



# The environment in the greater Rotterdam region

# 2009



# MISR

MILIEUMONITORING STADSREGIO ROTTERDAM



This appendix contains the English translation of the summary and the introductory paragraphs of the chapters of the report called 'HET MILIEU IN DE REGIO ROTTERDAM 2009'. We have also included a translation of the graph titles and the unique indicator numbers, referring to the page numbers in the main report. The report is a result of a co-operation of regional environmental authorities. This co-operation is called 'Milieumonitoring Stadsregio Rotterdam (MSR)'.

Together with this appendix and the graphs in the report itself, we hope to give a good insight into the environmental quality in the Rotterdam area and of the efforts that are being made to improve this quality.

# **The environment in the greater Rotterdam region 2009**





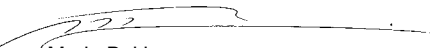
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**MSR has published an annual report on the regional environmental quality for the last fifteen years. Looking back over this period, we see that the results are encouraging. Environmental quality has clearly improved. Policy aimed primarily at pollution sources has greatly reduced industrial emissions. However, a critical analysis of recent years shows that progress is slowing down. It remains to be seen whether the current economic situation will further delay progress or whether this will provide the ideal opportunity to make great advances in sustainability. It is my firmly held belief that the last is the case and I challenge you to pick up the glove.**

Enabling the developments necessary in this region, regarding housing production, transport and the construction of Maasvlakte 2 will prove difficult. The European Commission has granted the Netherlands the right to delay compliance with EU air quality goals. This is fine in the short term, avoiding stagnation of current projects and maximising the results on measures already taken. At the same time we see that the targets for fine particulates for example are likely to be strengthened due to the growing awareness of the serious health damage they cause. Health must be more explicitly included in spatial planning in the region; here we can make enormous progress in the future. For further improvement of regional environmental quality, we are also dependant on other countries. As with air quality, water quality in the major rivers also requires a reduction in emissions from neighbouring countries. The construction of ecologically friendly riverbanks and fishways, which enable fish to pass around barriers by swimming and leaping up a series of relatively low steps is not only ecologically sound, its looks good too.

Looking back, we can be reasonably satisfied, but what about fifteen years from now? This year the Nicis institute has written the closing chapter of the rapport, with a look ahead to the next fifteen years. New challenges in relation to climate, CO<sub>2</sub>-storage, energy transition, water issues, the mitigation of, and adaption to, global warming, mobility and sustainable society await us. All requiring the innovation and creativity that today's youth must provide. For this reason, young people will take part in the discussion during the MRS-symposium. How good is it to live, work and play in this fantastic region? With this fifteenth MSR report, I hope to inspire you. ■



mr. Mario Bakker

*Chair of the Rotterdam Metropolitan Region  
Environmental Monitoring Steering Group  
Schiedam, June 2009*



The cover of this report has a dot on the spine. This dot has appeared on each of the MSR reports since 1995. If all the MSR reports which have been published to date, are stood side by side the dots will be seen to show an upward trend in environmental quality until 2000, with only a slight downturn in 1997. Since 2000 they remained at a constant level but 2007 and 2008 showed an increase. This year, in 2009, the dot remains at a constant level with 2008.

