

Towards low carbon cities



Foto: Daniel Nicolas

GWL site in Amsterdam

Sustainable urban planning is a challenge for planners and city managers. It fits in well with other goals and objectives in the field of urban planning, urban design and urban management, such as preserving and improving a city's identity and values while, at the same time, making it attractive to its inhabitants, visitors and talents as well as to businesses, developers and investors. This goal is common to all contemporary and competitive cities around the world and it is not only a basis for their local economy, it is also crucial for their survival. Amsterdam, The Hague and Rotterdam are cities that combine sustainable urban development while focusing on their identity and values, and simultaneously

A wide variety of conditions, contexts and processes determines the resourcefulness and the resilience of cities. A sustainable city is a city that is able to work effectively on energy efficiency, can make the transition to sustainable energy and water management, can reduce or reuse waste products and can reduce the effects of climate change. However, sustainable urban planning is more than a technical approach and there are other equally important values besides sustainable development. The values of a sustainable city are closely related to the values of an inclusive city, a competitive city and a liveable city. An inclusive city gives people a sense of place, of belonging, an identity and the security

of social networks. It provides identification and makes one proud of its history, community, culture, traditions, heritage and education. Identity, together with attractiveness, is also a major driver for a competitive city. A competitive city is considered successful, prosperous, vital, and full of opportunities for businesses, investors and institutions. A liveable city provides its residents and visitors with interesting, pleasant and safe public areas, an efficient public transport system and a healthy and green environment. Combining the values of sustainable, inclusive, competitive and liveable cities is a major challenge for planners and city managers. Throughout the centuries, our countryside

Martin Dubbeling and Michaël Meijer

and towns have been shaped by the availability of energy, raw materials and food. The Netherlands is very much an 'energy landscape'. The landscape and towns here have developed as a result of the exploitation of timber, water power, fenland, moorland and through the drainage by inland waterways, using windmills and steam power. By making good use of farmland, roads and the availability of local energy and raw materials, agriculture and horticulture developed, products were manufactured, goods were traded, taxes were charged and armies were equipped. Towns became increasingly specialized in the manufacture of certain goods, in a trade, land defence, governing, religion, education and science or culture, and in the past decade tourism, sports and media. The most successful towns are not only capable of repeatedly attracting new functions and identities, but they are also good at combining and including old and new values, functions and identities.

Sustainable towns are flexible

The position and identity of towns can change, sometimes even within a single generation. For example, for a long time Franeker was the second university town after Leiden, while Hoogeveen was the largest inland harbour in the Netherlands on account of the transport of peat. Other towns, on the other hand, remain unchanged for centuries or even longer. After some millennia, the enormous Sri Meenakshi temple in Tamil Nadu remains the geographic and religious centre of Madurai, a city with more than a million inhabitants. The Sri Meenakshi temple was in use even before the start of this era, and long before the construction of the Pantheon in Rome, the temple dedicated to all Roman gods.

Successful, i.e. sustainable or durable, towns and cities display flexibility. Town and city plans last for a long time, and develop again and again over decades and centuries to accommodate new functions and to meet new requirements. Changes throughout time and changes in identity and functions are necessary to retain the vitality and competitiveness of towns and cities. Sometimes drastic measures are called for, such as the Haussmann boulevards in Paris (1850), the harbour front of Oslo (1986) or Kop van Zuid in Rotterdam (1996). But the most remarkable example is the redevelopment of the shipyards and industrial centre of Bilbao into a fash-

ionable city district that houses the Guggenheim museum (1997), the icon of its transformation. Towns and cities change. In the twentieth century, their existence was based upon the production of goods, upon a trade or services. These days, a creative and recreational economy is required to safeguard the development and prosperity of towns and cities. In the near future, cities will be deemed successful when they are capable of coping with climate change and energy transition.

Not all drastic interventions in cities are a permanent success. The transformations of Hoog Catharijne in Utrecht (1973) and the seaside resort Scheveningen (1979) were never really successful, and are both once again on the verge of radical revamping. For urban developers, a sustainable city is not just about the environment; it is far more about a city plan's resilience in combination with the quality of the planning of its public areas outside, of its buildings and its infrastructure. Not all cities are equally resilient. Some towns in the old and the new world are now slowly depopulating after thriving for centuries, sometimes within the space of just a few years. Water supplies dry up, soil and raw materials become exhausted, the climate changes, trade moves on to other routes and towns, towns become run down or industry becomes outdated. One example of this is Eisenhüttenstadt (1953), located on the border between Germany and Poland.

