understand the needs of cities with regard to advancing their adaptation efforts as well as to detect the most important factors with respect to their participation in the CoM, and whether these could be transferred to a future support initiative on adaptation.

Interviewees highlighted needs and generated findings that are significant in understanding the support needed at the local level. Some of these are summarised below:

- Bigger cities[3] are frontrunners in climate adaptation;
- A geographical focus is needed when shaping adaptation support: while bigger cities and Northern European cities in general feel supported by their national governments, smaller cities, especially those located in Southern Europe and Eastern Europe, express a stronger need for support;
- Adaptation knowledge gaps present a major barrier to establishing an adaptation process including the development of an adaptation strategy;
- Political commitment by local policy-makers is crucial for cities to advance on adaptation;
- Technical support, guidance and tools are vital in supporting cities in developing vulnerability assessments, identifying adaptation options, and in developing a monitoring and evaluation framework for local adaptation;

[1] Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0216:FIN:EN:PDF.
[2] http://www.covenantofmayors.eu/about/covenant-step-by-step_en.html
[3] Defined here as cities with 500.000 or more inhabitants.

- Financial support by the European level has been indicated as an important trigger to advance and in some cases even to initiate adaptation action.

Based on these and further findings analysed within the report, a concrete proposal for a European initiative on urban adaptation is presented, foreseeing specific solutions to mainstreaming adaptation in Europe.

Structure of the Report

Part 1 presents an overview on the main climate change impacts in European regions and provides a summary of main climate change concepts.

Part 2 takes stock of current adaptation activities at the local and regional levels, thereby providing an overview of the state of play of adaptation in Europe, and gives concrete examples of implemented adaptation measures.

Part 3 analyses the EU Adaptation Strategy in light of the role of local and regional authorities and their empowerment through actions at the European level.

Part 4 presents the main trends of the survey results and explains the case study selection, the methodology used and the structure of the questionnaire.

Part 5 provides an in-depth analysis of the survey results with regard to support needs, potential responses and opportunities for a European initiative on urban adaptation. It also examines the experience of the case studies with regard to the CoM in order to identify synergies and success factors that are transferable to a new initiative on adaptation as well as to detect current deficiencies in tackling the issue of adaptation.

Part 6 examines current local-regional interfaces on climate change adaptation. It analyses main barriers and opportunities in order to make constructive recommendations. It also discusses the fundamental role of ecosystem-based adaptation and provides recommendations for regional and local involvement in relevant adaptation processes at the international level.

Part 7 elaborates on the findings presented in Parts 4 and 5 to make concrete suggestions in terms of developing a foundation for a future European initiative on urban adaptation including its main functions and responsibilities.

Part 1 - Overview of climate change impacts: the importance of adaptation at the regional and local levels

1.1 Introduction

This chapter identifies the main climate change impacts in Europe, especially how they relate to urban contexts and their specific vulnerabilities, so as to illustrate the importance and urgency of implementing adaptation actions at the regional and local levels.

1.2 European regions and the impacts of climate change

When referring to climate change impacts, a region can be defined as a geographical zone presenting more or less homogeneous changes in its climate. In its report "Urban adaptation to climate change in Europe"[4], the European Environment Agency (EEA), identifies diverse climate stimuli, whose expected oscillations form five regional clusters. These stimuli are[5]

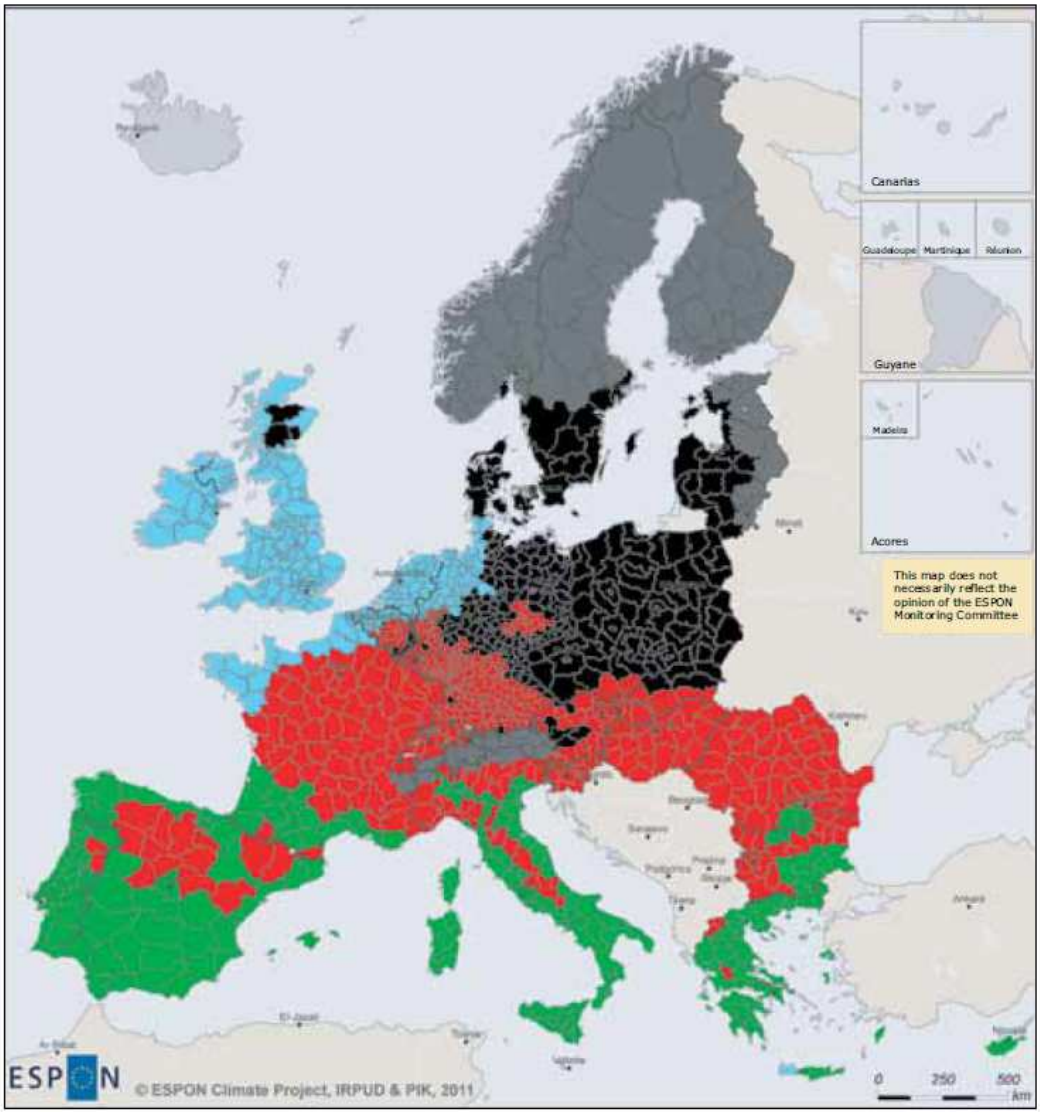
- An increase in the annual mean temperature and consequent decrease in number of frost days;
- A change in the annual mean number of summer days;
- Relative changes in the annual mean precipitation in winter and summer months;
- A change in the annual mean number of days with heavy rainfall;
- A relative change in annual mean evaporation and
- A change in the annual mean number of days with snow cover.

[4] *Urban adaptation to climate change in Europe: Challenges and opportunities for cities together with supportive national and European policies*, European Environment Agency Report, No. 2/2012
[5] EEA Report 2/2012, p.13-15.

The clusters deriving from the oscillations (increase, decrease, no oscillation) of the aforementioned climate stimuli are:

- Northern-central Europe;
- Northern-western Europe;
- Northern Europe;
- Southern-central Europe;
- Mediterranean Europe.

As can be observed in figure 1, the above listed climate stimuli will not be distributed homogeneously on the European territory, leading to the creation of non-contiguous climate regions.



Cluster/stimuli	Northern-central Europe	Northern–western Europe	Northern Europe	Southern–central Europe	Mediterranean Europe
Change in annual mean temperature	+	+	++	++	++
Decrease in number of frost days	––	–	––	––	–
Change in annual mean number of summer days	+	+	0	++	++
Relative change in annual mean precipitation in winter months	+	+	++	0	–
Relative change in annual mean precipitation in summer months	–	–	0	––	––
Change in annual mean number of days with heavy rainfall	0	+	+	0	–
Relative change in annual mean evaporation	+	0	+	0	–
Change in annual mean number of days with snow cover CDSC	–	0	––	0	0

Note: Key: ++ Strong increase; + Increase;
0 Insignificant stimulus for the characterisation of the cluster;
– Decrease; –– Strong decrease.

Figure 1. European regions clustered according to projected climate change
Source: EEA Report No 2/2012, Greiving at al., 2011; © ESPON, 2013

These expected stimuli could lead to several extreme weather events, resulting in detrimental climate change impacts[6], also depending on the morphology and specific geographical features of a territory. The main impacts on a regional level are represented in figure 2.

[6] "Climate change impacts refer to the observed or projected effects of climate change on natural and human systems. In the case of projected effects, these projections often refer to 'potential impacts', which are those impacts that may occur given a projected change in climate, without considering adaptation.", *Climate change, impacts and vulnerability in Europe 2012: An indicator-based report*, EEA Report, No 12/2012, p. 35.

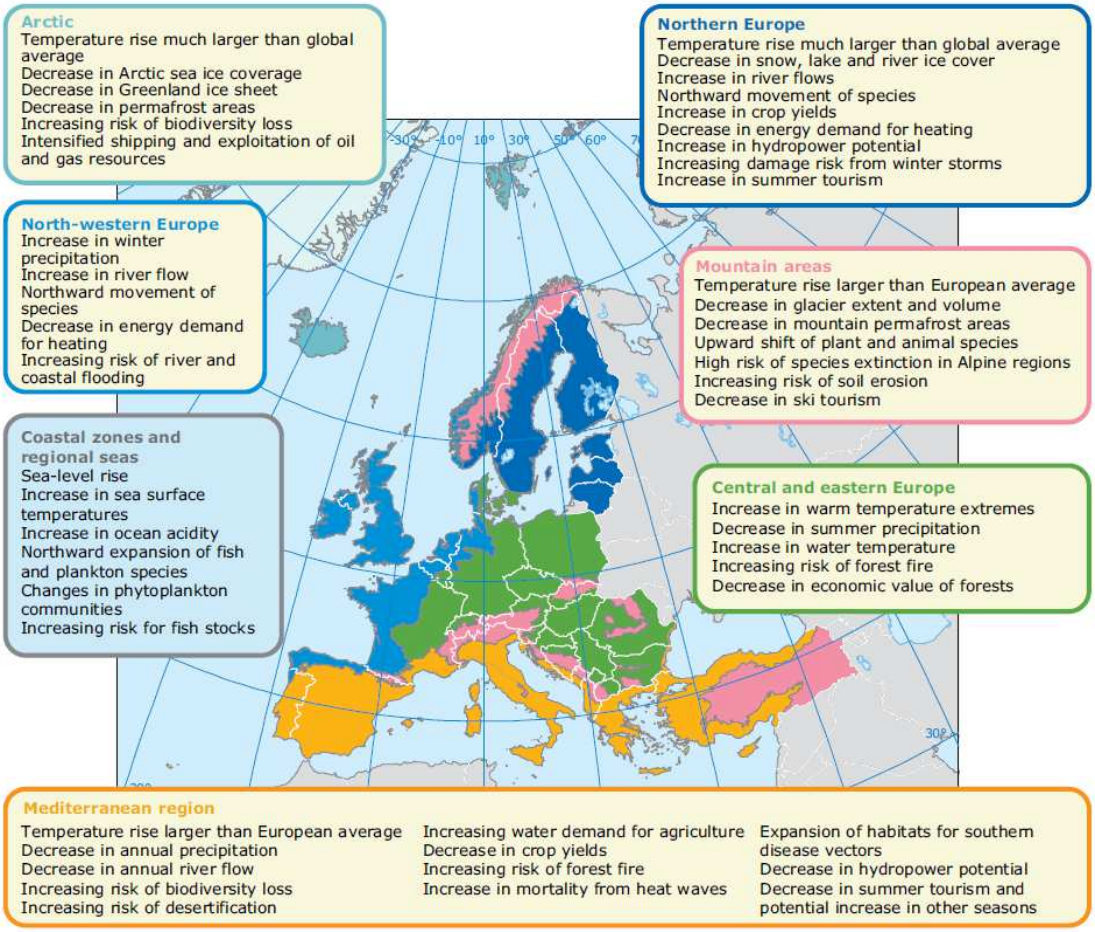


Figure 2. Key observed and projected climate change impacts for the main regions in Europe
Source: EEA Report No 12/2012

1.3 Moving the focus from regions to cities and back

Urbanisation is one of the most significant developmental processes which took place between the 19th and 21st century. The majority (41%) of the EU population now lives in cities, while 35% live in intermediate regions and only 23% in rural areas[7]. The trend toward urbanisation is expected to continue.[8] Large European regions face similar climatic threats, as described above, but it is at the city level that these threats will have the most severe impact due to the large concentration of built-up impermeable areas, and a high population density in a relatively concentrated space. However, responses to tackle local impacts need to include the regional level in order to deal with interconnected issues and areas beyond the city boundaries. Local-regional collaboration will also enable better organisation and identification of capacities and responsibilities. Consequently, each level must cooperate and take a multi-level governance approach in order to develop coherent adaptation strategies.

Cities must take action but their adaptation strategies need to be embedded in a coherent legislative and governance framework that enables different impacts to be dealt with by the appropriate level[9]. This includes an adequate, multi-level knowledge base and distribution of authority and responsibility, stable governance structures over time, and, ideally, access to dedicated funding sources. To this end, local adaptation strategies should correspond to regional ones.

1.3.1 Hazards, impacts and vulnerabilities faced by cities

For the local and regional contexts it is crucial to distinguish between climate change impacts, hazards[10] and vulnerabilities. A vulnerability can be defined as "a function of the sensitivity of a system to changes in climate (the degree to which a system will respond to a given change in climate, including beneficial and harmful effects)". Cities are complex systems comprising of numerous interconnected

[7] Eurostat news release 51/2012 from 30 March 2012. Available online at http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/1-30032012-BP/EN/1-30032012-BP-EN.PDF (last visited on 23 July 2013).

[8] *European Cities in a Changing Climate: Exploring climate change hazards, impacts and vulnerabilities*, J. Carter, A. Connelly, J. Handley and S. Lindley, The University of Manchester, 2012, pp. 18-19.

[9] EEA Report 2/2012, pp. 95-118.

