



Thames Barrier, London

European cities show ambition on climate adaptation

There is a lot at stake for cities in the event of radical climate change in the decades ahead. London, Rotterdam and Copenhagen are trying to anticipate the changes by means of innovative concepts such as ‘pocket parks’, floating houses and water plazas.

JACO BOER



Bridge over the river Meuse, Rotterdam

These days in Copenhagen there are comings and goings of ministers and heads of state from more than 190 countries. During the United Nations World Climate Change Conference, and subject to the critical gaze of journalists and environmental pressure groups, they will try to reach concrete agreement on how to slow down global warming. Copenhagen is proud to be acting as host to such an important event. Last year the city itself set up an ambitious climate change programme, with the aim of becoming the first 'carbon neutral' capital in the World in 2025. Before then, carbon dioxide emissions must be more than halved. The switch-over to energy extraction from wind and biomass will play an important role in this respect. Inhabitants and companies will also have to use less energy. The city aims to compensate for the eventual remainder of greenhouse gases by constructing extra windmills and by afforestation.

Safe and attractive

Apart from limiting greenhouse gas emission, the city intends to anticipate the

climate changes which, according to scientists, will inevitably descend upon us. These changes will increase the likelihood of floods, heat-waves and periods of extreme dryness. Economies will come under pressure and some places will lose their attractiveness to inhabitants and companies. The Danish capital does not want to let it come to this.

"Copenhagen should continue to be a safe and attractive city to live in", says municipal strategic manager for the environment Lykke Leonardsen.

At this moment the city is putting the final touch to a concrete climate adaptation plan which should be decreed by the summer of 2010. In the programme, attention will be focused on measures to combat the increasing risk of flooding. Towards the end of this century, rainfall will have increased by 30 to 40 per cent, not only in the winters but also as a result of summer downpours. Because the sea level near Copenhagen will rise by an average of 50 cm, the city will also have to find a long-term solution to the danger of flooding. Furthermore, the quality of ground



Public bicycles in Copenhagen.

water and drinking water is under threat as a result of salinization and pollution.

New canals and 'pocket parks'

"Fortunately, a lot of measures that have to be taken also have a positive effect on the quality of the city", according to Leonard-



The water plaza - a Rotterdam invention - discharges water in times of heavy rain showers, preventing water from collecting in the streets and effectively flooding them. In dry weather, the plaza doubles as a playground for children.

sen. "Take, for instance, the disposal of the increasing amount of rainwater, a spearhead in our climate adaptation plans. You can let it run off down the sewage drains as much as possible. But by collecting it in ponds and new canals you can make areas much more attractive." In the years ahead, Copenhagen will also lay out many 'pocket parks'. These not only retain rainwater longer, thus preventing overloading of drains, but they also provide an oasis of coolness and peace on hot summer days. To further improve the city climate, Copenhagen intends to lay cycle paths and stimulate the use of cars running on electricity or hydrogen. The city council itself is setting the right example. By 2015, 85 per cent of its car fleet must be made up of green cars.

As yet Leonardsen doesn't know how much it will cost to make Copenhagen 'climate proof'. "First we have to consider what we need to achieve this. Besides, we have to weigh up the various options from a financial point of view. In some cases it could be cheaper to move people out of an area rather than to protect it from flooding." She expects that it will not be easy to convince residents of the need to invest substantially in climate protection. "We will have to point out to them that, due to the increasing water threat and the risk of flooding, their own homes will also be in danger. Insurance companies will certainly increase their premiums in respect of storm and water damage. Just look at what happened in the U.S. after Hurricane Katrina."

