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Committee of the Regions

Regional and Local Adaptation in the EU since the Adoption of the EU Adaptation Strategy in 2013

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List of Abbreviations

AST	Adaptation Support Tool
BEI	Baseline Emissions Inventory
CDC	Connecting Delta Cities
Climate-ADAPT	European Climate Adaptation Platform
CMP	Conference Meeting of the Parties
COP	Conference of Parties
DG CLIMA	Directorate-General for Climate Action
DIN	German Institute for Standardisation (Deutsches Institut für Normung)
EEA	European Environment Agency
EU	European Union
FLA	Fondazione Lombardia per l'Ambiente (Lombardy Foundation for the Environment)
GDP	Gross Domestic Product
HELCOM	Baltic Marine Environment Protection Commission - Helsinki Commission
INTERREG	Community initiative which aims to stimulate interregional cooperation
LIFE	EU's funding instrument for the environment and climate action
NAS	National Adaptation Strategies
NGO	Non-Governmental Organisation
nrg4SD	Network of Regional Governments for Sustainable Development
RDP	Rural Development Programme
SECAP	Sustainable Energy and Climate Action Plan
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
UNISDR	United Nations Office for Disaster Risk Reduction

1 Introduction

The report analysed the impact of the EU Adaptation Strategy in 2013 on the development of national, regional and local adaptation strategies in the Member States. For the report, the authors analysed national, regional and local adaptation policies. The analyses included interviews with two regional governments and a survey to signatories of the initiative MayorsAdapt.

This report outlines the development in adaptation policies since 2013 on the national level (chapter 2) and on regional level (chapter 3). Chapter 3.1 presents how the EU Adaptation Package makes reference to the regional level. Subsequently, the newly founded initiative RegionsAdapt is described, which aims to support exchange of experiences between regions and enhance their capacities to develop regional adaptation strategies. One of its members, Lombardy in Italy is presented as one of two case studies. Lombardy is the first Italian region that developed a Regional Adaptation Strategy. The chapter highlights furthermore the different approaches that regions take for developing adaptation strategies, including project based adaptation or adaptation in macro-regions.

Adaptation on the local level is presented in chapter 4. The chapter analyses how far the local governments advanced in strategic adaptation planning. The authors elaborate on the support of the local level by the EU Adaptation Strategy and further initiatives and tools. Chapter 4.4 explores the MayorsAdapt initiative and its support for local governments with presenting the results of a survey that was conducted for the study. The report emphasises potential synergies between MayorsAdapt and RegionsAdapt and shows how international networks can support local adaptation. The report ends with a detailed presentation of conclusions from the analysis and derives recommendations to the Committee of the Regions.

The report is a collaborative effort by Ecologic Institute, the University College London and ICLEI - Local Governments for Sustainability.

2 Adaptation Processes in EU Member States

The EU Adaptation Strategy that was adopted in 2013 gave a new spin to EU adaptation processes. The chapter highlights the main developments before and after the above date. Furthermore, emphasis is given to the recognised role of regions as outlined in national key documents of the adaptation process i.e. the National Adaptation Strategies and Adaptation Action Plans.

2.1 Development since 2013

Until the development of the EU Adaptation Strategy in 2013, seventeen EU Member States had already developed National Adaptation Strategies (NAS), as Figure 1 illustrates. In the following years after 2013, Spain, Portugal and Finland published revisions to their national strategic documents for adaptation to climate change. Greece, Italy and Slovakia published their National Adaptation Strategies after 2013, some of them giving credit to the EU Adaptation Strategy. To date, ten Member States are in the process of developing national strategies. In some cases strategies were delayed due to political changes, or changes of political priorities, e.g. Slovenia and Czech Republic.

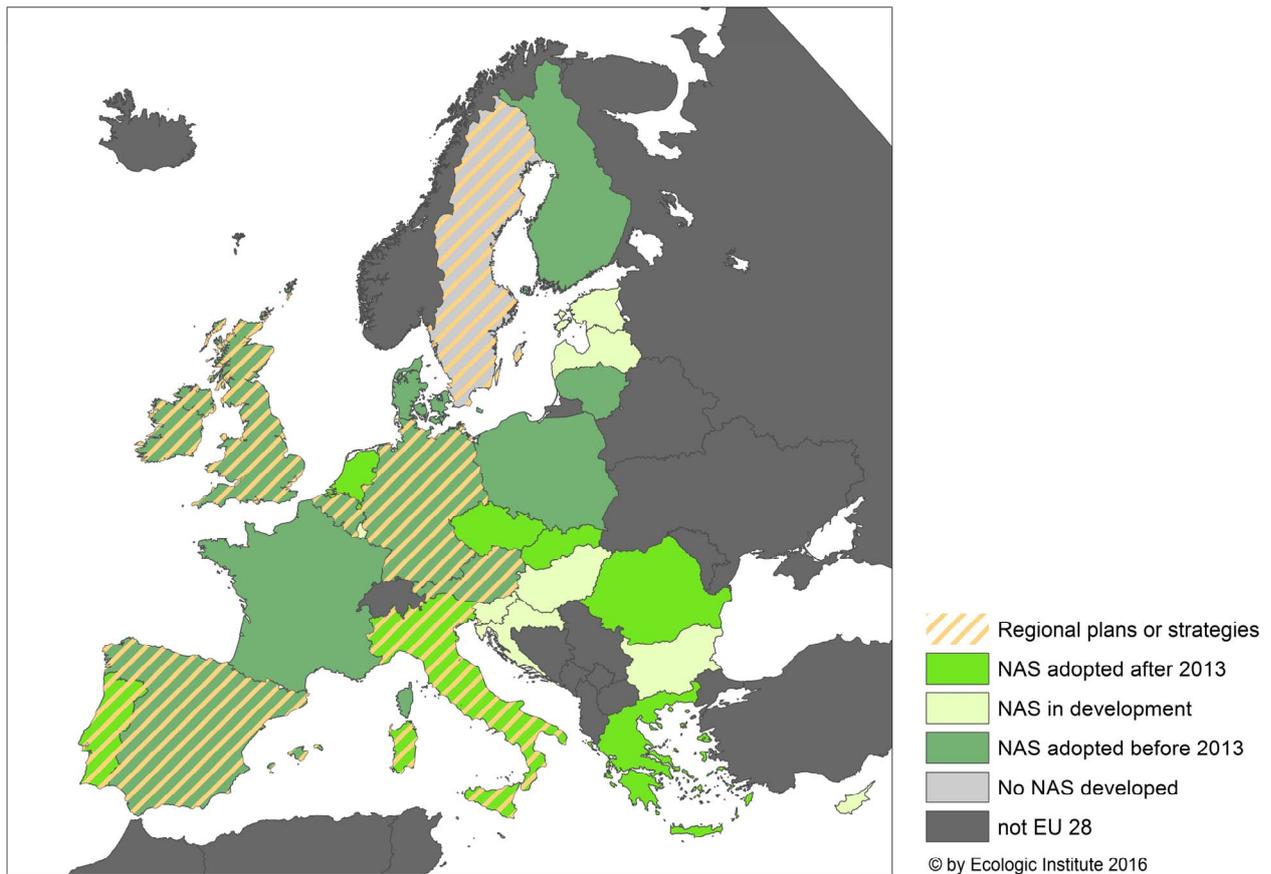


Figure 1: Development of National Adaptation Strategies (NAS) in the EU until and after 2013.

2.2 Adaptation in the EU Member States

The EU Adaptation Strategy, adopted in 2013, contains the three main objectives to promote actions by EU Member States, to provide better informed decision making and to promote adaptation in vulnerable sectors. The role of regions is not particularly focussed on per se, whereas the local level is addressed directly. Regions are amongst others addressed via the climate proofing of the Common Agricultural Policy. In the Rural Development Programmes for Europe's regions, several adaptation actions are outlined. Furthermore, the Programmes of Measures for Europe's river basin districts contain measures for adaptation in river basin management. Also, within the funding of cohesion policy through INTERREG and biodiversity policy through LIFE, projects on local and regional level foster adaptation efforts, as highlighted by the EU Adaptation Strategy.

A brief overview of the development of adaptation strategies is given below. If regional adaptation strategies or centralised efforts have been pursued, the description will not detail other adaptation efforts in the frame of projects.

2.2.1 Austria

The process for developing the Austrian Climate Adaptation Strategy was started in 2007 by the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water management and the nine Austrian Federal States. Fourteen different areas were developed, involving a series of participatory sessions, including various interest groups e.g. agriculture, tourism, and energy recommendations. Based on these inputs, the Austrian Strategy for Adaptation to Climate Change was developed and approved in 2012 (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft 2012). The Action Plan is included as a second part to the strategy (Kuik 2016; Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft 2012).

Apart from being involved in the preparation of the national strategy, some Federal states have already established regional adaptation strategies, e.g. Oberösterreich, Steiermark and Tirol.

2.2.2 Belgium

In Belgium, in line with the general structure of the state, the responsibility for adaptation is shared between the federal government and the regional governments of Flanders, Wallonia and the Brussels-Capital Region. A National Adaptation Strategy for Belgium was adopted in 2010. A National Adaptation Plan for 2015-2020 was planned to be adopted in 2015, but so far only a draft version of 2014 is available. The general idea has been to develop the Federal Adaptation Plan on the basis of regional plans in order to ensure consistency between both levels. A Flemish Adaptation Plan was adopted in June 2013 as part of the Flemish Climate Policy Plan 2013 – 2020. In April 2016, the Walloon Region adopted an integrated Air-Climate-Energy Plan for 2016-2022, which contains a section on adaptation. For the Brussels-Capital Region, a similar plan was published in June 2016.

2.2.3 Bulgaria

The Ministry of Environment and Water of the Republic of Bulgaria is currently coordinating the development of a National Climate Change Adaptation Strategy, which should be adopted by the end of 2017 (Ministry of Environment and Water of Bulgaria 2015a,b). A vulnerability analysis was included as part of the first phase of this process, and was finalised in 2014. Although the assessment includes a list of example measures for climate change adaptation at regional and local level, the role of the regions in the process is not clearly defined (Ministry of Environment and Water of Bulgaria 2014).

According to the Third Action Plan¹ for climate change 2013-2020, the sectoral measures defined in the Action Plan have also a local dimension and should therefore be taken into account in the elaboration of municipal strategies and the municipalities shall develop appropriate measures based on local climate scenarios (Ministry of Environment and Water of Bulgaria 2012).

2.2.4 Croatia

In Croatia the National Adaption Strategy and Action Plan are still being developed. The development of the National Adaptation Strategy, which started 2014, has its foundation in the Air Protection Act (EEA 2016). The strategy will cover the period until 2040 and will be adopted in 2017. In the development process that was supported by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the Croatian Ministry for Environmental and Nature Protection acknowledged the importance of integrating both local and regional levels in national adaptation planning (Peleikis 2014). So far, regional adaptation efforts have taken place at a project level.

2.2.5 Cyprus

In Cyprus no national adaptation strategy has been approved to date (EEA 2016a). A draft National Adaptation Plan has been developed, based on multi-sectoral climate change vulnerability analysis, after a consultation process with relevant stakeholders. The Adaptation Plan is based on work in the LIFE-project, “CYPADAPT - Development of a national strategy for adaptation to climate change adverse impacts in Cyprus” (CYPADAPT 2013). The plan contains a broad overview on climate impacts and possible adaptation actions in the relevant sectors. Because of the administrative structure of Cyprus, the regional level does not have high importance in respect to adaptation activities.

2.2.6 Czech Republic

In 2015, the national government adopted the Strategy on Adaptation to Climate Change in the Czech Republic. The development process started in 2009. Therefore, the EU Adaptation Strategy did not influence the Czech strategy. However, it aims to fulfil EU adaptation objectives (Moreira Alves, et al. 2014). A National Action Plan for the implementation of the strategy is currently under

¹ The policies and measures set out in the Action Plan are based on various national strategies and programmes (e.g. National Strategy for Development of the Forestry Sector in Bulgaria 2006-2015, Energy Strategy of the Republic of Bulgaria until 2020, Strategy for Development of the Transport System of the Republic of Bulgaria until 2020, National Development Programme: “Bulgaria 2020”).

development and planned for 2016 (Ministry of the Environment of the Czech Republic 2016). Regional adaptation is fostered through several projects, and is not directly promoted through national policy.

2.2.7 Denmark

The Danish government adopted its National Adaptation Strategy in March 2008 (The Danish Government 2008). A National Action Plan for a climate-proof Denmark was launched in December 2012, further developing the aims set in the Government programme of 2011.

Central to climate change adaptation efforts in Denmark is a strong interaction between state and municipalities (The Danish Ministry of Climate, Energy and Building 2013). As such, the Action Plan recognises that climate change adaptation is first and foremost based on initiatives at local level (involving local authorities, companies and individuals), and requires municipalities to develop climate change adaptation plans by the end of 2013 (The Danish Government 2012).

2.2.8 Estonia

Estonia does not yet have a National Adaptation Strategy. The Ministry of Environment, supported by the project “Estonian Climate Adaptation Strategy for Infrastructure and Energy” (SEI 2015b) is currently developing a strategy that is anticipated to be adopted by the end of 2016 (SEI 2015a). Input for setting up the National Climate Change Adaptation Strategy is also provided by several other on-going projects focussing on different sectors such as spatial planning, land use, human health and rescue capability (in the project KATI), and natural environment and bioeconomy (in the project BioClim²) (SEI 2015b). Regions that are most frequently affected by weather conditions have been the most active in crisis management (Ministry of the Environment 2013).

2.2.9 Finland

Finland was the first country in the EU to develop and adopt a National Adaptation Strategy in 2005 (Norden 2013), which was updated in 2014 with Finland’s National Climate Change Adaptation Plan 2022, (Ministry of the Environment and Statistics 2013). The Ministry of the Environment’s Action

² Project BioClim. Climate change adaptation strategy and measures for thematic fields of natural environment and bioeconomy: BioClim (01.01.2015 - 31.08.2015)
<http://pk.emu.ee/en/structure/landscapemanagement/projects/bioclim/project/>

Plan was published in 2008 (Ministry of the Environment 2008) and updated in 2011 (Ministry of the Environment 2011).

The actions required of the municipalities and regions in the Action Plan do not have a clear focus. The Plan promotes regional and local demonstration projects, and research and development projects, relating to adaptation. It recommends that the division of labour and responsibilities between the state, municipalities and private sector should be clarified. In the evaluation of the updated Action Plan it is recommended (Ministry of the Environment 2013) that a separate risk and vulnerability analysis would enable identification of special adaptation requirements to support allocation of resources at regional and local levels. Currently, adaptation efforts on these levels is mainly financed via projects (Aalto University, accessed July 2016)

2.2.10 France

In France, a National Adaptation Strategy has been approved in 2006, and an Adaptation Action Plan (for 2011- 2015) since 2011. A revised adaptation action plan is currently being prepared with the aim of presenting suggestions for regional adaptation actions by December 2016.

A comprehensive evaluation of the first National Adaptation Action Plan, which also includes recommendations for the new action plan, was published in November 2015. One of the major conclusions was that adaptation measures need to be broken down, at regional level, in an improved manner, and that the French overseas territories with their specific adaptation needs require more attention.

2.2.11 Germany

In 2008, the Federal Government of Germany adopted the “German Strategy for Adaptation to Climate Change”. This strategy laid the foundation for a medium-term process to progressively identify the effects of global climate change, assess the risks, and develop and implement adaptation measures. To provide detail to the strategy, the “Adaptation Action Plan for the German Strategy for Adaptation to Climate Change” was adopted in 2011. Chapters are dedicated to activities of the different Federal States and cooperative activities between Federal States and the National Government. A review of the German Adaptation Action Plan (Die Bundesregierung 2015) was published in 2015. Several Federal States have already established regional strategies. The regional activities by the Federal States are also summarised in the review of the German Adaptation Action Plan.

2.2.12 Greece

The Ministry of Environment, Energy and Climate Change is the competent authority that coordinates Greece's adaptation actions. In 2001, a National Action Plan for Combating Desertification was adopted, indicating clearly the need for reacting on climate changes. In 2015, the National Adaptation Strategy was adopted outlining adaptation needs for several sectors. The strategy makes reference to the EU Adaptation Strategy and highlights the involvement of regions, especially in the context of tourism development. Furthermore, the Strategy points out that Athens and Attica adopted legislation in 2014 that commits the region to climate change adaptation. Before this Strategy was in place, various measures were implemented in sectoral actions, mainly via national or international projects.

2.2.13 Hungary

In Hungary the National Climate Change Strategy was approved in 2008 (NÈS 2008) for the period to 2025 and revised in 2013 (NÈS2013). It is planned that the revised strategy will be adopted by the Hungarian Parliament this year, as part of the second revision of the National Climate Change Strategy – a draft version exists already. Currently, adaptation is covered by several sectoral policies (Bartholy et al. 2013).

Regarding local adaptation, significant developments have been achieved. About 27 Hungarian cities are part of the Hungarian Alliance of Climate-Friendly Cities that aims to support cities in the development of adaptation strategies and plans.

2.2.14 Ireland

Ireland's National Climate Change Adaptation Framework, the Irish NAS, was adopted in 2012 (Department of the Environment, Community and Local Government 2012). The strategy is divided into two phases which outline the development and implementation of sectoral and local adaptation plans (Department of the Environment, Community and Local Government 2013). A public consultation process to evaluate the NAS was undertaken in spring 2016. This evaluation is expected to form the basis for the revision of the document by the end on 2017 (Department of the Environment, Community and Local Government 2016).

The project Developing Adaptation Indicators for Ireland (Coastal & Marine Centre 2016) is to develop draft adaptation indicator sets that can assess levels of local and sectoral preparedness for climate change. The study will propose

adaptation indicators relevant to local level assessment of adaptation progress that can be aggregated to inform policy at a national level, and align it with forthcoming EU reporting requirements on adaptation progress. The project is expected to finish in 2016.

2.2.15 Italy

The Italian National Adaptation Strategy to Climate Change was developed between 2012 and 2014, by the Italian Ministry of the Environment (under the coordination of the Euro-Mediterranean Centre on Climate Change) and adopted in 2014. As well as scientists and national ministries, regional and local representatives were part of the development process. The EU adaptation strategy also was taken into account when developing the NAS. Apart from sectoral adaptation, the mountain areas and the Po river basin are emphasised, acknowledging the special needs of these regions.