[10] Hazards are sometimes also defined as "extreme weather events", indicating a "meteorological phenomenon that is rare at a particular place and time of the year. When a pattern of extreme weather persists for some time, such as a season, it may be classified as an extreme climate event", EEA Report 2/2012, p.125.

features including infrastructure and communication networks, water and energy distribution, and sewers and waste removal systems[11]. In many cities, existing physical infrastructure has been planned and built without any consideration of projected climate impacts. Cities are also complex from a social point of view, bringing together concentrations of vulnerable population categories such as elderly, children and low-income residents. The interdependence of these physical and socio-economic features renders cities highly vulnerable to the added stresses of climate change impacts.

Hazards refer to the weather and climate events to which a city is exposed and the resulting negative impacts on that given system. The more *vulnerable* a system is to a *hazard*, the higher the *impact* will be deriving from that hazard.[12]

According to a survey[13] carried out in spring/summer 2012 among 196 European cities in the framework of the EU Cities Adapt project[14], the main hazards European cities have faced or are expected to face are:

- Periods of very hot weather or heat waves (often made even more severe by the Urban Heat Island Effect[15]);
- Flooding from heavy rainfall;
- Storms;
- Water scarcity and droughts.

These are of course only some of the hazards expected to impact European urban systems; depending on their specific location and morphology, cities might also face, among others[16]:

- River and sea water flooding;
- Costal storm surges;

[11] *Background paper for the Council of Europe's report on resilient cities*, ICLEI – Local Governments for Sustainability, European Secretariat, January 2012, p. 6.
[12] Definition taken from *European Cities in a Changing Climate*, p. 32.
[13] *EU Cities Adapt Survey Report 2012*. Available from: http://eucities-adapt.eu/cms/assets/NewFolder/Appendix -3-Survey-v1-AEA.pdf.
[14] http://eucities-adapt.eu/cms/
[15] The UHIE describes the increased temperature of the urban air compared to its rural surroundings. This is caused by an alteration in the balance between the energy from the sun absorbed by impervious surfaces such as concrete, asphalt and stone and then released to the surrounding air. Source: EEA Report 2/2012, p.21.
[16] *EU Cities Adapt Survey Report 2012*. Available from: http://eucities-adapt.eu/cms/assets/NewFolder/Appendix-3-Survey-v1-AEA.pdf.

- Rock falls and landslides;
- Subsidence;
- Saltwater intrusion.

1.3.2 The urgency of adaptation in cities and regions

Dealing with impacts and risks

Many cities have already suffered the consequences of major hazards on their territory. The hundred-year flood in central Europe in May/June 2013, the river flooding in Dresden in 2002 or the heat wave in Paris in 2003 caused enormous economic and social damage. The 2013 floods caused 25 deaths and more than €9 billion in estimated physical and agricultural damages, in Dresden 28 people died and infrastructure, monuments and buildings were damaged, resulting in a total financial loss estimated to be €9.2 billion.[17] During the 2003 heat wave in Paris, the number of deaths increased by 150%, particularly among elderly people.[18]

Climate change hazards pose a serious risk to many of the core elements constituting cities, such as[19]:

- Physical elements (building and infrastructure)
- Environmental elements (ecosystems and landscapes)
- Cultural elements (heritage sites and museums)
- Economic elements (economic sectors)
- Social elements (people, governance structures)

Considering all of the above, it is crucial for cities to respond promptly to these threats to prevent harm to citizens and infrastructure.

Identifying benefits of planning for adaptation

As well as reducing the impacts of extreme weather events, adaptation also represents a significant instrument to plan and implement measures that are co-beneficial to many urban sectors and services. Adaptation action supports the

[17] *European Cities in a Changing Climate*, p. 65.
[18] *European Cities in a Changing Climate*, p. 74.
[19] *European Cities in a Changing Climate*, p. 39.

achievement of resilience[20] and helps improve the quality of life of citizens[21]. For example, the creation of green and blue infrastructure[22] can increase the adaptive capacity of an urban system (e.g., reducing heat-waves and mitigating flooding), while contributing to preserving biodiversity, improving well-being and enhancing recreational opportunities for citizens. Soft measures, such as land-use controls, information dissemination and economic incentives to reduce vulnerability, have a limited cost and can reduce the impact of hazards just by influencing human behaviour (e.g., by setting up an early warning system during heat-waves that advises vulnerable population groups to remain indoors during the hottest or most affected hours of the day). Furthermore, involving different levels of government (e.g., the regional level and the national level) in adaptation planning can reduce costs and improve the efficacy of measures. It is critical to understand that while economic and human impacts affect cities disproportionately, adaptation measures often need planning beyond municipal borders to be effective (e.g., in the case of river management)[23].

1.4 Conclusions

The effects of climate change are being felt all across Europe. However its impacts vary across different regions and pose differentiated risks for the rural and the urban contexts. Cities have shown to be highly vulnerable systems due to the existing low level of adaptive capacity and inherited vulnerabilities in both current physical elements such as infrastructure and in socio-economic elements such as high population density and higher shares of vulnerable population groups. For these reasons cities have been and will continue to be economically, socially and environmentally the most affected by climate change. Planning and implementing adaptation measures are not only crucial for proactively reducing disaster and risk, but it can also present a desirable integrated framework to present multiple co-benefits to cities including enhancing the quality of life for European citizens.

[20] Resilience is defined as the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation and the capacity to adapt to stress and change. See EEA Report 2/2012, p. 126.

[21] Specific adaptation measures will be analysed in the second part of this report.

[22] Green and blue infrastructure can be defined as interconnected networks of natural and man-made features, such as forests, extensive grasslands, rivers, wetlands, as well as parks, gardens, green walls and roofs, water streams and canals. Such infrastructure enables ecosystem services like flood protection, temperature regulation, filtering of air and providing recreation areas, among others. See EEA Report 2/2012, p. 126.

[23] EEA Report 2/2012, p. 98.

Despite these considerations and despite that many cities recognise the threat of climate change to their functioning and prosperity, progress on adaptation remains diffuse and uncoordinated. This is due to a number of barriers that cities encounter when planning for adaptation.

For effective and successful urban adaptation planning the following factors amongst others should be taken into consideration:

- A multi-level governance approach bringing together and coordinating the measures taken by local and regional levels;

- An allocation of stable and appropriate funds to adaptation planning.

Furthers barriers, support needs and opportunities to advance adaptation at the local and regional level will be presented in part 4, 5 and 7 of this report.

Part 2 - Examples of current local and regional adaptation activities in the EU

2.1 Introduction

Adaptation policy is being developed and advanced at various levels, from European through national and regional to the local level.[24] Cities have, in many cases, been frontrunners in adapting to climate change, but to advance they need a coherent framework in which to further develop their actions. The chapter introduces some examples of local and regional adaptation activities in the EU, focusing not only on measures that have already been implemented, but also on the governance processes that led to their development.

2.2 What does the term "adaptation activities" entail?

Adaptation "consists of [intentional] actions responding to current and future climate change impacts and vulnerabilities within the context of ongoing and expected societal change."[25] Definitions such as "actions" and "activities" entail different factors that are crucial to developing an adaptation strategy. On the one hand, we have concrete measures: technical measures designed to improve the adaptive capacity of a city or a region. On the other hand, we have process-based approaches to adaptation strengthening the capabilities of local and regional administrations to engage in cross-sectoral and adaptation planning and management (an example of this will be presented in section 2.3). When describing adaptation activities, it is therefore necessary to take a holistic approach, encompassing processes and actions.

For clarity, these different measures can be divided into:

- 'Grey' infrastructures: 'physical interventions or construction measures, using engineering services to make buildings and infrastructure essential for the social and economic well-being of society more capable of withstanding extreme

[24] *Adaptation in Europe: Addressing risks and opportunities from climate change in the context of socio-economic developments*, EEA Report No 3/2013, p. 62.
[25] EEA Report 3/2013, p. 14.

events and to avoid infrastructure lock-ins that will provide little to no adaptive capabilities in the future;

- 'Green' infrastructures: measures that increase ecosystems resilience and reduce biodiversity loss and degradation of ecosystems, and restore water cycles. At the same time, green infrastructures use the functions and services provided by ecosystems to achieve more cost-effective and sometimes more feasible adaptation solutions than grey infrastructures.

- 'Social' infrastructures correspond to the 'design and application of policies and procedures employing, inter alia, land-use controls, information, dissemination and economic incentives to reduce vulnerability, encourage adaptive behaviour or avoid maladaptations and infrastructure lock-in (for example, an increase in artificial air conditioning to mitigate the effects of heat waves). Some of these measures can facilitate the implementation of grey or green measures (e.g., funding, integration of climate change into regulations)'.[26]

2.2.1 State of play of local and regional adaptation activities in the EU

Notwithstanding the great urgency needed in reacting to climate impacts in cities, and although many cities have already started responding to single climate hazards that affected their territory in the past, the picture with regard to urban adaptation in Europe remains diffuse and uncoordinated.[27] Few cities have established a coherent integrated management process for adaptation that involves different departments in the municipality through cross-sectoral planning and management, and developed a comprehensive vulnerability assessment.

A survey[28] carried out in the framework of the 'EU Cities Adapt'[29] project showed that 70% of the interviewed cities have begun working on adaptation, but at different pace and scope:

- 1% state they have a far advanced programme in place,

[26] EEA Report 2/2012, p. 16.
[27] A more detailed picture of the state of play with regard to adaptation in European cities and regions will be drafted in part 6.
[28] *EU Cities Adapt Survey Report 2012*. Available from: http://eucities-adapt.eu/cms/assets/NewFolder/ Appendix-3-Survey-v1-AEA.pdf.
[29] http://eucities-adapt.eu/cms/

- 6% state they are moving ahead of the field,
- 16% state they are well on the way, and
- 47% are still in the very early stages of work on adaptation.

Regional adaptation presents a similar picture. Although several regional and macro-regional dedicated adaptation projects (such as REGKLAM[30] and Baltadapt[31]) have already started, in many cases, the regional and local levels still operate independently from one another and lack an effective collaboration on adaptation to be achieved through continuous communication and close cooperation.

2.3 Examples of adaptation activities in European regions and cities

The following examples illustrate some adaptation activities in Europe, focusing both on the process followed and measures implemented.

2.3.1 A Waterplaza for Rotterdam, The Netherlands

Rotterdam, the second largest city of The Netherlands, is highly exposed to climate change impacts. Large sections of the city are located below the sea level, and the region is facing increased rainfall, more frequent floods, sea level rise and increasing temperatures.

Figure 3. Project design for a Waterplaza
Source: http://www.waterpleinen.com/Watersquares.pdf

[30] For more information visit: http://www.regklam.de/.
[31] For more information visit: http://www.baltadapt.eu/index.php.

The city took the threats resulting from climate change as opportunities to enhance its attractiveness, accessibility, knowledge, innovation and business potential. The adaptation strategy 'Rotterdam Climate Proof'[32], which began in 2008, sets out a path for the city to achieve resilience by 2025. The strategy is based on three pillars: knowledge, actions and exposure, dedicated respectively to raise awareness, implement measures and then show-case them. Efforts are also dedicated to the development of knowledge sharing networks (e.g., 'Connecting Delta Cities'). The city cooperates with the national government as well as with other peers abroad to achieve its goals.

In this context, Rotterdam is testing ground-breaking ideas on water management linked to increasing the quality of life of its citizens. For example, a water plaza was specially designed to serve as a public recreation centre in times of dry weather and to function as a water storage basin during heavy rainfall.

2.3.2 Coastal adaptation in Almada, Portugal, a local-urban plan for Fonte da Telha

Fonte da Telha is an 85ha coastal area delimited by a coastal cliff to the East and the Atlantic Ocean to the West. The area is characterised by a fragile coastal dune system, and was traditionally inhabited by a fishing community. Due to increased demographic pressure, which led to the erection of illegal housing, the fragile balance of the system is now threatened, and climate change impacts could intensify the problem: in fact, according to climate projections looking at a 50 to 100 year timescale (established through a comprehensive analysis of the area) the region is prone to sea flooding and heavy impacts from storms.

Figure 4. A view of the Fonte da Telha area
Source: Municipality of Almada

[32] http://www.rotterdamclimateinitiative.nl/documents/RCP/English/RCP_adaptatie_eng.pdf

To salvage this important natural area and increase local resilience to climate change, the municipality developed specific adaptive measures aimed at preserving its identity as a fishing community, but also taking into account trends, which put pressure on the area, such as tourism. To this end, diverse measures have been developed. The reconstitution of the dune system and the replanting of local plant species will conserve and enhance biodiversity and allow for environmental conservation. Social and cultural heritage will be preserved by reconstructing the urban settlement of Fonte da Telha, respecting its past as a fishermen community. Tourism, an important economic sector for the municipality, will be increased through the construction of 10 beach support facilities and seasonal parking for 840 vehicles.

2.3.3 The Black Forest Region, Germany, prepares itself for heavy storm events

In the Black Forest area of Germany, forest management strategies have been developed to increase the capacity of the forests to withstand on-going climate change and improve resilience to heavy storm events. Local stakeholders are concerned about the changing climate, as this will directly influence reproduction, mortality and growth of the forests. The MOTIVE project (MOdels for AdapTIVE Forest Management under Climate Change) aims to simulate flexible forest management strategies under different climate scenarios. A simulation tool is currently extensively used to examine the effects of storms and climate change for several scenarios. The tool is also used to evaluate management strategies that were developed in close cooperation with local stakeholders.

The Bavarian government's Climate Change Programme 2020, which encompasses several ecosystem-based initiatives, includes a module on mountain forest protection. The programme aims to stabilise mountain forests' vital protective functions through intensive care and redevelopment. A state-wide information system will facilitate targeted responses in regional areas at risk. Along with reducing greenhouse gas emissions, the programme aims to enable areas that are particularly sensitive to the effects of climate change to best adapt to these impacts by 2020. To implement the adaptation component of the Bavarian Programme, €84.7 million was made available from German national funds between 2008 and 2011. An additional sum of €350 million has been provided for the next four years to develop tailored measures in Bavaria in crucial fields such as water, forestry, agriculture and health.

2.3.4 Burgas, Bulgaria, raising awareness among key adaptation stakeholders through "Adaptation Open Days"

In the framework of the EU Cities Adapt project, the City of Burgas situated by the Black Sea took the opportunity to organise an awareness raising event (12-13 March 2013) to inform key adaptation stakeholders and the public about the ongoing elaboration of the city's adaptation plan. Several municipal departments, NGOs, universities and local companies took part in the event. Municipal plans, strategies and programmes related to environmental protection, flooding and landslides prevention, as well as nature conservation and water management measures were presented. The Life+ funded "Salt of Life" project, which aims to establish a functional, efficient and sustainable infrastructure for water management of a coastal lagoon near the city, was inaugurated. One of the main targets of the project is to foster a long-term improvement in natural habitat conditions and adapt to climate change effects including changing rainfall patterns and sea-level rise.

