



## **Future Cities**

urban networks to face climate change

**THE FUTURE OF OUR CITIES –**  
Make them attractive and climate-proof!



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### Enjoy adaptation!

Our climate is changing and adaptive action is required. This is not only a challenge on the scientific, political and public agenda but it is a great opportunity to improve the urban environment. In fact, adaptation can be enjoyable! In this brochure, the Future Cities network presents concrete anticipatory measures for the local and regional level and highlights ways to achieve them.

### More Information

To find more information about [Future Cities](#) continue page 18 and visit [www.future-cities.eu](http://www.future-cities.eu). More details on the results of the project are available for download in the complete report “The [Future Cities](#) guide – creating liveable and climate-proof cities”.





## PREFACE



The effects of our changing climate will considerably affect the quality of life in our city regions. Repeated flash flood events, heat waves or storms - to name just a few - have a strong impact on our cities. Although it is important to do all efforts for mitigation, due to science it is not possible any more to fully avoid climate change. Therefore we, the [Future Cities](#) partners being

water boards, municipalities, council and planning authorities, have decided to proactively adapt: to take care of our densely populated cities.

The key role of cities in the adaptation process is recognised by the EU Commission within the development of the EU Adaptation Strategy. As a major transnational project, exclusively dedicated to making city regions in Northwest Europe fit to cope with the predicted climate change impacts, we believe that the results of [Future Cities](#) provide a useful perspective for other city regions and countries.

The European funding has enabled us to implement concrete adaptation measures based upon the retro-fitting of existing infrastructures in England, The Netherlands, Belgium, France and Germany. But we could do even more: to help foster adaptation the partnership has developed innovative tools such as the Adaptation Compass. This guidance tool for developing climate-proof city regions helps planners and experts at cities and

water boards to meet their needs to consider adaptation in planning process. Subject to exchanges with European and national organisations in charge of adaptation, the Adaptation Compass works in all European countries, complementing the range of existing tools.

“Enjoy adaptation” is the leitmotiv chosen by the partnership after five years of cooperation and is highlighted in this brochure. With this positive way of thinking, politicians and decision-makers are invited to consider the need to face climate change as an opportunity to develop future urban areas which meet environmental demands.

For us, the joint work with eight, fully engaged partners from five countries was always a great pleasure. We invite you to discover the many results of the [Future Cities](#) Partnership and wish you an inspirational read.

Dr. Jochen Stemplewski

CEO Lippeverband, Lead Partner from [Future Cities](#)



# ADAPTATION TO CLIMATE CHANGE

## - A GREAT OPPORTUNITY TO IMPROVE THE URBAN ENVIRONMENT

Adaptation concerns almost all issues related to urban infrastructure involving many services at the local level and beyond: spatial planning, environmental policies, building regulations, communication and economic developments.

Our message: Apply climate change adaptation as an opportunity to benefit from multiple land use and reconsider the use of the spaces by allowing them to cover several aspects: water management, public recreation and green structures can be combined in cities reducing climate change impacts such as heat stress and heavy rains.

### Parking lots became green squares – the citizens of Nijmegen enjoy climate adaptation

In the Dutch city of Nijmegen, the Korenmarkt, a former parking lot was turned into a multi-functional park. As a result of a complex participation process, the surrounding of the adjacent houses has become more liveable with a nice green park where the citizens can relax, meet and play. The children can play with a water artwork which also cools the square during periods of



heat. As the stony surfaces were removed, the rainwater is now drained at the square and kept away from the sewer channel. In addition, Nijmegen found a way to point to archaeological findings such as cellars, graves and a chapel providing evidence of its mediaeval history.

Green roofs and a green wall on public buildings illustrate the policy of greening the city centre and show that climate adaptation measures contribute to an improved city development. But also minor measures, like wall gardens in front of more than 100 houses and mobile green with trees and shrubs in moveable boxes, make the city centre more liveable and attractive. The water artworks in the city centre attract children and vividly communicate the city's water policy. All these measures are part of Nijmegen's strategy of sustainable city development.