One of the main objectives of the Strategy is the elaboration of guidelines for sectoral adaptation action at different scales, from the regional to the municipal level. The need for a governmental commitment to adapt to climate change impacts and to support and align regional and local initiatives and plans to the National Strategy was also highlighted in the Strategy. This has already resulted in the formation of the Interregional Coordination Board in 2015, and the start of several regional adaptation strategies.

2.2.16 Latvia

Latvia does not yet have a National Adaptation Strategy. However, it has made encouraging steps in this area, as can be seen in the Government report on Adaptation to Climate Change from 2008 and several national research projects, e.g. BaltClim (Ministry of Environmental Protection and Regional Development of the Republic of Latvia 2013). Within the BaltClim project, a roadmap was developed to support the competent authorities in the preparation of national policy planning documents for adaptation to climate change in the Baltic Sea region (Baltic Environmental Forum Latvia 2013). Two expert groups have also been established for the development of a national adaptation strategy (Ministry of Environmental Protection and Regional Development of the Republic of Latvia 2013). So far, no completion date for a national strategy has been given.

2.2.17 Lithuania

In 2012, Lithuania approved its Strategy for the National Climate Change Management Policy until 2050 (Parliament of the Republic of Lithuania 2012). This Strategy sets out the short-term goals and objectives (until 2020), indicative

mid-term goals and objectives (until 2030 and until 2040) and long-term goals and objectives (until 2050), in respect to climate change mitigation and adaptation. In order to achieve its strategic goal, one of four lines of action focuses on “the integrated approach on climate change impacts on the particular territories at the regional level”. In 2013, the Lithuanian Action Plan was adopted.

2.2.18 Luxembourg

In 2011, Luxembourg adopted a "National Adaptation Strategy on Climate Change" as part of a “Climate Package” (“Paquet Climat”). A revision is planned for the year 2016. Furthermore, a report on spatial planning strategies for adaptation to climate change for Luxembourg was published in July 2012 within the INTERREG project “C-Change”.

2.2.19 Malta

Malta adopted a National Climate Change Adaptation Strategy in 2012 (Ministry for Resources and Rural Affairs 2012). A Climate Action Act was adopted in 2015 to streamline Malta’s commitments on climate change on both mitigation and adaptation in a legally binding way (Government of Malta 2015). Given the limited size and capacities of the country, the responsibility for action on climate change adaptation is exclusively at the national level. However, the National Adaptation Strategy highlights the role of Local Councils, in particular those that have signed the Covenant of Mayors, in promoting communication for behavioural changes with regard to both mitigation and adaptation.

2.2.20 The Netherlands

For the Netherlands, a first National Adaptation Strategy was adopted in 2007. The provinces provided input, particularly in relation to flood and water management. However, this National Adaptation Strategy did not result in adaptation actions and was discontinued in 2010 (AR 2012). Initiated in 2010 and implemented in Dutch law through the Delta Act in 2012, the Delta Programme is acknowledged as the Dutch Adaptation Action Plan. It covers the areas of flood and water management. In the Delta Programme revision of 2016, several regions are highlighted when outlining regional adaptation. Furthermore, the Dutch cabinet is preparing a revision of the National Adaptation Strategy, which is planned to be adopted in 2016. The new National Adaptation Strategy takes on the recommendations of the EU adaptation strategy (Russel et al. 2014).

2.2.21 Poland

The Polish NAS “The Strategic Adaptation Plan for Sectors and Areas Sensitive to Climate Change up to 2020” is a product of the project KLIMADA and was adopted in 2013 (Ministry of the Environment 2013a). The Ministry of the Environment (2013b) recognises that local communities are most vulnerable to climate change and that the effectiveness of adaptation measures depends on the involvement of local communities and authorities in their implementation. Several initiatives have been undertaken to achieve this, such as Social Dialogue Committees (bodies containing NGOs and local authorities). These Committees propose initiatives and play an advisory role, providing a good model for cooperation between local authorities and nongovernmental organisations. So far, measures mainly concern flood risk management.

2.2.22 Portugal

Portugal was amongst the first Member States to adopt a National Adaptation Strategy (in 2010). Their strategy was prepared by an interministerial working group, developing an intersectoral view on climate change adaptation. Regional and local authorities³ were also involved in the strategy, in order to facilitate adaptation mainstreaming in local and regional governance, and to integrate local and regional needs in the adaptation strategy (José Festas 2011). Review periods are established within the strategy. The first phase assessed vulnerabilities and adaptation needs in the period from 2010 to 2013. In 2015, a review has been adopted covering the period until 2020 and aims to facilitate the initiation of adaptation actions (Moreira Alves, et al. 2014). European Economic Area Grants have supported adaptation projects by municipalities in Portugal that aim to develop local adaptation strategies (EEA Grants 2013). The regions themselves have already adopted individual strategies.

2.2.23 Romania

In July 2013 the Romanian Government adopted their National Climate Change Strategy (2013-2020), which aims to provide an action framework and guidelines that will enable each sector to develop an individual action plan (Ministerul Mediului Şi SchimbĂrilor Climatice 2013). With financial support from the EU, and with technical assistance from the World Bank, an Action Plan was implemented containing mitigation and adaptation actions for 2016 – 2030. Several sectoral plans complement the national strategy. Regional adaptation efforts are also implemented through national and international projects.

³Municipalities are after the national level the next smaller administrative level.

2.2.24 Slovakia

The Slovak Republic's Adaptation Strategy on Adverse Climate Impacts was adopted in March 2014. During the preparation of the National Adaptation Strategy, representatives from national and sub-national governmental bodies, and representatives of various NGOs (e.g. The Carpathian Development Institute), and organised interest groups (e.g. insurance, industry), were actively involved. In the near future, during the implementation of the adaptation policy, authorities at both national and subnational levels are expected to be involved and informed more systematically. However, the strategy itself focuses on the national level, although the provisions with regard to EU regional funding instruments create an implicit reference to the regional level (Ministry of Environment 2014, EEA 2016e). According to the EEA (2016e), many initiatives have been launched at the local level in recent years, but there is no mention of initiatives at the regional level.

2.2.25 Slovenia

The foundations for a National Adaptation Strategy in Slovenia were made in 2009, through a national declaration for a climate policy (Federal Office for the Environment 2012). During its development, the responsible authority at national level has changed, and because of this change in responsibility, the process of adoption has been interrupted. In 2014, the process was restarted and a national assessment of climate change risks and opportunities was developed, which builds the base for the development of adaptation action plans. As the agriculture and forest sectors are the most vulnerable with respect to climate change (Ministry of Agriculture and the Environment 2014) a sectoral adaptation strategy (2008) and action plan (2010) (amended in 2011) were adopted by the national government. Furthermore, the strategy for the transition of Slovenia to a low carbon society by 2050 was adopted in 2012, providing a framework for adaptation actions as a goal. As Slovenia does not have a governance level below the national level and above the municipalities, regions do not play a role in the country's adaptation efforts.

2.2.26 Spain

Spain's National Adaptation Strategy, called the National Plan for Climate Change Adaptation (Plan Nacional de Adaptación al Cambio Climático, PNACC) was given final approval in July 2006 (Ministerio de Medio Ambiente y Medio Rural y Marino 2006a). The same year, the first Work Programme was adopted (Ministerio de Medio Ambiente y Medio Rural y Marino 2006b). In 2009, the second Work Programme was published that outlines sectorial actions and that fosters the coordination of all administrative levels (Ministerio de

Medio Ambiente y Medio Rural y Marino 2009). The third programme was published in January 2014, which is in accordance with the aims of the EU Adaptation Strategy (Ministerio de Medio Ambiente y Medio Rural y Marino 2014). Apart from Asturias and Rioja, all Spanish regions have adopted regional action plans, or adaptation strategies.

2.2.27 Sweden

There is not a National Adaptation Strategy per se in Sweden. Instead, the responsibilities for this have been delegated to regional authorities with the requirement for these to develop Regional Action Plans (Climate Adaptation Portal 2015). Of the 21 Regional Action Plans, all have been developed and approved apart from that of Dalarna. The government has established an adaptation coordination post at all the Swedish county boards to coordinate regional adaptation. It has also amended the Planning and Building Act to state that adaptation concerns are to be considered in municipalities' comprehensive and location-specific planning policies. (Ministry of the Environment 2014).

2.2.28 United Kingdom

Climate adaptation policy in the UK is a devolved matter. Scotland, Wales and Northern Ireland have established their own adaptation programmes, while Defra leads for adaptation policy in England and for the UK in reserved matters (HM Government 2013). The 2008 Climate Change Act outlined a framework for adaptation and established an Adaptation Sub-Committee to the Committee on Climate Change for advice to the government on national adaptation matters (LSE 2015). In July 2013 the first National Action Plan was published. Due to the decentralised approach, further action plans exist for Wales (adopted in 2010), Northern Ireland and Scotland (both agreed in 2014). At the regional level, climate change adaptation has taken place across the UK, through regional climate change partnerships, government offices, regional development agencies, and regional assemblies.

3 Adaptation Efforts on Regional Level

3.1 Regions in the EU Adaptation Strategy

In April 2013, the European Commission adopted the EU Adaptation Strategy, aiming to enable the European Union to withstand the adverse impacts of climate change. The strategy is the main climate adaptation policy at EU level. The general objective of the EU Adaptation Strategy (European Commission 2013a) is to contribute to a more climate-resilient Europe. This implies improving the preparedness and capacity to respond to the impacts of climate change at local, regional, national and EU levels through coordinated action by all relevant stakeholders.

The Strategy has three sub-objectives:

1. Promoting action by Member States to adopt comprehensive adaptation strategies.
2. Mainstream adaptation activities in different EU policy areas, e.g. agriculture, infrastructure, cohesion.
3. Closing knowledge gaps about adaptation, resulting in better informed decision-making.

The EU Adaptation Strategy Package contains the Strategy document and several supporting documents, which are analysed (in respect to their focus on regions) in the following paragraphs.

The different objectives and parts of the EU Adaptation Strategy document also emphasise regional and cross-regional activities. LIFE is mentioned as one major funding source that is especially focused on adaptation projects in Member States, regions and cities (link to sub-objective 1). In addition, priority is given to LIFE-projects which have a trans-regional perspective. Furthermore, the exchange of good practice between Member States, cities and also regions is supported.

Linked to closing the knowledge gap (sub-objective 3) and mainstreaming adaptation activities (sub-objective 2), the Member States and regions can use the EU Cohesion Policy and Common Agricultural Policy to address the knowledge gaps and invest in the needed analyses, risk assessments and build up capacities for adaptation activities.

Different knowledge gaps, which should be emphasised in the next years, are described; one of them is regional and local-level analysis and risk assessments

(link to sub-objective 3). The Commission and the Member States should work on refining these knowledge gaps and identifying the relevant tools and methodologies to address them. The detailed knowledge gaps will be fed into the research programme Horizon 2020 (2014-2020). The Climate-ADAPT information portal (built up by the European Environmental Agency and the European Commission) should allow closer interaction with regional authorities, to fill the gap on cost-benefit assessment regarding different adaptation decision contexts.

Interlinkages to rural development, which is highly relevant at regional level, are described in the document “Principles and recommendations for integrating climate change adaptation considerations under the 2014-2020 rural development programmes” (European Commission 2013b). In this document, the Commission has proposed cross-cutting objectives like innovation, environment and climate change mitigation and adaptation to be pursued horizontally, through all the measures of the rural development programmes (RDPs). For that period, programming encompasses development of a Partnership Agreement between the Member State and the Commission, summarising all efforts to achieve the Europe 2020 goals amongst others via the RDPs (European Commission 2013b). It is highlighted that spending programmes should be driven by rural and sectoral strategies already in place, including national or regional adaptation strategies (European Commission 2013b). Several key actions when developing priorities and measures for RDPs are adaptation-related, such as the call to identify the multiple benefits that can be achieved through the measures identified to respond to climate adaptation needs, e.g., the economic, social and environmental benefits. Other adaptation related actions include identifying activities that are not deemed appropriate for funding because they would act counter to climate adaptation needs (European Commission 2013b). With regards to the monitoring and evaluation stage of RDPs, the Commission recommends integrating adaptation issues into the indicators within the Common Monitoring and Evaluation Framework, as well as the milestones developed at the programming stage. The CAP reform proposals include the idea to connect the decoupled payments for farmers (Pillar 1 of the proposals) with requirements for crop diversification on arable land; and the maintenance of permanent grassland, and the maintenance of seven per cent of the eligible area of arable and permanent crops as Ecological Focus Areas. It was also suggested (in Pillar 2) to implement the European Agricultural Fund for Rural Development measures at farm level (to Pillar 1) to ensure that national, regional or local adaptation needs are fully integrated into the programmes of expenditure for 2014-2020.

There are also opportunities to fund climate change adaptation through Cohesion Policy, implemented through Operational Programmes, with many Operational

Programmes being regional. There are specific thematic objectives that support climate change adaptation directly but there are also several thematic objectives where climate change adaptation has an indirect role within Cohesion Policy funding.

An important opportunity for promoting bottom-up climate change adaptation actions could be implemented under the initiative for Community-led Local Development Schemes for Cohesion Policy. As climate change impacts and adaptation needs are inherently local/regional in nature, bottom-up initiatives designed directly by local actors may have greater potential to directly address and/or integrate climate adaptation than traditional spending priorities designed at a national level by sectoral authorities.⁴

The document “Adapting infrastructure to climate change” (European Commission 2013c) shows the different impacts of climate change on infrastructure, while differentiating between different European regions (such as urban or coastal areas, and mountainous and outermost regions). Additionally, the different sectors and their needs and possibilities regarding adaptation are also presented.

It can be summarised that the regional level is not the main level of focus in the EU Adaptation Strategy. More activities are described in respect to action at the Member State or local level. However, there is still substantial importance in the Strategy given to supporting the development and implementation of regional adaptation strategies. Here, especially the integration of adaptation actions in rural development programmes under the Common Agricultural Policy is highlighted.

3.1.1 Adaptation efforts before the adoption of the EU Adaptation Strategy

Many regional plans and strategies have been published years before the EU adaptation policy was formed (see Ribeiro, et al. 2009). Strong examples of these can be found in Germany and Spain.

Spain started its adaptation processes in the early 2000s, adopting its national adaptation strategy in 2006. The majority of regional adaptation policies were also adopted before 2010, often as part of a general climate strategy. Still, several regional plans or strategies followed after the EU Strategy was adopted such as the Basque Country in 2015, which is also a member of RegionsAdapt.

⁴ For further information on Community-led Local Development see European Commission (2014): http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/community_en.pdf

For the development and implementation of the national adaptation policy, the Climate Change Office as part of the Ministry of Agriculture, Food and Environment is in charge. The office closely collaborates with Autonomous Communities and Local Administrations as well as other stakeholders in order to coordinate the national and sub-national level (EEA 2016c).

In Germany, many Federal States established their own regional adaptation strategies in the late 2000s when the National Adaptation Strategy was adopted, e.g. Bavaria, Thuringa and North Rhine-Westphalia in 2009, Sachsen-Anhalt in 2010. Many strategies followed, e.g. Lower Saxony (2012), Baden-Wuerttemberg (2015). Most of the states are also involved in projects which analyse regional climate impacts or regional adaptation activities. In recent years, the German Federal Environmental Agency initiated a stakeholder process on several sectors and cross-cutting issues, including participants from different authorities and ministries of Federal States. In 2009, a Committee of the different Federal States' environmental ministries on climate adaptation was also established. The aim of this is to coordinate activities between the Federal States and the National Government. In general, it can be said that the development and approval of the German adaptation strategy and action plan initiated also a process of developing regional adaptation strategies by the Federal States.

3.1.2 Adaptation efforts since the publication of the EU Adaptation Strategy

Nevertheless, it appears that the adoption of the EU adaptation package gave spin to the national and in particular regional level development. This is validated by the findings of Massey et al. (2014) who found that EU efforts were one of the main drivers for the development of adaptation efforts. With the development processes of the EU Adaptation Strategy, its objective of better informed decision-making was already brought forward, as “it demands new cooperation, capacity building, and new channels for disseminating knowledge” (Glass & Juhola 2013, p. 262).

An example of where the process of development of regional strategies falls together with the European level is France. After the adoption of the National Adaptation Plan in 2011, the adoption of regional level plans has followed since 2012. Adaptation at regional level is included in the *schémas régionaux du climat de l'air et de l'énergie* (SRCAE) (Regional climate, air and energy schemes) and *plans climat énergie territoriaux* (PCET) (Regional climate and energy plans). The SCRAEs include an analysis of the region's vulnerability to the effects of global warming, identifying the regions and sectors of activity most at risk. Concerning the PCET, an evaluation found that the sections

dedicated to adaptation were often rather weak, if existing at all. In addition to the aforementioned strategy documents, inter-regional strategies exist for different mountain ranges, which include adaptation actions.

In Denmark, adaptation is focussed according to the national action plan (from 2008) first, then secondly on initiatives at local level involving local authorities, companies or individuals. As an example, the Action Plan mentions the amendment to the Planning Act that made it possible for the municipalities to include climate change adaptation directly into the local development plans. It also requires municipalities to have drawn up climate change adaptation plans by the end of 2013 in order to map the risk of flooding, specify their priorities, as well as providing an overview of their efforts (The Danish Government 2012). Therefore, local development plans have considered adaptation since 2012. To support their undertakings, a mobile team offers guidance and facilitates collaboration between municipal authorities and other stakeholders.

The Irish NAS outlines that local adaptation strategies are required in order to develop and express a vision for a well-adapted local community that is resilient to the impacts of climate change (Department of the Environment, Community and Local Government 2012). The implementation of the second phase was supposed to lead to guidelines for the integration of adaptation into local level planning in 2013, in parallel to the EU Adaptation Strategy. The Environmental Protection Agency published guidelines in 2016. It is intended that these guidelines will be included in any updating of the statutory Planning Guidelines on Development Plans. They can be used by an authority at regional, local or municipal level to assess the coherence and adaptation fitness of its spatial plans and the other plans and policies under its remit. As authorities review their development plans in the normal planning cycle, the development plan will also be the adaptation plan (LSE 2016).

In Sweden, the development of regional adaptation plans coincided with the EU Adaptation Strategy. County Administrative Boards act as regional adaptation coordinators with a government remit. The responsibility for practical adaptation measures is usually located at municipal level (Ministry of the Environment 2014). Anderson et al (2015) found that climate adaptation initiatives in Sweden have advanced significantly and mention the County Administrative Boards' regional climate change action plans as one of the success stories, with each of them producing region specific action plans. However, the authors also state that there is still a considerable need for further measures, such as roles and responsibilities being made more transparent, and that better coordination among the many actors involved in climate adaptation is necessary. This shortcoming was also predicted by Glass and Juhola (2013) with regards to implementing a national objective to adaptation that may help to streamline

objectives into regional policies. Chapter 3.4.2 presents the case study of Kronoberg that will emphasise the efforts of Sweden's regions.

