

ROTTERDAM.**CLIMATE**.INITIATIVE

# Interim review

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Zero emission

# Rotterdam Climate Initiative interim review

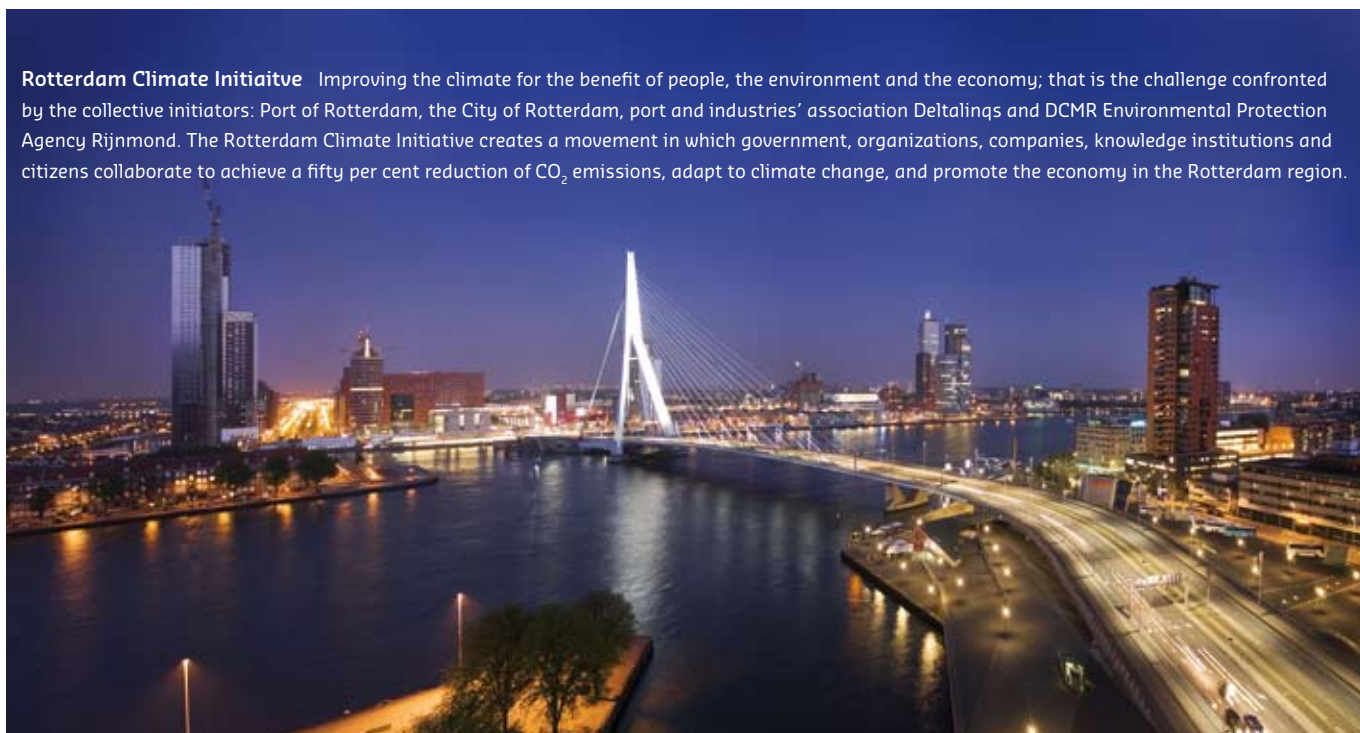
Since the launch of our initiative in 2007, RCI has yielded excellent results; both where the climate change approach is concerned and in strengthening the Rotterdam economy. In this review, RCI presents the results achieved so far as well as a list of ten opportunities for our city and our port.

From day one, Rotterdam has considered climate change an opportunity rather than just a threat. 'Rotterdam should take action now to counter greenhouse gas emissions and to prepare for the consequences of climate change. If we act today, we can reap the benefits in the future.' This was the guiding principle. Apart from being inevitable, a climate change approach will also benefit Rotterdam, by strengthening the economy in Rotterdam and creating job opportunities. In addition, it will enhance the quality of our living

environment. RCI is an alliance of the public and corporate sector, consisting of four partners: the City of Rotterdam, DCMR Environmental Protection Agency Rijnmond, the Port of Rotterdam, and Deltalinqs. In addition, we collaborate with many other parties as well. The present review demonstrates the success of this collaboration and the fact that it serves as an example on an international level. While many projects are initiated and implemented by the four RCI partners, other projects benefit from RCI's support and encouragement. The new city administration has reaffirmed the city's focus on sustainability, and their commitment to support the climate change programme in the next four years.