*A parking lot becomes a gree-blue space – a present for the citizens.*





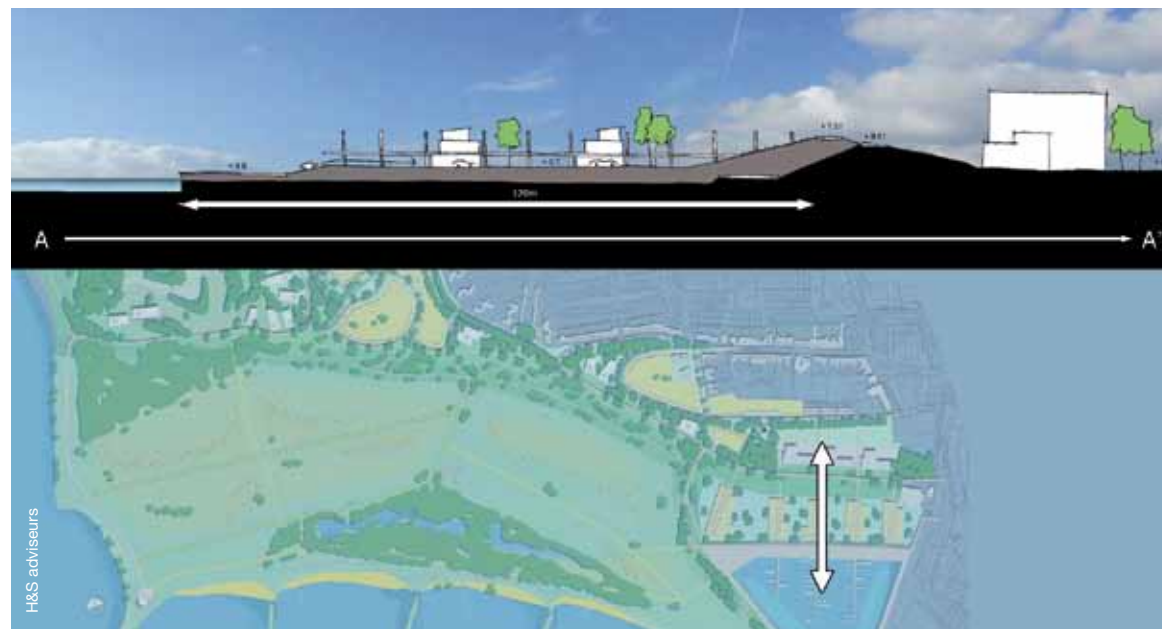
## ADAPTATION TO CLIMATE CHANGE - A GREAT OPPORTUNITY TO IMPROVE THE URBAN ENVIRONMENT

### Integral approach creates opportunities – the climate dike in Tiel

Located between the rivers Waal and Linge, Tiel and especially the eastern part, has always faced river flooding and high groundwater levels which will be aggravated by climate change. An integral water scenario displays the future-proofing measures.

A long-term measure is the realisation of the “Climate Dike”, a broad multifunctional dam that is robust enough to guarantee lasting safety. It is more than just a water measure because it has the potential to create additional space for housing, social meeting points and green areas and to serve economic functions.

In 2011, a master plan combined the possibilities of special forms of housing with magnificent river views, nature development and recreational functions and dry feet for the district behind the dike. With this development, new opportunities will be created for an area that is at present hardly accessible and positioned in a remote corner of the city. With the Cool Nature park, a decontaminated former landfill site, the first part of the Climate Dike was realised in the beginning of 2013. People find shelter from sun and heat on hot summer days in the park and children can play and learn about nature and climate change. Since Tiel East has not much public green, the park makes the district a lot more appealing.



*The Climate Dike creates additional space for urban functions.*



## GOOD OPTIONS IN THE FINANCIAL AND LEGAL FRAMEWORK EXIST – EXPLORE THEM!

The experience of the Future Cities network shows that in many cases the existing financial and legal framework at the EU and national level offer a pre-condition to realise the goals of adaptation. Nevertheless, some adjustments are sensible.

### Financial framework

- Develop "total cost-benefit ownership" principals for adaptation measures: costs and benefits of an adaptation measure are often not in the hand of one person or organisation. Therefore, the approach of taking the investment costs and all long-term costs into account should be followed by all involved stakeholders. Here, collaboration is essential.
- Good practice measures have to be spread to catalyse actions at local level: for that, appropriated financial incentives are needed.

### Legal framework

- Include uncertainties of climate change in regulations such as technical codes of good practice.
- Apply the existing framework of public procurement in a creative manner: use appropriate pre-set criteria to get a sustainable offer, e.g. it is not only the cheapest offer that wins but the one that is future-proof.

### Incentives for a green-blue corridor in Kamen

As a result of the history of the Ruhr region (Germany), the Heerener Mühlbach was a canalised water body used as an open wastewater system conducting a mixture of wastewater and storm water in a straight concrete bed. Wastewater detrimented the ecosystem tremendously and private as well as industrial buildings located near the brook suffered serious damage caused by frequent flood events.