Italy only adopted its National Adaptation Strategy in 2015, two years after the EU Strategy. In 2015, the Board for Interregional Coordination was established in order to support the adaptation initiatives of regional and local governments and to support the uptake of specific regional needs when implementing the National Action Plan for Adaptation. Regional and local adaptation strategies and plans have not been widely developed. In 2014 only the Lombardia Region (see Chapter 3.4.1) and a few cities, like Bologna and Ancona, have developed a Regional and Local Strategy aligned to the National Adaptation Strategy. At the end of 2015, Emilia-Romagna, Abruzzo and Sardinia committed to develop similar strategies. The region of Sardinia was appointed to technically support regions in their adaptation efforts (EEA 2016d). Developments at the regional level have been strongly supported by research projects such as RICLIC - WARM (2006) and Kyoto Lombardy (2008).

3.2 RegionsAdapt

RegionsAdapt was created to enable regions to share national and local governments' experiences from adaptation actions. The regions of Catalonia (Spain) and Rio de Janeiro (Brazil) initiated the process. The initiative is coordinated by the Network of Regional Governments for Sustainable Development (nrg4SD). At the World Summit of Regional Governments, that took place on April 14 -15, 2016, in Rio de Janeiro, Brazil, 20 new regions joined the 27 founding members in the RegionsAdapt Initiative (Table 1).

Several organisations partner with RegionsAdapt. These include several UN initiatives like Cap-Net (Capacity Development in Sustainable Water Management), Cepal (Comisión Económica para América Latina y el Caribe) and NAZCA (Non-State Actor Zone for Climate Action). From the private sector the initiative is supported by CDP and The Climate Group. Other initiatives focussing on the local and regional level also partner with RegionsAdapt and build a vast international network.

Regions that join RegionsAdapt commit to three actions:

- taking a targeted approach to adaptation (adopt or review a strategic document within two years),
- taking adaptation action in the outlined priority areas agreed within the initiative, and
- reporting annually on the adaptation process.

The key areas include:

- (1) Water resources and management,
- (2) Resilience and disaster risk reduction,
- (3) Forestry, protected areas and biodiversity,
- (4) Economic impacts and opportunities,
- (5) Agriculture and zootechnics,
- (6) Infrastructure (including transport and the energy sectors) and territorial planning, and
- (7) Social adaptation and impacts.

Around these key areas, working groups are established in which the regions should explore the impacts on each key area, options for adaptation planning, possibilities of monitoring and evaluation, support for adaptation actions and the actual adaptation actions in the regions. Currently, the key areas 1 – 4 are addressed, as the interest of the regions in these topics was highest (RegionsAdapt 2016). Sponsors like development banks, private organisations and the non-governmental sector are invited to join working groups in order to find synergies for the implementation of identified adaptation actions. Technical experts are welcome to support the working groups thematically. It is unclear, whether these invitations have already resulted in support by either technical experts or sponsors.

At the time of this document, several working group calls have already taken place and two webinars were organised for RegionsAdapt members to enhance capacity building. On the website, it is stated that in May 2016, strategies and actions sent by members were analysed and assessed. However, so far, no further information was published on this.

Table 1: Regions that are members of RegionsAdapt (sources: Secretariat of the United Regions Organisation, 2016 and nrg4SD)

Founding members	<ul style="list-style-type: none"> • Australian Capital Territory, South Australia (Australia) • Azuay (Ecuador) • Basque Country, Catalonia (Spain) • British Columbia, Prince Edward Island, Québec, Vermont (Canada) • California (USA) • Ceará, Goiás, Parana, Rio de Janeiro, Rio Grande do Sul, São Paulo, Tocantins (Brazil) • Fatick, Gossas, Saint Louis (Senegal) • Jalisco (Mexico) • KwaZulu-Natal (South Africa)
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	<ul style="list-style-type: none"> • Lombardia (Italy) • Sud-Comoé (Ivory Coast) • Tombouctou (Mali) • Wales (UK) • Western Province (Sri Lanka)
Members since April 2016	<ul style="list-style-type: none"> • Rabat-Salé-Kénitra, Fès-Meknès, Dakhla-Oued Ed Dahab (Morocco) • Kaffrine (Senegal) • Chaco Tarijeño (Bolivia) • Central Departament, Amambay, Cordillera (Paraguay) • Santander, Risaralda, Caldas (Colombia) • O'Higgins, Araucanía (Chile) • Pastaza, Napo, Morona Santiago, Pichincha (Ecuador) • Cerro Largo (Uruguay) • Cusco (Perú) • Roraima (Brazil)

3.3 Landscape of regional adaptation efforts in Europe

The landscape of adaptation efforts at international, national and sub-national level is colourful. Depending on their history, countries take different approaches to adaptation. Sweden, for example, organises decentralised, whereas Finland or France have a strongly centralised organisation. In this chapter, the regional adaptation efforts are presented for several cases, highlighting the development on macro-regional level, adaptation processes before and after 2013 and the specific case of the Kronoberg region in Sweden.

3.3.1 Adaptation on the macro-regional level

For some of Europe's macro-regions, a strategic, common approach for handling issues jointly has a long history. A front runner is the Baltic Sea Region, which through its governing cross-national body HELCOM addressed eutrophication in the sea in 1992. EU Strategies followed in 2009 for the Baltic Sea Region, in 2010 for the Danube Region and in 2014 for the Adriatic and Ionian Region and in 2015 for the Alpine Region. These strategies lay out specific objectives for regional development of the natural regions. With the European territorial co-operation, financing is allocated through INTERREG Projects financed via the European Regional Development Funds. These funds can be accessed also by other macro-regions for that no strategy has been developed so far.

In the Baltic Sea Region, especially the 2004 accession countries, Member States have benefitted from macro-regional projects funded via the European Regional Development Fund e.g. ASTRA⁵, BalticClim⁶ or BaltAdapt⁷. Within the latter, a macro-regional adaptation strategy and plan were developed in 2013, in parallel to the EU Adaptation Strategy. This parallel development supported streamlining EU policy objectives to the macro-regional level (Glas & Juhola 2013). For Latvia, within the BaltClim project, a roadmap was developed to support the competent authorities in the preparation of national policy planning documents for adaptation to climate change (Indriksone & Aļeksejeva 2013). The roadmap was developed as a working document - starting with identification of activities to be implemented, setting the time lines, responsibilities, further reviewing and updating the actions. The preparation process of a national adaptation strategy is continuing but there are no indications when it will be finalised.

The European macro-regions are defined according to Europe's natural regions. The advantage for actions within these regions is the similarity of the natural system, which for adaptation actions is necessary to take into account. Furthermore, projects on macro-regional level can enhance cross-border cooperation and aligned strategic goals of neighbouring countries. With regards to adaptation, this minimises contradictory actions of neighbouring states or regions and supports integrated adaptation planning.

3.3.2 Adaptation via projects

In several countries, where national climate adaptation efforts are still weakly developed, regional adaptation is mainly funded through projects. However, this also is the case for Finland that was on the front runners of national adaptation efforts in the EU. The importance that countries give to the financial incentives is significant for lower GDP countries (Massey et al. 2014).

In Croatia, there were no significant regional strategies until project funding was secured. At the local level, the cities Zadar and Zagreb developed adaptation plans partly within projects. Zadar is part of the ORIENTGATE project, which coordinates adaptation across South Eastern Europe. Zagreb has finished the first phase of the background study in 2013.

⁵ Project ASTRA. Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea Region (2005-2007).

⁶ Project BalticClimate. Baltic Challenges and Chances for Local and Regional Development Generated by Climate Change (2007-2013).

⁷ Project BaltAdapt. Baltic Sea Region Climate Change Adaptation Strategy (2007-2013).

At the regional level in Greece, several adaptation actions were implemented or prepared as part of national or international projects such as the project ADAGIO that fosters adaptation in agriculture, AdaptFor that focuses on forest ecosystems, and MEDROPLAN which concerns adaptation to droughts.

For Romania, project funds have also focussed on its location in the EU macro-region Danube. As such, Romania, Moldova and Ukraine developed the Danube Delta Climate Change Adaptation Strategy in 2014, coordinated by the International Commission for the Protection of the Danube River and based on the Strategy on Adaption to Climate Change for the Danube Basin.

3.4 Looking closer: the development and achievements of two regional adaptation plans

In order to see what detailed processes are behind the formulation of regional adaptation plans, two regional cases were analysed. Lombardy is a regional frontrunner in Italy and published its regional adaptation strategy before the national strategy was adopted. The case of Kronoberg in Sweden allows for conclusions on the successful horizontal and vertical integration of adaptation issues. Its strategy was published in 2016.

3.4.1 Case study Lombardy

Italy is divided into 20 regions (regioni), which are then subdivided into metropolitan cities (città metropolitane) and provinces (province), as well as municipalities (comuni).⁸ Lombardy is one of the largest, most populous and richest regions and is located in the northwest of Italy. It covers a total area of 24,000 km² and has a population of 10 million inhabitants. Because of the Italian institutional system on the allocation of responsibilities and jurisdictions (based on the principle of subsidiarity), climate change adaptation is dealt with in an autonomous way at both regional and local level in accordance with the main goals promoted by the National Adaptation Strategy. As a result of an administrative reform in 2014, policy on the provincial level has been amended. Responsibilities that were formerly dealt with on the provincial level, such as environmental issues including adaptation, were distributed to the next higher (regional) and lower (municipal) administrative levels.

⁸ CoR, <https://portal.cor.europa.eu/divisionpowers/countries/MembersLP/Italy/Pages/default.aspx>, accessed on 29 August 2017.

The objective of the Regional Adaptation Strategy is to cover all relevant regional sectors, such as risk management, soil protection, water and air quality, biodiversity, agriculture, transports, tourism or energy, leaving to municipalities the development of their own local strategy.

Lombardy has been selected as a case study for two main reasons. Firstly, it is a member of the RegionsAdapt initiative. Secondly, Lombardy published the first document, the guideline for the implementation of the Regional Adaptation Plan, on the way to its adaptation strategy in 2012, based on a bottom-up approach, before the EU and National Adaptation Strategy had been adopted (2013 and 2015 respectively). Thus, Lombardy has been playing a leading role in the national landscape in the field of climate change adaptation.

Development process of Lombardy's Regional Adaptation Plan

The region is perceived as highly vulnerable to climate change impacts due to the geographical circumstances (the landscape is characterised by the Alpine mountain area, steep valleys and high-flow rivers), but also due to the socio-economic conditions (one of the most populous, wealthy and productive regions of Italy). In the past decade, several projects and studies dealing with climate change mitigation and adaptation have been carried out in Lombardy. Most of these studies have been performed by the Lombardy Foundation for the Environment (Fondazione Lombardia per l'Ambiente – FLA)⁹, a research organization established the Regional Administration and five major universities of Lombardy to provide scientific advice to the policy-making in the environmental sector. One example among others is the research project “Progetto Kyoto Lombardia”, completed in 2008, that involved local universities and research centres and provided an initial base of information on climatology, emissions, impacts and scenarios for the region (Gurrieri 2016).

The challenges related to climate change led to a twofold strategy:

- mitigation policies and measures to reduce greenhouse gases emissions, and
- adaptation measures to reduce the vulnerability of the local natural and socio-economic systems and to increase the resilience towards the related impacts.

⁹ *Fondazione Lombardia per l'Ambiente* is a “nonprofit scientific foundation” established in 1986 by the Lombardia Regional Council to enhance and promote the technical and scientific knowledge on industrial risk. The aim of the activities of the FLA is to give scientific advice to policy makers and to the general public, conducting research, training and education in the environmental field (FLA, 2014).

For the development of such measures the regional scale has been defined as “the right place” to get a transversal meaning of adaptation, and to consequently directly decline the sectorial policies in an integrated way. In line with this approach the Lombardy region, with the technical support of the Lombardy Foundation for the Environment, produced in 2012 the “Guidelines for the implementation of the Regional Climate Change Adaptation Plan”, and two years later (2014) a more comprehensive “Regional Climate Change Adaptation Strategy” was completed, financed by the regional Department for Environment, Energy and Sustainable Development.

In order to deal with the climatic scenarios identified for its regional territory and the related variety of impacts in the different natural, social and economic sectors, the guidelines provided the first step for an official evaluation of such effects - and an integrated assessment of the vulnerabilities of those socio-economic and natural systems. This, together with the identification of the strategic directions (see Annex I), paved the way for the implementation of the subsequent Regional Adaptation Strategy, and following this, the definitive Action Plan in 2016 (FLA 2014).

The process to be adopted for tackling climate change challenges has been therefore structured in a number of key documents:

- Guidelines for the Implementation of the Regional Climate Change Adaptation Plan (2012);
- Regional Strategy for Adaptation to Climate Change (RAS) (2014);
- Regional Plan for Climate Change Adaptation (in development).

Development and content of Lombardy’s Regional Adaptation Strategy

The “Regional Strategy for Adaptation to Climate Change” was developed between 2013 and 2014 and approved in December 2014. This was done with the cooperation of the FLA, with a much more manifested reference to the European Union recommendations, particularly to the Green and White Papers on Adaptation to Climate Change, and in line with both the European and the Italian adaptation strategy (adopted in June 2015). In this way Lombardy became the first Italian region developing and adopting this kind of instrument as part of an organic and coordinated process aiming to address specific measures for the reduction of identified vulnerabilities (Gurrieri 2016).

The definition process of the RAS involved regional stakeholders and decision makers in considering climatic trends (present and past), as well as future projections and the concerning scientific knowledge about the related vulnerabilities and impacts. This provided a first methodological framework to

identify and prioritise future sectorial and cross-sectorial adaptation measures in Lombardy (Regione Lombardia 2015b). This sectoral horizontal approach has been the basis for the RAS, as it is structured according to eight different sectors. It highlights climate impacts, future scenarios, challenges and strategic directions for each of them.

Based on the consultation process, several key factors for ensuring, a successful, “*step by step*” adaptation process and to guide the formulation and implementation of further adaptation actions were identified, and included in the Regional Adaptation Strategy:

- Coordination with other administrative levels,
- Development of more effective regional climate models,
- Quantification of most significant impacts and evaluation of resilience and adaptive capacity of key systems to climate change and related main risks,
- Selection of priorities and adaptation objectives according to the vulnerability and risk assessed,
- Involvement of relevant stakeholders,
- Integration of climate change concerns and measures into sectoral plans and policies,
- Monitor and follow up of the regional adaptation process implementation.

The Regional Adaptation Strategy pays particular attention to the integration of climate change concerns and measures into sectoral plans and policies and defines a methodology for the mainstreaming process. Institutional stakeholders have been involved in the development of the RAS and the mainstreaming process since the initial stages and the process has been built on the already well-established connection between the institutions and external stakeholders. First of all, sectoral policies and plans were analysed to identify vulnerabilities, risks and objectives to cope with climate change in the future. In order to react to these, measures were designed in an iterative process between the Lombardy Department for Environment, Energy and Sustainable Development, the FLA and the sectoral administrations. Together with all sectoral administrations, the measures for each main sector¹⁰ were evaluated with regards to functional relationships between impacts and general objectives of adaptation (see Annex I), taking into account the overall framework of policies and sectorial interventions already in place or planned by the Regional

¹⁰ Physical environment - risk management and soil defense, water supply and quality, air quality, mountain areas; Biological environment- biodiversity and protected areas; Economic and social activities - agriculture, transports and mobility, tourism, energy; Human and cultural environment -. Human health, urban planning, cultural heritage.

Administration (Gurrieri 2016). The declared aim of this process is to communicate in a common language the main objectives and results and to discuss key vulnerabilities and adaptation priorities, but also to be able to convey those findings in each sectoral agenda (FLA 2014). Throughout the process, awareness for the interconnectedness of Lombardy's sectors and resources is created within the administration. This awareness can lead to better and more integrated decision making in the future.

The administrative framework of Lombardy is guided by several strategic documents, a set of reference laws and multiple sectoral plans and programmes, such as the Regional Development Programme (RDP). The Regional Development Programme (RDP) of the Lombardy region was approved in 2013 and acknowledges that climate change adaptation and mitigation are cross-sectoral issues that need to be managed by developing specific policies and measures for each regional sector (Regione Lombardia 2015a).

Apart from the RDP, the Territorial Regional Plan¹¹ is another strategic plan that addresses adaptation and explicitly mentions the RAS. As a consequence of these strategic policy instruments, subsequent sectoral reference plans and programmes include mitigation and/or adaptation as a necessity, including the Regional Environmental Energy Programme (June 2015), the Plan for Air Quality (September 2013) and the Regional Programme for Mobility and Transport (May 2015). The adaptation strategy and action plan aim to address those policy areas that do not yet include adaptation.

The Lombardy's Adaptation Action Plan, which will be published by the end of 2016, is based on the contribution of several regional sector-specific departments. Currently, various workshops for the evaluation of the possible priorities of the strategy have been carried out in an attempt to identify particularly urgent objectives. In the prioritisation, representatives from each regional department of the different sectors are involved. They weigh the importance of the impacts of the strategy and the need of intervention in each target sector (always considering the existing implemented and planned policies) (FLA 2014). The expected result of the final adaptation plan includes the identification of high-priority interventions - pilots for the different sectors - which are stated to invest a leading role for a more homogeneous future implementation of the strategy. Moreover, the Adaptation Action Plan aims to design a framework for Lombardy's adaptation effort, giving a more structured picture of adaptation. At the moment, adaptation actions are diffusely dealt with on the sectoral level and are rarely referred to explicitly as adaptation, which

¹¹ Piano Territoriale Regionale, adopted 2014.

make coordination a difficult task. The Framework will support adaptation action in the future.

Linkage between national, regional and local level

Among the key elements mentioned above, primary importance was given to the need of harmonisation with the National Adaptation Strategy to climate change, the information produced at the European level, and the already implemented adaptation strategies by EU Member States and regions (FLA 2014).

The use of European Funds as additional sources for developing and financing adaptation measures to the existing funding streams, which are already integrated in each sector's budget, is also mentioned in the Regional Adaptation Strategy. However, in practice there has not been any relevant contribution by European funding in the past stages of this process.