2.3.5 The EU Cities Adapt adaptation planning and management tool: The IMS Cycle

<Urban planning taking a cross-cutting and interdepartmental perspective is fundamental to plan for, implement and enforce adaptation at the local level. An integrated management approach is vital to correctly evaluate risks and vulnerabilities, plan for and implement adaptation measures, involve the relevant departments in the adaptation planning, and to secure political commitment for and funding of adaptation measures.

The Integrated Management System (IMS) Cycle, developed by ICLEI, (figure 5) proved to be a valuable tool in terms of structuring adaptation planning and management, and can serve as a

Figure 5. The Integrated Management System Cycle
Source: ICLEI

reference to illustrate crucial milestones when setting up a regional or a local adaptation strategy.

The tool was used by 21 pioneer cities during the EU Cities Adapt project, in the framework of which a dedicated 8-months-adaptation training was delivered. Cities of different sizes and located in different geographical regions (according to the EEA taxonomy presented in part 1) adopted the IMS Cycle as a tool to plan and manage their adaptation work.

2.4 Conclusions

Adaptation is the result of a process involving many interrelated steps and various actors that is a process of integrated planning between different municipal departments and allocation of funding for concrete measures, etc. However, the picture with regard to adaptation in Europe is still scattered, and in many cases, cities are implementing stand-alone measures not linked to a holistic adaptation process.

A cross-cutting approach can help plan for and implement urban or regional adaptation measures successfully and cost-efficiently. Effective adaptation requires cross-sectoral efforts and linkages at both the local and regional levels. Therefore, it is suggested that adaptation planning takes the shape of an integrated process involving different departments, key stakeholders, and tiers of government.

Part 3 - Relevance of the EU Adaptation Strategy for local and regional authorities

The EU Adaptation Strategy[33] identifies the need to take measures at all levels, from local to regional, national and EU level. It stresses the importance of action at the local level and the need for a flexible approach, taking into account existing actions.

This section analyses the EU Adaptation Strategy and its relevance and implications for local and regional authorities.

3.1 The EU Adaptation Strategy

In order to respond to the threats posed by climate change, the European Commission (EC) produced the 2009 White Paper 'Adapting to climate change: Towards a European framework for action'[34], which set out a number of measures to be implemented. A key measure was the launch in March 2012 of the web-based European Climate Adaptation Platform (Climate-ADAPT), incorporating the latest data on adaptation action in the EU, together with several policy support tools.
Fifteen member states have already adopted an adaptation strategy[35] while others are in the process of preparing one. However, more work still needs to be undertaken as only a third of the strategies are underpinned by a comprehensive vulnerability assessment.

On the ground, the EU is co-financing a number of adaptation initiatives, including cross-border or inter-regional adaptation projects through several programmes, such as LIFE and various cohesion policy programmes.

On 29 April 2013, the European Commission launched the EU Adaptation Strategy, with the aim of promoting best practices and supporting adaptation actions across the EU. The strategy sets out clear objectives and timeframes to implement a number of climate adaptation actions. The main party to implement these objectives for the European Commission remains the Member States'

[33] Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0216:FIN:EN:PDF.
[34] Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0147:FIN:EN:PDF.
[35] http://climate-adapt.eea.europa.eu/web/guest/adaptation-strategies

national governments. However, the strategy recognises the importance of the local and regional authorities to prepare for climate change, and considers adaptation as an important sustainable development instrument. A number of actions are directly relevant to regional and local authorities.

3.1.1 Objectives of the strategy

The EU is seeking to contribute to a more climate resilient Europe, and to enhance coherent action at all levels of governance by means of three objectives and eight key actions.

Adaptation will be streamlined into the multiannual programmes of the Member States. The Commission will provide specific support on adaptation through the LIFE instrument. LIFE will prioritise flagship projects addressing cross-sectoral, trans-regional or cross-border issues in green-infrastructure, ecosystem based approaches and innovative adaptation.

Objective 1. Promoting action by member states

Three actions are proposed to better promote adaptation:

- Encouraging all member states to adopt comprehensive adaptation strategies with the support of the Commission. By 2014 the Commission will develop key indicators and a scoreboard to monitor and assess actions at member state level. By 2017 it will set out a monitoring regulation and review national strategies.

- Providing funding support through LIFE for capacity building and adaptation.

- The strategy stresses the importance of involving cities and calls for using a similar approach to adaptation to that of the Covenant of Mayors (CoM), where cities are presently committing to specific mitigation targets.

Objective 2. Better informed decision-making

Lack of knowledge on adaptation needs can lead to maladaptation. The adaptation strategy calls for an EU action to bridge the knowledge gap on impacts and tools to respond to them by working closely with member states and stakeholders to enhance the knowledge base.

Two actions are envisaged:

- Expanding the knowledge base on climate impacts, which will be fed to the Climate-ADAPT web portal to inform the authorities and other stakeholders. It will also be used to develop EU programmes and determine research needs for Horizon 2020.

- Expand Climate-ADAPT's functionalities as a 'one-stop-shop' for information and best practices for policy actions and development. The platform will also include the future Copernicus climate services from 2014 on.[36]

Objective 3. Climate-proofing EU action: Promoting adaptation in key vulnerable sectors

The European Commission is mainstreaming climate action across all relevant EU policies, and is working on standards for the EU, such as on material specifications, building codes, technical standards and project planning, and on financing procedures to integrate adaptation.

Climate mitigation and adaptation mainstreaming within EU policies and programmes, and also national rules, may have a pronounced impact on the way local authorities plan and manage their regional infrastructures and services. Specifically, the Commission is undertaking the following actions:

- Facilitate climate proofing across EU-funded policies, requiring and assisting regions and local authorities to integrate adaptation within their programmes.

- Ensure more resilient infrastructure. To this end, the European Standardisation Organisation will map industry-relevant standards to ensure infrastructures are climate resilient.

- Promote insurance and financial services aimed at resilient investment and business decisions, thus sending a signal to the markets and influencing economic actors.

[36] Presently GMES (Global Monitoring for Environment Services).

3.1.2 Governance, financing and review

The Commission will facilitate coordination between member states through national contact points, and through continuous consultation with stakeholders, and awareness-raising, as well as by expanding the Climate-ADAPT platform.

The EU's Multi-annual Financial Framework (MFF) places climate action as one of its priorities. Climate adaptation is increasingly mainstreamed into existing budget lines, e.g., by introducing climate conditionality to investments and by earmarking funding for specific adaptation objectives. Consequently, a number of opportunities are emerging for adaptation action, or projects entailing adaptation elements. The implementation rules of the EU budget will in addition allow and encourage the combination of different support sources such as the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD). This may increase the potential leverage for adaptation projects, although the opportunities are limited compared to mitigation projects, due to the fact that many adaptation actions are non-revenue generating. In any case, Climate–ADAPT will be providing information on various opportunities, including the potential use of the EU ETS revenues.

Monitoring, evaluation and reviewing will be important elements to assist in improving programmes. In 2017 the Commission will report on the state of implementation of the Adaptation Strategy and propose a review if necessary.

3.2 Implications for regional and local authorities

The following table summarises the areas of particular relevance of the EU Adaptation Strategy for regional and local authorities and lists the potential implications and issues to address.

Action 2. Providing funding support through LIFE[37] for capacity building and adaptation

The EU Adaptation Strategy:

- Identifies LIFE as an instrument to finance climate action, with a proposed budget for the Multiannual Financial Framework for LIFE of €3.2 billion, which includes a new sub-programme on climate action (around €800 million for the period 2014-2020).

- New to LIFE is the possibility to use the funds for innovative financial instruments. This is being considered for the climate sub-programme, but the form of the instrument is still being explored. A study conducted by the Institute for European Environmental Policy (IEEP) for DG CLIMA[38] proposes a number of options for the funds. The most interesting are for funding energy efficiency projects, supporting innovation and innovative Small and Medium Enterprises (SMEs) and offering technical assistance to prepare projects, in the style of the present JESSICA and ELENA programmes. Given the identified role of the adaptation strategy in providing assistance to local and regional governments, the ELENA programme may be of particular relevance.

- LIFE is also mentioned as a potential assistance to implement lighthouse projects, reinforcing the need of the programme for Technical Assistance (TA).

[37] LIFE is a centrally planned programme particularly suitable for regional and local authorities, as its main function is capacity building and Technical Assistance (TA).

[38] DG Climate Action (2013), OPTIMAL USE OF THE EU GRANT AND FINANCIAL INSTRUMENTS IN THE NEXT MULTIANNUAL FINANCIAL FRAMEWORK TO ADDRESS THE CLIMATE OBJECTIVE, final report prepared by IEEP, http://ec.europa.eu/clima/events/0072/docs/study_optimal_use_en.pdf, retrieved 12 June 2013 .

Action 3: To take an approach to adaptation in line with the Covenant of Mayors

The EU Adaptation Strategy calls for a similar approach to that taken by the CoM, in order to develop strategic adaptation plans in addition to the present mitigation plans (Sustainable Energy Action Plan - SEAP):

- Based on the information contained in their impact assessments, the adaptation strategies will be voluntary in the same manner as the SEAPs. Cities of over 150,000 inhabitants in vulnerable areas will be required to prepare one by 2020[39]. There is, however, no operational definition of 'vulnerable'. The Climate-ADAPT tools are expected to provide assistance in this respect in conjunction with the LIFE programme.

- One of the difficulties of developing adaptation strategies following the Covenant of Mayors methodology is to define a baseline, indicators and objectives. Contrary to emission reduction pledges, adaptation needs are very context specific and need to be based on local vulnerabilities. The indicators are difficult to develop because unlike pledges to reduce emissions, which are quantified in terms of tons of CO_2, there is no specific single variable valid across all regions on adaptation with which to measure the type and level of adaptation.

- The impact assessment of the adaptation strategy calls for the Commission and the European Environment Agency (EEA) to create a list of indicators, as well as monitoring and assessment methodologies.

[39] SWD(2013) 132 final.

Action 6: Facilitate climate proofing across EU funded policies, requiring and assisting regions and local authorities to integrate adaptation within their programmes
This action requires regional authorities to use an integrated approach to programming, with funds from different sources coordinated in an overall programme. This presents a difficult programming process for regions, a process not helped by the delays in approving the Multiannual Financial Framework (MFF) regulations. Programming should be concluded by the end of 2013 unless a postponement in programming is necessary due to the late agreement on the MFF budget and the slow process to agree on the detailed implementing regulations. The integrated programming might also suffer from a number of complex barriers: • At the local level procedures for each fund are different and different bodies handle the European Regional Development Fund (ERDF), the European Science Foundation (ESF), and the European and Agricultural Rural Development Fund (EARDF). Even at EU level there are considerable procedural differences. Despite the Commission's intention to simplify procedures, it is unclear if and when such simplification will be accomplished. • The strategic combination of funding also includes, in addition to shared management funds (i.e., structural funds), LIFE, COSME and Horizon 2020, which are centrally planned instruments and not easily 'programmable' in advance. Horizon 2020 funding is allocated based on excellence and tendering and is not guaranteed for any region. Combining structural funds actions with those programmes faces large administrative hurdles, not principally due to the different EU bodies involved, but rather to the many different authorities and institutions responsible at the local level.

Table 1. Areas of relevance to regional and local authorities and their implications

3.2.1 Additional considerations on strategy, monitoring and evaluation

In order to provide effective policy guidance, adaptation strategies based on commitments – as intended by key action 3 of the EU Adaptation Strategy - will need to build on a vulnerability assessment and to be monitored and evaluated. Policy reviews will also need monitoring and evaluation. While the EU Adaptation Strategy stresses the need to increase the number of indicators, it gives only vague guidance on their use for planning and implementation at the local level.

Another challenge for regional and local authorities is to identify and evaluate their respective climate vulnerabilities. Most studies lack detail on local level implications. Support, both in terms of knowledge capacity and of financial resources to conduct vulnerability assessments, will be needed to appropriately address this challenge.

Finally, the lack of available benchmarking parameters and the uncertainties surrounding the magnitude of adaptation that is required to provide a desired level of protection further hamper adequate planning efforts. Adaptation is intrinsically linked to future events and therefore tied to projections based on historical data and understanding of climate processes. The interplay of factors determining a city's vulnerability to climate change is highly locally dependent and therefore adaptation needs change from region to region. This means that baselines and objectives will need to be defined by the cities and surrounding regions in a bottom-up fashion.

Part 4 - Case study survey - selection criteria, design and main trends

4.1 Introduction

This chapter describes the selection criteria and design of the case studies. Seven city case studies[40] were selected to inform Parts 5, 6 and 7 of this report. Due to a general lack of written information[41], a questionnaire and qualitative phone interviews were chosen as appropriate methodology to collect the necessary information.
Section 4.4 reports the main trends collated from the interviews while focusing on four main aspects: needs, benefits and obstacles, *de facto* adaptation measures and motivational aspects related to taking part in an adaptation framework.

4.2 Case study selection criteria

Seven Covenant of Mayor (CoM) signatories in Europe have been included in the exploratory exercise. These are:

- Birmingham, United Kingdom;
- Copenhagen, Denmark;
- Vitoria-Gasteiz, Spain;
- Padua, Italy;
- Burgas, Bulgaria;
- Almada, Portugal;
- Zadar, Croatia.

Since seven cities constitute a small sample to draw statistical conclusions from, focus has been placed on qualitative rather than quantitative results. Therefore, the results of the interviews should be seen as indicative of general trends while highlighting important city-specific information.

[40] In fact, 8 cities were originally selected. In one case, the City of Malmö, no interview appointment inside the given time-frame could be arranged for.
[41] As the object of the survey is very specific, it could not be expected to identify sufficient written information.

However, in order to increase the representativeness of the selected case studies, several interrelated criteria were used in the selection process, making the sample chosen as solidly founded, broad and technically sound as possible.

A. The first criterion addresses the experience of CoM signatories in two aspects:

- Their experiences with the CoM framework: This is crucial to evaluate the CoM performance when it comes to key factors that could be fed into a similar European framework for adaptation. Six out of the seven cities included in the exploration have already reached stage two (with only Zadar being at stage one) in the framework of the CoM and can draw upon this experience to evaluate its significance, benefits and shortcomings.

- Their experiences in local climate adaptation: Surveying cities at different stages in their adaptation journey but with a sound understanding of the topic is crucial for identifying specific needs for efficient and effective local adaptation strategies and the relevant support offered by a European framework process such as the Covenant of Mayors. Thus, cities at different levels in their adaptation journey have been selected. Six out of the seven cities selected have taken part in the EU Cities Adapt project[42] (January 2012- June 2013), where their adaptation processes were assessed and during which they received a dedicated training on climate change adaptation. It can be therefore assumed that they have sufficient awareness of climate change adaptation issues and support needs, regardless of their own stand in the development of an adaptation strategy.