The [Future Cities](#) project created a green-blue corridor combining the effects of green structures with the water system. In order to

work on the source of the problem, an efficient and fair process was necessary to implement adequate decentralized measures. A subsidy related to each disconnected square metre accompanied by communication activities convinced the owners of paved areas to take action. Now, their storm water drains off into the new natural water body and local inhabitants who live on disconnected properties benefit from lower fees: in Kamen and all other municipalities belonging to the Lippe catchment, the established system is called the "divided fee" system. The system distinguishes between a fee for paved area connected to the mixed sewer system with €/m<sup>2</sup> and a fee for wastewater with €/m<sup>3</sup>. The divided fee system was considered to be very interesting by the EU partnership.



## GOOD OPTIONS IN THE FINANCIAL AND LEGAL FRAMEWORK EXIST – EXPLORE THEM!

### Win-win: eco-retrofit to build capacity in Hastings

Hastings is a vibrant, coastal town in South East England with a rich history and a strong sense of community among its population of around 90,000 people. The majority of the town's homes and offices are historic, so do not conform to current environmental standards. Together, Hastings Council and Hastings Trust, made the conversion of a historic building into four eco-friendly apartments into a showcase for retrofit of older properties.

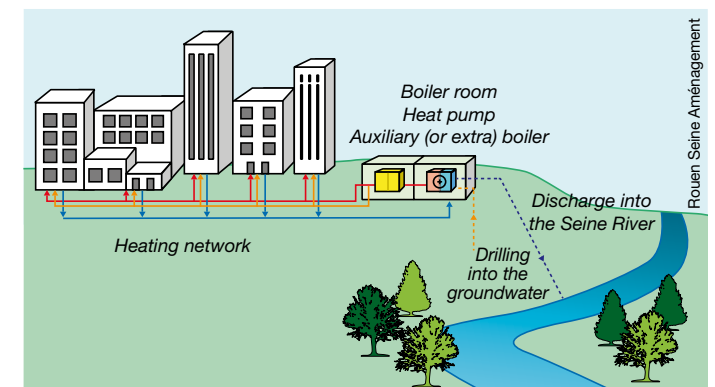
The eco-retrofit project put in adaptation measures such as insulation as well as sun pipes to bring down the carbon footprint of the building, making the homes cheaper and more efficient to heat and light. A group of trainees worked on the project, some long-term unemployed, who now have new skills to enable them to work in this industry. A technical training manual and video shows how to renovate a Victorian terraced property in an eco-friendly way focusing on installation skills for adaptation and mitigation measures.

*Left: Cambridge Gardens in Hastings – renovated state-of-the-art sustainability standards*

### A heating network exploring possibilities in Rouen

At the site of Luciline, geothermal energy will cover the needs for heating and hot water in winter and cold water in summer. The heat network is supplied by the geothermal sources located near the site: shallow groundwater, permanently renewed by the water from the river Seine, as well as by spring waters and rainwater. The site offers the possibility to discharge the water used as geothermal source into the surface water network. This public blue and energy network is combined with green structures. In total, it contributes to the preservation of urban biodiversity.

The municipality of Rouen makes use of the French law of 2012 according to which the connection to the heating network can be made compulsory for property owners. This allows the service provider selected by the city to implement the system and take over its maintenance so that a stable structure of the heating costs can be offered to the final users.



*Adventagous: The heating network is close to the Seine.*

## TARGETED COMMUNICATION – A KEY TO REALISATION

Communication and participation are prerequisites for the successful implementation of adaptation measures. The major aims are to raise the awareness of risks, to raise the acceptance and to foster the adaptation options as well as to change the behaviour. Therefore, it is necessary to communicate in many ways: to keep on raising the public awareness of adaptation to climate change; to keep on raising the political awareness in order to put the topic on the working agenda within the organisations. Moreover, local governments and organisations should be encouraged to assess their vulnerability to climate change in order to enhance their understanding of this challenge on the local level.

### **A positive message helps: “Adaptation is enjoyable”**

Adaptation is not only necessary, it is also enjoyable. It is an excellent way to enhance the quality of life, to create attractive public spaces, to benefit from a better local climate and from a richer biodiversity within a greener environment.

### **🔍 The city climate of Arnhem has to be protected**

The Dutch city of Arnhem aims at ensuring its good quality of life and wishes to remain an attractive city for all those who live, work, shop or recreate here, now and in future. For the benefit of the city climate, all relevant stakeholders in the city like housing corporations, enterprises, health care institutions, residents and the municipality itself, have to assume responsibility and take adaptive measures.