Rotterdam Climate Initiative

**Rotterdam Climate Initiative** Improving the climate for the benefit of people, the environment and the economy; that is the challenge confronted by the collective initiators: Port of Rotterdam, the City of Rotterdam, port and industries' association Deltalinqs and DCMR Environmental Protection Agency Rijnmond. The Rotterdam Climate Initiative creates a movement in which government, organizations, companies, knowledge institutions and citizens collaborate to achieve a fifty per cent reduction of CO<sub>2</sub> emissions, adapt to climate change, and promote the economy in the Rotterdam region.



## Partners Rotterdam Climate Initiative



City of Rotterdam



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# Results

Since the start in 2007, much has been achieved and put in motion. Below is a list from A to Z; from Adaptation to Zero emission.

## Adaptation

By the end of 2008, the International Advisory Board recommended the inclusion of water management and climate adaptation in the RCI programme. This advice was subsequently adopted. Rotterdam will become fully climate proof by preparing for the consequences of climate change, such as rising water levels and more extreme weather events. This completes the climate file of Rotterdam. What makes this file unique in the world, is that the two main climate issues, **CO<sub>2</sub> emissions reduction** and preparation for the consequences of climate change, are addressed in a combined approach. Specifically for the purpose of this aspect of adaptation, the Rotterdam Climate Proof (RCP) programme was set up as part of the RCI.

## Biofuels

RCI managed to solve the biofuel **chicken-and-egg problem**: filling station owners are reluctant to open up an extra pump unless they are sure that demand will warrant their investment, whereas clients are reluctant to switch to biofuel unless they are sure of convenient supply. As a result of close cooperation with transporters, suppliers, car dealers and filling station operators, RCI was able to set up several projects. In the Rotterdam region, it is now possible to fill up on sustainable biodiesel, produced from residual fats, on both banks of the River Maas. Dozens of lorries are already powered by this fuel type. In addition, a filling station for natural gas is now operational close to Rotterdam Airport to service the new taxi cabs of the *Rotterdamse Taxicentrale*. The region currently counts 3,000 flexifuel cars, belonging to municipal services, the Port of Rotterdam, DCMR Environmental Protection Agency Rijnmond, lease companies, the Mayor and Aldermen as well as private individuals. In various locations in Rotterdam we currently have stations where these cars can fill up with bioethanol. These initiatives lead to cleaner transport.

## Blue Connection

Connecting the waterways in Rotterdam's southern district, both within and outside the Rotterdam Ring, the Blue Connection is instrumental in improving the water quality in Rotterdam, as it connects the *Zuiderpark* with the Old River Maas. In addition, it can be used for recreational purposes such as canoe rides. Under the terms of the Beautiful Netherlands innovation scheme, the Water Board received a grant to the amount of € 630,000 for its further realization. The Blue Connection is an initiative of **Rotterdam Climate Proof** and the Hollandse Delta Water Board.

## Chicken-and-egg problem

Climate change issues often present the problem of various stakeholders waiting for others to make the first move. A case in point in this respect is the use of **biofuels**: filling station owners are

reluctant to open up an extra pump unless they are sure that demand will warrant their investment, whereas clients are reluctant to switch to biofuel unless they are sure of convenient supply. RCI breaks this deadlock by offering a platform for parties with different interests to meet.

## CO<sub>2</sub> capture, reuse, transport and storage

The corporate sector as well as the Dutch and European government have selected Rotterdam as the location for large-scale CO<sub>2</sub> capture, transport and storage or reuse. Nine large industrial parties are currently conducting research, together with RCI, into the feasibility of realizing CO<sub>2</sub> capture and storage facilities. An important milestone in this respect will be the announced investment of a few hundred millions in the CCS project of power companies E.ON Benelux and Electrabel. This will help to avoid the annual emission of approximately 1 megaton of CO<sub>2</sub>, starting from 2015, by means of storage under the sea bed. This pooling of resources under the auspices of the RCI will significantly enhance lobbying power.