B. Geographical representation has been a crucial criterion, in order to provide for an understanding of needs from a European perspective, i.e., independent from the specific national or regional contexts, which the interviewed cities are embedded in, as well as for a potential geographical focus of EU level activities. To this end, the surveyed cities have been selected from different geographical areas, climate regions and nations, which allows for a considerable diversity in legislative, politico-administrative, environmental, economic and social contexts. A Croatian city, Zadar, has also been included in the selection taking into account the incipient accession of the country in the EU.

[42] http://eucities-adapt.eu/cms/

C. Cities of different sizes have been chosen, so as to understand which experiences and needs big and medium/small-sized cities have in common or distinguish them according to their size and to examine to which extent size should be taken into account when setting up a European framework for local climate change adaptation.

An overview of the features relevant to this city selection is reported in table 2. Figure 6 shows the geographical representation of our selection.

City name	Nation	No. of inhabitants	State of play with regard to adaptation	Progress in the CoM framework
Burgas	Bulgaria	200,271	Initial stage	Stage 2
Zadar	Croatia	75,082	Initial stage	Stage 1
Padua	Italy	204,809	Intermediate stage	Stage 2
Vitoria-Gasteiz	Spain	238,247	Intermediate stage	Stage 2
Almada	Portugal	160,825	Intermediate stage	Stage 2
Birmingham	United Kingdom	1,036,900	Advanced stage	Stage 2
Copenhagen	Denmark	509,861	Advanced stage	Stage 2

Table 2. City selection and features

Figure 6. European map with selected cities
Source: http://mapnall.com

4.3 Exploration methodology

4.3.1 Questionnaire

In order to best target the aspects to be explored amongst CoM signatories, (i.e., specific needs for local climate adaptation, benefits and obstacles of an extension of the CoM, *de-facto* adaptation measures and motivation for a CoM for adaptation), a questionnaire was prepared by ICLEI, Local Governments for Sustainability, and either sent to the participating cities in digital format or filled out during phone interviews (a copy of the questionnaire can be found in Annex 1). The first part of the questionnaire focused on the cities' experience in relation to adaptation and the second part focused on their evaluation of specific features of the CoM. Each of these parts presented some initial open questions, setting the context and allowing for the collection of some qualitative information about the interviewees, as well as closed questions, targeted at tailoring the interviews to detect significant aspects for the present report.

4.3.2 Interviewees

The questionnaires were completed by the respective responsible officers for adaptation on the one hand, and for implementing the CoM commitments on the other. In small and medium-sized municipalities, responsibilities for climate adaptation and mitigation (i.e., for the CoM) were performed by the same person, whereas the thematic responsibilities were divided in the two biggest cities in the selection, i.e., Birmingham and Copenhagen.

4.3.3 Questionnaire section 1 - Adaptation needs and responses

Section 1A of the questionnaire started with an inquiry about the state of play with regard to climate change adaptation in the selected cities, the presence of *de facto* adaptation activities and the barriers cities encountered when confronted with the topic. In addition, in section 1B, questions were posed to determine the main barriers to adaptation and their scale of relevance according to the city's experience. The list of barriers below that were included in the questionnaire is derived from an analysis of the EU Cities Adapt city survey[43].

- Lack of awareness;
- Lack of appropriate knowledge and data at city level;
- Little opportunity for cities to exchange experiences;
- Limited availability of resources within city administrations and in financial terms;
- Lacking overarching multi-level governance framework for urban adaptation.

These questions speak to the aim of this report to map out needs encountered when dealing with adaptation, so as to understand how to best shape a dedicated European wide initiative on urban adaptation.

Contextually, cities were also asked in section 1B what kind of support they would need in order to overcome each of these barriers. Proposals were made with regard to features that could potentially be included in a European wide initiative on urban adaptation - a scale of relevance was given to these proposals.

[43] EU Cities Adapt Survey Report 2012. Available from: http://eucities-adapt.eu/cms/assets/NewFolder/ Appendix-3-Survey-v1-AEA.pdf.

This section aimed to understand what the most beneficial aspects of a dedicated structure on adaptation for cities could be according to the specific experience of the interviewees.

In order to further understand cities' needs and benefits with regard to adaptation support, the opportunity was given to the interviewees to propose up to five factors that should be taken into account when structuring a European wide initiative on urban adaptation.

4.3.4 Questionnaire section 2 - Experience of participation in the Covenant of Mayors

The second part of the questionnaire aimed to clarify the experience of the city with regard to the CoM with a particular focus on those aspects that could be replicated for a similar framework for adaptation. In section 2A, cities were asked about their main motivation of signing the CoM in order to both identify the political conjuncture in which it took place as well as clarify the main triggers of joining such an initiative. The scope of the first inquiry was to understand to what extent the recognition or award of being a signatory represented a strong motivation for signing the CoM, speaking to the potential for a dedicated adaptation framework to replicate this function. In section 2B, a series of questions was posed, aimed at understanding which factors were most significant for the city in the context of the CoM and relating it to similar features a dedicated tool for adaptation could offer. Several questions referring to both technical and motivational aspects when signing the CoM were posed.

4.4 Main trends observed from the survey results

The survey highlighted some key features and provided a good understanding of what shape a framework dedicated to adaptation should take, also looking at valuable features of the CoM that could be repeated[44]. The main trends observed during the interviews will be sketched out according to key aspects relevant to the present contract.

[44] A more detailed analysis of the survey results will be presented in part 5 of this report.

General observations[45]

- *Bigger cities that have been frontrunners in climate mitigation also seem to be proactive on climate adaptation.* For example the cities of Copenhagen and Birmingham have advanced mitigation measures in place and are the only sampled cities to have adopted an overarching adaptation strategy, including a comprehensive vulnerability assessment and implemented measures.

- *A geographical focus is needed when shaping a support framework for adaptation.* Cities from Southern/South-Eastern Europe might generally need additional support from the European level due to the lack of beneficial national frameworks for adaptation. In contrast, Copenhagen and Birmingham, both located in Northern Europe, have operated within beneficial national framework conditions that were adjusted in a timely manner to support the local level in developing adaptation strategies in their respective countries.

- *Size matters when shaping support.* The two bigger cities of the selected interviewees, Copenhagen and Birmingham, received funding from their city councils and had adequate resources available to initiate work on adaptation.

- *An experienced high vulnerability to climate change impacts and the occurrence of disastrous extreme weather events so far seem to play a role in gaining political commitment.* For example, Copenhagen was hit by a violent cloudburst leading to massive floods in 2011, which raised attention on the urgency of adaptation in the city.

Needs

- *Knowledge gaps have been commonly seen as a major barrier to action in the field of local climate adaptation.* However, bigger cities have more opportunities to benefit from scientific studies by local universities that can provide data needed to support the development of an adaptation strategy, thereby helping these cities to bridge the knowledge gap.

- *It is particularly the smaller cities in Southern and South-Eastern European countries feel a strong need for European support in creating political*

[45] Please note that these observations only refer to the responses of the seven selected case cities. Therefore there might be exceptions due to the different specific contexts of other cities.

commitment to climate adaptation. Although Copenhagen and Birmingham would generally welcome a support framework for adaptation in the shape of a European wide initiative on urban adaptation, direct support from the European level is not seen as urgent as compared to the view of other cities.

- *Medium and small-sized cities present a stronger need for technical and financial support by the European level than bigger ones.* In smaller cities the barriers presented with regard to developing an adaptation strategy proved to be higher, and resources to overcome them more limited.

- *Medium and small-sized cities interviewed have expressed a greater need to exchange with peers on the European level* as well as on the national level to support action on adaptation.

Benefits

- *Obtaining and maintaining political commitment would represent a valuable benefit of an adaptation support framework.* The CoM was generally regarded as a valuable tool to gain and maintain political commitment. Although the majority of the cities interviewed had already obtained political commitment for mitigation when signing the CoM, many of them valued this feature in the CoM and its contribution to maintaining it, especially given the intrinsic volatility of government coalitions.

- *Medium and smaller cities would benefit the most by receiving support by the European level, also with regard to facilitating exchange with peers.* Many of the cities interviewed spontaneously flagged their participation in the EU Cities Adapt project as a valuable element to overcome the barrier relating to a 'lack of exchange'. The project provided an eight-month interactive coaching and training period, encompassing face to face activities, giving cities the opportunity to create linkages and learn from the experience of other cities, and to fund this interaction through the project. The continuation of such activities through a dedicated adaptation framework was consequently mentioned to be crucial for them to keep advancing in the field.

Obstacles

Adaptation needs its own targets. While mitigation targets' achievement can be quantitatively measured, a framework dedicated to adaptation would need to set its

own set of benchmarks and milestones, taking into account the specificity of adaptation and its process-based requirements.

Targets need to be adjustable to different local situations. Cities having more ambitious mitigation targets than the 20-20-20 experienced some problems in getting support on how to best fit them into the CoM monitoring structure. A framework dedicated to adaptation should take this into account, and develop a structure that is suitable to shape targets according to specific local situations.

De-facto adaptation measures

- *Most cities have de facto adaptation measures in place*, mainly referring to risk management plans and activities and to urban design projects including green infrastructure related measures. From the findings gathered from the interviews, it can be assumed that overlap between adaptation measures and CoM planning is limited to only a small amount of existing measures.

- *Creativity helps adaptation*. Projects not explicitly addressing adaptation but involving collateral sectors can be used to include adaptation features (e.g., Almada included adaptation considerations into a project targeted to fire brigades).

Motivational aspects

- *A comparable commitment to the CoM would be beneficial in a support framework for adaptation*. Recognition of the cities' commitment to mitigation has been generally rated as a significant motivational aspect in joining the CoM, especially for maintaining a durable effort aiming to achieve the 20-20-20 target.

- *Momentum for adaptation is needed*. Especially with regard to national contexts in which no specific support is in place for adaptation, a framework providing assistance and a commitment for adaptation would give momentum and structure efforts by pilot cities. For example, in Burgas, mitigation as well as adaptation is advanced by an *agent of change*[46] working in the municipal administration, and the recognition deriving from the CoM framework helped crystallise these efforts and make them continuous.

[46] Agents of change are defined as personalities striving for change in a determined system.

Part 5 - Analysis of the information obtained from the case studies with regard to adaptation support needs and potential opportunities

5.1 Introduction

The chapter analyses the results of the interviews carried out in light of this report and identifies major support needs for urban adaptation and present opportunities that may constitute a basis for shaping a future European wide initiative on urban adaptation. The analysis is directly informed by the trends outlined in Part 4 and will inform the suggestions of the potential structure and main features of the adaptation initiative to be presented in Part 7 (see figure 7).

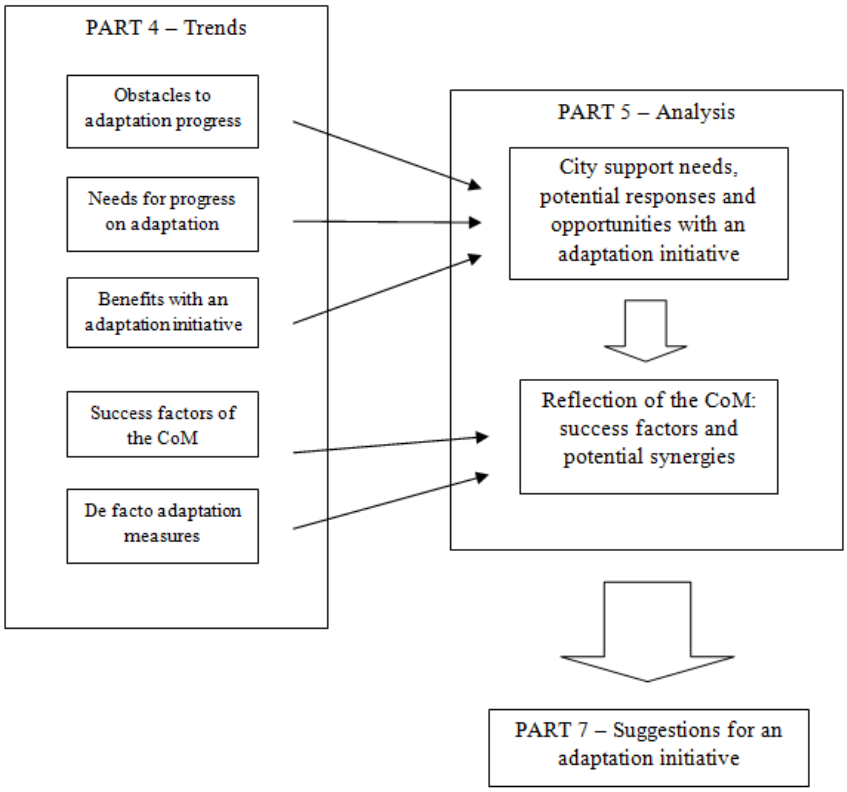


Figure 7. Structure of Part 5 and its links to Part 4 and 7

The analysis of the outcomes of the questionnaire is divided into two parts. The first part is structured according to five identified major support needs crucial to progressing on urban adaptation. Each support need corresponds to obstacles that the cities have experienced and provides potential responses to overcome these. The first part concludes with a consideration on the opportunities with creating an adaptation initiative to take on the suggested responses to the recognised support needs. The second part of the analysis focuses on identifying the success factors of the CoM and their transferability potential for an adaptation initiative as well as synergies and overlaps with adaptation activities. The second part concludes with a brief consideration on the CoM in light of embracing the issue of adaptation.

5.2 City support needs, potential responses & opportunities with establishing an adaptation initiative

This section identifies the areas most in need of support to promote progress on adaptation and gives recommendations on potential ways to respond to these needs. Opportunities for establishing an initiative on adaptation are also discussed.

5.2.1 Awareness-raising on adaptation in municipalities

Support needs

Lack of awareness about the urgency of climate change adaptation in municipal administrations represents an obstacle for cities to advance adaptation. This is especially a challenge for cities that are at the beginning of their adaptation process, whereas cities that are slightly more advanced in their adaptation work have already reduced the need for awareness-raising and generating stakeholder support within the municipality over time.

In general, holistic awareness on adaptation is still lacking in many municipalities. Although ‘de facto’ adaptation measures are sometimes embedded into risk management plans for vulnerable urban sectors, there is often no general awareness on the overarching nature of adaptation.

This is, for example, the case in the City of Padua, in which several targeted actions to mitigate typical impacts faced by the city have been mainstreamed and prioritised but no general understanding of adaptation has so far been introduced.

