

# Establishing and implementing a strategy for climate change adaptation within the territory of the municipality

## In a nutshell

<b>SUMMARY</b>
It is best practice to establish a holistic climate change adaptation strategy for the territory of the municipality that allows protecting the built and natural environment against the adverse effects and impacts of climate change (e.g. floods, heat waves, droughts). The climate change adaptation strategy can build on other local and regional adaptation strategies and should ensure that they are linked together. The strategy needs to be coherent with and taken into account by other relevant policies and strategies (e.g. watercourse management plans).
<b>Target group</b>
Local authorities
<b>Applicability</b>
This best practice is applicable to all local authorities. The scope of the adaption strategy should be developed in relation to the specific context of the public administration. The measures contained in the strategy need to respond to the projected climate change impacts on the territory.
<b>Environmental performance indicators</b>
<ul style="list-style-type: none"><li>• A holistic climate change adaptation strategy for the territory of the municipality is in place (y/n)</li><li>• Percentage of homes and businesses protected as a result of the strategy (%)</li></ul>
<b>Benchmarks of excellence</b>
A holistic climate change adaptation strategy for the territory of the municipality is in place

## Description

Climate change projections<sup>[1]</sup> show that there will be impacts from changing temperatures and climatic patterns across the whole of Europe. Some of these impacts (e.g. floods, heat waves, droughts) will be more severe in certain locations than others and the nature of these impacts will differ depending on the geographic location and local context. In order to ensure that municipalities are protected against the detrimental effects of these impacts and benefit from any positive changes it is important that they develop a holistic climate change adaptation strategy.

Climate change adaptation strategies can vary in scale from a single site or building, a city, the territory of a municipality, a region or at the national and international level. It is important to ensure that the scale of the strategy is appropriate and aligned to the role of the Public Administration body and within the means of their delivery.

Climate change adaptation strategies should build on other local and regional strategies and ensure that they are linked together. Due to the size of many adaptation measures it is important that local climate change adaptation strategies are

integrated into other local and regional adaptation strategies and other relevant policies and strategies (such as water course management plans).

#### Stakeholder Engagement:

Cities cannot adapt in isolation; for the successful creation of a climate change strategy it is vital that there is collaboration between key stakeholders. Stakeholder mapping will ensure that administrations identify relevant and influential individuals and organisations to drive the creation and delivery of a strategy. Representatives should be drawn from a range of national, regional and local cross-sector groups, including city-region and sub-regional partners. Stakeholders could include representatives from national/ regional government, Public Administration, the health sector, emergency services, major institutions and businesses, infrastructure and utility companies, environmental agencies, community representatives, transport and highways etc.

It is also important to engage and consult with local residents and communities. However, care should be taken when undertaking community engagement at the early stages of creating a climate change strategy as evidence suggests that consultation on issues that communities may not have answers for (due to the technical complexity of the issue) can be counterproductive (Ricardo-AEA, 2011). Some examples of best practice in participatory approaches include Kalamaria (Greece) who included the input from the wider public by conducting a web-poll and organising a social network with meetings of local community stakeholders (unions). Another example is London where a web platform was created for Londoners to upload ideas and cast their votes on which paths to pursue (Adelphi, 2011).

One good example of a regional climate change strategy developed through a strong partnership is in North West England, UK. This partnership was initiated by the North West Development Agency, who in turn set up 'Climate Change North West', a partnership between Local and Regional Public Administration, business representatives, National Climate Change Partnership, forestry and natural environment organisations, community groups, utility companies, economic partnerships and academic institutions (NWCCP, 2010)

#### Strategy Development:

Once relevant stakeholders have been engaged it is important to identify the potential scope and format of the strategy. There is no set rule relating to this and it will be dependent on the specific context of the municipality, the stakeholders involved and funding sources available. The scope of a strategy should be developed using the following guide:

- Will there be a specific focus – e.g. heat or flooding;
- what is the spatial scale – e.g. building, city, region;
- what format – policy document, a guide, statutory planning document, action plan;
- how will it relate to other local, regional and national existing and future policies and strategies;
- how will the implementation of the strategy be financed;
- where will the strategy sit within the PA, who has responsibility for delivering it;
- how will the strategy be monitored and reviewed;
- how will the strategy be communicated within the public administration (this will be dependent on the selected spatial scale)...
- assessment of the input from stakeholders (e.g. taking into account the above paragraph)