## CO<sub>2</sub> emissions reduction

The first RCI interim measuring point on our way to the target year 2025 will be the year 2010. In that year, emissions should be less than the level in 2005. Expectations are that this goal will be achieved, realizing a 0.7 megaton reduction. This volume is roughly equal to the emissions of 500,000 households. This result can largely be attributed to **energy efficiency in the corporate sector** and the co-incineration of biomass in power plants. In addition, we are starting to reap the benefits of the use of **biofuels**. Even today, 0.4 million tons of CO<sub>2</sub> are captured at Shell Pernis and transported to the glasshouse horticultural sector to stimulate plant growth.

## Connecting Delta Cities

Connecting Delta Cities, an initiative of the City of Rotterdam launched in 2009, is a network in which large delta cities from around the world collaborate to prepare for the consequences of climate change. Rather than having to reinvent the wheel, this collaboration help cities to adapt the available knowledge to suit local needs. The network currently already comprises Rotterdam, New York, Jakarta, London, New Orleans, Hong Kong, Tokyo and Ho Chi Minh City, and many other cities have expressed their interest to join the network.

## Deltalinqs Energy Forum (DEF)

RCI partner Deltalinqs has set up the Deltalinqs Energy Forum (DEF) to support companies in their efforts to enhance the energy efficiency of their operations. Underlying this goal is their conviction that it is actually feasible to combine economic development with efforts to enhance the liveability and sustainability of the environment. DEF organizes workshops for employers on the latest technologies to improve product efficiency and reduce their company's carbon footprint. Examples include possibilities to use residual heat, combined power supply and innovations in separa-

tion technology. Other possibilities that attract a lot of interest are **solar** and **wind** energy, and energy-efficient **LED lighting**. In addition, DEF enters into agreements with companies on energy scans and surveys to find opportunities for **energy efficiency in the corporate sector**. Examples include insulation, cooling systems, process control and new process technologies.

## Double benefits for entrepreneurs

DCMR is a partner of RCI. They are thoroughly familiar with the companies in the region and help them to save energy. Energy scans have been performed in five companies in the centre of the city. The retailers involved were presented with realistic and useful recommendations on how to save energy. If the project in the city centre is successful, DCMR will extend their efforts to other shopping areas. DCMR supervisors furthermore provide information for care institutions and hospitals. DCMR has calculated that care institutions can save up to 20% on their energy bills.

## Electric transport

The City of Rotterdam has set up the Power Surge programme to promote electric transport in the city. Within five years, at least 1,000 electric vehicles will be roaming around Rotterdam. Even today, you can see a shift taking place. The streetscape now includes street sweepers and scooters of the municipal services (Roteb), electric buses and shuttle buses, hybrid city buses of RET (public transport), Segways used by police squads and urban surveillance teams, and a shared electric car of *Hogeschool Rotterdam* (Rotterdam University). Public charging poles are already in place in the city centre. Four public bicycle storage facilities now have charging points for electric bicycles and scooters. In 2010, the number will be increased to twelve.

## Energy efficiency in the corporate sector

Using less energy and feedstocks to make a good product is the objective. Energy efficiency generates profit for both the environment and the economy. The industrial sector in Rotterdam – a major international market player – attaches high priority to this objective. To name a few examples, the Pergen plant of Air Liquide realizes significant progress in improving air quality and reducing CO<sub>2</sub> emissions; Exxon Mobil reduces its power consumption by 50% by implementing a new processing column in that particular part of the process; and Tronox managed to realize a drastic reduction of their energy consumption by means of the **Deltalinqs Energy Forum** Loop Control project. A number of studies and new technology pilot projects are currently in progress with the support of RCI, that will help to increase energy efficiency.

## Fine particles

Measures to reduce CO<sub>2</sub> emissions can at the same time result in improved air quality. Energy efficiency and the use of renewable energy will help to reduce outdoor air levels of fine particles as less fossil fuels are burned. In addition, **green roofs** and **green façades** help to improve the air quality as the plants will trap particulate matter and absorb CO<sub>2</sub>. **Electric transport** directly leads to a reduction of fine particles in the city, and if electric vehicles run on green power, the benefits for the environment are evident. Specifi-

cally in view of combining the benefits of **CO<sub>2</sub> emissions reduction** and improved air quality, RCI consistently seeks collaboration with the air quality programmes of the city and region of Rotterdam.

## Floating pavilion

The floating pavilion is a remarkable building in the *Rijnhaven* in Rotterdam. It was opened in 2010 as a showcase and a pilot for floating buildings and communities in Rotterdam. It is the reference centre for the innovative and inspiring approach to water management, climate change and energy issues. The Dutch water sector has selected this exceptional building to establish the National Water Centre.