Creating awareness also means starting to address and change the way municipal departments typically function (e.g., from sectoral thinking and acting towards cross-sectoral coordination), and changing the mindset of senior staff having worked for a long time in municipalities that might show resistance to factoring adaptation into their daily work. Making different municipal departments aware of the importance of planning for adaptation is not a short-term and immediate process: the experience of the cities interviewed reveals that external support might be very beneficial to bridge this gap and catalyse action.

For example, in the case of the cities of Almada (Portugal) and Zadar (Croatia), an external project was crucial to overcome or diminish this barrier. In the case of Zadar, a UNDP-financed project on mitigation raised awareness on climate change and constituted the basis for a spill-over effect into adaptation, which the city is now starting to show progress on. In the case of Almada, adaptation action carried out mostly due to a dedicated and perseverant agent of change in the municipality have been brought forward and adopted without substantial consensus by other departments in the past, and it has been only through the coaching delivered during the EU Cities Adapt project[47] that a dialogue to relevant departments, such as the infrastructure department, has been initiated and is now being brought into the local planning process.

Responses

- Give exposure and give more weight to adaptation from higher governance levels. Here the EU Adaptation Strategy can be considered a first milestone for raising awareness that may benefit the local level.

- Develop guidance material in the shape of awareness-raising and communication material targeted to municipal staff. A crucial aspect is to raise awareness in local authorities on the cross-cutting nature of adaptation and on the consequent restructuring of departmental work and behavioural change needed in municipalities to set-up an adaptation process. The City of Birmingham specifically proposed the creation of such a communication package as this links to their past experience in involving municipal staff.

[47] http://eucities-adapt.eu/cms/

5.2.2 Data and knowledge management at city level

Support needs

Lack of data and technical knowledge or lack of access to it represents a major obstacle for most of the cities that have been interviewed, and especially for smaller municipalities. Bigger cities usually have easier access to research conducted by local universities, while smaller municipalities have normally less resources to access this knowledge. Furthermore, bigger cities are more likely to be included in adaptation related research studies compared to smaller cities. Also, bigger cities can both afford and need to have more staff working for the city council, thereby allowing for more flexibility in taking on a new issue such as adaptation. Data is a crucial element in adaptation planning and enforcement, as it becomes much easier to argue in favour of adaptation when sustaining the argument with concrete evidence. Lack of data and technical knowledge or lack of access to it raises various needs for support in municipalities. On the one hand, cities often lack data that is downscaled to the local level since climate observations are usually made at the regional level and data are not produced to serve the needs of municipal planning. On the other, municipalities can lack capacity in interpreting data in light of adaptation planning. Especially smaller municipalities having fewer human resources are not always correctly equipped to interpret data even if these are available. A third aspect of this issue also links back to the lack of awareness in municipalities: in fact, even if data is available for specific municipal sectors, other relevant departments might not be aware of this due to a lack of internal communication. It is therefore crucial that different sectoral data are shared between different departments.

The need for data is sometimes also intertwined with funding shortages. Unless cities have a privileged relationship to local universities, obtaining data requires a monetary investment municipalities might not always be in the position to afford.

Responses

- Create a helpdesk that provides support for gathering data and climate projections.

- Create an on-line ‘climate registry’ acting as a database collecting information from cities that allows cities to:

- Exchange on data and adaptation examples, especially between cities that face similar challenges. Getting examples on data collection and use and comparing measures already implemented can represent a significant support to focus on options that are viable, thus easing their decision-making processes, speaking to time and money saving. This need was particularly expressed by the cities of Vitoria-Gasteiz and Almada and bridges the support need on data collection with the need to exchange with other cities.

- Source information on adaptation-specific indicators to monitor progress.

5.2.3 Peer-to-peer exchange

Support needs

Lack of practical examples and urban case studies to provide lessons learned with regard to setting up an adaptation process and in planning and implementing adaptation measures has been indicated as a major obstacle. Cities wish to learn from practice rather than theory to avoid pitfalls and to find motivation and inspiration for their own local context.

Exchanging knowledge and experiences is a crucial activity to improve action on adaptation as is benchmarking progress by comparing it with that of other cities and gaining new insights on process and strategy development. Despite the emphasis on the importance of this aspect, only one of the cities interviewed, Copenhagen, fostered peer-to-peer exchange from the beginning of the adaptation process to get insights in other cities' experience.

This leads to the conclusion that cities in general need support to initiate peer-to-peer exchange as this is not always recognised as a priority by municipalities. A factor leading to this sub-optimal output might be represented by the lack of a clear mandate in cities to be able to exchange. Birmingham presents a good example that despite the creation of a network of British cities engaging on adaptation, the city lacked both time by municipal staff to travel and a clear mandate to engage and as a result did not take the chance to exchange with peers.

Support needed for exchange was clearly reinforced during the interviews by the fact that interviewees that engaged in peer-to-peer exchange clearly stated that they benefited very much from it as these activities served to better understand options and success factors to be replicated. For instance, some of the interviewees taking

part in the EU Cities Adapt project regarded "the project activities as a valuable opportunity to exchange and create strategic partnerships". For example, Almada initiated cooperation with the City of Barcelona during the project. The city of Padua declared in its turn that the EU Cities Adapt project was instrumental in understanding which other Italian cities were active on adaptation, and to start networking beyond the project participation.

Responses

- Engagement in external opportunities that support exchange activities. The information obtained in the interviews suggests that exchange is crucial to advancing adaptation but is hindered by time and personnel constraints in cities (and by financial constraints exacerbated by the economic crisis). This factor was particularly highlighted by the City of Zadar and was reaffirmed by most of the cities interviewed.

- In addition to face-to-face exchange and in order to overcome time and budget constraints, an online portal containing city case studies such as the EEA Climate-Adapt platform could be a useful tool to foster knowledge on other cities' experience.

- The creation of a common methodology on adaptation-related issues, such as the creation of a common framework for vulnerability assessment methodology and indicators, and a common reporting structure on measures. This would create a common language for adaptation approaches, thus making adaptation actions in European cities more easily comparable.

5.2.4 Funding for local adaptation

Support needs

Lack of financial resources is a limiting issue with regard to planning for adaptation. This is especially true for smaller cities and for those cities that are in countries most severely hit by the economic crisis. However, some of the interviewed cities indicated that the economic crisis forced them to develop creative ways to partly overcome this barrier. In the case of Almada adaptation has, for example, been planned into risk management measures and adaptation considerations have been introduced into municipal land-use plans and included in the different departmental budgets. Although this has been a good means to finance

isolated adaptation measures there is a need for a holistic approach when planning for adaptation. Therefore, there is a need for additional financial support and financing options on adaptation.

Responses

- The European level can play a crucial role in providing guidance on how to factor adaptation into municipal budgets and create programmes to make funding accessible.

- European programmes specifically targeting adaptation both to support and implement an adaptation process and to develop and implement adaptation strategies and plans. These factors are particularly relevant for the 'LIFE programme', explicitly designated in Action 2 of the 'EU Strategy on Adaptation' as the programme deputed to support adaptation action in Europe. This aspect was particularly highlighted by the City of Padua.

- Information about available funding is crucial and could include an online platform gathering relevant European funding opportunities and guidelines on how to access these. Information about national and regional adaptation funding opportunities could be incorporated into this platform to increase its outreach and usability.

5.2.5 Multi-level governance framework for urban adaptation

Support needs

Lacking support and a multi-level governance framework is generally a barrier for cities. The severity of this barrier varies considerably depending on the region and the country in which the cities are located and tends to be more severe in Southern and Eastern Europe. The cities of Copenhagen and Birmingham, both located in Northern Europe, seemed to be the ones that felt best supported by their respective tiers of government. This is supported by the fact that their national governments adjusted promptly to adaptation needs by adjusting national laws that created a general support for all cities in their countries.

A multi-level governance interface is needed when planning for adaptation as many adaptation impacts exceed the municipal boundaries and are better suited to be tackled at the national and regional levels. A successful multi-level governance

approach requires several enabling factors to be included into the adaptation planning. Firstly, a clear division of responsibilities between different tiers of government and cooperation structure is needed, creating an interface of roles and division of responsibilities. Secondly, effective multi-level governance implies the need for regional and local data and knowledge to be properly aligned and for local and regional adaptation strategies to be planned in parallel.

Responses

As a means to support the creation of a multilevel governance framework for adaptation, the introduction of a European legislation enforcing the adoption of a national rule has been generally regarded as a good means to make progress on adaptation, keep momentum on the topic and provide the local level with a better and more even starting point.

In the absence of a European legislation on adaptation in cities, it is expected that mainstreaming adaptation will be difficult. Such legislation should acknowledge the different situations in member states and consider the needs of countries that are less advanced in working with adaptation.

5.2.6 Creating opportunities: addressing responses by establishing an adaptation initiative

The expressed support needs and suggested responses speak to current gaps in urban adaptation processes. These gaps will be crucial to bridge in order to effectively and efficiently plan and implement adaptation at the local level. To this end and derived from the expressed support needs of the interviewed cities there are crucial aspect or pillars of effective urban adaptation that can be identified. These are:

- A relevant element to enable and facilitate adaptation is represented by the set up of a cross-sectoral planning framework. This is crucial, on the one hand, when conducting a vulnerability assessment and identifying priorities, and, on the other, to carrying out a baseline review in municipalities when allocating resources and responsibilities. A cross-sectoral planning framework can enable taking advantage of different co-beneficial aspects when planning for adaptation measures (for example, a cross-sectoral planning of green infrastructures will

allow for their use as recreational facilities, as well as, for instance, natural water storage facilities in case of heavy rain).

- Setting a framework that considers all intertwined levels of adaptation also requires the creation of a multi-level stakeholder process: stakeholder engagement is key to mainstreaming adaptation in cities, as this fosters exchange of information between local groups of interest and increases awareness on adaptation options, thus avoiding 'maladaptation' to be pursued by uninformed stakeholder groups (e.g., businesses).

- Urban adaptation processes should be aligned to regional ones, as the more coordinated and internally consistent local and regional adaptation strategies will be, the more effectively they will respond to climate hazards. A clear division of responsibilities and an integrated planning effort between different tiers of government is also likely to decrease adaptation costs, as co-financing schemes for measures could result from such cooperation.

- The process-based approach presented above also calls for an appropriate monitoring structure for adaptation measures, once these are planned for and developed. Consequently, 'ad hoc' indicators should be developed when evaluating progress on adaptation.

By reviewing the responses given by the cities that speak to strengthening the above pillars there is a clear indication of the need for a support framework for urban adaptation. The suggested responses open a window of opportunity for an initiative that could help coordinate and mainstream adaptation efforts and at the same time assist cities in developing and implementing adaptation strategies. It may be suggested that the initiative embraces the following highlighted responses:

- Give exposure to adaptation by lending it a political significance. This speaks to emphasising a comparison between European cities and their expressed involvement in adaptation.

- Develop guidance material for different aspects of setting-up and running a local adaptation process including practical advice on how to involve stakeholders, how to raise awareness, how to manage data, how to conduct an integrated vulnerability assessment, how to identify and prioritise appropriate measures, and how to measure and evaluate adaptation.

- Create a platform for exchange of data, adaptation measures and strategies, experiences and case studies (both online and face-to-face).

- Form a hub for online reference materials, adaptation publications and related resources.

- Develop support for gathering information on relevant EU funding on adaptation including availability and suitability of funds and technical assistance on application processes.

- Support regional and EU collaboration by creating coordination and exchange nodes regionally and even nationally and being the portal for collaboration with the European Commission.

In Part 7 more concrete recommendations will be discussed on crucial elements and suggested functions of an adaptation initiative derived from the above analysis.

5.3 Reflection on the CoM: success factors and potential adaptation synergies

Based on the results of Part 2 of the questionnaire (please see appendix), the following paragraphs will present the main success factors of the CoM and analyse their potential transferability into a future initiative on adaptation.

5.3.1 CoM: potential for transferability of success factors

Part of the interviews of CoM signatories was targeted at inquiring into features of the CoM that could successfully be transferred into a future initiative on adaptation and, on the contrary, features which are mitigation specific and would not fit into it. Therefore, interviewees were asked about their experience with the CoM in order to isolate success factors.

To this end, the first question cities were asked in part 2 of the questionnaire, dedicated to the CoM, was related to their motivation for signing up to the initiative. Results were quite homogeneous and, in the majority of the cases, cities had already started planning for renewable energy and energy efficiency before joining the CoM. The decision to sign up to the CoM served mostly to reaffirm

their commitment in developing sustainable energy plans and make their progress on mitigation accountable. Consequently, it can be argued that accountability at the international level played an important motivational role in the success of the initiative. Linked to this aspect, another important motivational factor for cities was represented by visibility on the initiative's website, increasing public international credibility on the mitigation efforts of municipalities. In some cases, the commitment shown by signing up to the CoM also helped increase credibility of cities when applying for European projects on energy and energy efficiency, and turned into an instrument to attract funding through the JESSICA and ELENA programmes.

One other crucial motivation for signing up to the CoM was represented by political commitment. Although many cities had already obtained a mandate for mitigation, they reckoned joining the CoM and committing to achieve concrete results until 2020 could facilitate maintaining it in the longer term.

Peer-to-peer exchange was also, in some cases, generated at national and regional level through the support of CoM coordination and support structures, while a funding framework enabling face-to-face international peer-to-peer exchange is missing in the CoM. Some of the CoM signatories interviewed declared they would have benefited from such a possibility, and suggested its adoption in a future initiative for adaptation.

Technical support by the CoMO was generally appreciated, although not all interviewees made use of the tools offered, as many had already established partnerships with universities or research institutes and created GHG inventories and monitoring schemes based on local indicators. This created in some cases problems in reporting results to the CoMO (consequently negatively affecting accountability).

5.3.2 Potential synergies: de facto adaptation measures in the CoM

Climate change adaptation and mitigation are two fundamental pillars of climate strategies in cities. In fact, integration in the planning of overlapping aspects can avoid maladaptation, create co-benefits and allow for consistency and coherence in the municipal management system.

Therefore, integration between these two issues should be fostered when possible. Nevertheless, as stated above, adaptation needs and targets are context-specific.

Based on the empirical observation conducted among the CoM signatories, this differentiation seems to be crucial when thinking of an initiative to advance urban adaptation in Europe. In order to better understand the degree of overlapping potential between mitigation measures planned in the framework of the CoM and *de facto* adaptation measures, an analysis of the interviewees' Sustainable Energy Action Plans (SEAP)[48] was conducted. As it results from this analysis, Padua is the only city to have explicitly mentioned adaptation in its SEAP. Both Padua and Vitoria-Gasteiz have planned for urban green spaces that will contribute to reducing CO_2 and to contextually reducing heat-island effect, but these are minor actions in the context of their whole mitigation strategy and constitute a very small part of their SEAP (for example, in the case of Padua, this is one measure over 39 that are planned). Most importantly, and as stated above, crucial milestones in the adaptation and mitigation planning processes are separate and specific: a good example of this is represented by the need for GHG inventories in mitigation against the need for vulnerability assessments in adaptation as fundamental steps to initiate the two processes.