Instead of focusing on the negative consequences of up-heating and the need to take action, Arnhem went for the opposite approach as the current city climate is relatively good compared to other Dutch cities. Investigations about the city climate, such as temperature measurement by climate bike and infrared pictures out of an airplane, were used to make residents curious of the next steps and the local and regional media reported constantly about this.

*Eye-catching investigations  
help to raise awareness.*

This approach worked among residents and decision-makers. In October 2012 an inquiry among the visitors of the Arnhem Future City Festival revealed that most of them knew about the city climate investigations. The city council decided on an extra budget for trees and green space to reduce the heat stress in some parts of the city.



van Ammers, Arnhem



van der Lint, Nijmegen





## TARGETED COMMUNICATION – A KEY TO REALISATION

### The “Green Heart” of Nijmegen

The climate campaign “Our Green Heart” was originally designed to raise the public awareness of sustainable energy and to make the citizens support the goal of the municipality to convert Nijmegen into an energy-neutral city by 2045. Since its start in 2010, many activities have been organised involving colourful messages by a bright Nijmegen personality, Nijmegen’s Annie. As a follow-up on these activities, a local Climate Shop started to offer information on mitigation and adaptation measures. Advice is given on sustainable products and local suppliers, but also on available subsidies. The shop arranged a number of markets focusing on topics such as green roofs, insulation and energy saving measures as well as disconnection possibilities.



*Nijmegen’s Annie delivering a colourful message with a green deer. The campaign’s original Dutch name is “Ons groene hert”. “Hert” means “hart” as well as “deer”. Therefore, Nijmegen chose a green deer as a mascot.*

### Get prepared for climate change – involving the staff of Emschergerossenschaft

The German water board Emschergerossenschaft, in charge of one of the most densely populated regions throughout Europe, established a “Guideline Climate Change” for its own activities as a basis for its long-term no-regret strategy. As the water board acknowledges its responsibility for the inhabitants of the Emscher catchment, it deals with climate change and investigates in how far the catchment area and its activities might be affected by climate impacts. Decisions on the mitigation and adaptation measures are taken, e.g. the impact of climate change is compensated by disconnecting paved areas and decentralising retention and infiltration of rainwater so that the natural water cycle is strengthened.



*Informing staff members of the Emschergerossenschaft: What can you do within your daily work to deal with climate change?*

## TARGETED COMMUNICATION – A KEY TO REALISATION

### The water game - switching roles to create understanding in Tiel East

The water game is an interactive computer game that simulates the local water problems and the consequences of possible measures. Four organisations, the water board, the municipality, project developers and housing associations, have to work together to solve current and to prevent future water problems. Tiel East is one of the pilot locations in the water game but other places in different situations can be chosen as well.

The aim was to create insight in each other's interests and the awareness that water problems can only be solved by an integral approach and in close cooperation. The water game is based on facts and figures derived from the real situation in Tiel East and projections on the effects of new developments. The opinions of the concerned stakeholders and inhabitants of course influence the way the game is played.

When the game was played in Tiel every participant had to play a role different from his or her real one. This was a striking way

to gain more insight in each other's interests and to experience the benefits of cooperation. The water game proved to be a very useful instrument to create awareness. It played an important part in the development of the integral water scenario of Tiel East.



*The water game features the circumstances of Tiel East.*







## SEIZE THE OPPORTUNITIES OF INTERNATIONAL EXCHANGE

The Future Cities twinning approach proved to be an excellent instrument to exchange information and opinions between different European partners. As there are always different ways to deal with problems, twinning allows to cope with problems beyond the standard way.

Organisations such as municipalities, water boards and planning institutions endorsing responsibilities with regard to climate change should be technically and financially encouraged to network. Their capacity to exchange and spread knowledge and experiences within their own organisations and also externally needs to be enhanced.

### The role of green roofs in France and the Netherlands

Administration staff from Rouen Seine Aménagement, Arnhem and Nijmegen exchanged their knowledge and experience regarding green roofs and biodiversity. At the hosting municipality, Nijmegen, examples of green roofs could be visited in different stages of development and the monitoring results were discussed. Besides the practical aspects, the twinning especially focused on the implementation of green roofs on public and private buildings and on their early integration in concrete real estate projects. Furthermore, the improved quality of housing, urban landscape and life in general is a social aspect, which often holds a commercial interest for the developers.