## Green façades

The largest green façade in Europe has been installed in 2010. A total of 5,000 m<sup>2</sup> of green façade has been installed covering the *Westblaak* car park in the city centre. Green façades add to the reduction of **fine particles**, nitrogen and environmental noise levels. In addition, they contribute to a green and more attractive living environment, for instance by preventing heat stress in summer. This also helps to reduce power consumption for air-conditioning systems.

## Green roofs

The green roofs developed in Rotterdam now cover an area of 30,000 m<sup>2</sup>, equivalent to about six football pitches. Add to this the soon to be installed green roof on the Erasmus Medical Center Rotterdam, which will cover another 12,500 m<sup>2</sup>. Green roofs help to retain excess rainwater as well as trap **fine particles** and absorb CO<sub>2</sub>. The benefits of installing a green roof are considerable: lower energy bills (due to the insulating effect), increased property value (up to approximately 5%), and increased comfort and convenience. Green roofs keep homes cooler in summer and reduce noise levels indoors due to their sound absorbing effect. Moreover, green roofs extend the life of the roof. The City of Rotterdam helps to defray the costs by making subsidies available as part of the Rotterdam Climate Proof programme in conjunction with the Water Boards.

## Homes and other buildings adapted for increased energy efficiency

RCI has reached agreements with housing associations, construction companies, developers and property investors to realize substantial **CO<sub>2</sub> emissions reductions**. The goal agreed on with the housing associations is to achieve a 3% energy efficiency increase annually. Renovation can be another way to enhance sustainability. Testimony to this effect can be found in the 'passive buildings', where power consumption is reduced by means of a sophisticated insulation system, achieving levels of up to five times lower the consumption in recent new development projects. Yet another striking example is the monumental Central Post (the former mail distribution centre), which is the largest sustainable building in the Netherlands. As it offers an attractive and healthy work environment, lease contracts have already been signed for the majority of the offices. Furthermore, the City of Rotterdam has expressed the ambition to ensure that the new Municipal Office will become the most sustainable building in the Netherlands.

## International exposure

RCI has succeeded in putting Rotterdam on the international map as a climate city. Scores of national and foreign delegations have visited Rotterdam or are planning to do so. RCI participates in the C40 Cities Climate Leadership Group, a worldwide alliance of large cities collaborating on climate change issues. This group also cooperates closely with the Clinton Climate Initiative, an initiative of former United States President Bill Clinton.

## Knowledge for Climate

Knowledge for Climate is the research programme for the development of knowledge and services that makes it possible to climate proof the Netherlands. Governmental organizations and businesses actively participate in research programming through the input of additional resources. Rotterdam Climate Proof, the adaptation programme of the Rotterdam Climate Initiative, is part of this research programme. The initial results are described in the publication entitled Rotterdam's Climate Adaptation – research summaries 2010. The topics addressed include heat stress in the city of Rotterdam, adaptive building, urban water systems and the vulnerability of unembanked areas.

## LED lighting

In 2007, Rotterdam was proud to announce that the *Stadhuisstraat* was the first street in the Netherlands to be lighted by high-power LED streetlights. Later on, the Christmas tree in front of the City Hall was lighted by LED lights as well. In 2009, the start-up of the process to replace traffic lights by LED lights was expedited. By the end of 2010, all 12,000 traffic lights will have been replaced by LED lights. By that time, the City of Rotterdam will also have replaced all yellow or orange public lights by more sustainable white lights with a dimmer option. This will lead to savings equal to the annual energy consumption of 600 average households. At the same time, the work provides a boost to the economy.

## Low-energy light bulbs

In 2007, the low-energy light bulb campaign was RCI's launch campaign, attracting public attention to the intention of reducing CO<sub>2</sub> emissions by 50%. Approximately 300,000 households in Rotterdam received a set of two low-energy light bulbs. RCI used the slogan 'Everyone talks about climate change, but Rotterdam actually tackles the problem' to urge the people of Rotterdam to become more aware of climate change. Six months later, studies showed that about 80% of them had actually turned in the light bulbs or were planning to do so.

## Network

RCI has built up an extensive network by bringing parties together and creating a platform. Ever since the start, this has been an alliance of the public and corporate sector: the City of Rotterdam, DCMR Environmental Protection Agency Rijnmond, the Port of Rotterdam and Deltalinqs (the umbrella organization for the industrial and port sector in Rotterdam). All of these partners in turn maintain relations with numerous other parties, including companies, knowledge institutes, local and regional authorities and residents.