#### Key objectives of the strategy:

Adaptation strategies can cover many areas and some objectives will be very context specific and should be decided on a case by case basis. However, the following objectives have been identified by the GRaBS project<sup>[2]</sup> as useful in all contexts (GRaBS 2014):

- To raise general awareness and understanding of climate change and the need to adapt to its potential impacts within the local authority, municipality residents and relevant partner organisations;
- To strengthen the decision-making process in order to encourage the adoption of climate change adaptation principles and practices

- To select the appropriate level for decision-making e.g. municipality, region etc.
- To improve the capacity to respond to changing climate vulnerabilities and risk;
- To ensure that new development and infrastructure is located, designed and constructed for the climate it is projected to experience over its expected lifespan;
- To promote and facilitate the adaptation of the natural and built environment;
- To help business, public sector organisations and other institutions incorporate the impacts of climate change into their strategy and plan-making processes.

[1] For more information on European climate change projections please visit the European Environment Agency website : <http://www.eea.europa.eu/themes/climate>

[2] The GRaBS project is a pan-European project made up of 14 project partners involved in integrating climate change adaption into regional planning and development, with a specific focus on Green and Blue Infrastructure <http://www.grabs-eu.org/>

## **Environmental benefits**

The development and implementation of climate change strategies will benefit the environment by protecting against the adverse effects and impacts of climate change. Where green and blue infrastructure is implemented as a result of a climate change adaptation strategy there will be benefits for the natural environment and biodiversity. There will also be multiple positive environmental impacts as a result of the insulation properties of some adaptation measures (e.g. green roofs) and the cooling effect of green and blue infrastructure reduce the need for building cooling resulting in lower energy consumption and resulting carbon emissions. Reducing runoff, flooding and erosion will have positive effects on water quality, contamination and the siltation of water ways.

The specific environmental benefits of implementing green and blue infrastructure as part of a climate change adaptation strategy will be dependent upon the scale interventions and their scale. However, the following generic benefits can be expected:

- Removal of pollutants by trees – in Mecklenburg County, north Carolina (USE) this amounted to economic welfare benefits of US\$4 million based on the costs saving of preventing the pollutants from entering the atmosphere (Trust for Public Land, 2010).
- The sheltering effects of trees can save 3-9% of energy bills (Rawlings et al. 1999)
- Increasing green cover by 10% in urban residential areas reduces run-off from a 28mm rainfall by almost 5%. This reduction is almost 6% if the tree cover is increased by 10% (eftec, 2013).

## **Side effects**

There are no negative impacts resulting from well-developed and implemented climate change adaptation strategies. However, when implementing changes to drainage systems and local water courses it is important to ensure that a full environmental impact assessment is carried out to minimise disruptions to local ecosystems.

## **Applicability**

This best practice is potentially applicable across all typologies and scales of Public Administration areas and applicable across Europe. However, each adaption strategy should be developed in relation to the specific context of the Public

Administration and respond to the projected climate change impacts of the region.

Barriers to development and implementation:

It is important to note that there are often numerous barriers to implementing climate change strategies. These barriers should be directly addressed at the start of the development of a strategy. Some common barriers include:

- Political resistance
- Lack of internal organisation capacity and support;
- Shortage of funds and resources;
- Lack of awareness and understanding (both of climate change and the value of green and blue space as an effective natural adaptation infrastructure);
- Lack of expertise and skills;
- Insufficient or non-existing community and other stakeholder networks

## Economics

Calculating the costs and benefits of climate adaptation strategies can be very complex. Whilst the development and creation of a strategy can take time and some resource, it is the implementation of the strategy where significant investment is required. The return on this investment is often difficult to calculate on a financial basis alone due to the multiple benefits gained through some adaptation measures. E.g. the use of green and blue infrastructure does not only reduce the risk of flooding and reduce the urban heat island effect but also provides amenity value and can result in increased health and wellbeing (often associated in reduction in spending on health) and save energy through insulation and cooling effects. It is important to use a cost benefit analysis when identifying the suitability of adaptation options. However, where there are multiple objectives and impacts and the financial benefits are difficult to calculate it is often more appropriate to carry out a cost-effectiveness or multi-criteria analysis. A cost-benefit analysis should be carried out using the following steps (UNFCCC, 2011):