City concepts

This year it is exactly 150 years ago that Ildefons Cerdà drew up the expansion plan for Barcelona. This plan comprised a grid of streets and construction blocks around Barcelona's centre. Cerdà's city plan was partly inspired by sunlight, fresh air, spacious public areas and public transport for the inhabitants, combined with the efficient supply and removal of water, energy, goods and waste. This all seems obvious now, but it was a huge leap forwards compared to the living environment in the old city. Barcelona seized the opportunity of the 1992 Olympic Games to relocate the harbours and to give the city a seaside character. By doing this, an old identity was discarded and a new identity was taken on. It was the second great leap forwards for this city.

The well thought-out city plan that Cerdà made for Barcelona was by no means unique, by



Photo: Peter van Bolhuis

Beemster in the Netherlands, an examples of reclamation settlement in energy landscapes dating back to the seventeenth century.



Barcelona; Cerda's city, and the new sea side character.



Photo: Harry Harsema



Photo: istock

The Tempel of Sri Meensakshi in Madurai: a geographic and religious centre since the start of this era.

the way. The city plans of both Jaipur (1731) in Rajasthan, the first planned town in India, and Lutyens' New Delhi (1931) and Chandigarh (1953), the capital of the Punjab and Haryana, are well adjusted to natural circumstances and match the social range of thought at that time. In the city concepts of the Garden City Movement (1898) by Ebenezer Howard, Une Cité Industrielle (1918) by Tony Garnier and Ville Contemporaine (1922) by Le Corbusier, the free and unrestricted development of the individual is a central theme. Present-day city concepts do not stop at city boundaries. Copenhagen in Denmark, for example, and Malmö in Sweden have now virtually become one dual city as a result of the new bridge over the Sont (2000) and a joint top-quality public transport system.

People, towns and cities, natural surroundings and the environment have been inextricably linked for centuries. This is evident everywhere, in both Maastricht and Nijmegen, the oldest cities in the Netherlands, as well as in Droogmakerij de Beemster or the wonderful double ribbon Wildervank in the province of Groningen – examples of reclamation settlements in energy landscapes dating back to the seventeenth century. The development of the Netherlands took off in the last decades as a



A climate neutral landscape for Amsterdam.

result of the extraction of coal, oil and gas. However, there is a danger that the unlimited and the relatively cheap supply of energy, water and raw materials will run out. In the coming years, Dutch society will have to fulfil serious ambitions in the field of sustainable energy provision.

Climate cities

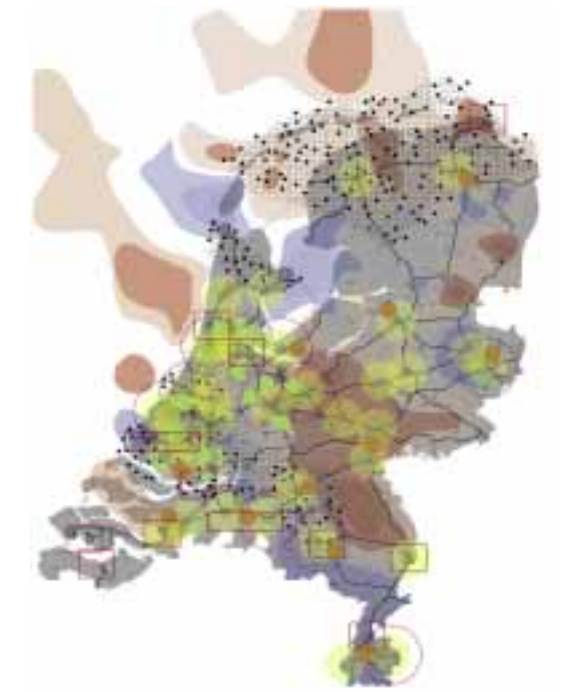
The successful and sustainable cities of the near future are searching for solutions on the scale of both the city itself and the surrounding urban region, to seriously tackle the current challenges in the generation of sustainable energy and the reduction of greenhouse gas emissions. This is no longer just about 'how can we save (fossil) energy', but about 'how can we deploy (sustainable) energy at a city level and make it accessible to everyone?' Slowly, the realization is beginning to dawn that tremendous environmental benefits can be achieved in areas such as urban and rural planning, urban construction projects and landscape architecture.

Through urban restructuring, the use of intelligent links in the local generation of sustainable energy, the utilization of residual heat and drastic improvements in public transport, it is possible to effectively reduce the emission of greenhouse gases. If this is done drastically on a large scale, then we are talking about Low

Carbon Cities, cities or urban regions that have their CO₂ management in good shape. If you take this one step further, we are talking about Zero Carbon Cities or what one refers to as 'climate cities'. These are cities or urban regions that use only sustainable energy, generated by solar energy, geothermal energy, wind energy or hydro energy. Smart City Amsterdam, Climate City Rotterdam and The Hague – the Sustainable Global City by the Sea – are three examples of cities that are already working towards becoming sustainable cities.