Rotterdam aspires to a pioneering role

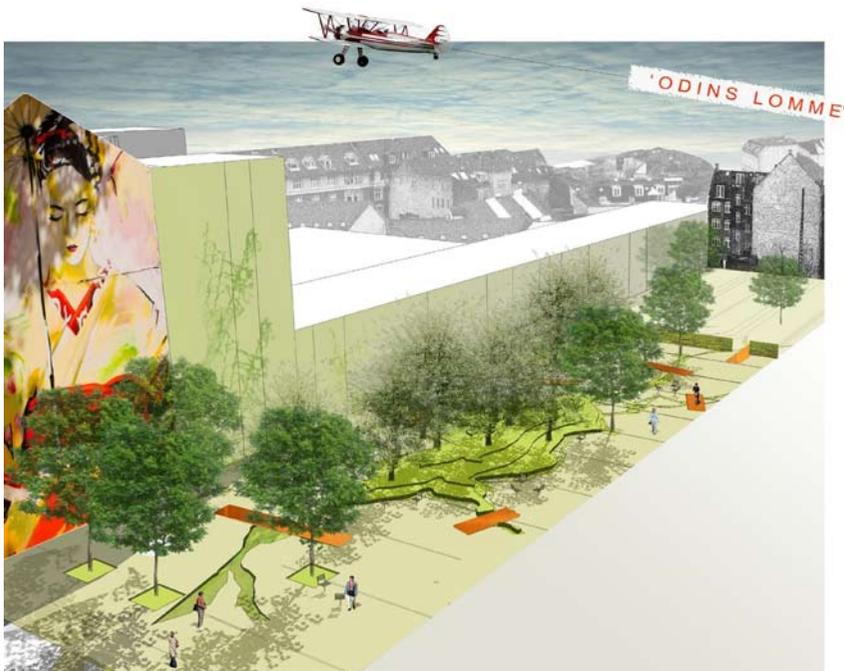
The Dutch port of Rotterdam has also begun to protect itself against the consequences of climate change. Last year the city council drew up an ambitious climate adaptation plan, in which it indicates that the city intends to be fully climate proof by 2025. Rotterdam is assuming a pioneering role where this subject is concerned. Ports all over the world are struggling with the problem of the rising sea level. If we succeed in keeping our feet dry, we will be able to help them with our knowledge and experience and also gain economic advantage from our climate programme", says municipal programme manager of Rotterdam Climate Proof, Arnoud Molenaar. Just like Copenhagen, Rotterdam is for the moment laying the emphasis on col-

All over the world, port cities are struggling with the problem of the rising sea level

lecting the increasing amount of rainwater. As it is, the city renews about 40 kilometres of sewage pipes per year. Also, more ponds and canals will be dug in public spaces. For example, 14 hectares of new waterways were dug at Zuiderpark. "The residents think it's great and at the same time the quality of the water has improved", says Molenaar. The city also wants to introduce so-called 'water plazas', which will be dry most of the year but will, in the event of heavy rainstorms, be allowed to fill up and retain superfluous rainwater for a longer period. For the same purpose, underground reservoirs are being integrated into some new housing projects. The new car park under Museumpark, for instance, will house a collection reservoir with a capacity of 10,000 cubic metres. However, the relatively cheapest solutions for the collection of water remain in laying out small parks and constructing green roofs. Meanwhile, 20,000 square metres of roofs have been made green, and a similar area is expected to be covered in 2010. To add to this, in the district of Delfshaven the largest green roof in Europe will be constructed on top of a new business centre.

Danger strikes from the hinterland

For the long term, Rotterdam must protect itself against the greater likelihood of flooding from the sea and from its hinterland. For the present, the city has little to fear from the rising sea level, thanks to a modern storm surge barrier in the Nieuwe Waterweg, the sea entrance of Rotterdam. The danger is more likely to come from the rivers, which are of vital importance, due to the transport of goods. Consequently, Rotterdam is currently, in conjunction with the national government, studying a recent report advising the construction of four new movable weirs. "A major investment, but possibly essential for the future of the region", according to Molenaar.



The pocket of Odin

At one time a row of old houses stood on the elongated patch of land. Recently residents of the Copenhagen district of Odinsgade have been able to enjoy the sight of blossoming trees and meandering streams filled with rainwater. "The pocket of Odin", which was opened mid-November, is the first 'pocket park' in Copenhagen. The fact that the mayor in person cut the tape shows the importance the Danish capital attaches to these mini-parks in its struggle against the effects of climate change. Not only do they provide cooling on hot days and retain water from rain showers; they also provide residents with new opportunities for play and recreation. The council intends to lay out fifteen 'pocket parks' in the next ten years. Meanwhile, money has been reserved for the realization of two parks in 2011 and at least one more in the following year. The planning for the other parks depends on the future budget.