Also, as a result of the preparation process of the RAS, Lombardy joined as a founding signatory the Regions Adapt Initiative with the declared intent of giving voice to the importance of regions in the process of adaptation, stressing the much stricter relations with processes and peculiarities in their own territory. This very experience of networking and being part of working groups with other international experts and stakeholders was declared to be very successful in giving further strength and authority to the final definition of the Plan for Climate Change Adaptation.

Another example of knowledge transfer and dissemination activities is the involvement process of other Italian regions to the Under2MOU agreement, for greenhouse gas emissions reduction, that Lombardy signed as a frontrunner in 2015.

Because of this leading role, Lombardy and the FLA are directly involved with the Energy and Environment Commission within the Italian Interregional Coordination Board on climate change adaptation strategies¹² and have joined the development process of the National Adaptation Strategy. This choice was informed by the anticipated opportunities for debate and comparison of similar approaches with contiguous and homogeneous territories (e.g. Alpine region). Such cooperation has already proved to be effective for Lombardy in the past with regard to the development of policies in neighbouring regions for matters such as air and water quality management.

¹² Commissione Ambiente ed Energia della Conferenza Stato Regioni e Province Autonome.

The process for developing an Action Plan is also ongoing on the national level. The working group of the above-mentioned commission works on promoting and coordinating the development of Regional Adaptation Strategies and/or Plans. The group comprises all Italian regional governments, under the coordination of Sardinia, and has convened several times a year since 2015. Lombardy is willing to disseminate its experience with the step-by-step implementation process and thus may support other Italian regional administrations. So far, the working group has been proven to be very effective for harmonising regional and national objectives.

Furthermore, Lombardy and the FLA are part of the new LIFE Climate Action Project “LIFE Master Adapt”, led by region Sardinia. This new project, entitled, “Mainstreaming Experiences at Regional and local level for adaptation to climate change” aims to provide decision-support tools capable of making efficient and effective strategies and adaptation measures at regional and local levels. Several case study regions and municipalities are working together to identify best adaptation practices.

The parallel process of adaptation strategies at municipal level is at an earlier stage compared to other cities in Italy due to the voluntary nature of participation in the Mayors Adapt initiative. When defining measures for the regional adaptation Action Plan, local level policies were taken into account and evaluated for potential barriers for regionally proposed measures. Lombardy is furthermore planning to set three channel of cooperation in order to influence and stimulate such efforts:

- Programme-based, for the cooperation on common goals at a regional level (e.g. water and hydro-geological hazard management);
- Policy-based, for a direct correlation on local scale directions of intervention (e.g. urban planning);
- Subsidy-based, for experimenting financial support to public and private stakeholders in the development of specific measures (e.g. agriculture, tourism).

3.4.2 Case study Kronoberg

Sweden is divided into 21 counties regionally and into 290 municipalities locally, each with an elected assembly or council (Swedish Institute 2016). County Administrative Boards in each county have a Government remit to coordinate climate change adaptation regionally. County Administrative Boards are also required to compile, report and compare climate change adaptation efforts taking place in its municipalities (Kronoberg County Administrative Board 2016a). Sweden does not have a National Adaptation Strategy, but has

instead delegated this responsibility to regional authorities to develop Regional Adaptation Action Plans (hereafter Action Plan). Of the 21 Regional Action Plans, all have been developed and approved apart from that of Dalarna. (Climate Adaptation Portal 2015).

Swedish municipalities have in general been struggling to implement climate change adaptation measures in practice. This has been mostly due to a lack of information, uncertainty of who will finance the measures, as well as a lack of consultation/coordination/allocation of responsibilities. (IVL, Swedish Environmental Research Institute 2016).

Kronoberg County has been selected as a case study due to its strategic approach to vertical and horizontal integration of climate change adaptation in its Action Plan, published in March 2016. The County also contains the Västervik municipality, which has traditionally been highly ranked among all Swedish municipalities in its climate change adaptation efforts (IVL, Swedish Environmental Research Institute 2016).

Development process of Kronoberg's Regional Action Plan

In March 2013, Kronoberg County Administrative Board compiled a summary of the adaptation work taking place in the municipalities within the county, as well as identifying shortcomings that could be addressed in their Action Plan. (Kronoberg County Administrative Board 2016b). This led in 2014 to Kronoberg's first draft of the Action Plan and 28 proposals for adaptation action (Kronoberg County Administrative Board 2016a).

In 2015 the County Administrative Board consulted municipalities and relevant stakeholders on the initial draft of the Action Plan. These consultations provided concrete suggestions, which were considered in the update of the Action Plan. (Kronoberg County Administrative Board 2016b).

The revision of the draft Action Plan took into consideration a report by the Swedish Meteorological and Hydrological Institute (SMHI 2015), which estimated climate change scenarios for Kronoberg up to 2100.

A revised Action Plan was sent for consultation to the region's municipalities and relevant stakeholders between January and March 2016. The revised Action Plan included 47 action points and was approved by the Governor of the County Administrative Board on the 29th March 2016 (Kronoberg County Administrative Board 2016a). The Action Plan will be revised every fifth year.

Financing and co-ordination with other adaptation initiatives

The County Administrative Board recommends that municipalities would join the latest Covenant of Mayors for Climate and Energy. Currently the municipalities of Våxjö and Ljungby are members, with Våxjö also being a member of Mayors Adapt (joined 28 August 2014) (Kronoberg County Administrative Board 2016b).

The County Administrative Board has developed its regional adaptation aims based on both the EU scoreboard and the check list of the Mayors Adapt reporting requirements. The evaluation of the aims takes place every second year, supported by the reporting to the Covenant of Mayors for Climate and Energy by the municipalities. Based on the scoreboard aims, quantitative sub-targets for adaptation are developed in co-operation with the municipalities. To ensure that the work on climate change adaptation is as efficient as possible and to avoid any duplication, the County Administrative Board is planning to co-ordinate its evaluation with that of the Covenant of Mayors for Climate and Energy (Kronoberg County Administrative Board 2016b).

Max von Meeningen, who is the head of Climate Change Adaptation at Kronoberg County Administrative Board, was not aware of RegionsAdapt and consequently there are no plans for the County to join.

In the 2016 state budget all counties in Sweden receive jointly €3.15 million for climate change adaptation, of this total €90 000 has been allocated to Kronoberg County. In addition Swedish state owned authorities across the country share €13 000 for climate change adaptation (Correspondence with Max van Meeningen 31.8.2016). In addition a LIFE proposal on climate change adaptation was submitted by the Kronoberg County Administrative Board in 2016 to finance further coherence towards climate change adaptation and to realise the vision of Kronoberg to become the greenest region in Europe (Kronoberg County Administrative Board 2016b).

Content of Kronoberg's Action Plan

The Action Plan lists 47 measures, which are divided into national, regional and local measures. The stakeholder, having the main responsibility for initiating and fulfilling the measure, is indicated. The measures in the Action Plan are dynamic and can be revised if needed.

The 47 measures in the Action Plan are divided into the following groups and are briefly summarised below:

- Strategic:
 - 11 measures, mostly in relation to adaptation co-operation/integration (horizontal and vertical) and recommended processes to enable this. This measure will be discussed in more detail in the next section.
- Land use planning and preparedness:
 - 7 measures, mostly in relation to land use planning and climate change resilient infrastructure.
- Water:
 - 15 measures, mostly linked to pilot studies, such as extreme rainfall warning systems, GIS analysis, preparedness for flooding and holistic water/sewage planning within municipalities.
- Health:
 - 5 measures, such as improved heatwave warning systems, public information about heatwave health impacts/prevention and climate change resilient architecture.
- Forestry and Agriculture:
 - 4 measures, such as animal welfare, information about the impacts of climate change on agriculture/forestry and financial incentives to develop green infrastructure.
- Nature:
 - 3 measures, such as measures against invasive alien species and the mapping of habitat/biodiversity needs.
- Cultural heritage:
 - 2 measures on awareness raising about climate change impacts and measures against flooding.

Linkage between national, regional and local level

The Strategic category of the Action Plan includes the recommended measures for the co-operation and integration of climate change adaptation on a national, regional and local level, both horizontally as well as vertically. These measures will be summarised here but a detailed description of these can be found in Table 4 (page 85), which also includes the actor responsible for the measure as well as the timeframe of the measure.

The Action Plan recommends strengthening horizontal co-operation on climate change adaptation within the County Administrative Board through common projects and working groups. A climate change adaptation working group already exists, with participants from all the departments within the County Administrative Board, but the Action Plan suggests further improvements, such as setting up a surface water working group (Kronoberg County Administrative Board 2016b).

At national level, no Government department has a coordinating role in climate change adaptation. The lack of coordination is also a problem at a municipal level, as municipalities do not tend to have a dedicated person who has responsibility for better coordination between municipalities. An improved co-ordination between municipalities would also make the overall co-ordination role of the County Administrative Board more efficient (Kronoberg County Administrative Board 2016b, Correspondence with Max van Meeningen, 31.8.2016).

The coordination work that normally happens between municipalities covers flooding and other water related topics. Many of the municipalities have also discovered that horizontal coordination is a necessity to cope with limited resources (Kronoberg County Administrative Board 2016b).

Of the municipalities in the Kronoberg County, the municipality of Växjö has been in the forefront of climate change adaptation and published its Local Adaptation Action Plan in 2013 (Växjö Municipality 2013). This Local Action Plan evolved from being part of the EU project CLIPART in 2011-2012. The measures in this plan are restricted to adaptation measures within the municipality and do not cover co-operation with the County Administrative Board or other municipalities. The adaptation work undertaken in Växjö has only had a marginal influence on the Kronoberg Action Plan (Correspondence with Max van Meeningen, 31.8.2016).

Climate change adaptation is often seen within the municipalities as a technical issue but the climate change adaptation process itself often occurs within a broad

range of topics. Consequently the Action Plan recommends that there ought to be a contact point in the municipalities that can coordinate the adaptation inputs, as well as being a link between the municipalities and the county Administrative Board (Kronoberg County Administrative Board 2016b).

The national Government has established an adaptation coordination post at all the Swedish county boards to coordinate regional adaptation. It has also changed the Planning and Building Act to state that adaptation concerns are to be considered in municipalities' comprehensive and location-specific planning (Ministry of the Environment 2014). There is also initial work in progress to develop a national adaptation plan for Sweden to improve regional and sectoral co-operation (Correspondence with Max van Meeningen 31.8.2016).

3.4.3 Conclusions

The regional adaptation processes that were analysed in the study - Lombardy in Italy and Kronoberg in Sweden - have both run either in parallel or shortly following the EU Adaptation Strategy was developed. As also found by Massey et al. (2014), this parallel development supported the successful creation of the adaptation strategies. The success was nevertheless determined by regional specifics.

Development of the Action Plan

In Kronoberg, a comprehensive consultation process took place (amongst municipalities), providing a draft. In further consultations of municipalities, stakeholders, and experts, this draft was refined. A final consultation took place on the content of this Action Plan. We assume that the comprehensive consultation process has provided a greater ownership of the Action Plan to municipalities and stakeholders and has also been a likely contributor to the good quality of the Action Plan.

Lombardy took a rather technocratic approach. Before the development of the adaptation policies, several scientific actors were involved in the assessment of regional climate change risks and vulnerabilities. The development of the strategy was supported by the Foundation for the Environment, which assisted the regional government with technical support. Part of that support was a collaboratively developed guideline that supported the path to implementation. Through intersectoral workshops, cross-sectoral links were strengthened and the departmental officials were integrated in the adaptation process.

Co-ordination with other Adaptation Strategies

As far as possible, the development of adaptation strategies was well coordinated between the regional and national level.

The development in Lombardy took existing adaptation strategies on regional and national level into account and derived insights from the development process of the EU Adaptation Strategy. As Lombardy was the front runner of the Italian regions, no Italian case could support the development. However, the Lombardy experience has and will provide guidance to the development on national and regional levels.

The Kronoberg County Administrative Board developed its regional adaptation aims based on the EU scoreboard, and complemented the check list of the Mayors Adapt reporting requirements. It has also coordinated its own evaluations with that of the Covenant of Mayors for Climate and Energy. This approach is likely to ensure that best practice of other adaptation strategies are properly integrated into the regional and local adaptation strategies in an efficient manner.

Financial resources

For both of the case studies it is proposed to make use of existing financing streams. In Kronoberg, horizontal coordination to cope with limited resources was acknowledged among the municipalities as a necessity. In addition, the Adaptation Strategy for Lombardy aims to use the currently available sectoral budget plans.

Nevertheless, additional funds will be needed to implement the outlined adaptation actions. In both regions, the use of LIFE project funds is well established. A LIFE project in Lombardy supported the initial risk assessments and a LIFE project proposal has been submitted in Kronoberg for funding to further enhance co-operation and integration within the county.

Co-operation between national level and regional level

The Kronoberg Action Plan recommends for the national Government to designate a central government department for coordinating climate change adaptation efforts. The national Government has established an adaptation coordination post at all the Swedish county boards to coordinate regional adaptation. A national adaptation plan is currently being developed to improve the coordination effort between the counties. This might also contribute to improved national coordination. On the horizontal level, the Action Plan

proposes to strengthen horizontal cooperation on climate change adaptation within the County Administrative Board through common projects and working groups.

In Italy, the Ministry of Environment is responsible for adaptation policy on the national level. The Board for Interregional Coordination was established in order to strengthen the regional and local level in national planning of adaptation actions. As a result, coordination between the national and sub-ordinate levels has been institutionalised. The Lombardy region played a special role in this coordination as it supported the development on the national level with participation in the scientific board and assists regional developments with the elaborated guideline. Lombardy is member of RegionsAdapt in order to strengthen other regional governments in the field of adaptation policies.

It can be concluded from the cases studies that front-runners can play a strong role in shaping processes on other governance levels and can become a role model for other bodies. If the adaptation action on the lower governance levels is already well developed, it seems crucial to streamline the actions in order to maintain a joint approach to achieve common goals and to foster the exchange of good practices between regions.

4 Local Adaptation within EU Cities and Towns

Climate change will have severe impacts on cities. Whilst many cities in Europe are already working on mitigating the effects of climate change, adapting to climate risks is still a novel challenge for many of them (EEA 2016f). To tackle this issue, the European Commission adopted the EU adaptation strategy, focusing specifically on action at the local level. The Mayors Adapt initiative, launched in 2014 by the European Commission's Directorate General Climate Action, was the specific instrument designed to support cities in adapting to climate change. Furthermore, the European Commission has been exploring integrating mitigation and adaptation policy as a way to save resources, exploit co-benefits and tackle potential conflicts in the allocation of urban space (EEA 2016f). This resulted in a merger of the Covenant of Mayors¹³ and Mayors Adapt, in June 2016, into the new Covenant of Mayors for Climate & Energy initiative, which extends the timeline of voluntary climate mitigation and adaptation commitments from 2020 to 2030 and sets new, more ambitious targets.¹⁴

This chapter provides an overview on the state of play of adaptation in European cities, and considers the progress made following the adoption of the EU Adaptation Strategy in 2013. It also examines the support provided to cities by Mayors Adapt, through a survey of signatories to the initiative. Finally, the chapter explores the possible synergies between Mayors Adapt and RegionsAdapt and describes the role played by international networks in the support given to cities to advance climate adaptation.

4.1 State of play of local adaptation in the EU

A survey (EU Cities Adapt 2012) carried out in 2012, under the framework of 'EU Cities Adapt',¹⁵ via a pilot project financed by the European Commission, DG Climate Action, reported that, at that time, only 70% of the 196 interviewed cities had begun any work on climate adaptation, and that very few had reached a desirable level of awareness and action on this issue. Specifically:

¹³ The initiative was launched in 2008 by the European Commission's Directorate General for Energy to support European cities in increasing energy efficiency and the use of renewable energy sources on their territories to reach 20% CO₂ reduction by 2020.

¹⁴ http://www.covenantofmayors.eu/index_en.html

¹⁵ <http://eucities-adapt.eu/cms/>

- 1% stated they had a far advanced programme in place,
- 6% stated they were moving ahead of the field,
- 16% stated they were well on the way, and
- 47% were still in the very early stages of work on adaptation.

As a result of the project, run by a consortium including ICLEI and Ricardo AEA, dedicated training and coaching activities on adaptation were then provided. By 2013 a group of 21 cities had drafted an adaptation plan (EU Cities Adapt 2013).

Since the adoption of the EU adaptation strategy, initiatives, publications, resources and toolkits for cities have been produced in the framework of a variety of projects and initiatives. This has certainly contributed to increasing awareness of climate adaptation amongst cities, and helping them make progress in planning and implementation. As an example, at the 2016 edition of the Open European Day¹⁶, a dedicated event on cities and climate adaptation in Europe, participating cities affirmed that, slowly, interdisciplinary thinking linked to adaptation action was starting to be adopted at the local level. Furthermore, co-benefits and opportunities are increasingly being recognised, although in some cases cities are reacting to the consequences of an extreme climate event, rather than taking a proactive policy effort.

The Mayors Adapt initiative was launched in 2014 by the European Commission's Directorate General Climate Action. The aim of this was to support cities in acting to adapt to the negative consequences of climate change, and to voluntarily report on their progress. By December 2015, 142 cities¹⁷ had joined the EU Mayors Adapt Initiative and approximately 500 had engaged in other adaptation initiatives (including the Compact of Mayors, C40 with adaptation action, UNISDR's Making Cities Resilient campaign, the European Green Capital and European Green Leaf Awards, Metropolis no regret charter, and the Rockefeller Foundation's 100 Resilient Cities).

In autumn 2016, according to the Covenant of Mayors for Climate and Energy initiatives website, 419 local authorities had committed to take action on adaptation in their own territories, by signing one, or both, of the Mayors Adapt and the Covenant of Mayors for Climate and Energy initiatives.¹⁸

These numbers are, nevertheless, not exhaustive. In some cases, it is difficult to monitor the state of advancement of adaptation in cities because many, although

¹⁶ <http://resilientcities2016.iclei.org/open-european-day/>

¹⁷ Statistics on the Mayors Adapt and the Covenant for Climate and Energy websites slightly differ.

¹⁸ <http://mayors-adapt.eu/taking-action/participating-cities/>

implementing action, do not take part in initiatives that give visibility to their progress (EEA 2016f).

4.2 Creating a window of opportunity through the EU Adaptation Strategy

EU Member States are at different stages of preparing, developing and implementing adaptation strategies (see chapter 1). In many cases, local governments have not waited for their national governments to release a strategy. Faced with the negative consequences of climate change, they have started acting, often searching for technical or policy support at the EU level through the Mayors Adapt initiative.