## Outstanding business location

The dynamic nature of the city and the fact that Rotterdam is the scene of so many developments in the area of climate change, water management and energy have already attracted scores of companies and institutions to Rotterdam. Companies and institutions for whom sustainability is an important (economic) factor recognize the advantages Rotterdam has to offer. Examples include Dura Vermeer, KEMA, FiberCore (sustainable bridges), Ledned (LED lighting), Donqi (wind turbines) and Qurrent (distribution systems for renewable energy). Rotterdam's climate ambitions also play an important role for industrial corporations. Air Products, for instance, decided in favour of Rotterdam to establish their new hydrogen plant in view of the imminent solution to the CO<sub>2</sub> problem. In addition, activities in the area of **biofuels** are expanding rapidly.

## Plant One

By the end of 2009, Plant One was launched by the Minister for Economic Affairs. The Minister handed over a cheque for 2 million euros on behalf of the Ministry, the Province of South Holland and the RCI. Plant One is the bridge between a laboratory setting and large-scale chemical production site. In an existing factory building, the actual feasibility of sustainable innovations in chemistry can be demonstrated in pilot or demonstration setups on a larger scale than in the lab, under the umbrella permit of Plant One.

## Prizes and awards

Rotterdam-based climate projects frequently win awards. Here is a list of examples. In 2007, the Electric Tuk Tuk of the Tuk Tuk Company won the TNO Innovation Award. The idea was conceived after the City of Rotterdam had stipulated that energy efficiency would be a condition for obtaining a licence. Today, the RCI Tuk Tuk drives around the city as a moving billboard promoting our climate approach. In 2008, former United States President Clinton designated Rotterdam as one of the three CCS capitals in the world, making the commitment to help start up the new technology. In 2009, the EnergyBattle was awarded the GasTerra Transition Prize to the amount of € 75,000. The online competition between fraternities and sororities was further elaborated using the prize money.

## Quote

'When trying to find solutions to the consequences of climate change, rules and regulations are not of paramount importance initially. What is essential is the commitment to effect change. On a more personal level, we can make a contribution, for instance, by using **low-energy light bulbs**, and on a larger scale we could think of capturing CO<sub>2</sub> released in power plants, storing it and subsequently putting it to good use. If companies and citizens become aware of the necessity and benefits of **CO<sub>2</sub> emissions reduction**, in my view this is more important than any rule or regulation on any level whatsoever.' Former Mayor of Rotterdam and co-founder of the RCI, Ivo Opstelten (2008).

## RCI brand

Over the years, RCI has developed into a brand that stands for climate approach and effective collaboration between the public and corporate sectors. Companies, organizations and private individuals are only too happy to be associated with the oak leaf logo and the name of the Rotterdam Climate Initiative. The logo is used as a label to facilitate communication with other parties on the developments in Rotterdam with respect to climate change. This helps us to highlight and display the results achieved and to draw attention to those responsible for these results. RCI is also the link connecting various networks, such as the Rotterdam Pioneers.

## Research and education

RCI closely collaborates with knowledge institutes including Erasmus University Rotterdam, Delft University of Technology and Rotterdam University. Endowed chairs have already been established at Rotterdam University in Energy Transition, Green Feedstocks and Water Management. In 2008, Professor Braungart was appointed to the special endowed chair in the Cradle to Cradle concept at Erasmus University Rotterdam, for a period of five years. This ensures that the knowledge required in Rotterdam is also developed in Rotterdam and lectured here as well. The teaching institutes are committed to incorporating sustainability content as a theme into their higher education curricula and enhancing the level of sustainability of their own operations.

## Rotterdam's Energy Approach (REAP)

The City of Rotterdam, the companies known as DSA and JA Architects, and Delft University of Technology have developed a method to make new and existing buildings, districts and areas CO<sub>2</sub> neutral. Key to this method is the reuse of energy waste flows. Many venues, such as swimming pools, require heat, while other facilities, such as ice-skating rinks and supermarkets, have a high level of heat loss. This approach links supply and demand within a certain area. The method can be applied everywhere and is currently already implemented in the *Hart van Zuid* restructuring project. In the *Stadionpark* and *Stadshavens* projects it is implemented as well, in order to maximize energy saving.