### Successful transfer of ideas and equipment

What conclusions for spatial planning and urban developments should be drawn from the knowledge about the city climate in Arnhem? Input given by climate experts from the city of Rotterdam, the Regional Health Service and Dutch and German universities and the practical experiences of six Future Cities project partners was combined. As a consequence, the city of Arnhem was advised to translate the Heat Map into a Heat Attention Map. The

workshop, which brought together climate experts, health services and spatial planners, allowed for views from different angles and interests. It also introduced a tool called “Map Table”. The Map Table was considered to be very useful as a consultation, planning and communication tool. It inspired the English partner Hastings to have this design tool shipped across the channel in order to inform the climate change adaptation plan in Hastings and to demonstrate it to planners, developers, policy makers and residents of Hastings and the wider South East of England. Following a successful demonstration in the UK, Hastings has purchased its own Table and will use it for scenario planning, consultation work and energy projects.



*Participants of a twinning discuss options for Arnhem.*

## THE RIGHT STRATEGY – BOTTOM-UP MEETS TOP-DOWN

It is necessary to trigger and combine the top-down and bottom-up approach: an overall climate strategy and appropriate policies are required at the EU, national, regional and municipal level to implement concrete and coherent projects. Of course, it is inevitable that everybody has to make his or her individual contribution.

### Regional guideline for sustainable housing projects: a bottom-up approach

The West-Vlaamse Intercommunale (Belgium) developed a sustainable new district, the residential quarter “de Vloei”, in English “the Flow”, in the city of Ieper. An ambition note defined the goals of the project. The document was generated in cooperation with the local partners, the city of Ieper, a social and a private housing company and they agreed to execute what had been stipulated. The Department of Environment, Nature and Energy of the Flemish Government and the province of West Flanders provided support. The ambition note is based on an integrated approach of sustainability according to the four p’s:



Defining the goals in Ieper

people, planet, prosperity and process. The positive experience with De Vloei became the basis of a regional guideline. It is an instrument that introduces sustainability to municipalities and focuses on the implementation of the concept in a housing project. At the municipal level, it aims not only at the development of housing projects but also at involving politicians, municipalities and citizens thanks to the awareness raising measures.

### Forming a chain: national, regional and town-wide adaptation strategy

At the regional level, the South East England Climate Change Vulnerability Study was developed within the [Future Cities](#) project directly informing the national UK Climate Change Risk Assessment published in 2012. It details the projected impacts of climate change and provides an evidence base and framework for local policy making, and shows the importance and linkages between regional and national policy. This evidence in turn informed the Hastings and St Leonards town-wide climate change strategy. The basic approach was to develop a town-wide climate change adaptation strategy with a range of local partners, including residents, businesses, the community sector and public agencies. A number of workshops were held to gather information and project work from all the partners. It lists among other things a community gardening project, the adaptation strategies of the local fire and police services and energy measures taken by a local housing association.



De Urbanisten





## THE RIGHT PLANNING PROCESS - THINK AND ACT ACROSS ALL SECTORS

It is necessary to strongly coordinate sectoral plans and to consider climate adaptation as an improvement for city development. This should be realised at an early stage of spatial planning so that adaptation measures are not just added at the end. Acting across all sectors also means to always keep mitigation of greenhouse gases in mind. It is necessary to involve specialised organisational capacities with multidisciplinary teams from the beginning on. In the long term, sustainability will thus be incorporated as a standard process.

### 🔍 De Vloei, Ieper – an integrated process to deliver a sustainable housing quarter

The development of the quarter De Vloei integrated sustainability from the beginning on. Energy, water, viability, use of space, materials, mobility, economy and other aspects were considered. At the regional planning association, West Vlaamse Intercommunale, all departments worked together and cooperated also with the city of Ieper.

In the first phase, the ambitions within the project were determined and agreed on. Second, a master plan had to be developed to translate these ambitions in spatial planning outputs. The visual quality plan resulted from the master plan whereas the energy and water study provided more detailed information. After these steps, the master plan could start to be converted into concrete implementation plans.

In parallel to the process, the awareness of sustainability among the local stakeholders and inhabitants was raised. Due to open and clear communication and consultation it was possible to develop support and trust between the partners and within each organisation.

### 🔍 Choice of measures in an industrial park in Bottrop

The Emschergenossenschaft and the municipality of Bottrop agreed on a cooperation to restructure the industrial park “Scharnhölzstraße” combining water, green and energy measures to make it climate proof. At this old business site, heavy rains tend to cause problems as well as overheating during dry periods. The feasibility study showed that decentralized measures on private properties like rainwater infiltration and rainwater use, solar power usage combined with public green-zone enrichment meant the best approach in terms of economic and technical efficiency. A flexible public-private cooperation will allow to implement the measures on private grounds.