Amsterdam Smart City

In the case of Amsterdam Smart City, the focus is on the combination of innovative technology, changing the attitudes of the city population and sustainable economic investments. In a two-year period, a large number of projects will be set up concerning Sustainable Employment, Sustainable Living, Sustainability Mobility and Sustainable Public Areas. The first three account for around one third of the CO₂ emissions in the city. In Amsterdam, climate policy is considered together with policies in the areas of air, sound, sustainable consumption and manufacture, soil and public parks. The objective of 'Amsterdam: leader in sustainability, Environment Plan Amsterdam 2007–2010' is a clean, compact, healthy and liveable city. As part



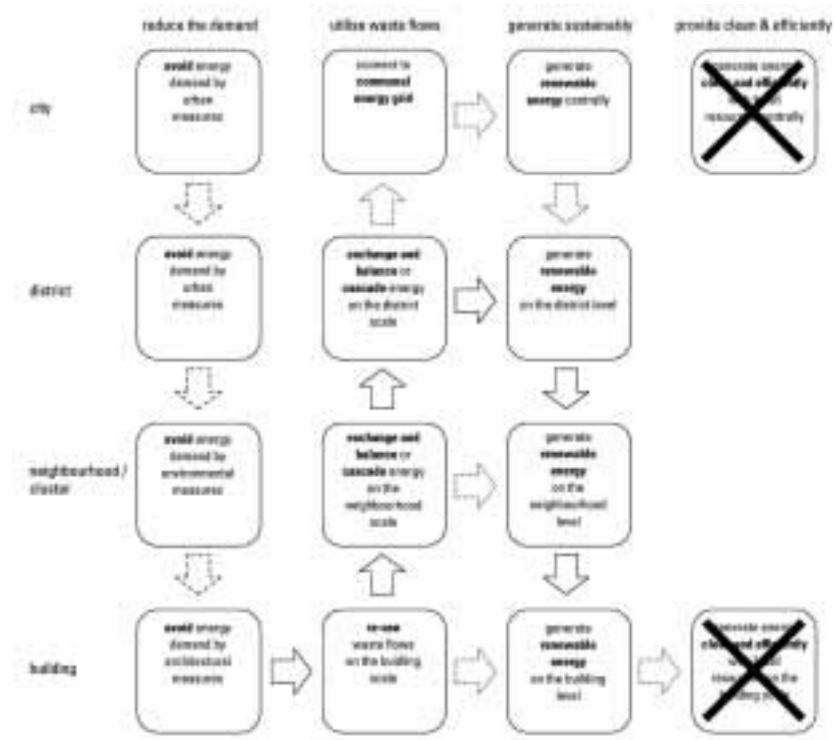
Scheme of all the tasks for the CO₂ reduction in the Netherlands.

of the Clinton Global Initiative, Amsterdam has focused on inclusiveness and cooperation in a programme called Connected Urban Development. The measures should be reproducible in other cities and countries.

The report 'Amsterdam's New Climate' (2008) outlines the achievements up to now of the current climate projects and lists new projects that the city has planned or set up in cooperation with business and social organizations. These include enhancing the efficiency of city buildings, street lighting and council vehicles and using sustainable energy. In cooperation with key parties in the building sector, Amsterdam will make 40% of its newly built houses climate neutral by 2010 and 100% by 2015. To achieve this, standard building procedures will be amended. When the development of an area commences, an energy vision will be drawn up. This will include the best measures for that particular location concerning urban heating and cooling, underground storage of heat and cooling and sustainable energy generation. In several pilot projects, like the GWL-site and Oosterdok Island, Amsterdam has gained experience in sustainable urban planning and building.

The Rotterdam Climate Initiative

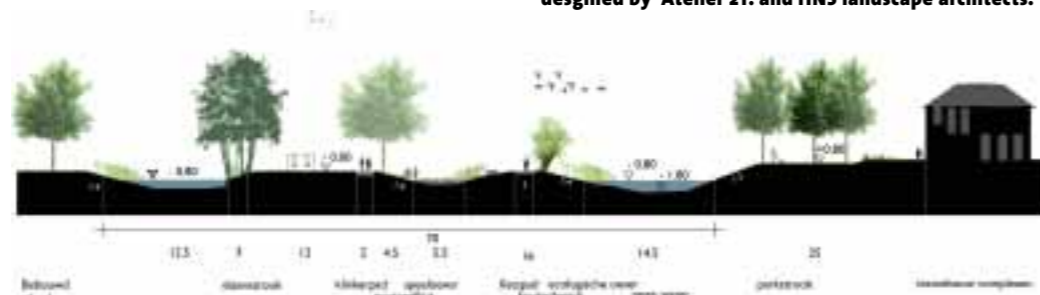
Rotterdam is concentrating on reinforcing the



Scheme of the Rotterdam Energy Approach.