## Solar energy

The new rafter roof of the Rotterdam Central public transport terminal will be equipped with 70,000 photovoltaic cells, creating the largest solar energy roof on a station in the Netherlands. With over 110,000 passengers visiting the station every day, this roof will become a showpiece for Rotterdam's sustainability approach. In addition, it will produce a CO<sub>2</sub> emissions reduction of 8% in the station's power consumption. Besides the Province of South Holland and the City of Rotterdam, the costs will largely be borne by ProRail. The project is part of a comprehensive greenification project for the entire station area (the Rotterdam Central District). RCI plays an active role in this project.

## Tour de France

In the past few years, Rotterdam has generated (inter)national exposure for itself as a climate city. Under the New Energy theme, Rotterdam succeeded in bringing the start of the Tour de France to the Netherlands for the first time in history. Even the presentation of the Tour attracted a lot of international media attention. A comment in the 'Volkskrant' of 15 October 2009 read: 'The New Energy theme Rotterdam has embraced filled in the rest. The combination of a 50% reduction of CO<sub>2</sub> emissions, participation in Bill Clinton's climate initiative for large cities and efforts to encourage the people of Rotterdam to exercise more and more effectively dovetails perfectly with the agenda set for the Tour by its director, Christian Prudhomme.'

## Waste incineration

Rotterdam is the first municipality in the Netherlands to implement the use of industrial residual heat for the purpose of heating homes and buildings on a large scale. The contracts have been signed, and the project has been started up. In 2020, some 50,000 buildings and homes in Rotterdam will benefit from the heat that is released in the Rozenburg waste incineration plant. One bag of household refuse will provide enough energy to heat water for five showers. The annual CO<sub>2</sub> emissions reduction will amount to some 80 kilotons.

## Wind energy

The Rotterdam port area currently has over 150 megawatts in installed wind power capacity. In ten years' time this will be at least doubled to 300 megawatts, a capacity equal to the power demand of at least 250,000 households. For this purpose, RCI has signed a covenant with the initiator, the Province of South Holland; the Ministries of Economic Affairs and Housing, Spatial Planning and the Environment; the City of Rotterdam; the Port of Rotterdam; the Environmental Federation of South Holland; Deltalinqs; and the Netherlands Wind Energy Association (NWEA). Rotterdam is the perfect location in view of its vast industrial expanse and the predominantly strong winds prevailing in the area.

## World Ports Climate Initiative

This initiative offers a platform for 55 ports from around the globe to pursue the goal of CO<sub>2</sub> emissions reduction in ports and to develop new approaches for adaptation. The Port of Rotterdam was one of the initiators of this initiative in 2007, as part of the RCI. Under the guidance of the International Association of Ports and Harbours, its members endeavour to develop an Environmental Ship Index, encourage the development of a registration system for the carbon footprint of ports operations, supply quayside power for ocean-going vessels, and promote the use of clean port equipment.

## Zero emission

Bringing emissions in Rotterdam down to zero by 2025 is not a realistic ambition, but we do hope that by that time we will at least have a number of CO<sub>2</sub>-neutral buildings in the city. With great dedication and commitment, we will be able to achieve at least 50% reduction, enough to make a significant contribution to the (inter)national climate objectives!

# Ten opportunities

Many plans have already been realized or put in motion. Below is a list of ten opportunities that we will be able to capitalize on in the next few years. These opportunities concern our climate ambitions, but certainly also economic effects, efficiency and quality of life.

## Annual reduction of eight megatons of CO<sub>2</sub> emissions

The second interim measuring point on our way to the year 2025 will be the year 2015. In the years leading up to this reference point, organic developments, such as growth in the energy sector, will initially cause substantial increases in CO<sub>2</sub> emissions, but as a result of RCI measures and close collaboration with the corporate sector, we will be able to realize a reduction of eight megatons of CO<sub>2</sub> emissions in 2015. CO<sub>2</sub> storage under the North Sea will account for over half of this volume. The start-up of a large-scale pilot project by E.ON and Electrabel is planned for 2015. Reuse of CO<sub>2</sub> in glasshouse horticulture will then account for one megaton. In addition to energy efficiency in industry (1.5 megatons) and large-scale biomass co-firing (1 megaton), the impact will then also be visible in the built environment (40 kilotons), as a result of measures including the renovation of municipal buildings and the renovation of homes by housing associations. In cooperation with the industrial sector, the possibilities will be surveyed of the reuse of residual energy, such as heat, cold and steam. One promising project is the Steam Pipe project, involving the reuse of high-quality steam.