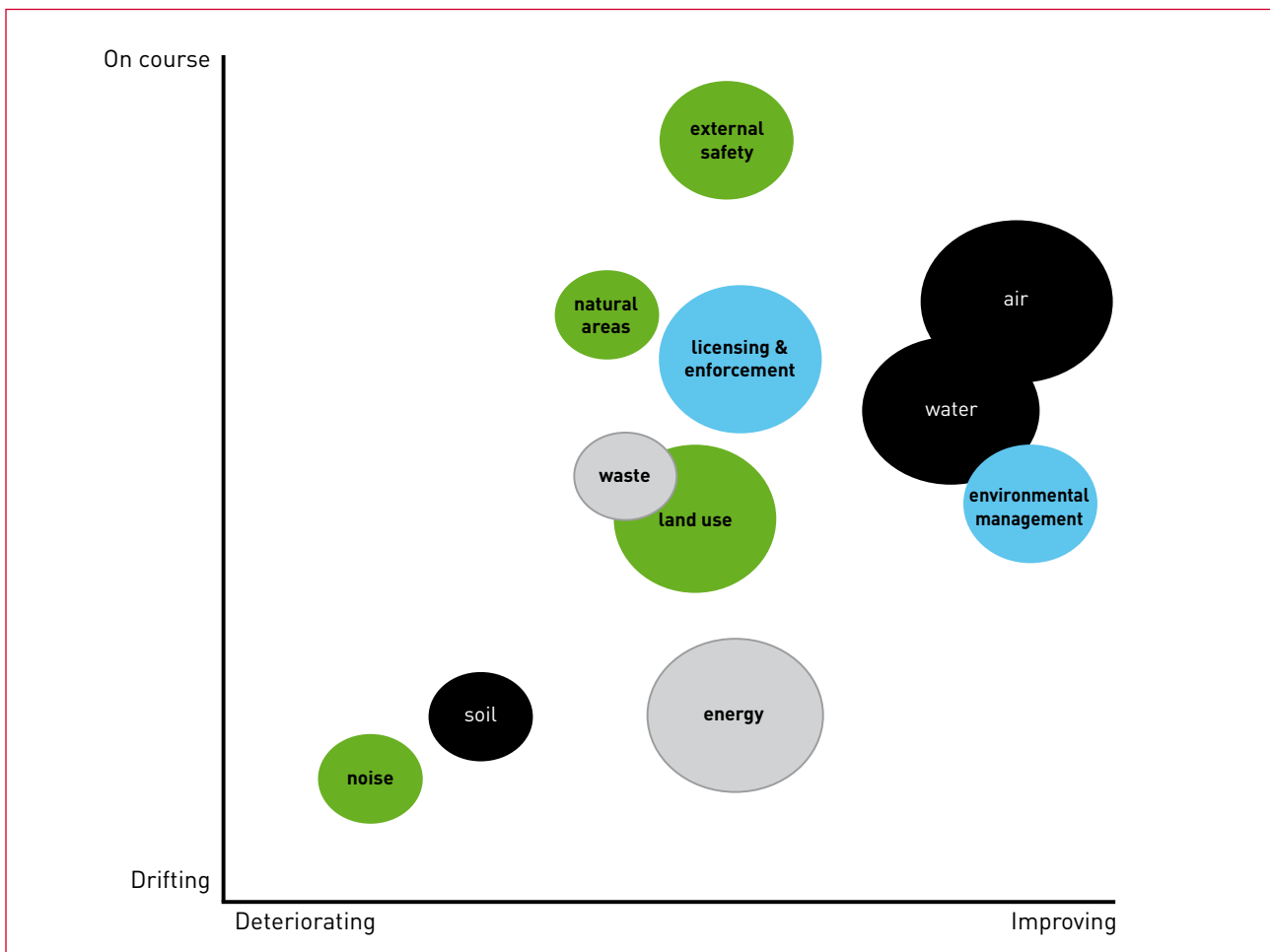
The reason the dots remain constant is that, despite some successes, the measures which have been implemented have only achieved limited results. In addition, several goals expire in 2010 and new goals have yet to be determined.

The world does not stand still. MSR will continue to follow developments and results via the customary MSR approach. Monitoring correlates, where possible, indicators and policy objectives to show whether the policy is on track. We also raise the following questions. Are the objectives being met, and if not will they be met if current developments continue on the present course, and are these developments proceeding at the desired rate? This summary looks at the state of affairs for each theme.

The short outline entitled 'on course/not on course' generally presented in this summary has been replaced this year by a

concluding chapter at the end of the report. This chapter, written by members of the Nicis Institute, analyses in chapter 14.2 those factors which have the most influence on the achievement or lack thereof of intended social effects.

This figure summarizes the current state of affairs and movement. The black patches symbolise the traditional environmental themes: air, water and soil. The grey patches represent the themes energy and waste. The green patches are themes that affect experience and spatial environment: external safety, noise, natural areas and space itself. The blue patches concern environmental management and environmental licensing and enforcement. MSR does not attach importance to any particular environmental theme. The Nicis Institute has shown the relative importance of the themes by presenting larger or smaller patches. The overlap of the patches has no specific meaning. ■





**The importance of a healthy living environment in the Rijnmond region requires attention and vision. Here, environmental monitoring can serve as an objective basis. Milieumonitoring Stadsregio Rotterdam (Environmental Monitoring Rotterdam Metropolitan Region (MSR)) has been in existence for 15 years. That is special and deserves special attention. This year, the structure of the report differs from that of previous years. The main report deserves and gets more attention.**

This year, the MSR did not write a theme report and the main report includes a concluding chapter concerning the status of the environment. The format of this concluding chapter is new. It has not been written by MSR but by the monitoring department of the Nicis Institute. The Nicis Institute is the top public institute for the cities and offers practical solutions through scientific research, sharing knowledge, education and advice. Nicis provides the most important conclusions arising from the theme chapters. This chapter also indicates diagrammatically what the Nicis Institute considers to be themes that require attention based on the previous chapters.

Behind the scenes, experts from all of the environmental themes have been working to determine what has been carried out in the past fifteen years by companies and authorities in the region. They have also translated this into the expectations for the coming fifteen years at the regional level. The Planning Office for the Living Environment (PBL) does this for the whole of the Netherlands. It was therefore logical that for this part MSR followed the methodology that PBL used for the whole of the Netherlands. The MSR experts have included this in the texts. These texts have been assessed by the PBL, so they form a solid basis. The concluding chapter has been written based on these texts, the indicators and the introductions to the chapters.