When asked what some of the main obstacles to adaptation action are, cities traditionally mention (EU Cities Adapt 2012, Terenzi, Wigström 2014):

- Lack of budget or resources;
- Lack of a multilevel governance interface;
- Lack of political commitment;
- Lack of knowledge and data at city level;
- Lack of good practice examples;
- Lack of peer-to-peer exchange possibilities.

These obstacles have been taken into account by the EU Adaptation Strategy and resources and initiatives have been created to respond to them (MayorsAdapt, the CLIMATEAdapt tool, etc.). Therefore, the EU Adaptation strategy has created a framework to tackle the most pressing requests by local governments when it comes to climate change adaptation.

The EU strategy has undoubtedly raised the profile of urban adaptation at all government levels, reaffirmed the importance of action at a local level in tackling climate risk, and creating a more resilient Europe. The most important instruments to empower action at the local level laid out in the strategy can be summarised as:

1. Promoting action to develop local adaptation strategies in European cities;
2. Providing funding to help Member States (and as a consequence their cities) build up their adaptation capacity and take action;
3. Bridging the knowledge gap on regional and local risk assessments;

4. Mainstreaming urban adaptation into the different European policy areas e.g. EU cohesion policy;
5. Funding of local adaptation measures, and knowledge development and raising awareness for urban adaptation through projects and initiatives;
6. Fostering informed decision-making by addressing knowledge gaps through targeted learning and exchange activities for cities;
7. Enabling and coordinating exchange of knowledge and experience across borders.

Adaptation to climate change is a relatively new issue for cities and as a consequence, many are still in a learning process. Some cities have limited or fragmented knowledge of adaptation. The urgent need for adaptation calls for a systemic shift in the way cities act and plan their future development, but due to several obstacles, the majority of European cities are still lagging behind and not investing sufficient resources in climate resilience. The cross cutting nature of adaptation challenges the traditional sectoral approach through which local governments have operated, but represents also a crucial opportunity to ameliorate the urban environment, thus enhancing the residents' quality of life, and creating local jobs and fostering local economic development.

The EU's role is particularly crucial when climate change impacts transcend borders of individual states - as in the case of river basins. The EU Adaptation Strategy has *de facto* created a policy framework that fills an institutional gap and empowers action. Furthermore, integration with other EU strategic objectives, such as the EU Cohesion policy, will allow adaptation to be included in cross-border, transnational and interregional programmes and projects. This might have a great impact, especially when one considers that important and well established macro-regional strategies, such as the Danube area and the Baltic Sea, represent a suitable framework to foster climate adaptation in cities (European Commission 2013a).

4.3 Support tools and instruments for local governments created by the EU Adaptation Strategy

4.3.1 Climate-ADAPT and the Urban Adaptation Support Tool

The European Climate Adaptation Platform (Climate-ADAPT)¹⁹ is the “one-stop shop” for climate adaptation in Europe. The website contains a great amount of resources to support adaptation policy and decision making. These include, amongst others, a toolset for adaptation planning, a database of projects and case studies, and information on adaptation action at all administrative levels, from the local to the European. Launched in March 2012, the website has already become a centre of reference for adaptation knowledge platforms, both within the EU and abroad.

Particularly relevant for cities is the Urban Adaptation Support Tool²⁰ (AST). This tool is directly linked to the Mayors Adapt and new Covenant of Mayors for Climate and Energy initiatives, and is conceived as a guidance support system for signatories in planning and taking adaptation action. The Urban AST provides step-by-step guidance based on the adaptation planning and implementation cycle. The tool provides easy access to relevant adaptation information, data, tools and guidance specifically tailored for urban settlements in Europe. In summary, the tool provides practical guidance (how to act on adaptation) through its cyclical approach, which supports planning and implementing action in cities, and theoretical guidance (which solutions and approaches exist) through its collection of resources, which are grouped according to themes and topics, so as to be easily accessible. The tool follows the approach of the general Adaptation Support Tool on the Climate-ADAPT platform, thus promoting a harmonised EU approach to adaptation guidance for every tier of government.

4.3.2 Voluntary adaptation local action through the Mayors Adapt initiative

The EU Adaptation Strategy laid out a clear mandate for the Covenant of Mayors initiative, which primarily had a focus on climate mitigation, to be extended to climate adaptation. As a consequence, a new EU Adaptation Initiative for cities was shaped “through which local authorities can make a voluntary commitment to adopt local adaptation strategies and awareness-raising

¹⁹ <http://climate-adapt.eea.europa.eu/>

²⁰ <http://climate-adapt.eea.europa.eu/knowledge/tools/urban-ast>

activities”²¹ This initiative builds upon the results of the aforementioned pilot project EU Cities Adapt, and links to the EEA platform Climate-Adapt. In a nutshell, the Mayors Adapt initiative engages cities in taking action to adapt to climate change. By joining the initiative, participating local authorities benefit from support which will enable them to develop local activities to tackle climate change – they will also join a European network for cooperation and exchange of best practices, and can use its international visibility to generate greater public awareness on adaptation locally.

To foster peer-to-peer learning, which has proven to be one of the most effective forms of learning during the EU Cities Adapt Project, Mayors Adapt offers a twinning programme that aims to accelerate local capacity building and exchange of good practices between cities facing comparable climate risks or implementing similar solutions. Through this programme, between 2015 and 2016, ten beginner cities (in adaptation) had the opportunity to connect with ten mentor municipalities that had already developed adaptation strategies.

Cities that sign up to the initiative commit to developing a comprehensive local adaptation strategy, and/or integrating adaptation to climate change into relevant existing development plans. They also agree to submit an adaptation strategy to the initiative within two years from signing the commitment and, after that, report every second year on the city's achievements. Similarly to the Covenant of Mayors on energy, the initiative has a time horizon spanning to 2020. A helpdesk supports cities on technical issues regarding climate adaptation and further guidance is provided through the Urban Adaptation Support Tool (see paragraph 3.4.1).

According to member statistics, 142 municipalities have signed up to the Mayors Adapt initiative (118 of which have also signed the Covenant of Mayors on energy).

Traditionally, smaller cities have indicated a higher need for support and resources than bigger cities. The composition of the signatories seems to reflect this. As shown by figure 1, the vast majority of cities that signed up to Mayors Adapt for support are smaller and medium-sized cities.

²¹ <http://mayors-adapt.eu/>

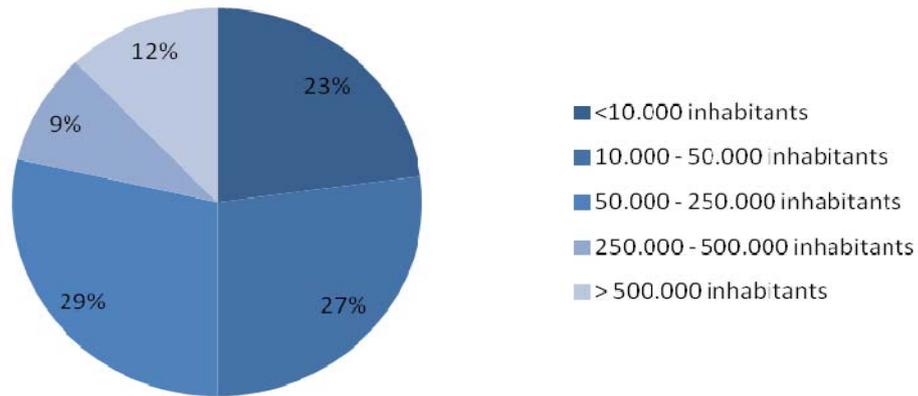


Figure 2: Percentage of Mayors Adapt Signatories according to their size

When looking at the signatories' geographical location, it can be seen that Southern European cities represent the majority of signatories, with Italy, Spain, Portugal and Greece making up approximately 70% of the signatories, as shown by Figure 3: Number of Mayors Adapt signatories in the different European Countries.

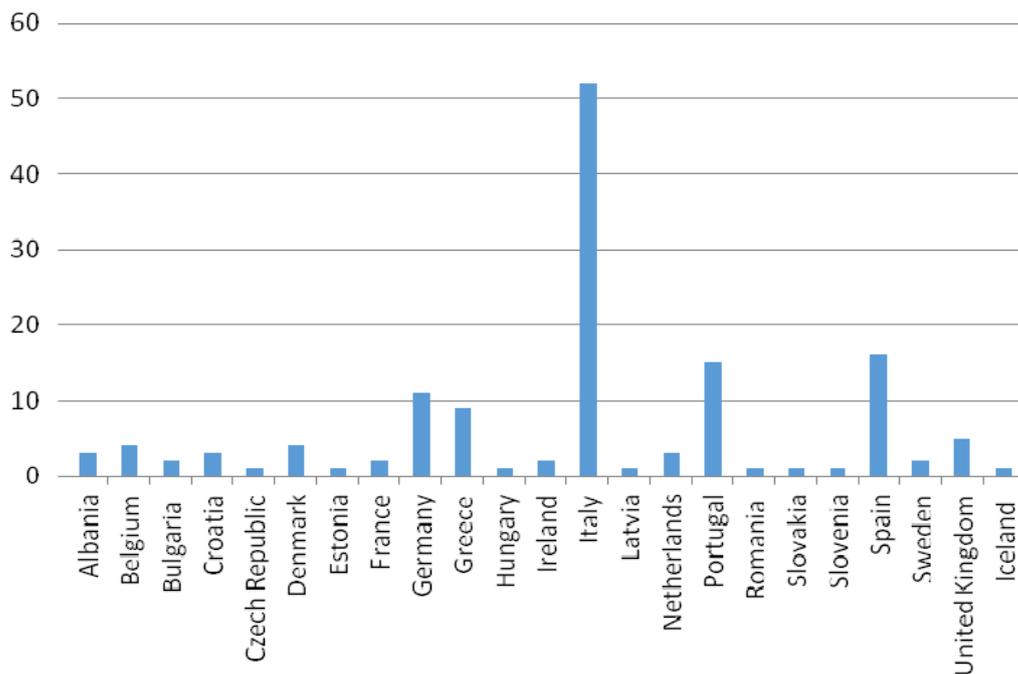


Figure 3: Number of Mayors Adapt signatories in the different European Countries

4.3.3 The Covenant of Mayors for Energy and Climate

Mitigation of greenhouse gases and adaptation to climate change are two sides of the same coin. Developing an integrated approach between mitigation and adaptation brings co-benefits, streamlines the management process, and helps harness political commitment and foster coordination among municipal

departments. For these reasons, the European Commission decided to set a clear focus on integrating climate change adaptation and mitigation efforts in cities. As a consequence, in summer 2015 the Mayors Adapt Initiative and the Covenant of Mayors were merged into the Covenant of Mayors for Climate and Energy.

Further to encompassing both climate adaptation and mitigation, this new initiative extends signatories' commitments to 2030. Specifically, they commit to reduce carbon emissions across their territory by at least 40% and to increase their resilience to the impacts of climate change. To translate their commitments into action and track progress, they submit a Sustainable Energy and Climate Action Plan (SECAP) after two years following the formal signing. This action plan(s) must be based on a Baseline Emissions Inventory (BEI) for mitigation and a Climate Risk and Vulnerability Assessment (CRVA) for adaptation. After its submission, signatories have to report on the implementation of their SECAP every two years, and can readjust priorities and/or review their SECAP to make sure they are acting in line with their targets.

The SECAPs and the progress and results achieved are made available through the new Covenant portal, enabling local authorities to track, report, and publicly show their local efforts. This enables proper accountability, transparency and recognition of climate action.

4.4 Survey amongst Mayors Adapt signatories

In order to gain insight into the state of play of the Mayors Adapt initiative and its impact on European Cities, a questionnaire was prepared and a small sample of signatories contacted. Specifically, a qualitative survey encompassing open and close ended questions was conducted in August-September 2016 amongst adaptation managers in the respective local authorities.

Three main criteria were used to select the sample of interviewees:

1. **Geographical coverage and size of cities** - location of cities to ensure equal distribution in Europe and a mix of different sizes of cities;
2. **Experience in local climate adaptation** - cities at different stages of their adaptation process, but with a sound understanding of the topic;
3. **Experience with the Mayors Adapt initiative** - Mayors Adapt signatories, as well as Mayors Adapt signatories that have also already joined the integrated Covenant of Mayors for Climate and Energy.

The diversity in the selection criteria of survey respondents resulted in data being obtained that can be regarded, as far as possible, as indicative of general European trends, despite the relatively small number of survey respondents.

Table 1 illustrates the nine cities selected as respondents for the survey, their relevant characteristics, and state of advancement with climate adaptation. Figure 3 shows their geographical distribution.

Table 2: Participants to the survey

City	Country	Population	State of advancement with adaptation
Cascais	Portugal	205.000	Has an adaptation strategy and measures in place.
Reykjavík	Iceland	122.460	Has an adaptation strategy encompassing measures, but these have not been implemented yet.
Bologna	Italy	386.181	Has an adaptation strategy and has implemented some pilot actions.
Ghent	Belgium	255.000	Has an adaptation strategy and has started the implementation process.
Sfântu Gheorghe	Romania	56.000	Does not yet have an approved adaptation strategy.
Greater Manchester	United Kingdom	2.700.000	Has embedded adaptation into relevant plans and strategies but did not develop a separate adaptation strategy.
Copenhagen	Denmark	560.000	Has an adaptation strategy and measures in place.
Stockholm	Sweden	925.934	Has embedded adaptation into relevant plans and strategies, but has not developed a separate adaptation strategy.
Växjö	Sweden	90.000	Has an adaptation strategy and measures in place.

The questionnaire submitted to cities had a qualitative rather than quantitative focus. The first part of the questionnaire (see Annex III) focused on the cities' state of advancement on climate adaptation, asking for self-evaluation of the city's activities, as well as identifying any remaining barriers to local adaptation action.

The second part focused on the cities' experience with the Mayors Adapt initiative, inquiring into the motives that led cities to sign up to it, as well as the main perceived benefits of the initiative to them. Finally, cities were asked to assess remaining needs for further support under the initiative and give their recommendations.



Figure 4: Geographical spread of the participants to the survey

4.4.1 Main trends observed from the survey results

From the questionnaire results, it appears clear that cities with very different adaptation contexts, and with very different motives signed the Mayors Adapt initiative. Some cities needed to push adaptation forward on their local agenda, others already had a strategy approved when they signed up to the initiative, and other cities joined because they needed resources (i.e. climate data or methodologies to carry out vulnerability assessments), to better understand their climate risks and how to minimise them.

In general, the questionnaire results point to the fact that, in line with previous observations (EU Cities Adapt 2012 and Terenzi, Wigström 2014), cities in Northern-Western Europe have been “early movers” on adaptation and have needed less technical support from the EU Mayors Adapt initiative. These have focused on exploiting its political impact to keep momentum on their endeavours and obtain visibility. Southern and Eastern European cities seem to have struggled more to keep political commitment high, and have generally encountered more challenges in gathering resources for adaptation and obtaining tailored information.

4.4.2 State of advancement and adaptation needs

When it comes to the state of play of adaptation, Table 2 illustrates the different situations in the nine cities.

The results show that there is not one standard way to tackling the effects of climate change locally, and there are different pathways that cities can choose, according to their local situations. In order to understand how adaptation action takes place on the ground, adaptation managers were asked to evaluate the impact of some recurrent barriers to climate change adaptation in their cities:

- **Lack of awareness and political commitment:** Six out of the nine interviewees stated that this did not represent a barrier or was only a very minor barrier. Three answered that it was still a significant obstacle to adaptation planning. In general, respondents stated that adaptation is recognised as a priority in their city and that the awareness of the potentially negative consequences of climate change has brought about political commitment. This is nevertheless not the case for all of the interviewees; some of them responded that they still struggled to push adaptation forward in their local political agenda. It was also pointed out by some participants that even if adaptation was already recognised as a priority at the local level, at the national level there were still notably behind and lacking in support for the local action.

- **Financial constraints, lack of funding:** Interviewees gave very different answers in respect to this barrier. Typically, this has been one of the most common obstacles to local adaptation, but over the past years cities, while still experiencing a lack of co-funding, have found different ways to finance their adaptation measures.

As an example, some of the interviewees have mainstreamed adaptation into their development plans (such as spatial development plans), inserting adaptation consideration into their general development policies, and thus financing it within the general scope of those plans. Others have unlocked ad-hoc financing from the municipal or national level, and others have used EU financing, mainly through the LIFE programme. For some cities, the financing barrier is still crucial though, especially in those cases in which a lack of appropriate capacity in the administration itself has not allowed creating momentum around adaptation, and making it into a business-as-usual consideration in the city development discourse.

- **Lack of appropriate legislative and regulatory frameworks:** On this question, interviewees gave different perspectives. For cities that have relatively high internal capacities, and whose national governments have been early movers in adopting adaptation strategies, this has not hindered action. Cities that have not had the opportunity and capacity to act more autonomously, see the absence of a legislative prescriptive framework as an obstacle to action and would welcome a clearer mandate that would give them more opportunities to adapt.
- **Limited cooperation between government levels:** Many respondents said this was mostly still a barrier. Whenever it comes to taking action on assets that are not solely the responsibility of local governments (such as different natural assets), coordination between different authorities is needed, which is often still lacking.
- **Lack of possibilities for exchange between cities:** All the interviewees were in agreement that this does not represent a barrier. All affirmed that several exchange opportunities were offered by Climate Adapt and other projects and initiatives (e.g. the national British network Core Cities²²). So, rather than a lack of opportunities to exchange, cities reported the most significant barrier in this regard to be their limited capacity to make use of such opportunities.

²² <https://www.corecities.com/>

4.4.3 Reasons for joining the Mayors Adapt initiative

Questionnaire respondents signed Mayors Adapt for different reasons. The majority indicated their willingness to showcase political leadership on adaptation and existing actions. Six of the nine respondents indicated that they wanted to be recognised as climate adaptation pioneers in Europe. The majority of respondents also sought an exchange of experience with other cities. It is interesting to note that even cities that are well ahead in their adaptation planning still considered learning from other cities to be a valuable aspect.

Only a minority of the interviewees strongly indicated that receiving technical support was an important motive for signing the initiative, while for others this played a role, but did not represent the main reason for signing or was regarded as not needed, as technical capacity already existed in their cities when they joined the initiative.