1. **Agree on the adaption objective and identify the potential adaptation options.** An adaptation objective must be well defined and its attainment must be quantifiable in monetary terms, it can, for example, be defined in terms of reducing vulnerability, such as achieving a particular standard of protection from flood risks
2. **Establish a baseline.** It is essential to define a baseline (the situation without the adaptation intervention being carried out) and the project-line (the situation with successful implementation of the adaptation option) to determine the costs and benefits by comparing the two situations.
3. **Quantify and aggregate the costs over specific time periods.** Costs of an adaptation action include direct costs (e.g. investment and regulatory) and indirect costs (e.g. social welfare losses and transitional costs)
4. **Quantify and aggregate the benefits over specific time periods.** Benefits of an adaptation intervention should include the avoided damage from climate change impacts and co-benefits, where relevant. If there is no market for the goods or services provided by the adaptation activity, benefits can be estimated in indirect ways through non-market-based approaches.
5. **Compare the aggregated costs and benefits.** The bottom line for choosing an adaptation option is the comparison of the monetised elements of costs and benefits. The costs and benefits need to be discounted to properly calculate their present value. Adaptation planners can choose between three indicators of whether their options are efficient
  - The net present value (NPV), i.e. the difference between the present value of the benefits and the present value of the costs.
  - The benefit-cost ratio (BCR), i.e. the ratio of the present value of the benefits to the present value of the costs

- The internal rate of return (IRR), i.e. the discount rate that makes the NPV equal to zero.

One example of best practice example of informing adaptation decisions in relation to flood and coastal erosion management using cost-benefit analysis can be found in North East England. Redcar, a town in North East England considered various options in response to the threat posed by flooding and coastal erosion on its flood defences, putting 978 residents and 209 commercial properties at risk, for more information please see Reference Organisations (UNFCCC, 2011).

## **Driving forces for implementation**

The driving forces behind the implementation of climate change adaptation strategies are multifaceted and often quite complex. With climate change now affecting every continent on the planet it is vital that we not only tackle the cases of climate change but also the impacts and effects. Driving forces will vary depending on the location of the Public Administration and the conditions specific to it surrounding area. For example, land locked municipalities and cities will not be required to adapt to coastal erosion on possible sea level rise but may be at risk of flooding and extremes heat and drought. The economic implications of climate change impacts can be catastrophic and often far outweigh simple adaptation measure required to mitigate against them. More importantly there is often a risk to the health and safety of residents and in extreme cases people's lives. For example, prolonged periods of extreme heat can have lethal effects on vulnerable sections of society (e.g. the elderly and infirm).

Running in parallel with these social, environmental and economic drivers pushing adaptation into the mainstreamed there are also some positive benefits to adaptation measures driving change e.g. increasing green and blue infrastructure in a city will not only slow water runoff and reduce the urban heat island effect but will also improve the health and wellbeing of the population, benefit biodiversity and increase amenity value. There are also opportunities presented by climate change, such as the ability to grow new crop varieties, experience more pleasant temperatures with resulting opportunities for tourism etc.

## **Reference organisations**

### *Climate Change North West, UK*

A strong partnership approach to creating a regional climate change strategy where numerous Public Administration bodies have come together to create a proactive and cohesive plan to tackle the effects of climate change.

### *Kalamaria, Greece*

Community engagement in the development of climate change adaptation strategies via a web-poll and organising social networks with meetings of local community stakeholder.

### *Live with Water: Public awareness raising campaign, Netherlands*

A Country level campaign focused on public engagement as an integral aspect of successfully delivering a climate change strategy.

### *London, UK*

Community engagement in the development of climate change adaptation strategies via a web-platform for Londoners to upload ideas and cast their votes on which paths to peruse in relation to climate change adaptation options.

### *Redcar, UK*

Climate change adaptation options based on detailed cost-benefit analysis to ensure that finance was directs at measures with the greatest impacts.

### *Rotterdam Adaptation Strategy, Netherlands*

Climate change adaptation strategy at a city scale based on independent scientific evidence relating to the impacts of climate change.

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