## THE RIGHT PLANNING PROCESS - THINK AND ACT ACROSS ALL SECTORS

### Sustainability is manifold – the Luciline district in Rouen

The Luciline district is part of Rouen's most ambitious and largest reconstruction projects to be accomplished by 2020. Wasteland left by its industrial past and port activities is being reclaimed to create a new eco-district just one kilometre from the historic centre. All aspects of transport, energy and the living environment have been carefully reviewed according to the environmental planning approach developed by the French Environment and Energy Management Agency. From the initial surveying phase on, a specialist environmental consultant has been part of the planning team.

The developing agency Rouen Seine Aménagement works with a team of designers with complementary skills who design and follow up the realisation of public spaces and also define the main guidelines for the buildings realised by private developers. As a result of the communication process with the public, the city added additional environmental aspects, such as uncovering the Luciline which has flowed underground since the first part of the 20th century.



*The river Luciline will be uncovered as a result of the involvement of the stakeholders.*

### EmscherGenossenschaft saves energy in wastewater treatment plant

Municipal wastewater treatment plants in cities consume an average of 15% of the energy demand of public infrastructure. Therefore, the EmscherGenossenschaft works hard to reduce its energy demand. A multidisciplinary team analyses mass and energy flows at wastewater treatment plants and aims at making the plant in Bottrop self-sufficient in terms of energy.

The coal used for the sewage sludge treatment was partly substituted by shredder fibres from scrapped cars. In the medium term, a new solar and waste-heat dryer system will avoid the use of coal completely. As a consequence, 32,000 tons of CO<sub>2</sub> emissions per year will be saved, which is the equivalent of the average emissions of 30,000 persons in Germany. In addition, the micro energy generation is enhanced. The heat from the incineration plant will be converted into electricity by a new turbine. Furthermore wind power was assessed to be feasible as renewable energy source although the area of the wastewater treatment plant is densely populated.



*Wastewater treatment in Bottrop – mass and energy flows are optimised.*







## START NOW!

Don't wait until all answers are clear – they never will be!

Most anticipatory options are not only beneficial for climate change adaptation but also for other sectors such as economic growth. Even if climate change impacts do not occur as expected, the measures will still be beneficial and cost-effective. Such adaptation options are called no-regret measures.

### No-regret measures – the example of Heerener Mühlbach

The enhancement of a water body brings lots of benefits for people, for the eco-system, for flood resilience. Also, it is an opportunity to make the residents aware of their chance to act individually in favour of climate change adaptation. In view of the uncertainties of climate change, the decision was made to apply no-regret measures in Kamen. The ecological improvement of the Heerener Mühlbach brook in combination with the disconnection of storm water of the nearby paved areas is ready to make a significant contribution to weakening the potential impacts of climate change. In case of more intense and frequent heavy rainfall, it reduces the flood risks since the water run-off is slowed down by means of



No-regret – fulfilling multiple aims

meandering and infiltration through the natural sole and banks. Also, the ecological improvement and the sustainable use of storm water can reduce the floods because the sewer system does no longer have to cope with the same amount of storm water. With rising temperatures in summer, the water bodies tend to dry out. Due to the use of rain water for the open water body the water cycle remains sound even in dry periods and evaporation creates a better micro-climate. So the ecological functions of the water system are strengthened. While combining water management measures with green corridors in the cities, the climate in the urban surrounding area is enhanced.

If the effects of climate change do not come true as expected, these measures will still allow for a number of benefits. Local inhabitants enjoy better living conditions with the recreational purposes the river now offers. The process of getting the inhabitants involved in the storm water disconnection within the green-blue corridor is also a great opportunity to raise their general awareness of the water cycle and own responsibility for sustainable development. For the water board Lippeverband, such a no-regret measure is also a way to attain the EU Water Framework Directive, to reach better flood resilience and to allow for a more cost-effective water treatment. At the level of the municipality, the city has become more attractive due to the ecological innovations and the discussion on creating water bodies in existing or new urban developments has been set off.

## FROM BEING VULNERABLE TO TAKING ACTION – FOLLOW THE FUTURE CITIES ADAPTATION COMPASS

Based on their experience, the [Future cities](#) partners developed a practical tool to check the vulnerability and adaptation options across sectors. In a city, almost all departments face the impacts of climate change. They have to adapt their policy and practice. Measures taken by one department might also meet the adaptation needs of another. On the other hand, adaptation activities of one department may conflict with the adaptation aim of another urban structure. This situation is the starting point of the Adaptation Compass: it is a guide to interlink different stakes.