All the respondents had previously signed the Covenant of Mayors initiative on mitigation; this signals continuity in their climate commitments and seems to suggest that early movers in mitigation were also the most responsive to including adaptation into their policy priorities.

Furthermore, at the current time, five out of the nine interviewees have signed or have clear plans to sign the new Integrated Covenant for Climate and Energy. The integration of mitigation and adaptation was considered to be a move in the right direction by all respondents. Integration is seen as a way to make the planning, management and policy creation process more streamlined and to use resources more efficiently.

4.4.4 Main achievements of Mayors Adapt

What emerged clearly from the questionnaires is that participation in Mayors Adapt raised the awareness of local decision-makers and kept up momentum on the importance of climate adaptation. Showcasing progress and gaining visibility at the European level has contributed to local awareness for both frontrunner cities and for cities that are still at earlier adaptation stages. There does not appear to be consistent breakthroughs in respect to adaptation communication to the general public, as a consequence of signing Mayors Adapt. Public opinion has generally only been swayed in cities that invested locally in communicating to their populations. In most cases there has been poor communication with the public and climate adaptation remains mostly only known by insiders.

Learning from peers has been regarded as a very important achievement of the initiative, especially for cities that were still at early stages in identifying their

priorities when signing it. The opportunity to share experiences with other cities has been highly valued, and proved very useful in respect to the impact this has had on learning and progressing on adaptation. The city twinning programme was highly regarded, and seen as very relevant and useful by interviewees.

The technical support offered by Mayors Adapt has not been made use of by most of the questionnaire respondents. In some cases, this was due to the fact that such support was already available locally and was therefore not needed. In others, cities have indicated that support for local issues such as risk and vulnerability assessments, and identifying and selecting adaptation options was, in their opinion, not best placed to come from the EU level and should be provided locally. In contrast to this, other respondents indicated that technical support materials were very useful in conducting each step of the planning adaptation cycle. Specifically, the reporting template developed by Mayors Adapt was deemed useful by most respondents, especially to identify and track adaptation progress.

Furthermore, some of the respondents indicated that Mayors Adapt has elevated their profile as adaptation frontrunners, thus generating opportunities to be involved in projects, especially EU-funded ones, and to attract further financing.

4.4.5 Further needs for support and recommendations

Respondents had different needs in respect to further support and recommendations for the future development of Mayors Adapt (and/or the Covenant for Climate and Energy). These are:

- **To organise more events in Mayors Adapt frontrunner signatory cities and experience-sharing workshops.** This reflects a general need for structured workshops and hands-on examples of adaptation projects and experiences from other cities, and for a more tailored exchange through the creation of different topical groups based on hazards. Such exchanges would also be valuable for advanced cities, as they are normally strong on certain hazards that they are mostly exposed to, but sometimes lack knowledge on other hazards that have not traditionally affected them, but may be affected by in future as a consequence of climate change (e.g. heat waves for Northern European cities).
- **To obtain more guidance and support on the management of the adaptation building process.** Managerial, organisational and resourcing challenges are particularly hard felt in cities, even more than technical ones. Identifying and involving the right set of stakeholders, throughout

the process, as well as keeping momentum and engagement high, is challenging, and requires expertise that not many cities possess.

- **To foster multi-level governance.** In many cases governments at national and regional level follow local action, rather than supporting it. For this reason, a special awareness raising programme for national/regional authorities on how to support their local governments could be helpful.
- **To obtain training on communication and awareness raising techniques (e.g. especially between local politicians and the general public).** Guidelines on how to present adaptation results effectively to different target audiences would be appreciated.
- **To obtain technical support in the definition of long-term local climate scenarios and strategies, and in the set-up of monitoring and evaluation systems.** Consultees called for a more active promotion of tools and support in this respect.
- **To obtain support in identifying the cross-cutting nature of adaptation measures and thus co-benefits.**

Finally, consultees supported future focus being on the new Covenant for Climate and Energy initiative, and thus on the integration between mitigation and adaptation. Cities wished the new initiative to become a recognised international standard for the definition of local initiatives on adaptation and mitigation, and provide consistent assessment and reporting criteria throughout Europe.

4.5 Possible synergies between Mayors Adapt and RegionsAdapt

When looking at the European local adaptation landscape, it is unquestionable that the creation of the Mayors Adapt initiative has acted as a catalyst for urban adaptation in Europe, and has provided a common, widely accepted platform for cities to engage, implement, monitor and report on adaptation.

Further to the role of cities, the EU Adaptation Strategy also recognises the crucial role of regions in advancing climate adaptation, especially when it comes to flood management, water and coastal management, as well as for mountain areas. Nevertheless, a specific EU support initiative for regions similar to Mayors Adapt has not yet been created. Regions are given the possibility to join

Mayors Adapt (now Covenant for Energy and Climate) with the status of “coordinators” or “supporters”, but this is rather foreseen as a supporting role for city members, and not as a support tool for regions as such.

At international level though, an initiative to support regions in the development of adaptation strategies has been created e.g. through RegionsAdapt, there is a global commitment dedicated to inspire and support state, regional and provincial governments to take action, collaborate and report efforts on climate change adaptation (see Part 2). Four European regions²³ have already subscribed to this initiative:

- Wales (UK),
- Lombardy (Italy),
- The Basque Country (Spain),
- Catalonia (Spain).

These regions are home to approximately 21,600,000 people²⁴ and contain some cities that have also subscribed to the Mayors Adapt initiative.²⁵ This situation reveals a great potential for creating further synergies. Reinforcing cooperation between these two initiatives could, on the one hand improve the multi-level governance framework regarding adaptation in Europe, and on the other hand support further promotion of Mayors Adapt (and/or the new integrated Covenant of Mayors for Climate and Energy) in cities located in the “RegionsAdapt” regions. This might also promote adhesion to RegionsAdapt in further European regions.

Furthermore, the RegionsAdapt Initiative lays out clear commitments to adaptation and sets the focus on transparent, verifiable targets – which is consistent with the approach of Mayors Adapt (see chapter 3.2).

RegionsAdapt uses the Compact for States and Regions²⁶ as a platform for its members to report progress on adaptation. The Compact for States and Regions is defined as “the first dedicated reporting mechanism for states, provinces and regions, showcasing and analysing their climate efforts. Through an annual assessment, it provides a transparent, global picture of efforts to tackle climate change from state and regional governments”.²⁷ This mechanism is used to report on both adaptation and mitigation, seeking integration between these two

²³ Considered, are regions geographically located in the European Continent that are part of EU Member States.

²⁴ Source: <http://www.nrg4sd.org/climate-change/regionsadapt/>

²⁵ At this stage, only a few major cities in the European RegionsAdapt members have signed the Mayors Adapt initiative though, and these are mostly in Spain (Barcelona, Lleida, San Sebastian, Granollers).

²⁶ <https://www.theclimategroup.org/project/compact-states-and-regions>

²⁷ <http://www.nrg4sd.org/climate-change/compact-of-states-and-regions/>

policy areas. Also, the Compact for States and Regions has sought synergies with the Compact of Mayors, the initiative launched by UN Secretary-General Ban Ki-moon and his Special Envoy for Cities and Climate Change, Michael R. Bloomberg, under the leadership of the world's global city networks – C40 Cities Climate Leadership Group (C40), ICLEI – Local Governments for Sustainability (ICLEI) and the United Cities and Local Governments (UCLG) – with support from UN-Habitat. The Compact establishes a common platform to capture the impact of cities' collective actions through standardised measurement of emissions and climate risk, and consistent, public reporting of their efforts²⁸.

The Compact of Mayors and the Compact of States and Regions are both based on the principle of committing to create measurable results that are compiled in publicly available databases, and thus leverage the profile of local/regional governments by setting and monitoring their targets transparently. As mentioned above, these initiatives have synergised and worked together to harmonise their reporting mechanisms, also through the Carbonn²⁹ Climate registry, another reporting platform for climate data, which was launched in 2010 as the global response of local governments to measurable, reportable and verifiable climate action.

Furthermore, the Compact of States and Regions provides the link to another initiative, which also makes use of its reporting system, the Subnational Global Climate Leadership MOU.³⁰ Created by the regions of California and Baden-Württemberg, this initiative “brings together ambitious states and regions willing to make a number of key commitments towards emissions reduction and to help galvanise action at COP 21.” “All signatories agree to reduce their greenhouse gas emissions by 80% to 95%, or limit them to 2 metric tons CO₂-equivalent per capita, by 2050”.³¹ This initiative has been signed or endorsed by a total of 135 jurisdictions,³² representing 32 countries and more than 783 million people. As it uses the Compact of States and Regions reporting platform (the same used by RegionsAdapt), the Subnational Global Climate Leadership MOU should also be synergised with. At the moment, its focus is only on mitigation efforts, but a reinforced cooperation with the Covenant of Mayors for Energy and Climate could stimulate integration of adaptation into its commitments and incentivise membership by cities and towns in the regions that are part of the initiative (and vice versa).

²⁸ <https://www.compactofmayors.org/history/>

²⁹ <http://carbonn.org/>

³⁰ <http://under2mou.org/>

³¹ <http://under2mou.org/background/>

³² List here: http://under2mou.org/?page_id=238

The synergic potential of all these initiatives is very high, given that they are all using similar reporting mechanisms and basing their action on the same underlying principles (i.e. a public, transparent, verifiable climate commitment). In particular, negotiations should be started to harmonise the different reporting mechanisms for cities and for regions, so as to facilitate climate action reporting at every level.

Finally, the recent announcement of a merger between the Compact of Mayors and the Covenant of Mayors, which resulted in the creation of the “Global Covenant of Mayors for Climate & Energy”³³ acts as an additional multiplier on all these efforts. Although this initiative is still taking shape (it was officially announced on the 22nd June 2016), it demonstrates that creating compatible commitments for cities around the world, using a sole methodology and framework to track and report progress, is the direction that current approaches are taking.

In light of all of the above, it is crucial that negotiations are started for a closer cooperation between RegionsAdapt and Mayors Adapt. In fact, the effort by regions to reduce their emissions inevitably has an impact on cities, and at the same time, regions can act as supporters and catalysts for their cities to meet the commitments formulated by Mayors Adapt. The global merger of the Covenant of Mayors and the Compact of Mayors can also provide a harmonisation in this sense. As RegionsAdapt is a global initiative, widening the geographical outreach of the Covenant will avoid creating geographical disparity between RegionsAdapt members and provides a further layer of integration.

In conclusion, a closer cooperation between these initiatives would leverage the scope of both, benefitting regions and cities and facilitating and improving the multilevel governance interface in these.

4.6 The role of international networks in supporting local adaptation

Transnational municipal networks emerged in the late 1980s as initiatives bringing city governments together nationally and internationally in the policy making and international arena’s – they represent important actors for policy innovation (Benington & Harvey 1999). International networks of cities, regions and towns have traditionally focused on the promotion of sustainability and during more recent years, have given more attention to climate adaptation,

³³ <https://www.compactofmayors.org/globalcovenantofmayors/>

playing a key role in sharing experiences, enabling learning and supporting leadership among member cities. They have been very important to localise international or regional policies and goals, to disseminate knowledge, to foster peer-to-peer learning and exchange of best practices, and to connect leaders and accelerate change. Networks have had considerable impact on policy formulation and implementation (Bulkeley et al. 2003) and have become influential players internationally, filling in gaps in the mandates of national governments and international organisations to expedite and advance sustainability (Keiner and Kim 2007). A clear indication of their influence is represented by the bottom-up initiatives launched by networks, in cooperation with cities at key international negotiations. Examples of this include the Mexico City Pact,³⁴ to advance climate action, adopted in 2010 by 138 mayors (now 207), and the Durban Adaptation Charter³⁵ launched at COP17-CMP7 representing 950 local governments from 27 countries.

4.6.1 Support of international networks for adaptation

International city networks working on adaptation play a key role in sharing experiences, enabling learning and supporting leadership. They bring together practitioners, researchers and scientists to fill existing knowledge gaps by co-creating resources, approaches and planning methodologies for European cities in a changing climate (Carlsen et al. 2012). The growth of international networks has gone hand-in-hand with the increasing recognition of the role of local governments in international sustainability summits and agreements. In fact, city networks have advocated for a stronger recognition of local governments in tackling climate change and have ensured an ever growing visibility and presence of local government representatives at these events. Some of the most well-known city networks are: ICLEI - Local Governments for Sustainability, Eurocities, Energy Cities, Climate Alliance, R20 Regions for Climate Action, C40 Cities, United Cities and Local Governments (UCLG), 100 Resilient Cities, Citynet, Metropolis, the Alliance in the Alps (*Allianz in den Alpen*), and the Union of the Baltic Cities (UBC).

Some networks have developed reinforced cooperation initiatives for specific target groups. For example, the C40 Connecting Delta Cities initiative supports delta cities within the C40 network to mainstream adaptation policies and approaches, to deliver concrete climate change adaptation action by facilitating the sharing of good practice and technical expertise (C40 2016).

³⁴ <http://www.mexicocitypact.org/>

³⁵ <http://www.durbanadaptationcharter.org/>

When it comes to adaptation specifically, what these networks may offer ranges from simple consulting services, around the development of an action plan for local adaptation strategies, to continuous support in resilience building efforts through projects and initiatives. Some of the most important ways city networks provide support are:

- Informing about climate hazards and identifying risks and vulnerabilities;
- Identifying and prioritising local adaptation options;
- Building capacity of local decision makers, community members, private sector representatives and further stakeholders;
- Connecting leaders, fostering inter-municipal dialogue, conducting international advocacy on behalf of local governments;
- Promoting co-creation, mutual learning, innovative solutions and demonstration projects;
- Raising awareness of, and influencing uptake of local adaptation strategies among a broader network of cities and local authorities that may replicate such experiences.

Furthermore, city networks promote experience sharing, learning and action through campaigns, programmes and projects. They create and disseminate adaptation knowledge through targeted publications, such as policy briefs, thematic reports and training packages. Networks organise international knowledge-sharing and capacity building events, including conferences, seminars and workshops for knowledge exchange and joint learning. They provide space for strengthening collaboration within and, across regions, thus facilitating the development of multi-country projects and initiatives (Global Adaptation Network 2011).

4.6.2 Case studies: ICLEI and Climate Alliance

In order to better illustrate how international networks support local governments in advancing adaptation, two of them will be described more in detail. These are: (1) ICLEI - Local Governments for Sustainability and (2) Climate Alliance. Both these networks support Mayors Adapt – the Covenant of Mayors Initiative on Climate Change Adaptation and work closely with the EU Commission on projects and initiatives which seek to foster action by cities on

climate change adaptation in Europe. The following paragraphs present insights into how they work and act to promote adaptation at the European level.

4.6.3 ICLEI - Local Governments for Sustainability

ICLEI - Local Governments for Sustainability is a global movement bringing together around 1,500 cities and towns committed to building a sustainable future. With regards to adaptation, ICLEI is committed to supporting cities, towns and urban regions in their efforts to develop integrated adaptation strategies and holistic action plans, and to guide them through a systematic process of implementation and management. Acknowledging the complexity and cross-cutting nature of these challenges, ICLEI emphasises the need to act holistically, and in a cross-sectoral way, to develop adaptation action as an integral part of any statutory planning process.

At the European level, ICLEI's adaptation team acts as an interface between various tiers of government - from the European Union to the local level - as well as between research, policy and practice, and is involved in a number of climate change adaptation projects, where it plays a knowledge brokerage role and ensures that scientific results are designed and produced in co-creation with cities and are thus most useful for them. Some of ICLEI's main adaptation projects include:

- **RAMSES**³⁶ (2012 – 2017), a multi-disciplinary European research project delivering detailed quantification of the impacts of climate change on cities. The project assesses risks and vulnerabilities, and the costs and benefits of respective adaptation measures.
- **Smart Mature Resilience**³⁷ (2015-2018), a multi-disciplinary European research project working to enhance cities' resilience by developing a Resilience Management Guideline to help cities resist, absorb and recover from shocks and stresses caused by climate change, social dynamics and critical infrastructure vulnerability.
- **RESIN**³⁸ (2015-2018), a multi-disciplinary European research project investigating climate resilience in European cities by developing tools to support cities in designing and implementing climate adaptation strategies in a local context.

³⁶ <http://www.ramses-cities.eu/>

³⁷ <http://www.smr-project.eu/home/>

³⁸ <http://www.resin-cities.eu/home/>

In addition to these projects, ICLEI also undertakes advocacy and strategic work to advance the understanding of local adaptation in Europe. For example, ICLEI is member of the EU Adaptation Steering Group, the Mayors Adapt Group of Practitioners and is involved in different standardisation committees at national and international level e.g. such as the new German Standardisation Institute (DIN) committee on climate adaptation.

In addition to these activities, ICLEI Europe, in cooperation with the European Environment Agency organises an ‘Open European Day’, a yearly event that provides a unique interactive exchange platform focused on European Cities, and their requirements to successfully adapt.³⁹

4.6.4 Climate Alliance – working group on climate adaptation

In order to foster the exchange of views, knowledge and experiences on key issues around adaptation to climate change, Climate Alliance launched a Working Group on adaptation in spring 2015. The working group brings together climate experts and political leaders from Climate Alliance member cities and several partner organisations to help take stock of current adaptation challenges and possible solutions at local level. The group explores possibilities for local practitioners to consider mitigation and adaptation in an integrated way, while finding solutions to mobilise political and financial support. Climate Alliance aims to build bridges between adaptation practitioners and (political) decision makers to discuss the main adaptation challenges to increase awareness and understanding and implement an integrated approach.

Topics range between adaptation in the EU context, new solutions tested by peers, and possible financing schemes for adaptation efforts. The group’s experiences and opinions are fed into the preparation of Climate Alliance resolutions and political position papers, helping convey key messages to national and international decision-making processes. The group collaborates with the Mayors Adapt Group of Practitioners, including participation in its consultation meetings, as well as cooperation with other key institutions such as the European Commission’s Directorate General for Climate Action and the Committee of the Regions. Group members also have the opportunity to prepare joint protect proposals, take part in site visits and engage in a variety of other activities (Climate Alliance 2016).

³⁹ <http://resilientcities2016.iclei.org/open-european-day/>

4.6.5 Conclusions

The EU Adaptation Strategy and the Mayors Adapt initiative have contributed to profiling climate adaptation in cities, and have provided an appropriate framework and support mechanism for cities to act. Nevertheless, cities still face many obstacles when confronted with adaptation planning. Further to technical challenges, the management of the adaptation governance process, which is very complex in its nature, is one of the key issues for which cities demand more support, both at a local level, and also with respect to the multi-level governance framework.