Climate-proof pilot project Stadshavens

Rotterdam has ambitious plans for a part of its port area located outside the dikes. In the next twenty years, the phased re-development of 1600 hectares of quays and harbour basins into a climate-neutral and energy-neutral area with 13,000 houses must be carried out. This area, known as Stadshavens, should become a pilot project for innovative concepts in the field of energy production and climate adaptation. The Rotterdam Climate Campus will play an important role in this. Within this centre, companies, knowledge institutions and local authorities will work together on the development and application of knowledge about the subjects of energy and climate. Also, 1200 houses will be built on the water, either on piles or floating. In order to make the various parts of the area accessible, the council intends to put as many water taxis and ferries as possible into service. The absolute eye-catcher of Stadshavens will be a spherical floating exhibition hall, which will open its doors to the public as early as the spring of 2010. In this pavilion, Rotterdam wants to exhibit its knowledge in the field of water management and climate adaptation. In addition, there are plans for the construction of a National Water Centre.

The focus on water does not imply that Rotterdam is otherwise ignoring the problem of rising temperatures. For example, the green roofs and 'pocket parks' help to keep the city cool. "Also, together with the housing associations, we are investigating how they can cool their houses and prevent an explosion in the use of air-conditioning equipment. However, right now we still don't know enough about the subject to take all the right measures", says Molenaar.

Urban heat island effect

London is one step ahead in this field. As a result of the enormous surface area of buildings, the British capital suffers strongly from the 'urban heat island effect', which drives the temperature up. Buildings and asphalt roads cause the city to heat up quickly during the day and then retain the heat, so that it barely cools down in the evenings. In order to combat overheating of the capital, the city council intends to plant two million trees and lay out 'pocket parks' in the inner city. This will result in an increase in the total amount of green area by 5 per cent in the next twenty years. "We are actually aiming for an increase of one third before 2050", says the strategic manager for Climate Change Adaptation & Water, Alex Nickson.

London expects not only hotter but also dryer summers. At this moment, the amount of water available per inhabitant is much smaller than in many Mediterranean countries. In the years ahead, the city will have to be even more sparing with its water reserves. To start with, it would help if the privatized water companies would renew their water pipes more quickly. "One third of the pipes is over a hundred years old. Every day, hundreds of millions of litres of fresh purified water leak away", says Nickson. Moreover, only one in five households is fitted with a water consumption meter. That will have to change in the coming years. "We must help people manage their water consumption more carefully. This is particularly important for poor families from a financial point of view", according to Nickson. The city also wants to make new houses water-efficient to such an extent that the total consumption in the city will not rise any further and will even fall in the future, despite an increasing population.

Concrete river

Apart from heat-waves and longer periods of drought, London must also arm itself against an increasing likelihood of flooding. Just like Rotterdam, the city is, for the time being, well protected against the consequences of the rising sea level, thanks to the Thames Barrier, a sturdy storm surge barrier. However, the risk of getting wet feet remains, due to the tributaries of the Thames. "Seventy per cent of our rivers flow over concrete riverbeds and, as a result, superfluous water cannot be absorbed in a natural way." That's why the city intends to try making arrangements for the collection of water at a number of locations in the case of heavy downpours. "It is preferable to allow the flooding of a park or football pitch once in a decade than to have a whole district flooded."

Hefty price tag

Many of these measures bear a hefty price tag. However, there are also provisions which can be incorporated into planned renovations at little additional cost. Furthermore, part of the costs can perhaps be met by parties who will benefit from the measures. "If we do lay on green roofs, the



London Mayor Boris Johnson plants a tree as part of his 10,000 street trees project

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water companies will save on the investment involved in extending their sewage system", says Nickson. The remaining essential investments will have to be paid out of national tax revenues. "You should bear in mind that a large part of the gross domestic product of England is made in London."

Nevertheless, it will require a great deal of exertion to convince citizens and administrators about the need for billions of investments. Measures which visibly improve the quality of life, such as the planting of trees, speak for themselves. But, according to Nickson, it will be quite a task to make people really aware of the problems facing them. "We can make the infrastructure climate proof all right, but it's just as important that the inhabitants of London familiarize themselves with the threats faced. In San Francisco, everyone is aware of the fact that a large earthquake may occur. Buildings are adapted in this respect and inhabitants know what to do when they feel tremor. The city is prepared for the problems. In our case, that cultural shift has yet to be made."

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