The [Future Cities](#) Adaptation Compass supports planners, climate change policy officers, technical staff and experts at cities and water boards to structure their adaptation work. It gives examples for good practice, presents the experience of the [Future Cities](#) partners and highlights possible obstacles.

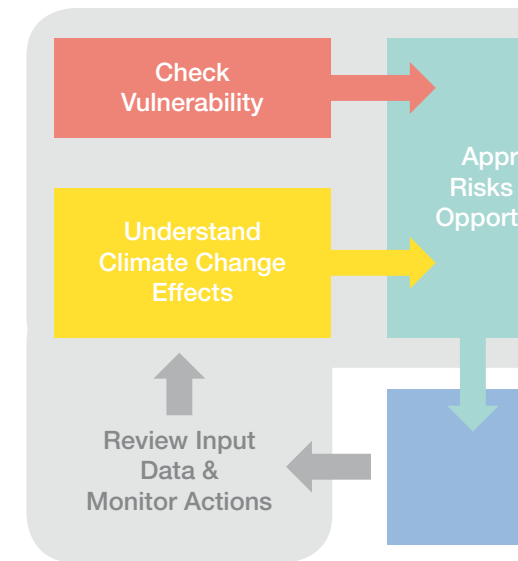
The main features are:

- Applying a pre-structured assessment and documentation layout, the Compass allows the user to plan the different stages in order to create climate proof cities.
- The Adaptation Compass can be applied to a region, a city or a project area providing best results for a city or a city quarter.
- The tool provides general information and automated answers. It also gives the user the opportunity to submit local information.

The focus is on guiding through the process from a vulnerability assessment to adaptation options and their selection. The tool is available in English and German language.

### A closer look: module Explore Adaptation Options

A database of adaptation options as well as of combinations of different options is given and evaluated: What types of adaptation measures exist for the urban scale? Which combinations are possible and efficient? General information is provided for each type of measure, e.g. the category “green structures” is split up in the types “green roofs“, “green walls” and “green open spaces”. Fact sheets inform about the [Future Cities](#) measures. They document the technical description and practical experience of [Future Cities](#) pilot projects. For example the synergies and conflicts encountered because of other adaptation and mitigation measures are named.



Determine the current vulnerability of a city region or parts of a city with the **VULNERABILITY CHECK**.

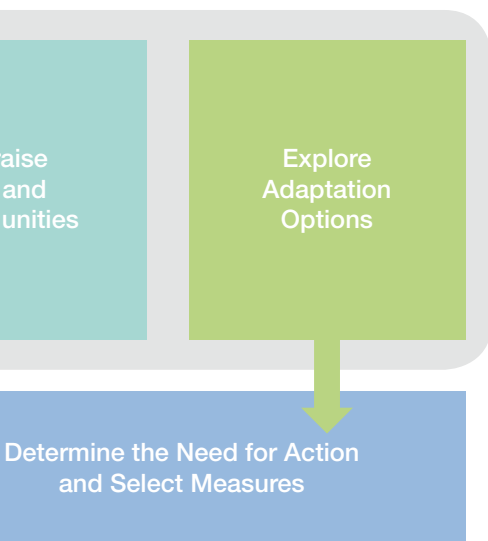


The module **UNDERSTAND CLIMATE CHANGE EFFECTS** assists in getting the relevant information and helps to cope with uncertainties.



For the **ASSESSMENT OF RISKS AND OPPORTUNITIES** a method is proposed that uses the results of the vulnerability check and the projected climate change trends.





The module **EXPLORE ADAPTATION** explores the various adaptation options: especially the combination of different measures based on the practical experiences of the Future Cities partnership.

Last but not least, the **NEED FOR ACTION** can be determined. The core problems and problem areas can be identified and suitable adaptation measures can be found.

The user can save the results, **REVIEW** input data later and update, if required. Examples for **MONITORING** the results of the measures are also provided.

## FROM BEING VULNERABLE TO TAKING ACTION – FOLLOW THE FUTURE CITIES ADAPTATION COMPASS

### Discuss, interlink, integrate

Using the tool, the **Future Cities** partner organisations considered it extremely convenient for discussions with colleagues from other departments. Different approaches could be detected, e.g. concerning the indicators to weigh the impacts. The discussion improved the development of mutual understanding within the organisations.