The integration of climate mitigation and adaptation in the Covenant of Mayors for Climate and Energy initiative, which is already ongoing, can contribute to streamlining governance processes at the local level and enable exploitation of co-benefits. In order to ensure the success of this process, adequate resources and support need to be provided to cities through the initiative.

Finally, closer cooperation between the Mayors Adapt and the RegionsAdapt initiatives will improve the multi-level governance interface: by acting together, the two initiatives can provide better communication and support to both cities and regions when tackling climate change.

5 Conclusions and Recommendations

5.1 State of play: Adaptation progress in Member States:

To date, nineteen Member States have adopted National Adaptation Strategies and ten Member States are in the process of developing theirs. Ireland and Germany are currently revising their strategies, having already adopted them in 2012 and 2008 respectively.⁴⁰

Before 2013, approximately 50% of Member States had developed adaptation policies. After the EU Adaptation Strategy was adopted, seven Member States approved a National Adaptation Strategy, two of them, the Netherlands and Portugal, already had strategies in place but amended their current strategies.

The development of the EU Adaptation Strategy has clearly impacted on national policy development. Time will show whether this will also hold true for future amendments of National Adaptation Strategies.

5.2 State of play: Adaptation policies in EU regions

Observation: Regarding the current state of development of regional adaptation strategies, Eastern European countries, in particular, have made little progress with the development of regional strategies. In respect to Western European countries, no regional strategies are in place in some of the Member States with more centralised governments, including France, Finland and the Netherlands. In contrast, Sweden and Denmark have distinct adaptation policies. Sweden has strong regionally driven governance and therefore adaptation strategies in all regions, whereas policies in Denmark have originated at local level, rather than the regional level. With regards to the Eastern European countries that have just adopted their national strategies, or are still developing them, it is likely that further encouragement at European level can enable development at the regional level. In these countries, regional adaptation is mainly reliant on project funding.

Recommendation: In larger countries, in particular, where regional conditions vary, regional adaptation should be fostered and be on the agenda for the next period in EU Adaptation Policy. But as seen in the above described examples, a one-fit-all solution cannot be recommended here. Governance structures vary in the EU28 countries – some have strong local or regional governments, others

⁴⁰ They are therefore counted twice.

have very centralised structures. However, all the different forms of governance structures for regional adaptation activities and planning can and should be supported by EU activities. Knowledge and experience transfer can be supported between comparable governance structures. Good practice for certain kinds of governance structures should also be described and promoted.

We consider that promoting the development of regional adaptation strategies and action plans can increase climate resilience at a regional level. Nevertheless, this needs to happen in accordance with national governance structures, and should also comply with the subsidiary principle.

5.2.1 The Role of the EU Adaptation Strategy in regional adaptation

Observation: Although adaptation at the regional level is not the main focus of the EU Adaptation Strategy, it is still referenced in both the Strategy and in the accompanying documents of the Adaptation Package. In order to foster regional adaptation to climate change, two priority funds are in place, which regions, or regionally active stakeholders, can access. LIFE projects can focus on the development of adaptation strategies (in support of objective 1 of the EU Adaptation Strategy). A second opportunity for regions to set the agenda for climate adaptation, and to access funds which enable its implementation, is via rural development programmes. The EU Adaptation Package recognises the importance of such planning tools (e.g. Partnership Agreements). This Package also acknowledges the importance of regional and national adaptation strategies, with which the rural development programmes need to be aligned.

Recommendation: One way of improving EU support for regions is to ensure that the established tools within the EU Adaptation Package highlight the importance of regions in climate adaptation. To ensure better information and exchange of experiences amongst regions, the ClimateAdapt portal could allow for more interaction with regional authorities. This portal could also feature more examples of regional efforts. In particular, the regions in which considerable adaptation progress had already been made could function as good-practice case studies for other regions that are still developing their strategies. This would also support the objective of the EU strategy: strengthening better informed decision making.

In regions that do not have adaptation strategies in place, Partnership Agreements could function as an incentive in establishing regional adaptation planning goals. There could be greater exploitation of the valuable experience which has been gained at the regional level, and this could be used more effectively to support the development process of regional adaptation strategies.

This point applies particularly in relation to Member States that have National Adaptation Strategies, and regional experience of projects (mostly LIFE funded). The experience of such countries, which include Slovakia, Romania, Czech Republic and Finland could be better disseminated to regional and local authorities. We consider that the dissemination of project results to relevant regional and local level authorities could be made obligatory for EU funded regional adaptation projects.

5.2.2 The future role of RegionsAdapt

Observation: RegionsAdapt could become an important driver of regional adaptation in the future. It aims to empower regions in their adaptation efforts, with targeted support and knowledge exchange amongst members. In the short time since its foundation in April 2016, the impact of the initiative still remains modest. Our research found that RegionsAdapt was not always known about by the regions, as highlighted by the Kronoberg County Administrative Board case study. Lombardy, which was another case study, was, however, a member to the initiative and had received support from RegionsAdapt.

Recommendation: When more regions become members and engage in RegionsAdapt activities, the initiative should become a more effective tool towards achieving the EU Adaptation Strategy's objectives and strengthening the role of regions in adaptation policy. As a member to RegionsAdapt, Lombardy could become one of the key technical supporters for regions that look to develop strategies in the future. For strengthening the role of RegionsAdapt, it is recommended that further guidance on this is disseminated to relevant regional authorities. The Committee of the Regions could play a more active role in promoting the RegionsAdapt initiative within the EU, and assist in disseminating outcomes and experiences with other regions internationally.

5.3 Further needs for support of the regional level

5.3.1 Integrating climate change adaptation into sectoral planning

Observation: Existing planning tools are important in fostering adaptation at the regional and local level. This is recognised in the Partnership Agreements, laid out in the EU Adaptation Strategy. Some lessons learnt can be gained from experience within Member States. In Denmark, where mandates have shifted from the regional level to the local and national level, the amendment to the Planning Act makes it possible for municipalities to include climate change

adaptation directly in the local development plans. Ireland also follows a similar approach and deals with adaptation in local plans. Sweden and the Netherlands have also made a linkage between adaptation and spatial planning. A further example can be found in the UK, where adaptation planning is integrated with river basin planning.

Recommendation: In order to cope with budget constraints and to unfold synergies e.g. for flood protection and biodiversity protection, the linkage between climate change adaptation and spatial planning seems to be an effective way of incorporating adaptation objectives at a regional and local level. We consider that going forward the effectiveness of this approach might be increasingly emphasised by the Committee of Regions.

5.3.2 Improving multi-level governance

Observation: As adaptation actions are implemented at different governance levels, efforts need to be coordinated efficiently. In the Swedish municipality of Kronoberg, adaptation is often seen as a technical issue – probably because of a lack of understanding of the vulnerabilities and risks caused by climate change. This is an example of the need for enhanced multi-level coordination. Coordination at regional and national level is often better in countries in which regional adaptation is more developed. For example, the Austrian and German Federal States were included in the developments of their respective national strategies and their contributions contained in national documents. Spain also encouraged coordination between the various different government levels when producing a working plan to its adaptation strategy.

Recommendation: We consider that coordination between stakeholders at the local and regional levels can still be improved in many cases. As shown above, there are several good existing examples of different types of vertical co-operation in governance. Therefore, in order to strengthen the role of sub-national levels in adaptation efforts, multi-level governance needs to be highlighted. Member States could be required to establish effective, vertical integration in institutions, e.g. regular working groups on adaptation which include stakeholders from national and regional governments and authorities. We believe that regional representatives should play a more prominent role in national adaptation decisions. They could be given greater opportunities to both review, and develop, national adaptation strategies and action plans. Greater engagement should increase awareness of impacts and have the positive outcome of increasing commitment to take action.

Stakeholder discussions, e.g. at a sectoral level, could also include participants from different governance levels. Furthermore, national and regional authorities

could cooperate to interlink relevant databases containing climate-relevant information and indicators, to enhance the information and evidential basis in regional decision making.

5.3.3 Strengthening horizontal coordination

Observation: Examples of horizontal coordination can be observed in Member States. One example comes from Italy, where an Interregional Coordination Board was established in order to coordinate efforts within the same governance level. This Board supports the mainstreaming of adaptation actions in natural regions such as the Alpine region. A further horizontal strategy has been taken forward in Denmark, which established a mobile task force to provide technical support to municipalities.

Horizontal coordination is also required when integrating adaptation in governmental sectors. For example, Lithuania, Germany and Lombardy recognised the need to address sector specific and inter-sectoral actions.

Recommendation: In order to develop effective adaptation strategies, it is necessary for regions to work with, and communicate with, their neighbours in order to make adaptation effective. With regards to floods risk and water management such issues were foreseen and are now taken care of following the implementation of the Floods and Water Framework Directives. We consider that other interregional approaches which foster information exchanges across administrative borders should be encouraged by the Committee of the Regions.

5.3.4 Fostering exchange of experience

Observation: Reviewing the existing experience with regional level adaptation in Member States gives a diverse picture. In several countries, such as Spain, Austria, Sweden and Belgium, adaptation strategies are in place across all the sub-national levels. This is lacking in other countries. Efficient exchange of experiences between regions is needed for progress in adaptation policy at the regional level. This need was also highlighted by regional stakeholders interviewed in the course of this study.

Recommendation: The dissemination of lessons learnt and good practices in respect to regional adaptation can provide policy makers working on regional adaptation strategies with organisational knowledge on how to develop and implement such strategies and how to access financial funds. The Committee of the Regions should strengthen exchange of experience within the European regions. In order to do so, the RegionsAdapt initiative could be further promoted at the European level. We foresee that eventually, European regions could gain

greater insight from international experience, and contribute to regional adaptation worldwide.

5.3.5 Improving stakeholder engagement

Observation: In order to set the right goals for adaptation, we consider that stakeholder engagement, or at the very least consultation, is crucial. Different approaches to stakeholder engagement are pursued in the Member States. For example, Spain and Germany engage stakeholders via consultation processes at the national level, e.g. workshops. Conversely, in Denmark mobile teams visit municipalities' representatives and private stakeholders to provide on the ground technical adaptation support. The Kronoberg County Administrative Board involved stakeholders in the process of drafting their Adaptation Plan. In Lombardy, the Regional Plan for Climate Change Adaptation was developed in cooperation with relevant stakeholders from various administrative departments and sectors.

Recommendation: It is notable that many successful cases of adaptation planning included stakeholders in the process. These could serve as good examples for a regional strategy on participation, which in turn could increase awareness of climate impacts and creating acceptance among stakeholders. This will eventually play an important role in the successful implementation of the strategy. Thus, bottom-up and stakeholder inclusive processes need to be mainstreamed in regional policies, for which we believe the Committee of the Regions can act as a supporter.

5.4 State of play: Adaptation policies at local level

Following the adoption of the EU adaptation strategy, many initiatives and projects on local adaptation have already started, creating resources and toolkits to support cities in their adaptation journey. This has certainly contributed to an increase in awareness within cities of climate adaptation, which before 2013 was still scarce. Nevertheless, at the present time many cities still struggle to understand the local impacts of climate change and how to set up an adaptation process.

Approximately, 140 cities have signed the Mayors Adapt initiative and around a further 420 local authorities have committed to take action on adaptation within their own territories – by signing one or both of the Mayors Adapt and the Covenant of Mayors for Climate and Energy initiatives. In particular, many smaller local authorities from Southern Europe have joined these initiatives. This clearly shows that, in line with previous studies, they remain in higher need of support from the EU, in comparison to Northern European and bigger cities.

The outcomes of the Mayors Adapt initiative and the Covenant of Mayors for Climate and Energy represent positive steps in the right direction. In particular, the Mayors Adapt initiative has been successful in building, and maintaining momentum on climate adaptation amongst its signatories. It has also made adaptation more politically visible. This initiative has also supported cities in showcasing their achievements at the EU level, thus bringing visibility and leverage to them. The Mayors Adapt initiative has also been successful in fostering peer-to-peer exchange between signatory cities, which has proved to be particularly relevant in respect of learning and advancing adaptation.

Nevertheless, the number of signatories to Mayors Adapt still remains relatively low. Furthermore, when the number of cities committed to climate adaptation is compared with those committed to mitigation, it is clear that adaptation is still building momentum (e.g. almost 6000 cities have subscribed to the Covenant of Mayors for Energy with commitments to 2020). The difference in subscription numbers is probably due to a number of factors. On the one hand, climate adaptation is a newer priority (when compared to mitigation) and needs more time to be digested by local policy makers; and on the other, understanding and monitoring adaptation measures and progress is not as linear as it is for mitigation. This makes it more difficult to create a business case for adaptation. Another obstacle to climate adaptation is that it requires a broad and cross-cutting understanding of urban development processes, and thus a change in the sectoral approach, according to which local administrations have traditionally operated. Although a change of mentality and *modus operandi* can be already observed in many cities that have started working on adaptation, they still represent a minority in the European context.

For the above reasons, the number of cities working on adaptation is still relatively small and will need to increase in the future. A coupling of adaptation and mitigation seems to be a sensible move to enable streamlining of decision-making processes, and to exploit co-benefits between these two policy areas.

5.5 Further needs for support at the local level

5.5.1 Creating a well-functioning multi-level governance interface

Observation: Even in those cases where there is adaptation awareness and political commitment at the local level, cities often consider that the regional and national tiers of government lag behind in recognising adaptation as a policy priority, and in offering cities a suitable framework for action.

Recommendation: The EU should create a mechanism, or consider introducing some form of dedicated resources to empower the national and regional level to support cities in their climate action. This is important because adaptation requires a well-functioning multi-level governance framework and coordination – which is often still lacking, and in many cases hindering action in cities. In this sense, further synergies should be sought between Mayors Adapt, Regions Adapt and other similar initiatives, so as to integrate methodologies, procedures and reporting mechanisms and foster local-regional dialogues.

Creating new EU regulatory frameworks for adaptation could also support local action in contexts in which cities have limited financial and human resources to act, and in which political commitment is still lacking.

5.5.2 Financing adaptation

Observation: Despite having found different ways to fund adaptation, often through local budgets, cities still have issues co-financing adaptation, and especially financing bigger infrastructural projects.

Recommendation: Innovative mechanisms for co-funding adaptation need to be designed. The revision of the EU Adaptation Strategy should draw conclusions from the already existing EU financing mechanisms for adaptation (e.g. the LIFE Programme and the Natural Capital Financing Facility), to give recommendations on how to develop bankable adaptation projects. Furthermore, an analysis of existing adaptation projects and measures financed directly by local/regional governments (including those financed in cooperation with the private sector) should be conducted in order to understand, and give recommendation on, how to empower cities to follow best practice. As an example, a resource could be created which provides data on economic and non-economic benefits (and co-benefits) of nature-based solutions and green infrastructure, as well as the possibilities to integrate them with existing grey infrastructure. If such a resource was created it could provide better support to cities in developing a business case for solutions.

5.5.3 Fostering peer-to-peer exchange

Observation: In general, Mayors Adapt signatories have been satisfied with the quantity and quality of past events, workshops and conferences organised around urban adaptation. Nevertheless, the signatories would welcome more opportunities to exchange experiences directly with peers, ideally through more city twinning opportunities, or in-depth city case study workshops.

Recommendation: A new peer-to-peer exchange and mentoring mechanisms between cities should be identified, promoted and financed adequately.

5.5.4 Providing tailored knowledge for adaptation

Observation: Cities would welcome more tailored technical assistance on adaptation in respect of key issues such as obtaining local climate projections, developing vulnerability assessments, and selecting adaptation options and monitoring their impact. In addition to information provided at the EU level, there should be more empowerment of, and cooperation with, local knowledge providers.

Recommendation: The EU should develop guidelines on how to obtain climate data and services, and also generate viable models on creating partnerships between local governments and knowledge holders. These resources should focus on effective ways to co-create information. As well as receiving information from universities and research institutions, cities should collect data and report on the implementation of adaptation measures, so as to become active information providers. The EU should also gather existing experiences of innovative local public private partnerships and use them as a basis to provide guidelines to other cities.

5.5.5 Managing the adaptation process

Observation: The creation and maintenance of an adaptation management process is probably the most challenging endeavour to cities, and one which they often lack the capacity to govern. Therefore, methodologies on how to best and most efficiently drive, manage and keep up such processes are needed. Communication to different stakeholders, especially local politicians, and raising awareness to the general public are crucial aspects of this ‘process support’.

Recommendation: The EU should build upon the Urban Adaptation Support tool to create further modules and resources dedicated to process management and communication, focusing on practical guidelines and worksheets. Furthermore, capacity building programmes to use these resources should be designed and carried out.

5.5.6 Integrating mitigation and adaptation

Observation: Cities interviewed in the framework of this report welcomed and supported the closer integration between climate mitigation and adaptation in the Covenant of Mayors for Climate and Energy initiative. In their view, coupling these two policy priorities would streamline local governance processes and foster the exploitation of co-benefits. Integration should also foster political

commitment on adaptation, and set a unique and clear line of action when it comes to climate policy.

Recommendation: In order to ensure the success of this process, adequate resources and support should be provided to cities through the Covenant of Mayors for Climate and Energy. This calls for the creation of adequate guiding materials and capacity building programmes. In particular, cities should be trained on how to manage the mitigation and adaptation processes complementarily, how to generate co-benefits, and how to manage the complex stakeholder constellation that revolves around the creation of an integrated Energy and Climate Action Plan. Conclusions can also be drawn from existing frontrunner experiences of integration between mitigation and adaptation and translated into process guidance methodologies.

In order to realise the above, the new Covenant for Climate and Energy should take stock of the process management methodologies that are available for mitigation and adaptation and seek to integrate them into a new management system providing step-by-step guidance on developing integrated climate and energy plans.