Master plan and cross section of Erasmusveld in Rotterdam, designed by Atelier 2T and HNS landscape architects.



economy and increasing the use of sustainable energy in the urban environment, stimulating changes in attitude and sustainable mobility and innovation. In addition, Rotterdam presents itself as an energy port and a leader in the field of mitigation (reducing greenhouse gas emissions) and adaptation (reducing the vulnerability to climate change). The Rotterdam Climate Initiative (2006) is the city's climate programme. Its aim is to achieve a 50% reduction in CO2 emissions by 2025 compared to 1990, preparing for climate change and reinforcing the competitive economy of Rotterdam, one of the gateways of Europe. The Rotterdam Climate Initiative is founded on several pillars dealing with the use of sustainable energy, mobility, attitude and innovation.

One of the achievements of the Innovation Lab is a new methodology that enables designers and clients to develop a CO2-neutral city. The Rotterdam Energy Approach and Planning

(REAP) project propagates the optimum use of residual heat and waste products. Its methodology interlinks houses, shops, offices, sports facilities, schools and other amenities located in one neighbourhood in order to utilize residual heat and cooling. One example is the utilization of residual heat from a supermarket or office block for heating adjacent apartments. The project also investigates the possibility of producing biogas from residual water or waste streams of homes and gardens. According to the REAP methodology, achieving an energy-neutral built environment is a simple and cost-effective way to tackle the climate issue – cheaper even than CO2 storage for example. The methodology provides a step-by-step procedure to make all housing estates in the Netherlands energy neutral.

'Sustainable Global City by the Sea'
Global city The Hague puts itself on the map

with internationally trend-setting projects in the field of ecology, energy and urban development, and is intent on utilizing its coastal position and the surplus availability of geothermal energy. The Municipality of The Hague is on the verge of a large-scale operation to ensure that the city will become climate neutral by 2050. The Hague has perhaps better prospects than other cities in the Netherlands to become climate neutral, because it is situated on the coast, has the most hours of sun and wind and has no polluting industries. Underneath the city there are endless opportunities for harvesting geothermal energy. In the recent climate programme 'The Hague: towards sustainability' (2009) sustainability has become one of the pillars of the enthusiastic spatial vision 'Global City by the Sea'. This vision has given The Hague great self-confidence and a renewed identity. The Hague has been a green, internationally orientated city for more than a century and it wants to combine this identity



Photo: Harry Harsma

Duindorp in The Hague: temperature of sea water is used for heating.

with a global climate improvement. This is to be achieved by way of six wide-ranging, integrated themes: the council as a sustainable organization, energy, urban development, public areas, mobility and the international city The Hague.

The achievements in The Hague can be seen in Duindorp, a redeveloped residential estate situated in the dunes at Scheveningen, between The Hague and the North Sea. Around 800 newly built houses in Duindorp utilize the temperature of the seawater for heating – a world première. One of the recent spearheads of the city is the future residential estate Erasmusveld which will have 600 to 800 houses. The office Atelier 2T Architects was assigned by the municipality of The Hague to broadly investigate how the housing estate could become the most sustainable residential area in the Netherlands. Under the motto 'ignorance is one of the most significant threats to sustainability', the assign-

ment led to an encyclopaedic and visionary report on opportunities and possibilities for sustainable and self-supporting environments. Atelier 2T Architects believes that strong ambitions in the area of sustainable spatial planning can only be implemented in cooperation with new visions involving the ecological infrastructure, energy, water as well as waste. The numerous impressions and collages in the report 'Sustainable Erasmusveld' strikingly demonstrate that sustainability must run parallel to new and credible urban development and architectural typologies.

A fresh look

Spatial planning and urban design can contribute significantly to climate-proof cities and a CO2-neutral built environment. To paraphrase some of the many contributions to and the conclusions of the 45th ISOCARP world congress Low Carbon Cities in Porto in October 2009,

delivering sustainable and low carbon regions and cities is not just a question of technology. It also requires taking a fresh look at city values, sustainable regional development and communication with its inhabitants and its businesses. In addition, cities like Amsterdam, Rotterdam and The Hague need to make a number of mental leaps. One of them is that attention must be shifted away from energy efficient buildings towards energy-generating residential areas, housing estates and business districts. Another one is that sustainable cities can only prosper in sustainable regions, and that the sustainable cities of tomorrow are cities that are compact and attractive, inclusive and connected, liveable and healthy, vital and competitive.

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