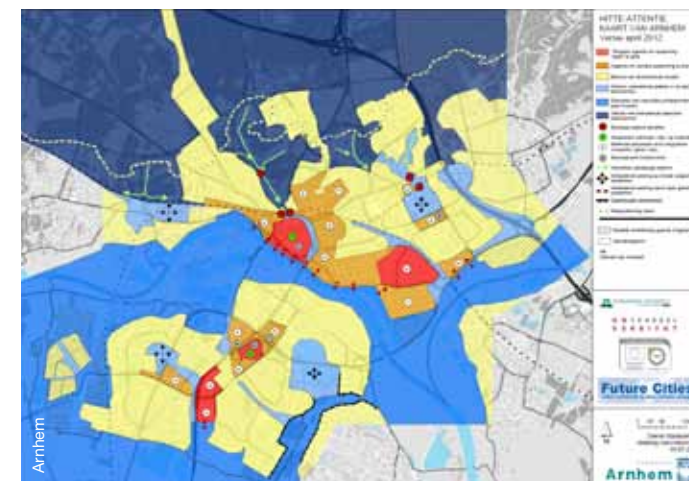
In order to take full advantage of the Adaptation Compass it should not be considered to be a single tool but as an instrument to provide links between the working methods used in different departments. As an example, the structuring of the process can be combined with a visualisation-tool like the Heat Attention Map to develop the best adaptation strategies.

### Heat Attention Map to manage projects in Arnhem

In urban areas, reflecting surfaces and a lack of vegetation cause an unbalance in the energy input and output as cities become significantly warmer than their surrounding rural area: this phenomenon is called the urban heat island effect which will be aggravated by climate change. Arnhem investigated the current climate of the city concluding that urban heat islands exist: the city centre and a major industrial area, as laid down in the so-called “Heat Map”. To define the actions required, the Heat Map was translated into a “Heat Attention Map”. This map distinguishes between four types

of areas which require different measures. The Heat Map and the Heat Attention Map triggered city planners and project developers and made them aware of the item and the possibilities to make their projects climate resilient and more attractive.

The issue of climate adaptation was incorporated in the new structure plan of the city and has thus received an official and legal status. Arnhem is the first city in the Netherlands which did this and is ready to face the consequences of climate change while remaining a city worth living in. The experience and results of the **Future Cities** project have paved the way for several Dutch climate adaptation programs.



*Heat Attention Map of Arnhem: In the red areas further heating-up should urgently be prevented and efforts should be made to improve the current situation; blue areas should be kept open and protected. Building is either prohibited or restricted here.*

## ABOUT FUTURE CITIES

The urban heat island effect in summer or particularly wet winters with increased flood risk are phenomena which have a tremendous impact on urban and regional living conditions. This is where the impacts are felt and the adaptation measures have to be implemented “on the ground”. Rising temperatures and weather extremes like floods and storms can be detrimental for the quality of life in our towns and cities – challenges we have to face. Our urban city regions must be prepared to cope with the effects of climate change as city structures and the urban living environment are especially vulnerable.

“Future Cities – urban networks to face climate change” - a project in the framework of the INTERREG IV B NWE programme, led by the German water board Lippeverband: the project aims at making city regions in North-West Europe fit to cope with climate change impacts. The Future Cities strategy combines selected strategic key components of the urban environment – green structures, water systems and increasing energy efficiency – for a proactive transformation of urban structures. As public bodies are frequently responsible for urban water management and green structures in cities, they also have the possibility to design and implement adaptation measures within the existing urban infrastructure.

Since the beginning of the project in 2008, the project partners have developed and implemented:

- Common evaluation methods for climate proof city regions – the “Future Cities Adaptation Compass”
- Action plans to enable the participating regions to adapt their strategies in a concrete manner
- Combined measures: selected construction solutions in pilot projects
- Targeted awareness raising methods and campaigns with decision-makers and disseminators.

Future Cities is part of the Strategic Initiative Cluster of North-West Europe *SIC adapt!*: “Adaptation to the spatial impacts of climate change” which makes available the experience of eight projects including over 90 partner organisations.



The Future Cities partnership includes water boards, urban administrations, planning associations and project developers in North-West Europe. The geographical scope of the partnership covers densely populated areas in river catchments or directly at the coast.

The Future Cities partners are: Lippeverband/DE (Lead Partner), City of Arnhem/NL, EmscherGenossenschaft/DE City of Bottrop/DE, Hastings Borough Council/UK, South East England Partnership Board/UK (formerly), Sea Space (Hastings and Bexhill Renaissance)/UK (formerly), City of Nijmegen/NL, Rouen Seine Aménagement/FR, City of Rouen/FR, City of Tiel/NL and West-Vlaamse Intercommunale/ BE.



Lippeverband



Sea Space 2012





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