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Annex I: Challenges and strategic directions for adaptation in Lombardy

Table 3: Main climate changes challenges and strategic directions for adaptation per sector in Lombardy (adapted from FLA 2014, based on FLA 2012)

Sektor	Strategic directions for adaptation
1. Human health: heat wave	<ul style="list-style-type: none"> - Reinforce healthcare services in response to the frequency and intensity of summer heat waves; - Increase efforts and resources in prevention and control considering explicitly climate change projections; - Intensify efforts in reducing the ‘heat urban island’ effects in metropolitan areas (e.g. expand green spaces and urban parks, bioclimatization of buildings, etc.); - Promote campaigns of good hygiene practices, food safety and healthy life style.
2. Soil defense: increase in hydro-geological hazard	<ul style="list-style-type: none"> - Reevaluate the hydro-geological hazard Mitigation Plan of the regional territory by explicitly considering future climate variability; - Adequate current policies and protection systems in response to the expected increase in flood risk; - Safeguard the necessary space for water streams, limit the extension of sealed areas to ensure the natural soil capability of water retention and flood control; - Adapt the current Early Warning System and emergency management plans to the possible increase of flash flood.
3. Water supply: water stress increase	<ul style="list-style-type: none"> - Reduce water demand in hydro-demanding sectors; - Optimise available water reservoirs; - Optimise agriculture and farming systems and techniques; - Reinforce present monitoring systems; - Examine legal bases and where necessary take into account changing standard conditions (residual flow, thermoelectric discharge, lake regulation, water restitution).
4. Tourism: rise of the limit of	<ul style="list-style-type: none"> - Diversify touristic offer as an alternative of winter sports;

snow cover	<ul style="list-style-type: none"> - Promote flexibility of existing ski resorts by adapting the opening season to real snow availability; - Promote cost-benefit analyses to existing ski areas to evaluate its environmental and economic suitability with regards to future scenarios; - Include climatic consideration in the feasibility assessment of future ski areas, discouraging the use of massive artificial snow; - Reinforce current monitoring and forecasting weather systems and risks protection infrastructures especially in touristic alpine areas.
5. Agriculture: water stress and diffusion of pests	<ul style="list-style-type: none"> - Promote the application of new agricultural techniques for water saving and for minimising the effects of extreme events on crops (in harmony with the objectives of mitigation and water management); - Promote conservative soil management practices to maintain its main functions: natural fertility, capacity to act as carbon sink, water retention ability and biodiversity protection; - Improve farmers access to climate suitability maps, drought forecast and pest / diseases monitoring systems; - Reallocate crops production to the new suitable areas; - Define good climate adaptation practices to support farmers along the adaptation process (e.g. providing ad hoc insurance mechanisms, fight plant diseases).
6. Mountain areas: permafrost and glaciers melting	<ul style="list-style-type: none"> - Ensuring continuous monitoring and updating of hazard cartography in alpine areas explicitly accounting for future climate projections; - Analyse and optimise (if necessary) existing protection systems considering the evolution of natural risks and prioritising the use of natural protection systems in supplementary protection activities; - Continuously improve integrated methodologies for identifying new natural hazard processes, considering changes in hazard in areas already at risk, caused by climate change; - Ensure coordination and collaboration with adjacent alpine countries.
7. Biodiversity	<ul style="list-style-type: none"> - Safeguard the most representative areas in terms of

<p>and protected areas: loss of species, habitat modification and shifts in species distribution</p>	<p>biology conservation, with special attention to rare, or in delicate state, habitats;</p> <ul style="list-style-type: none"> - Reduce cognitive gaps and uncertainties in relation to the appearance, settlement, diffusion and fight against alien species and vector disease; - Reduce habitat fragmentation and ensure the progressive connectivity of regional protected areas networks, considering shifts of species distribution due to new climate conditions; - Expand existing protected areas to preserve target species, expected to reduce in spatial distribution due to climate changes.
<p>8. Energetic sector: decrease in hydroelectric production capacity</p>	<ul style="list-style-type: none"> - Promote information and awareness-raising campaigns for saving energy; - Create more incentives and promote greener building and planting trees to save energy in residential areas; - Enhance sensitivity studies concerning the effects of new climate conditions in the renewable energy sectors, to identify local weakness and opportunities (e.g. possible expansion in solar energy suitability).
<p>9. Transports and mobility: impacts on transport infrastructure</p>	<ul style="list-style-type: none"> - Strengthen the existing monitoring and risk analysis plans to identify main vulnerabilities and priorities for transportation infrastructure; - Promote the adoption of transport infrastructure that can resist meteorological extremes (thermally stable materials, draining asphalt); - Combine adaptation efforts with the promotion of the use of low emission transportation facilities; - Review and update if necessary the authorisation processes and normative bases of transport infrastructure planning, considering future climate changes
<p>10. Air quality: favorable condition for air pollutants accumulation</p>	<ul style="list-style-type: none"> - Cover the cognitive gaps on climate change implications in atmospheric pollution (mechanism of influence of climatic variables on the dynamic of main atmospheric pollutants); - Improve present surveillance and alarm systems to take into account any future increase of acute atmospheric pollution situations; - Strengthen technical measures to decrease emissions of

	<p>fine particulate and precursors of ozone;</p> <ul style="list-style-type: none"> - Promote soil management practices that can enhance the absorption of air pollutants and ensure carbon sequestration
11. Human health: heat wave	<ul style="list-style-type: none"> - Reinforce healthcare services in response to the frequency and intensity of summer heat waves; - Increase efforts and resources in prevention and control, considering explicitly climate change projections; - Intensify efforts in reducing the ‘heat urban island’ effects in metropolitan areas (e.g. expand green spaces and urban parks, bioclimatisation of buildings, etc.); - Promote campaigns of good hygiene practices, food safety and healthy life style.
12. Soil defense: increase in hydro-geological hazard	<ul style="list-style-type: none"> - Reevaluate the hydro-geological Hazard Mitigation Plan of the regional territory by explicitly considering future climate variability; - Adequate current policies and protection systems in response to the expected increase in flood risk; - Safeguard the necessary space for water streams, limit the extension of sealed areas to ensure the natural soil capability of water retention and flood control; - Adapt the current Early Warning System and emergency management plans to the possible increase of flash flood.
13. Water supply: water stress increase	<ul style="list-style-type: none"> - Reduce water demand in hydro-demanding sectors; - Optimise available water reservoirs; - Optimise agriculture and farming systems and techniques; - Reinforce present monitoring systems; - Examine legal bases and where necessary take into account changing standard conditions (residual flow, thermoelectric discharge, lake regulation, water restitution).
14. Tourism: rise of the limit of snow cover	<ul style="list-style-type: none"> - Diversify touristic offer as an alternative of winter sports; - Promote flexibility of existing ski resorts by adapting the opening season to the real snow availability; - Promote cost-benefit analyses to existing ski areas to

	<p>evaluate its environmental and economic suitability with regards to future scenarios;</p> <ul style="list-style-type: none"> - Include climatic consideration in the feasibility assessment of future ski areas, discouraging the use of massive artificial snow; - Reinforce current monitoring and forecasting weather systems and risks protection infrastructures especially in touristic alpine areas.
15. Agriculture: water stress and diffusion of pests	<ul style="list-style-type: none"> - Promote the application of new agricultural techniques for water saving and for minimising the effects of extreme events on crops (in harmony with the objectives of mitigation and water management); - Promote conservative soil management practices to maintain its main functions: natural fertility, capacity to act as carbon sink, water retention ability and biodiversity protection; - Improve farmers access to climate suitability maps, drought forecast and pest / diseases monitoring systems; - Reallocate crops production to new suitable areas; - Define good climate adaptation practices to support farmers along the adaptation process (e.g. providing ad hoc insurance mechanisms, fight instruments to plants diseases).
16. Mountain areas: permafrost and glaciers melting	<ul style="list-style-type: none"> - Ensuring continuous monitoring and updating of hazard cartography in alpine areas explicitly accounting for future climate projections; - Analyse and optimise (if necessary) existing protection systems considering the evolution of natural risks and privileging the use of natural protection system in supplementary protection activities; - Continuously improve integrated methodologies for identifying new natural hazard processes, considering also changes in hazard in areas already under risk, caused by climate change; - Ensure coordination and collaboration with adjacent alpine countries.
17. Biodiversity and protected areas: loss of	<ul style="list-style-type: none"> - Safeguard the most representative areas in terms of biology conservation, with special attention to rare, or in a delicate state, habitats;

<p>species, habitat modification and shifts in species distribution</p>	<ul style="list-style-type: none"> - Reduce cognitive gaps and uncertainties in relation to the appearance, settlement, diffusion and fight against alien species and vector disease; - Reduce habitats fragmentation and ensure the progressive connectivity of regional protected area networks, considering shifts of species distribution due to new climate conditions; - Expand existing protected areas to preserve the target species which is expected a shrink, in its spatial distribution, due to climate changes.
<p>18. Energetic sector: decrease in hydroelectric production capacity</p>	<ul style="list-style-type: none"> - Promote information and awareness raising campaigns for saving energy; - Create more incentives and promote greener building and planting trees to save energy in residential areas; - Enhance sensitivity studies concerning the effects of new climate conditions in respect to the renewable energy sector, to identify local weakness and opportunities (e.g. possible expansion in solar energy suitability)
<p>19. Transports and mobility: impacts on transport infrastructure</p>	<ul style="list-style-type: none"> - Strengthen the existing monitoring and risk analysis plans to identify main vulnerabilities and priorities for transportation infrastructure; - Promote the adoption of transport infrastructure that can resist meteorological extremes (thermally stable materials, draining asphalt); - Combine the adaptation efforts with the promotion of the use of low emission transportation facilities; - Review and update if necessary the authorisation processes and normative bases of transport infrastructure's planning considering future climate changes.
<p>20. Air quality: favorable condition for air pollutants accumulation</p>	<ul style="list-style-type: none"> - Cover the cognitive gaps on climate change implications in atmospheric pollution (mechanism of influence of climatic variables on the dynamic of main atmospheric pollutants); - Improve present surveillance and alarm systems to take into account any future increase of acute atmospheric pollution situations; - Strengthen technical measures to decrease emissions of fine particulate and precursors of ozone;

	<ul style="list-style-type: none">- Promote soil management practices that can enhance the adsorption of air pollutants and concomitantly ensure carbon sequestration.
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Annex II: Recommended strategic adaptation actions, Kronoberg

Table 4: Recommended strategic adaptation actions on a national, regional and local level, actors responsible and timeframes.

Measure	Actor Responsible	Timeframe
National		
1. Designate a central government department for coordinating climate change adaptation efforts	<ul style="list-style-type: none"> • Government 	2016-2020
Regional		
2. Kronoberg County strives to achieve an overall and coordinated approach to energy and climate issues. This is to be done through a common organisation and network to coordinate, inform and create synergies as well as resourcing finance for local initiatives.	<ul style="list-style-type: none"> • Kronoberg County Administrative Board • Kronoberg County Municipalities • Kronoberg Energy Agency for Southeast Sweden 	2016-2021
3. The County Administrative Board has developed its regional aims based on the EU scoreboard as well as complemented the check list of the Mayors Adapt reporting requirements. The evaluation of the aims takes place every second year, supported by the reporting to the Covenant of Mayors for Climate and Energy by the municipalities.	<ul style="list-style-type: none"> • County Administrative Board 	2016-2020
4. Based on the scoreboard aims, quantitative sub-targets for adaptation are developed in co-operation with the municipalities.	<ul style="list-style-type: none"> • County Administrative Board 	2019-2020
5. Estimation of costs in case no climate change adaptation action.	<ul style="list-style-type: none"> • County Administrative Board 	Continuously
6. Strengthen horizontal co-operation on climate change	<ul style="list-style-type: none"> • County Administrative 	Continuously

<p>adaptation within the County Administrative Board through common projects and working groups. There already exists a climate change adaptation working group with participants from all the departments, but the Action Plan would like to see further improvements, such as setting up a surface water working group.</p>	<p>Board</p>	
<p>7. Information campaigns targeting the public about simple climate change adaptation measures to protect private property.</p>	<ul style="list-style-type: none"> • County Administrative Board • Municipalities • Insurance companies 	<p>2016-2020</p>
<p>8. Information campaigns on climate change adaptation with a focus on planning, targeting key stakeholders, such as municipalities, property owners (forestry and agricultural sector) and energy companies.</p>	<ul style="list-style-type: none"> • County Administrative Board • Municipalities • Insurance companies • Kronoberg County • The Rural Economy and Agricultural Societies (offering advice to rural businesses) 	<p>2016-2020</p>
<p>9. Inform municipal and larger private real estate companies about climate change adaptation.</p>	<ul style="list-style-type: none"> • County Administrative Board (in co-operation with Kronoberg County and municipalities) • Insurance companies 	<p>2016-2020</p>
Local		
<p>10. All municipalities to be actively involved in deciding how climate change adaptation is to be</p>	<ul style="list-style-type: none"> • Municipalities 	<p>2016-2020</p>

integrated into existing plans or a climate change adaptation plan.		
11. Municipalities to join the Covenant of Mayors for Climate and Energy.	<ul style="list-style-type: none"> • Municipalities 	2016-2020

Annex III: Questionnaire to Signatories of Mayors Adapt

In order to inform the Committee of the Regions' Report: "Regional and local adaptation in the EU since the adoption of the EU strategy in 2013" a survey will be conducted among a small sample of Mayors Adapt signatories (approx. 7-10 cities). The questionnaire presented below will serve as a basis for the survey (phone interviews and/ or written survey) which will be conducted in August and early September 2016.

The questionnaire's objectives are to identify signatory profiles, the status of local adaptation efforts in the cities, as well as how and for which motivation the cities came to be part of the initiative. It also aims at identifying potential barriers, challenges and expectations and helps seizing the positive impact of the EU strategy on urban adaptation in climate proofing cities and building resilience at local level.

The interviews/ written survey was be conducted with the respective municipal employees or elected officials responsible for adaptation in the selected signatory city.

Questionnaire

The questionnaire combines multiple choice with open questions, as well as closed questions with rating system, all of which aim to set the context and allow for the collection of qualitative information from the interviewees. Part 1 of the questionnaire focuses on the cities' experience with regard to adaptation, while Part 2 focused on their experience regarding the Mayors Adapt initiative.

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City:

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Country:

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Population (Municipality and Metropolitan area):

.....
Classification (small, medium, large):

.....
Climate:

.....
Name of city representative interviewed:

.....
Municipal department:

.....
Function of interviewee:

.....

Part 1: Adaptation

1. 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 have implemented some measures, but there is not an integrated, holistic strategy with regard to adaptation
 - c. We have conducted an assessment for vulnerability to climate change, but no specific measures have been implemented
 - d. We have added adaptation in our general sustainability portfolio, but there is no plan yet
 - e. Other:
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2. Are there any specific activities, projects or initiatives in your city that fall under the umbrella of climate adaptation? If yes, please specify.
 - a.
.....
 - b.
.....
 - c.
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- d.
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- e.
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3. Are there any adaptation related activities, projects or initiatives in your city that may not be labelled as climate adaptation? If yes, please specify.

- a.
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- b.
.....
- c.
.....
- d.
.....
- e.
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4. Which are from your experience the main barriers in enhancing local adaptation action?

- a. Lack of awareness
Yes/ no -> if yes, to which extent? (with 1 indicating the lowest and 5 the highest extent)

1	2	3	4	5
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Please motivate your answer.
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- b. Lack of political commitment
Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.
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- c. Financial constraints/ lack of funding

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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d. Lack of appropriate knowledge and access to information

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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e. Lack of appropriate legislative and regulatory frameworks

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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f. Limited coordination between governance levels/ lack of multi-level governance framework

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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g. Lack of/ little possibilities for exchange among cities
Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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h. Other:

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To which extent?

1	2	3	4	5
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Please motivate your answer.

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Part 2: The Mayors Adapt initiative

1. When did your city sign the Mayors Adapt initiative?
Year/Date:
2. Has your city signed Mayors Adapt or the new integrated Covenant of Mayors for Climate and Energy?
 - a. Mayors Adapt
 - b. Integrated Covenant of Mayors for Climate and Energy
3. In case your city signed Mayors Adapt (not the integrated Covenant of Mayors yet), has your city also signed the Covenant of Mayors?
 - a. Yes
 - b. No

4. What was the main motivation for your city to sign the Mayors Adapt initiative? Please elaborate.

a. Showcasing political leadership in adaptation

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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b. Showcasing action on adaptation

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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c. Profiling your city's territory as pioneer and raising its profile, including in and via the Mayors Adapt community and beyond

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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d. Benefitting from the learning and experience of peers

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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e. Sharing the expertise developed in your city with others

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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f. Benefitting from tailored and hands-on technical support

Yes/ no -> if yes, to which extent?

1	2	3	4	5
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Please motivate your answer.

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g. Other:

..... To which extent?

1	2	3	4	5
---	---	---	---	---

Please motivate your answer.

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5. From your experience and perspective, does the Mayors Adapt initiative succeed in achieving the below mentioned objectives? Please rate from 1 to 4 and motivate your answer.

OBJECTIVE	Not at all	Rather not	Yes	Strongly yes
	1	2	3	4
Inform decision makers and other actors about the initiative and adaptation needs, and raise awareness among them				
Please motivate your answer.				
Mobilise cities to commit to the initiative				
Please motivate your answer.				
Support cities in their process of setting up and implementing local adaptation plans, e.g. through the helpdesk and access to existing expertise				
Please motivate your answer.				

Facilitate networking and learning amongst cities on taking adaptation action, e.g. through providing city profiles				
Please motivate your answer.				
Enable signatory cities to showcase their activities and engagement in the initiative				
Please motivate your answer.				
Raise the profile of climate adaptation for the broader, general public				
Please motivate your answer.				

6. Has signing the Mayors Adapt initiative played a crucial role in gaining political commitment on implementing climate adaptation measures in your city?

Yes/ no -> If yes, to what extent?

1	2	3	4	5
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Please motivate your answer.

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7. Has the Mayors Adapt initiative been helpful in sharing good practices and facilitating networking among cities engaged in climate adaptation for your city?

Yes/ no -> If yes, to what extent?

1	2	3	4	5
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Please motivate your answer.

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8. Has the Mayors Adapt initiative been instrumental in creating momentum regarding climate adaptation in your city so far?

Yes/ no -> If yes, to what extent?

1	2	3	4	5
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Please motivate your answer.

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9. Has the Mayors Adapt initiative helped you in attracting funding for climate adaptation measures?

Yes/ no -> If yes, to what extent?

1	2	3	4	5
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Please motivate your answer.

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10. Does the Mayors Adapt initiative provide adequate support for the following steps in the adaptation process (e.g. through the helpdesk for operational questions and information; the online platform with guidance materials, best practice examples, etc. and awareness raising and information event)? Please rate for each step and motivate your answer.

	Not at all	Rather not	Yes	Strongly yes
	1	2	3	4
Assess risks and vulnerabilities to climate change				
Please motivate your answer.				
Identify adaptation options				
Please motivate your answer.				
Assess and select adaptation options				
Please motivate your answer.				
Implementation				
Please motivate your answer.				