## Strengthening the economy and the jobs market

Economists view renewable energy, energy conservation, water management and delta technology as important growth sectors for the Dutch economy. Rotterdam can respond to this opportunity by attracting industrial and commercial activities as well as investments in these sectors. Realizing the RCI climate objectives will require substantial investments in the years ahead, both in the city and the port. In the years leading up to 2025, it is estimated that (for CO<sub>2</sub> emissions reduction alone) some 13 billion euros will be required. This concerns mostly private investments, supported by the central government and the European Union. For the region, this will generate a lot of employment – approximately 4,000 new jobs. RCI encourages parties to invest in such projects and shows great commitment in securing subsidies for Rotterdam-based projects. Apart from the immediate economic effects, the RCI activities generate important economic benefits for other sectors as well.

## Greenifying and strengthening the port

Enduring development of the port and industry in Rotterdam and proper preparation for the period after the recession can only be realized in a sustainable manner. Sustainability is, therefore, a prime focus for the Port of Rotterdam. Their aim and desire is to be an energy

port that attaches great importance to compliance with the rules of sustainable conduct. Hans Smits, Chairman and President of the Board of Directors, declared: 'Our climate approach is more than just a sustainability strategy; it is also an economic strategy.' For this reason, the Port of Rotterdam participates in the RCI. In the realization of the Second Maasvlakte, sustainability is an integrated element of the development process. The Environmental Ship Index is intended to promote environmentally friendly and efficient shipping. The index identifies ships that demonstrate better performance in terms of emissions than the currently prescribed international regulations and that go beyond the current average technology applied in new ships in reducing air emissions. The index can be used by ports and shipping and transport companies. Within the World Ports Climate Initiative, Rotterdam is the coordinator of this project. The ambition is to launch this system on 1 January 2011 in six Western European ports. Mobility in the port is yet another aspect that is addressed, with a focus on lorries, tractors, cranes, et cetera.

## Saving costs by saving energy

Investing in efficiency can yield a handsome return, for instance when the power consumption in homes is reduced. This is relevant to low-income households. Together with the City of Rotterdam, these groups in particular are actively approached. Also in the City of Rotterdam itself, where municipal services run up an annual energy bill of over 30 million euros, energy saving will lead to substantial cost reductions. The municipal buildings offer excellent efficiency opportunities. Rotterdam is a trendsetter in the Netherlands in the field of retrofitting, an advanced system of making buildings more energy-efficient. The investments in energy-saving measures are set off by the energy saved, which means that no additional expenses need to be incurred. In April, tenders will be invited for swimming pools, and after the summer, preparations will be started for theatres. Sustainable property delivers a higher return on investment anyway. Today, parties demand green buildings as they are more attractive, safer and provide a healthier working and living environment.

## Enhancing quality of life and safety

Measures that are necessary to combat climate change will often entail the additional benefit of enhanced liveability in the city. Examples include reduction of local air emissions and noise levels, as well as improved accessibility. Electric transport delivers an important contribution to this effect, as it is cleaner, quieter, and – provided the power is generated in a sustainable manner – better for our climate. Within five years' time, at least 1,000 electric vehicles will be roaming the streets of Rotterdam. Through the Power Surge programme, the City of Rotterdam promotes the accelerated introduction of these vehicles by ensuring the installation of sufficient charging points and encouraging innovation. Green roofs and green façades make the city more attractive as well, by reducing the levels of fine particles, nitrogen and environmental noise, and by preventing excess heat in the city in summer. A liveable environment is a safe environment. This includes flood protection. The Delta Committee has provided recommendations on the protection of the Netherlands against the consequences of climate change. These recommendations are incorporated into Rotterdam's planning procedures to enhance future safety.

## Renewable energy generation

Renewable energy is a growth market. All over the world, we can observe a strong increase in the demand for renewable energy technology. In its advice to the Cabinet (February 2010), the Innovation Platform calculated that the world market for renewable energy will see an annual growth rate of 11%, ranging between 800 and 1200 billion euros by 2020. In 2015, Rotterdam will achieve an annual reduction of 1 megaton of CO<sub>2</sub> emissions as a result of the use of renewable energy, such as biomass, biofuels, wind and solar energy. In the port district, the wind energy capacity already stands at approximately 150 megawatts. In the next decade, this will be at least doubled to 300 megawatts. Possibilities for wind power generation offshore and in the city region are currently under investigation. Current plans involve the participation of citizens in wind farms so that they can generate their own power. Solar energy also shows great potential. The results from an initial industry survey show that a surface of approximately 240,000 m<sup>2</sup> of industrial roofs is suitable for the installation of photovoltaic systems. In the city, a roof surface of around 4.5 million m<sup>2</sup> is suitable for the installation of solar panels. The number of non-sun-oriented roofs is large enough to ensure that competition with green roofs is avoided.