The schedule 'On track, not on track' is included in the summary of the MSR report. This schedule has been written by the MSR experts, where among other things the realised policy objectives have been examined. It gives an overall impression of the state of affairs within the Rijnmond region.

During the symposium, the results of the MSR report will be discussed, and the links will be made with the year of the youth. As a result, the main question of the symposium is; 'How do you want to live, work and recreate here in fifteen year's time?' The discussion that will arise from this can be borne in mind when making the administrative decisions that are needed to respond to this question. Furthermore, the main report will form the basis for the advice to the authorities regarding how to address the problems. This advice will be drawn up by a renowned scientific institute in the region. Together with the points from the symposium, this advice can later be used by the authorities to draw up the environmental policy for the coming years.

## Chapter Outline

The chapters start with an introduction that indicates the current legislation and regulations, a short description of the efforts being made and the future developments. This is followed by the indicators. The chapters concerning the various environmental themes will be followed by the concluding chapter written by Nicis.

In addition to the main report, the MSR will present the information on the internet, so that it can easily be used. As a result, the underlying data can also be used. We hope that you will enjoy reading this MSR report and that you will once again be able to use it frequently in your work this year. ■



**Public authorities, companies and households all have a responsibility when it comes to caring for the environment. The nature, extent and development of environmental pressure depends in part on economic activities and social developments in the region. This comes together in the Provincial Spatial Structure Vision (PRSV) that the Province of Zuid-Holland specified in 2004. The PRSV consists of three sections. The vision has an integral, spatial character and as such covers urban networks, economic clusters, sustainable water systems as well as area qualities related to landscape. Part Two translates this vision into a number of strategic tasks and projects, both area oriented and thematic, while Part Three addresses the long term, the time after 2020.**

In this chapter we focus on the indicators which sketch, in particular, a picture of those activities and developments. These indicators must be regarded as more or less autonomous, because they are very difficult to influence at the regional level.

## Population

What do the residents think about the environment in the region? Reports, complaints and perception surveys are a good way of measuring this. Residents can address their complaints, reports and questions about environmental matters to a large number of municipal, regional and national bodies. In this report, we will deal with the reports and complaints that have been received by the joint Public Health Services, the police and the DCMR incident room. This information can be found in Appendix 1. We also address complaints that have been received by the managers of inland waterways; this information can be found in Chapter 7.

Every two years, the Province of Zuid-Holland conducts an environmental perception study in which residents are asked about their experiences in the field of environmental nuisance. The indicator for the general perception of the environment can be found in this chapter. In Chapter 4, we address the nuisance related to odour, particulates, etc and in Chapter 5 the nuisance related to noise. This also applies to the complaints that are received by the DCMR incident room. In the environmental perception study, we also ask the residents if and if so what concerns they have about a possible industrial accident. You can find this indicator in Chapter 12, together with other information about external safety.

## Traffic and transport

Road traffic is a diffuse source of pollution, which makes it difficult to tackle; what's more, social resistance forms a complicating factor. Regional policy as set out in the Regional Traffic and Transport Plan 2003-2020 (RVVP) addresses itself to promoting an integral policy on vehicle use. This means that the policy focuses on improving traffic circulation. The indicators for public transport and park-and-ride sites can be seen in this context. Chapter 4 contains indicators for the emissions from road traffic and in Chapter 5 we address the subject of received noise levels.

The A15 motorway between the Maasvlakte and the Vaanplein will be widened to be able from 2010 to keep the future Maasvlakte 2, the Mainport and the hinterland accessible. The expectation is that the activities will be completed around 2015-2016. Minister Eurlings from Transport, Public Works and Water Management, the Rotterdam Metropolitan Region and a large

number of regional parties have signed an agreement on this subject. The parties involved aim to reduce the volume of traffic during the activities on the A15 motorway by 20%, so that goods transport can continue to flow adequately. They want to achieve this by introducing alternatives for commuter transport and other forms of goods transport. To be able to correctly manage these initiatives, on 9 July 2008 the Traffic Company was founded by the Directorate General for Public Works and Water Management, the Rotterdam Port Authority and the Rotterdam Metropolitan Region. The Traffic Company focuses on two tracks. In the first place, taking measures to ensure that the capacity of the A15 is used optimally and in the second place, tempting road users to not use their cars during rush hours.

The 'OV-chipkaart' (chip card for public transport) will be introduced in phases. Since December 2006, the 'OV-chipkaart' has been usable in Rijnmond on the buses and the metro operated by the Connexxion and RET public transport companies, and from July 2007 also for the RET trams and buses. A new phase started on 29 January 2009, because since that date the 'OV-chipkaart' has been the only way to pay for transport on the metro. The first experiences show that this has had neither positive nor negative consequences for the use of public transport.