5.3.3 CoM consideration in light of adaptation

Drawing conclusions from the CoM experience, crucial factors can be isolated that could be transferred to a future initiative on adaptation. Accountability, political commitment and visibility will represent crucial features to enhance motivation for cities to sign up to a new adaptation framework, enabling them to gain and keep momentum on their adaptation effort. While mitigation was at a more mature stage when the CoM initiative was launched, adaptation is still in its infancy, therefore a strong trigger for a European initiative appears to be needed to kick-start and mainstream this process. Consequently, gaining and maintaining political commitment over time despite changing political coalitions should represent one of the goals of the new framework for adaptation.

Peer-to-peer exchange proved to be a crucial support need for cities, therefore, a new initiative on adaptation should create opportunities to exchange that are, differently to the CoM, directly funded, organised and coordinated by its secretariat.

[48] With the exception of Zadar, that has, at this stage, still not submitted its SEAP to the CoMO.

In order to enhance and improve multi-level governance, coordination and support structures similar to the ones present in the CoM should be set. These proved, in fact, to have a crucial role in linking the European and the local level through the creation of regional and national interfaces.

As is described in part 7, and in line with what was argued in paragraph 4.4, a framework for an initiative on adaptation should include specifically tailored indicators, targets, monitoring tools and technical support materials. As a general rule to respond to cities' needs, these materials should be flexible enough to be adaptable to different specific local situations and levels of advancement with regard to adaptation, so as to be applicable to the largest number of cities possible. Table 3 presents a synthesis of transferable, improvable and non-transferable factors from the CoM to a future initiative on adaptation.

Transferable factors	Improvable factors	Non-transferable factors
Motivational aspects including: • Gaining and maintaining political commitment • Accountability • Visibility • International credibility • Support and coordination structures bridging the gap between the international and local level	Peer-to-peer Exchange: • Creation, in the new initiative, of funding and programmes dedicated to participants' peer-to-peer exchange	Technical support materials for implementation, monitoring and reporting: • New adaptation specific materials will need to be developed for cities

Table 3. Transferable, improvable and non-transferable factors to a new initiative on adaptation

5.4 Conclusions

The analysis of the interviews carried out in this chapter has shown an array of valuable factors that can support the shaping of a European wide initiative on adaptation. Such a support framework should enable the creation of a coherent and multi-level adaptation approach and promote the involvement of multiple stakeholders and different tiers of government. Moreover it should encourage cross-sectoral planning inside municipal administrations in order to take advantage of the co-benefits that adaptation presents. A European wide initiative on adaptation may help to empower municipalities to set-up long-term adaptation planning processes by means of financing and creating access to knowledge.

Taking into account the identified specific support needs for urban adaptation and the consideration of the current limited synergies and overlaps between mitigation and adaptation activities amongst the CoM signatories, it is suggested to establish a separate initiative for adaptation to accurately respond to specific adaptation related aspects. However, based on the above analysis of success factors of the CoM it is also suggested to build on the model of and establish an adaptation initiative within a similar framework to the CoM, in order to create close linkages and further synergies between adaptation and mitigation efforts. The nature of the future adaptation initiative including suggestions on its specific functions and responsibilities will be elaborated on in Part 7.

Part 6 - Identifying challenges, barriers, opportunities and benefits in the local-regional interface to facilitate adaptation processes

6.1 Introduction

This chapter reflects on the state of the art of local-regional interfaces with regard to climate change adaptation and gives recommendations on possible solutions to improve local-regional interface. The chapter also briefly touches upon the link to the international adaptation processes with special reference to ecosystem-based adaptation and the potential involvement of local and regional authorities.

6.2 Analysis of local-regional interface in the case-study cities

A good starting point to reflect on local-regional interfaces is provided by the case-study cities to the present report. As it has been stated in Part 2.2.1, a wide-spread uptake in local-regional cooperation for climate change adaptation is still largely lacking in Europe. This assessment is supported by the interviewed cities. In fact, only two of the seven cities have cooperated with the regional/national level to plan for adaptation, and these are Copenhagen and Birmingham, the biggest cities part of the selection and both located in Northern Europe. While in the case of Copenhagen the interface took more the shape of a lobbying activity generated by the city in order to convince the national government to adopt legislation and provide funding for adaptation activities, the experience of Birmingham presents different elements. Birmingham started planning the management of key resources that exceeded its administrative boundaries in cooperation with the regional level, thus establishing an interface early on. However, due to the economic crisis the regional authority was unable to continue its cooperation with the city with regard to adaptation, leaving Birmingham to continue its collaboration with only the national government. According to Birmingham this has had negative impacts on the management of regional resources.

The rest of the cities interviewed do not present a structured cooperation with other tiers of government in the field of adaptation, although all of them recognised this would be a beneficial factor for the advancement of their adaptation strategy. For example, the city of Almada is working intensively on coastal adaptation, a sector that is by definition subject to the jurisdiction of different public bodies. The lack of a regional tier of government in the Portuguese State is delaying their work, since the city has to engage in 'ad hoc' unstructured communications with the other institutions deputed to manage the coastal area rather than being able to base cooperation on an existing protocol.

The example of Almada represents a typical experience that in many cases it is the local level that is trying to create interfaces with the regional level, rather than vice versa. A similar situation has been reported by the City of Burgas. In the Bulgarian case, as in many Eastern European countries, the state structure is rather centralised, thus not allowing for the creation of different tiers of government. Notwithstanding the presence of state agencies on the territory, there is no clear responsibility or multi-level governance interface on the management of key resources. Also in this case, it is the city that is trying to create an interface and to enable a dialogue with other tiers of government to initiate their adaptation work. Similar in this respect is the case of the City of Padua. Although Italy presents several intermediate tiers of government (provinces, regions), a clear interface on adaptation allowing for integrated planning still has to be created in most of the regions. Also in this case it is a city to recognise the need for an interface as crucial to advancing adaptation and to strive for the adoption of a clear legislation ruling this matter.

From the interview results we can state that adaptation action is at the moment mostly residing in cities. In accordance to the trends presented in Part 4.4, in Northern Europe the level of responsiveness and preparedness of superior levels of government seems to be higher than in Southern and Eastern Europe, suggesting that these areas might need more external support to tackle the problem. Although several regional adaptation projects have been initiated, these are generally only generating knowledge for regional or trans-regional adaptation strategies. The focus are yet to be centred around reconciling and synchronising cities and regions in the adoption of coherently interfaced adaptation plans that can enable an integrated management structure of natural resources that exceed municipal boundaries.

6.3 Main challenges and barriers to local-regional interfaces

After the analysis of the evidence presented in the case studies, it is useful and informative to look into the main barriers leading to inefficiencies in the development of local-regional interfaces. First of all, it might be useful to differentiate between two regional typologies, since each of them could encounter specific problems. We will define 'micro-regions' as regions that are part of the same national context. These may be administrative regions (e.g., Baden Wurttemberg in Germany or Emilia Romagna in Italy) or historical-geographical regions (e.g., the Black Forest Region in Germany). On the other hand, 'macro-regions' can be defined as regions that transcend national boundaries. These two clusters experience, at the same time, problems that are common and issues that are rather cluster-specific.

6.3.1 Challenges and barriers in 'micro-regions'

One of the main challenges in linking the regional and the local levels is connected to the absence of clear authority and division of responsibilities between these two levels hindering coherence between policies. For instance, the regional level of a determined territory might lack a mandate to act on adaptation by the national level or has received a mandate not foreseeing cooperation and integration with the local level on the matter[49].

A clear lack of mandate also entails the absence of specific funding for setting-up a multi-level governance framework. Setting up such a process requires of course additional dedicated resources, at least in terms of time invested by civil servants[50]. A harmonization in the parameters used for data collection is also vital to foster a dialogue between the local and regional levels. Without a common interpretation of data and without an interpolation between data at various degrees of complexity there can be no sound knowledge to base cooperation on[51].

All of the barriers mentioned above lead to sub-optimal outcomes in the development of adaptation action. Firstly, the adoption of separate adaptation

[49] A first important step by national states to enhance interface lies in the adoption of a National Adaptation Strategy foreseeing targets and actions to be implemented at the regional and the local level.
[50] EEA Report 2/2012, p. 108.
[51] Advance: Common Strategic Paper of the AlpAdapt Project (http://www.adaptalp.org/index.php?option=com_content&view=category&id=146&Itemid=135), p. 14.

strategies that are not aligned between regional and local levels can create conflicts in the management of common resources. Secondly, it can lead to suboptimal results in tackling climate impacts. A clear example of this is river flood management, for which the local level only has jurisdiction over very small portions but the impacts of which can invest entire regions.

Furthermore, if the decision-making process is not integrated between the local and the regional/national levels, decisions that are made at the higher levels of government can even contradict or hinder adaptation at the local level (e.g., the construction of hard infrastructure on a territory can decrease areas for flood retention at the local level)[52].

6.3.2 Challenges and barriers in 'macro-regions'

Macro-regional cooperation is of fundamental importance for adaptation. In addition to the local-regional interface presented in this report as crucial to advancing adaptation, it must be highlighted that different regions are interconnected, making adaptation to climate change an inter-regional issue. For example, if a region in the Alps reacts to water scarcity by extracting more water from its rivers, this has consequences for downstream water users. This challenge calls for inter-regional coordination of adaptation policies[53].

Even if some of the challenges presented for 'micro-regions' are common for 'macro-regions', these face specific challenges of their own due to the fact that cooperation in these cases can also involve a bilateral or multilateral dialogue. A first obvious barrier is language, representing an obstacle for communication and data interpretation in different countries involving both general and scientific communication (since technical reports are usually written in the local language). Together with language, 'cultural' barriers can lead to diverging priority-setting or working methodologies during transnational cooperation activities.

Further to presenting a clear allocation of responsibilities on their territory, transnational regions, implying different sovereign political systems, also face the problem of identifying responsibilities of different regional institutions in different

[52] EEA Report 2/2012, p. 114.
[53] EEA Report 3/2013, p. 19.

countries, making it more difficult to understand who the correct contact people for specific issues are.

Mutual trust on relevant knowledge has proven to be a crucial element in transnational cooperation. In fact, it is necessary to ensure that all the regions taking part in one action rely on the same knowledge base: if climate projections or risk assessments are carried out according to different parameters, this can undermine the creation of a common understanding on actions to be taken. Many macro-regional adaptation cooperation projects aim first at creating a common understanding by developing sound scientific knowledge to then implement regional adaptation strategies and action plans. For example, the Baltadapt Project[54] is at the moment creating a common adaptation knowledge base in the region and elaborating an overarching adaptation strategy, but it is not yet in the position of integrating it into local adaptation plans and strategies.

Furthermore, in order to create a regional adaptation strategy that is consistent; development strategies for the regions involved have to be aligned to the national development plans for those regions. Conflicting spatial or land use planning can hinder trans-regional cooperation.

Finally, a crucial element of macro-regional adaptation is represented by a lack of mandate to initiate cooperation. At this stage, transnational adaptation is often propelled by European or national cooperation programmes (such as the INTERREG Programme) but has not yet become a durable and institutionalised process.

6.3.3 Benefits and opportunities of local-regional interface in 'micro-regions' and 'macro-regions'

Several benefits and opportunities deriving from an integration of climate adaptation planning between the local and regional level can be highlighted.

First of all, territorial, differentiated adaptation strategies are able to cover a specific geographical area within which common impacts are predicted. The development of regional strategies can lead to greater territorial cohesion through the overriding of political barriers, such as national borders. Regions have direct

[54] www.baltadapt.eu

influence over national and European policy formulation but are also in a strong position to enable local stakeholders, such as municipalities, to participate and integrate their own initiatives into the development and implementation of an adaptation strategy.

A crucial benefit is represented by the possibility to plan for and implement measures that cannot be developed or implemented by one actor due to limits in jurisdiction or responsibilities. Furthermore, local-regional cooperation can create a comprehensive knowledge base for climate change impacts, vulnerabilities and options to improve efficiency in resource management, potentially leading to financial savings. Another crucial issue, which was already highlighted in section 1.3 of this report, is the necessity to manage natural resources that are normally much broader than municipal or even 'micro-regional' boundaries. An appropriate spatial planning taking into account a broad area can allow managing resources coherently and better tackling risks. Clear government structures and the creation of integrated adaptation multilevel strategies also serve to mitigate the barrier of short-term political mandates: even if cooperation is established due to the presence of agents of change at the regional or local level, if this is not institutionalised through a clear division of responsibilities, its duration can be quite volatile.