## International exposure for Rotterdam as Number 1 Water City

One of the objectives of the Dutch government is to strengthen the water management sector's export function. The Rotterdam region is developing into a testing ground for delta and water management technology. The city is both an international centre of expertise on water management and climate-related issues and an attractive place of business for companies that are active in this market. Visually prominent projects underscore Rotterdam's qualities as a Water City.

- This spring saw the official opening of the floating pavilion, presenting a combination of two functions as the pavilion demonstrates the current status and rapid advancement of floating constructions while at the same time serving as a venue for exhibitions, lectures and conferences on climate change and water management.
- This year, Rotterdam is also represented in a prominent location at the World Expo in Shanghai, presenting a water pavilion. The pavilion is expected to draw one and a half million visitors to witness Rotterdam's approach to water management.
- In September 2010, Rotterdam hosted the global climate conference for delta cities: Deltas in Times of Climate Change.
- The year 2012 will see the official opening of the National Water Centre, an expertise and visitors' centre in the area of water management and delta technology. The Dutch water sector, united in Dutch Delta Design 2012, selected Rotterdam as its domicile in view of the city's climate approach. Also in 2012, Rotterdam will host a large 'Dutch Delta Design' event.

## Knowledge development

Climate themes offer Rotterdam many opportunities to generate exposure for the city as a centre of expertise. Young talents with an interest in these fields of knowledge will be drawn to the city as a result, while at the same time it will help us to encourage the development of the innovations that we need, as a port city, to sustain our leading position. In addition, it will strengthen our position on an international level as it will help us to develop solutions that can be

implemented in other parts of the world as well. The collaboration with knowledge institutes such as Erasmus University Rotterdam, Rotterdam University and Delft University of Technology will be stepped up. Erasmus University Rotterdam, for instance, is preparing interdisciplinary research on barriers that are currently delaying sustainable development. Furthermore, the United Nations Development Programme pronounced Rotterdam the centre of expertise for cities and climate-related topics. And finally, the first academic curriculum in Water Management was recently set up in Rotterdam. Sustainability thus plays a role in attracting students to Rotterdam.

## Enhancing civic engagement and participation

Dutch consumers account for 24% of the overall national power consumption. In general, consumers are well aware of energy-saving options. Nevertheless, it remains a challenge to convince consumers to change their behaviour. In the autumn of 2009, the Citizens' Panel Rotterdam demonstrated that even though the people in Rotterdam are aware of the urgency of the matter, they generally find it hard to determine for themselves what they can personally do to combat climate change. The National Think Tank demonstrated that it is, indeed, possible to make a personal contribution, based on 54 measures that will help the average household to save over 1,000 euros a year on their energy bills. Now is the time to engage the active participation of citizens and companies in Rotterdam in this effort, by showing them what they can do to contribute to the solution, and by serving as a 'help desk for climate change issues'. Rotterdam's claim of being a climate city and port needs to be supported by its citizens. This means they have to be aware of this claim, and able to back it up. Awareness of their own consumption behaviour is an important element in this respect.

## Providing space for innovation

Rotterdam wants to be one of the most important (port) cities where knowledge and innovation are concerned with respect to climate change, energy and water management issues. There are two reasons why Rotterdam is a suitable location for this position. First of all, RCI ensures that the right players are on board: large corporations, knowledge institutes and a municipality that endeavours to satisfy the preconditions. Secondly, we have the advantage of a geographical location that facilitates the creation of a 'living showcase'. The Second Maasvlakte, a vast expansion and land reclamation project of the port of Rotterdam, is the ideal location for the sustainable development of a new industrial site. The *Stadshavens* project subsequently offers opportunities for the practical implementation of new ideas with respect to redevelopment. The city centre will become a testing ground for sustainable transport. And under the qualification of Clean Tech Delta, international exposure will be generated for this region as a centre of activity and expertise in this area. The innovations to be realized in Rotterdam will furthermore help to strengthen technology exports (by research institutions and companies) from the Netherlands and from the European Union. One of the economic focus areas in the advice to the Cabinet of the Innovation Platform is the biochain of biomass, biofuels and biogas. According to the Platform, this is an area of great economic potential for our country. A strong sector such as the (petro)chemical industry is shifting to a bio-based economy in order to preserve its leading position as a commercially viable and attractive place of business.