6.3.4 Recommendations on how to bridge the gap of regional-local interface

The main barriers to the full realisation of regional-local interfaces are summarised below:

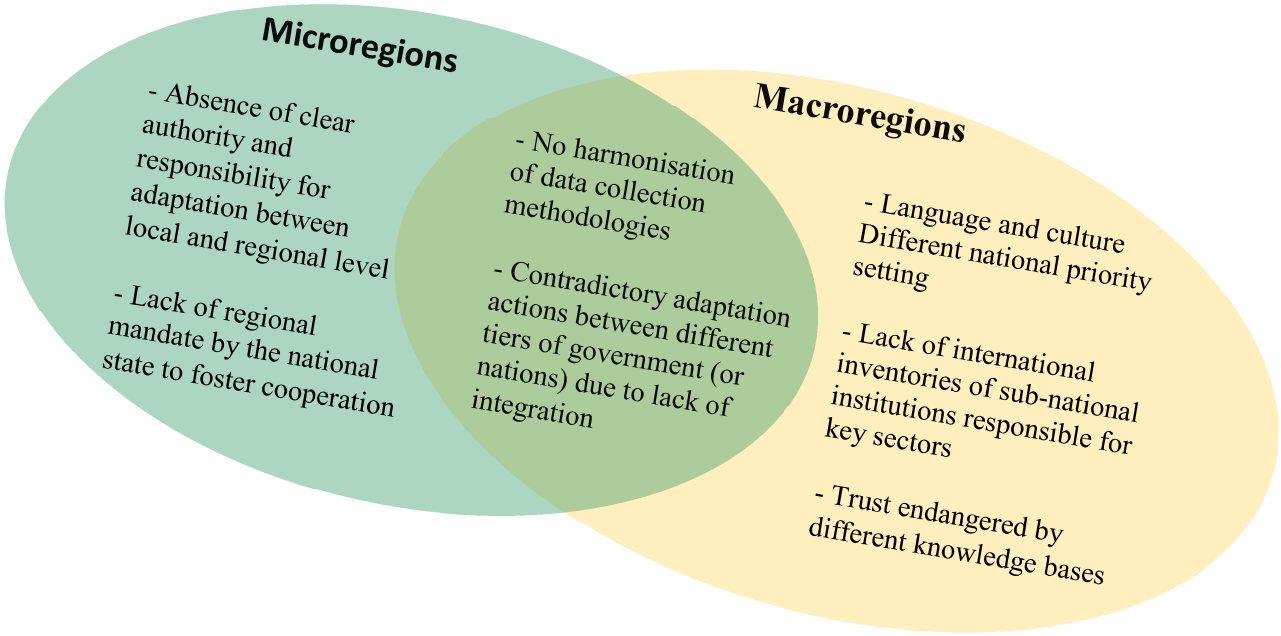


Figure 8. Main barriers and challenges to local-regional interfaces
Source: ICLEI

One of the crucial aspects that emerged in this chapter relates to the fact that the picture in respect of climate change interaction is quite scattered. In many cases cities are developing climate change adaptation knowledge and actions that are more advanced than the ones of the region they are located in. In other cases, (also through trans-regional cooperation projects) regional adaptation strategies are being produced that are not yet connected to those of the cities present in that region. It is clear that, due to the severe consequences of climate change comprehensive action on adaptation at any level of government need to be incentivised. Waiting for a harmonisation of local and regional legislations and mandates to act on adaptation would cause a huge delay in implementing adaptation action. To overcome this barrier it is crucial that cities use a flexible management framework (an example of this is the IMS Cycle presented in section 2.3.5 of this Report) when planning for adaptation. By having a framework that cyclically allows for monitoring of results and for updating the baseline rather than having a linear planning approach, cities can more easily incorporate new regional developments into their adaptation strategies. The adoption of national adaptation strategies by member states should structure and increase the delegation of competences to regions to enable planning with cities on their territory in order to create a coherent framework improving multi-level planning and cooperation. To this end, the inclusion of adaptation

considerations into for example Environmental Impact Assessments (EIA)[55] and Strategic Environmental Assessments (SEA) would be very beneficial to regional adaptation. This would ensure mainstreaming of adaptation efforts into crucial policies and create a common understanding of impacts and vulnerabilities at different scales as well as creating better coordination for disaster risk reduction management.

Especially for macro-regions, the creation of an inventory of functions and responsibilities of key experts and policymakers can make interaction between different actors more efficient. This would lead to the adoption of trans-boundary communication protocols that should ideally include actors of both public and private sectors that are in charge of strategic resources (e.g., water, infrastructure and energy). Finally, in accordance to the findings presented in Part 5, it is crucial that coherent and integrated data are produced and peer-to-peer exchange activities are carried out, so as to create synergies and foster peer-to-peer learning. Regions could, in this respect, take the lead and organise knowledge and capacity building activities with municipalities on their territory and create harmonised tools for data collection.

6.4 Reflection on the key-role of ecosystem-based adaptation and green infrastructure at the European and international level

In its "Report on the technical workshop on ecosystem-based approaches for adaptation to climate change", the United Nations Framework Convention on Climate Change (UNFCCC) states that "climate change exacerbates the pressure on ecosystems and people that are already negatively affected by unsustainable practices".[56] In accordance with this position, a focus for adaptation presenting co-benefits for the environment and humans should be taken.

Ecosystem-based adaptation can respond to this need, being based on natural ecosystems as well as those ecosystems intensively managed by humans. Relevant activities might include conservation of existing ecosystems or creation of "new" ecosystems (e.g., green spaces in urban environments). Ecosystem-based

[55] EEA Report 2/2012, p. 114.

[56] UNFCCC Subsidiary Body for Scientific and Technological Advice, thirty-eighth session, Bonn, 3-14 June 2013, Report on the technical workshop on ecosystem-based approaches for adaptation to climate change, p. 5.

adaptation approaches can be applied across a large number of sectors (e.g., agriculture, forestry and water management, nature conservation and human health).

With particular reference to the European experience, ecosystem-based adaptation has come to be used in urban adaptation in the form of green and blue infrastructures, due to their cost-effectiveness in comparison to grey infrastructures and the co-benefits deriving from their use, such as health benefits through reduced air pollution, improved quality of life in cities (through, for example, the creation of an urban green space providing cooling effect in summer and representing a recreational facility for citizens) and improved productivity from agriculture[57]. Cost-effectiveness and co-beneficial aspects can facilitate the adoption of measures in times of economic crisis and speak to political commitment for adaptation.

In the case of ecosystem-based adaptation it is particularly crucial to seek for an integration of regional opportunities across institutions, sectors or territories. In fact, cross-sectoral partnerships and collaboration between decision-makers are vital to integrating climate, biodiversity and ecosystem service policies.[58]

6.4.1 International-regional-local interfaces

The UNFCCC requires Parties to the Convention to take action on mitigation and adaptation with the ultimate goal to achieve a degree and rate of climate change that is limited to a level which would allow ecosystems to adapt naturally to avoid threats to food production and enable sustainable economic development. Parties are also required to take measures to minimise negative economic, social or environmental impacts of their activities with the aim to mitigate or adapt to climate change. The Nairobi Work Programme encourages action on adaptation[59] and is aimed at assisting all Parties, in particular developing countries, to improve their understanding and assessment of climate impacts and vulnerabilities and make informed decisions on practical adaptation actions and measures.

[57] BfN Workshop on "Developing ecosystem-based approaches to climate change – why, what and how", 2010, p. 11.
[58] BfN Workshop on "Developing ecosystem-based approaches to climate change – why, what and how", 2010, p. 20.
[59] BfN Workshop on "Developing ecosystem-based approaches to climate change – why, what and how", 2010, p. 20.

UNFCCC highlights different actions that would be crucial for advancing ecosystem-based adaptation, specifically:[60]

- Developing and exchanging best practices for ecosystem-based adaptation;
- Compiling and synthesising existing guidelines on ecosystem-based adaptation, as well as integrating ecosystems into climate change vulnerability assessments and
- Undertaking an assessment of how ecosystem-based approaches for adaptation are integrated into climate change adaptation strategies.

To this end, the Nairobi Work Programme can have a crucial role in facilitating a dialogue between policymakers and expert organisations on knowledge production and dissemination, with particular reference to:[61]

- The development of guidance on ecosystem-based approaches for adaptation, engaging Parties and relevant expert organisations, also through the organisation of training of trainers;

- The development of a mapping exercise at the country level to evaluate outcomes of different projects, programmes and policies, and to identify the conditions under which synergies have been achieved;

- The monitoring and evaluation of the effectiveness of ecosystem-based approaches for adaptation in promoting synergies between the Rio Conventions;

- The facilitation of greater integration across the goals and indicators for major funds, through the provision of further information and opportunities for such integration.

All these activities call for experienced parties in adaptation and representatives of local and regional authorities to provide their expertise. Organisations such as the CoR, being an outstanding representative of local actors in Europe and ICLEI, having a renowned expertise in capacity building and training, and having kick-started some of the most significant policy processes on adaptation (e.g., the

[60] UNFCCC Subsidiary Body for Scientific and Technological Advice, thirty-eighth session, Bonn, 3-14 June 2013, Report on the technical workshop on ecosystem-based approaches for adaptation to climate change, p. 18-19.
[61] *Ibid.*

Durban Adaptation Charter[62]), can have a crucial role in creating and facilitating peer-to-peer and knowledge exchange.

Building up on the Nairobi Work Programme, the Cancun Agreements[63] established the Cancun Adaptation Framework, and invited all Parties to the UNFCCC to enhance adaptation action.[64] Sub-national authorities are among key partners to provide assistance to developing countries for climate action across multiple levels and sectors, and have a crucial role in setting up a long-term shared vision on adaptation, i.e., in planning, prioritising and implementing adaptation measures. Under the umbrella of the Cancun Agreements, the CoR can share its valuable experience and, with the support of local government networks such as ICLEI, provide developing countries with tools and guidance, case studies on adaptation activities and tailored trainings. CoR and ICLEI, based on the recommendations of the present Report, could provide crucial assistance in developing interfaces between the local and regional level and empowering multilevel governance approach in developing countries' regions and cities. This would speak to increasing local-regional interaction as a crucial element to developing adaptation strategies, for which Europe can provide local experiences which could serve as a model and be built upon internationally.

[62] http://durbanadaptationcharter.org/

[63] The Cancun Agreements request developed countries to provide developing countries, 'taking into account the needs of those that are particularly vulnerable, with long-term, scaled-up, predictable, new and additional finance, technology and capacity-building, consistent with relevant provisions, to implement urgent, short-, medium- and long-term adaptation actions, plans, programmes and projects at the *local*, national, sub-regional and regional levels, in and across different economic and social sectors and ecosystems…'. Decision 1/CP16, p.5, item 18.

[64] Such action refers to 'planning, prioritising and implementing adaptation actions, including projects and programmes, and actions identified in national and *subnational adaptation plans and strategies*…', Decision 1/CP16, p.4, item 14.

Part 7 - Suggestions for a future European adaptation initiative supporting local and regional authorities

7.1 Introduction

This section elaborates on the trends and results of the interviews presented in Part 4 and 5 with regard to adaptation support needs and opportunities. It builds upon them to formulate concrete proposals for the set-up of a European adaptation initiative.

7.2 Considerations for an adaptation initiative

Local and regional authorities have to play an increasing role in climate change policy. A successful adaptation and mitigation strategy requires much more than slight changes in infrastructure and municipal management, it requires deep rooted transformations in the way citizens live and perform their business operations, supported by the necessary framework. This framework is constituted by a complex mix of 'hardware', from public transport to a smart-grid, to 'software' such as information and communication networks and new, intelligent legal rules that create incentives for changing the population's behaviour.

Such changes do not come either easily or without considerable costs: they will require a deep-rooted change in the way local and regional administrations operate, in the planning process and the financing models used to implement them. The rules and tools developed at EU level can influence the mitigation and adaptation paths of cities: decisions made today, in particular on the support mechanisms designed for the EU budget interventions, are therefore very important and need to be set right from the earliest possible time.

A European initiative on adaptation needs first of all to take into account the barriers and challenges that Local and Regional Authorities (LRAs) identify, and the reality of adaptation needs. Policies need to be based on a stakeholder focus, and LRAs are one of the most important enablers for change being at the core of changes and closest to citizens and local realities.

The EU Adaptation Strategy proposes to build on the model of the Covenant of Mayors (CoM). This report argues that, while there is some merit in the work of the CoM in raising awareness and developing the commitments of cities towards adaptation, the approach to set up an initiative on adaptation should not only be seen as an extension of the CoM *tout court*. While the initiative can take some of the elements of the CoM into consideration as discussed in Part 5, it is important to realise that adaptation needs its own approach.

First of all, it is important to learn from the strengths and weaknesses of the CoM. While the process of raising awareness has been significant, the impacts on implementation are questionable. Local commitments and action plans are important, but SEAP strategies failed in many places to materialise as concrete actions due to the lack of appropriate planning, procurement rules, financing models and administrative structures; pledges often remained pledges. Those cities that acted often would have done so without the SEAPs exercise. Pledges and strategies are a necessary but not a sufficient condition for action. Adaptation, like mitigation, cannot be limited to the top 10% of cities and a more succinct approach is needed.

The initiative needs to be linked to a relevant framework including existing elements that can be further built upon and integrated by innovative materials and tools. The first is an expansion of the information provided by the EU Climate Adaptation Platform (Climate-ADAPT)[65] with more tailored and practical tools to be developed in the framework of the initiative. The second is the creation of a clear link with EU-related trainings and specific financial support instruments. As a conclusion, the initiative should be part of an integrated information, training and finance structure.

7.3 Developing the backbone of the adaptation initiative – framework conditions

Chapter 5 of this report presents the barriers and needs that local authorities have identified as important, emerging from the questionnaire to cities prepared for this study (please see Appendix). EU initiatives should be based closely on those results.

[65] http://climate-adapt.eea.europa.eu/

The interviews have pointed out a number of barriers and support needs. A climate initiative should provide solutions to these.

7.3.1 Awareness-raising on adaptation in municipalities

Raising awareness, with special reference to internal awareness in municipalities, is still a problem in many cities. Smaller cities are of special concern, but a number of larger cities also face important administrative capacity and knowledge gaps, in particular in economically less developed regions.

Action: A dedicated structure offering a methodology and a toolkit to bridge this gap would be welcomed by cities. Peer-to-peer exchange is also considered as a crucial element in the development of an adaptation plan. This can be provided by creating a new dedicated section in the Climate ADAPT platform, but adaptation awareness and provision of tools will not be enough to ensure a coherent and integrated implementation of climate adaptation actions. In particular, a helpdesk has been generally considered as a beneficial tool to receive support on technical issues (e.g., how to develop a vulnerability assessment). A common methodology on prioritising and planning technical measures would be also considered a valuable tool. A clear progressive integrated planning process for cities should be developed, guiding local authorities in a generic way to the questions to answer and steps to follow. Analytical methodology and case studies are useful, but a "how to" step by step guide with lists of contacts and technical information providers should also be developed.[66]

This requires information from various sources including Climate -ADAPT to be enhanced and integrated with the creation of new training materials for adaptation, which should also be linked to mitigation actions where possible. Adaptation should be also integrated as far as possible in the follow-up programmes for JESSICA and ELENA, helping cities to develop viable plans based on an appropriate and targeted allocation of private and public funding.

[66] Examples on 'how to' documents can be found in the planning document published by the Smart Cities Stakeholder Platform http://www.eu-smartcities.eu/sites/all/files/integrated action plan V1 2 June 2013_0.pdf or for procurement by ICLEI services and documents http://www.sustainable-procurement.org/about-us/iclei-services/.

7.3.2 Data

Data is missing at the local level. Even if data at the regional level is sometimes available, downscaling is not always appropriate to back local decision-making. Cities would welcome a "climate registry", where they can find data from other cities with similar characteristics (geography, size, vulnerabilities, etc.), to serve as a first inspiration and orientation on possible measures.

Action: This could be set-up in the Climate-ADAPT platform. Currently case studies are presented by climate sector and impact, but there should be separate criteria for cities. In fact, there is a need to offer information relevant to city administrations wishing to replicate initiatives and on 'how' to proceed. The Platform is at this stage scientific in the approach to information, but not tailored to local concerns.

7.3.3 Funding

There is a need for a dedicated information portal on financing sources. A dedicated funding source for adaptation is also considered necessary. European programmes should come to acknowledge this specificity and tailor tender and proposal requirements for adaptation projects accordingly. A portal gathering financing options and possibilities has been considered a beneficial tool for adaptation.

Action: Information on potential financial sources could be added to the Climate-ADAPT platform. Specific financial instruments are also needed, and LIFE+ has already been identified by the EU Adaptation Strategy as a source for adaptation specific support. This does not reduce the need for other funds, such as structural funds, to finance adaptation projects. In fact, LIFE + has a limited budget, and financial instruments are in preparation to allow a financial leverage to occur. Funds involved are very limited; therefore they could be used as technical assistance tools to develop projects. In any case, the financial instruments to be set up should take careful consideration of the needs on the ground and their use should be compatible with the planning and guidance materials to be developed for cities. Funding programmes should also set up a framework to measure and monitor progress.

7.3.4 Policy coherence and governance framework

Adaptation is not simply to be solved by specific projects, but is a way to manage resources and govern. Adaptation needs involve many players at different levels. Impacts on water availability and quality cannot be solved with actions solely at the level of a municipality, but at river basin level and even beyond. There is a need for coherence and policy integration and the implementation of a well designed subsidiarity mechanism in a multilevel governance framework from the local level up to the EU level, not only for the division of responsibilities, but also for designing the right support tools. For example, some actions need to be planned and managed at municipal level, while managing authorities may be regional authorities with less capacity to evaluate the situation and monitor developments.
The elements of information, training and financing presented above can be the cornerstones of an adaptation initiative, supported by the EU through the Climate-ADAPT Platform and the LIFE+ instrument, ensuring information, coherence and support, and developing instruments to also coordinate with other policies and funding streams.

7.4 The role of the adaptation initiative

The EU Adaptation Strategy proposes the use of the Covenant of Mayors method as an implementation tool to motivate cities to draw adaptation plans. Presently, adaptation has not been significantly integrated into SEAPs.

While there is some merit in the work of the Covenant of Mayors in raising awareness and developing the commitments of cities towards adaptation, action has been limited. For all these reasons, and in order to be effective, an adaptation initiative should not be a simple extension of the CoM *tout court*.

If an adaptation network were to be established, the elements of 1. a “voluntary commitment”, 2. a dedicated secretariat and 3. support and coordination structures present in the CoM should be taken into account and developed independently and specifically in the new structure. Consequently, the initiative is suggested to have its own secretariat and facilities.

An adaptation network which promotes the development of adaptation strategies should certainly create interfaces to the Covenant of Mayors to ensure consistency and gain visibility, and should foresee the establishment of voluntary political and

technical commitments for cities to develop and implement adaptation strategies. However, the mere extension of these features under the CoM office might lead to inefficiencies, and the weaknesses observed in the CoM also represent important lessons to be taken into account.

Adaptation commitments require a distinct approach to what the CoM has performed and the commitment to adaptation deriving from signing up to this new initiative should not be extended to all CoM signatories automatically, if it has to have any realistic level of success. Adding adaptation considerations to SEAPs strategies will bring little added value, as methodological issues differ considerably. Adaptation strategies need to have their own focus and methodologies.

Integration should occur at higher planning stages, within an integrated action plan, indicating how mitigation and adaptation paths and objectives can be reached in practice. Integrated action plans with city development plans would create the right framework of action. Figure 9 below presents the complete support framework leading to plans and actions under an adaptation initiative, rather than starting by plans and pledges without the supporting framework in place.

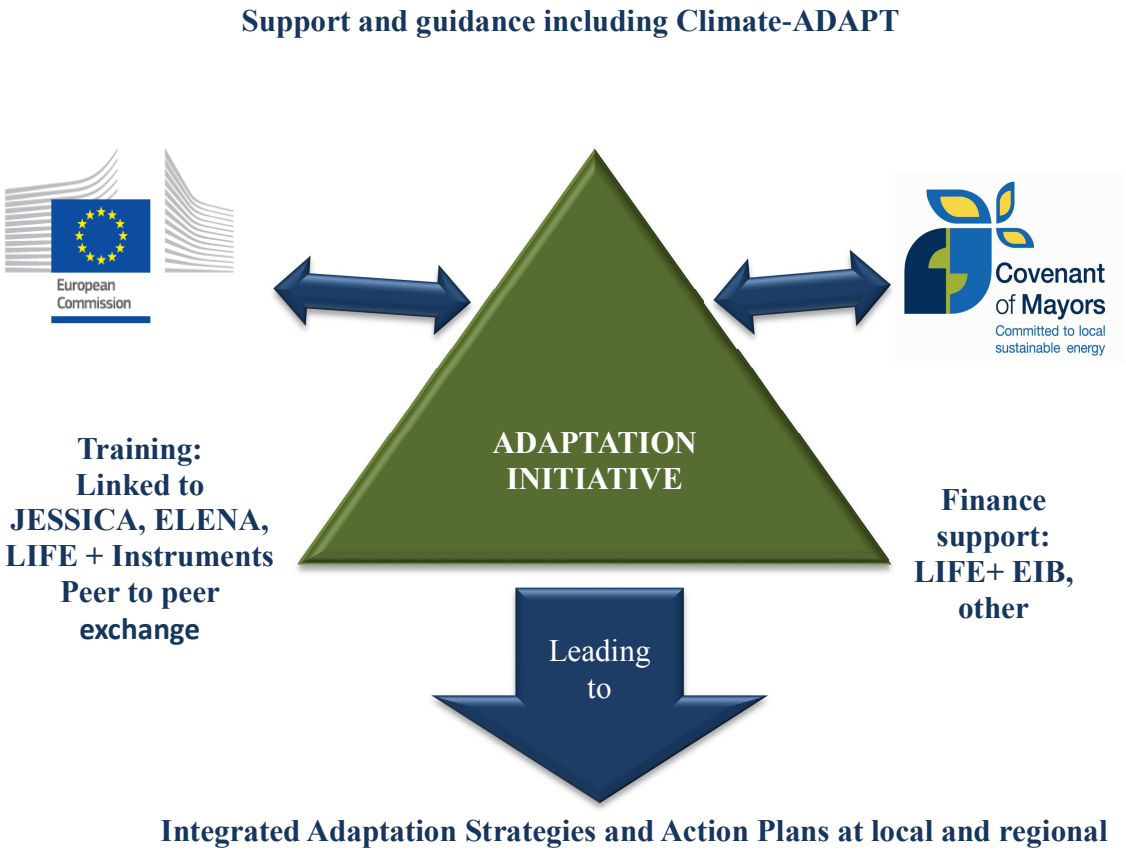


Figure 9. The elements of the initiative
Source: CEPS

7.5 Linking the adaptation initiative to the international processes

While maintaining its autonomy, it is suggested to link a European initiative on adaptation with the international adaptation processes and governance structures to identify synergies with existing global initiatives, avoid potential conflicts and promote exchange of information. The EU's initiative could directly find an entry point into both the UNFCCC process from top down and voluntary processes from bottom up. They could be complementary, simultaneous and not necessarily mutually exclusive. As examples of these parallel processes, this report looks at the future activities of the Adaptation Committee under the UNFCCC as well as the Durban Adaptation Chapter and signatories' commitments.

Building on the recognition of the potential roles of subnational authorities in the Cancun Agreements, two ongoing international processes are particularly relevant

to linking a European adaptation initiative with the international adaptation framework: one is the Adaptation Committee; the other is the Durban Adaptation Chapter.

Established as a driver for implementation of adaptation action, the Adaptation Committee is committed to sharing of information, knowledge, experience and good practices at sub-national levels.[67] One cluster of activities is to convene workshops in 2014 to share technical adaptation-related expertise on topics including best practices and needs of local and indigenous communities. This involves a process to produce a scoping paper, convene workshops, and then provide recommendations and guidance to Conference of Parties. Hence, one concrete option for linking the adaptation initiative could be the exchange of information and good practices on adaptation that could speak to the peer-to-peer exchange component of the initiative as well as inform training and guidance material.

While the Adaptation Committee leads an institutionalised process of sub-national governments' implementation, the Durban Adaptation Charter could provide a more informal framework for their participation through voluntary commitments: currently 114 signatories representing 950 local government organisations from 27 countries. Signing the Charter[68] commits them to:

- Mainstreaming adaptation as a key informant of all local government development planning;

- Ensuring that adaptation strategies be aligned with mitigation strategies;

- Promoting the use of adaptation that recognises the needs of vulnerable communities and ensuring sustainable local economic development;

- Prioritising the role of functioning ecosystems as core municipal green infrastructure and
- Seeking innovative funding mechanisms.

[67] The Adaptation Committee is established 'to promote the implementation of enhanced action on adaptation in a coherent manner' through functions such as '[s]trengthening, consolidating and enhancing the sharing of relevant information, knowledge, experience and good practices, at the *local*, national, regional and international levels…' Decision 1/CP16, p.5, item 20.

[68] http://www.durbanadaptationcharter.org/Resources/Durban_Adaptation_Charter_5_December_2011.pdf

It would be important to analyse the functions and components of the Charter to identify transferability factors and to avoid conflict. Already several European cities have signed up to the Charter and it will therefore be crucial that the adaptation initiative will not be mutually exclusive but instead allow for complimentary functions building on the current commitments.

Appendix - City questionnaire for the Committee of the Regions Report on "Climate Change Adaptation: Empowerment of Local and Regional Authorities"

Part 1: Adaptation (to be filled out by the responsible person for adaptation in the Municipality)

Section 1A: State of Play with regard to climate change adaptation

How would you define the state of play in your city with regard to adaptation?
a. We have an adaptation strategy and have implemented measures
b. We implemented some isolated adaptation measures but no process is underway.
c. We conducted a vulnerability assessment but haven't implemented measures
d. We have initial discussions ongoing on adaptation but no plan
Other:……
……
Do you have *de facto* adaptation activities on your territory that are not yet labeled as climate change adaptation?
If yes, please specify
……
……
……

Section 1.B. The EU Cities Adapt survey pointed out the following KEY BARRIERS to developing adaptation strategies

A - Lack of awareness -> Is this relevant to your experience? Yes/No -> If yes, to which extent?
1 2 3 4 5
Please motivate your answer
……
……
……
Do you think a dedicated initiative to trigger political commitment and support it over time would be beneficial? Yes/No -> If yes, to which extent?
1 2 3 4 5
……
……
……

B - Lack of appropriate knowledge and data at city level -> Is this relevant to your experience? Yes/No -> If yes, to which extent?
1 2 3 4 5
Please motivate your answer
……
……
……

Do you think a guideline and support framework for data collection and management (e.g. a helpdesk or a climate registry) could be suitable? Yes/No -> If yes, to which extent?

1 2 3 4 5

……
……
……

C - <u>Little opportunity for cities to exchange experiences</u> -> Is this relevant to your experience? Yes/No -> If yes, to which extent?

1 2 3 4 5

Please motivate your answer

……
……
……

Do you think specific resources as the EEA Climate-Adapt Platform could help you overcome this barrier? Yes/No -> If yes, to which extent?

1 2 3 4 5

……
……
……

Do you think dedicated adaptation framework could be helpful in creating more experience exchange (on the example of the CoM, the Aalborg Commitments, the Green Capital Award etc.)? Yes/No to which extent?

1 2 3 4 5

……
……
……..

D - <u>Limited availability of resources within city administrations and in financial terms</u> -> Is this relevant to your experience? Yes/No -> If yes, to which extent?

1 2 3 4 5

Please motivate your answer

……
……
……

Do you think a platform gathering information about diverse financing possibilities would be useful to overcome the lack of founding?

1 2 3 4 5

……
……
……..

E - <u>Lacking overarching multi-level governance framework for urban adaptation</u>-> Is this relevant to your experience? Yes/No -> If yes, to which extent?

1 2 3 4 5

Please motivate your answer

……
……
……

Do you think a European or a national compulsory legislation on adaptation would be suitable for adaptation?

1 2 3 4 5

……
……
……

Other barriers, please specify

……
……
……

General support of a European Framework

Bearing in mind all of the above, what factors do you think an 'initiative on urban adaptation' should take into account? Please indicate 1 to 5 factors

1.
2.
3.
4.
5.

Part two: CoM (to be filled out by the responsible person for CoM in the Municipality)

Section 2A – Main motivation when joining the CoM

Why did your city decide to sign the CoM?

……
……
……..

Section 2B – Main factors in the experience of the city with the CoM

Was the CoM crucial in raising awareness on climate protection in your city? YES/NO

Please elaborate on your answer:

1 2 3 4 5

……
……
……..

- Was the CoM crucial to gain political commitment on sustainable energy in your city through the public statement of extra commitment to CO_2 reduction? Yes/No -> If yes, to which extent?

Please motivate your answer

1 2 3 4 5

……
……
……..

- Was the CoM instrumental in improving communication of good practices and benefit from encouragement and example of other pioneers? Was it also instrumental in sharing the expertise developed on your own territory? Yes/No -> If yes, to which extent?

Please motivate your answer

1 2 3 4 5

……
……
……..

- Do you think the CoM represents a good instrument to facilitate exchange among peers? Yes/No -> If yes, to which extent?

Please motivate your answer

1	2	3	4	5

……
……
……..

- Was to CoM useful to attract funding for the implementation of measures related to renewable energy and energy efficiency? Yes/No -> If yes, to which extent?

Please motivate your answer

1	2	3	4	5

……
……
……..

- Is the visibility and recognition on the CoM website a relevant feature for your municipality? **Yes/No -> If yes, to which extent?**

Please motivate your answer

1	2	3	4	5

……
……
……

- Do you find the overall approach of the CoM appropriate to reach the 20-20-20 target at the local level? Yes/No

Please motivate your answer

1	2	3	4	5

……
……
……..

- Do you find the CoM mechanisms and targets too rigid with regard to the implementation of sustainable energy action plan? Yes/No

Please motivate your answer

1	2	3	4	5

……
……
……..

- Do you think the support materials provided by the CoM are appropriate and useful? Yes/No

Please motivate your answer

1	2	3	4	5

……
……
……..

- Do you think the "Benchmark of excellence" tool is valid to create visibility and raise awareness among peers? Yes/No

Please motivate your answer

1	2	3	4	5

……
……
……..

- Do you think the CoM is a good instrument to gain and maintain political commitment? Yes/No

Please motivate your answer

1	**2**	**3**	**4**	**5**

……
……
……..

- Do you think the CoM is a good instrument to set targets and plan for measures? Yes/No

Please motivate your answer

1	**2**	**3**	**4**	**5**

……
……
……

- Do you think the CoM is a good instrument to measure and monitor progress? Yes/No

Please motivate your answer

1	**2**	**3**	**4**	**5**

……
……
……

- Do you thing the CoM provides an adequate technical support to gathering data, selecting indicators and planning for concrete measures? Yes/No

Please motivate your answer

1	**2**	**3**	**4**	**5**

……
……
……

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