To encourage the use of public transport, various measures are being taken. Inhabitants of Rotterdam (and from 1 May 2009 also those of Capelle aan den IJssel) who are 65 years of age and older can, with the exception of the period up to 9:00 on working days, travel for free on the trams, buses and metros of the RET. For the new high-quality public transport connection between Ridderkerk and Rotterdam, TramPlus proved to be the best option. The construction costs of approximately € 100 million are covered and it is expected that at the end of 2009 a decision can be taken regarding the route to follow. A schedule of requirements has been drawn up for water-borne public transport, with the objective being to start the new services by 1 March 2010.

## Environment and the economy

Environmental policy is aimed at decoupling growth from environmental pressure. This is the case when economic growth is accompanied by a reduction in environmental pressure (absolute decoupling) or when economic growth increases at a faster rate than environmental pressure (relative decoupling). We can show the degree of decoupling by dividing the index for environmental pressure by the index for economic development. The resultant figure is termed environmental intensity. The more sharply the

line drops, the greater the degree of decoupling that has been achieved. If the line rises, this indicates a situation of coupled growth. The indicators for power stations are presented in this chapter.

### **Environment and health**

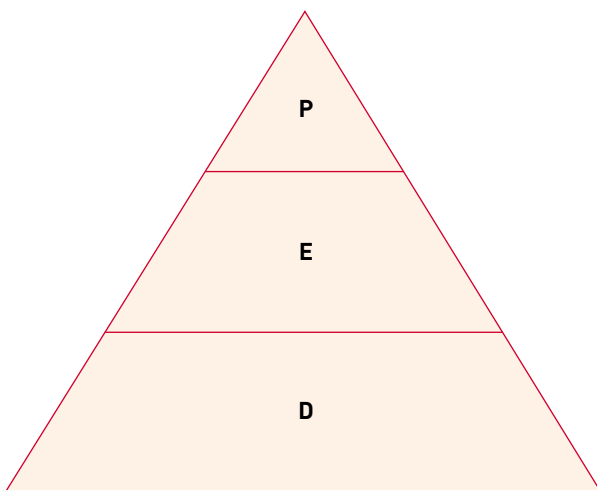
In Rijnmond, it is estimated that 5% of the burden of disease and reduction in health among the population can be attributed to environmental factors. The most important causes are the pollution from particulate matter in the ambient air, severe noise nuisance from traffic and poor air quality of the indoor environment. Data concerning the relationship between health and air quality can be found in Chapter 4 and between health and noise in Chapter 5. It seems that there is insufficient ventilation in the majority of primary schools and child centres. This is a problem for various reasons. For instance, research shows that children perform less well in poorly ventilated spaces. Health problems can also occur, including headaches, fatigue and irritation of the mucous membranes in the eyes and upper airways. People with sensitive airways, such as asthma sufferers, can also suffer more from airway complaints. Finally, infectious diseases can be transmitted more easily. ■

**The Spatial Planning policy domain does not stand alone. It interfaces with many other policy domains, including the Environment and Economy, as shown from the tasks the municipalities have in regard to construction in the region. These interfaces are also described in this chapter.**

**In recent years, this could clearly be seen in the themes of Air and External Safety. It is sometimes very difficult for spatial planners; much more consideration must be given to environmental issues than a few years ago. The integration of environmental themes in spatial planning procedures ensures that the environment receives timely consideration in the spatial planning decisions. The municipal structure vision of the new Spatial Planning Act provides the municipalities every opportunity in this area. This structure vision makes possible the area-oriented integration of the environmental themes.**

Furthermore, health aspects have a real influence on spatial planning and building and are receiving increasingly more attention. After all, a healthy internal environment and healthy surroundings are of great importance. The users (in other words 'the market') are also increasingly demanding a healthy living environment. There is continuous interaction between our health, well-being and surroundings. The surroundings can benefit health in numerous ways, from clean air, challenging places to play through to a relaxing walk in the woods. It is therefore necessary to consider this in the 'planning' process for the physical surroundings. Therefore, this year a number of indicators have been added that reflect the relationship between health and spatial planning.

The interaction between the regional spatial and environmental hygiene developments are addressed at various places in this report. We consider the spatial aspects from three levels that together form a pyramid.



The base D of this pyramid is formed by the environmental Data as included in the other chapters of the MSR. There are increasingly more spatial environmental data available in Geographic Information Systems (GIS).

One level higher addresses the spatial Effects in the area of the environment. Where can a high environmental load be seen? How many people are exposed? What is its effect on health? This is shown visually in this chapter using maps and graphs. Under the header 'Space' on our website you will also find indicators from other chapters that have a clear link with spatial

aspects. Examples of these are the indicators for air quality and noise. More geographically oriented information can be found in RegioGIS for the participating MSR partners: Rotterdam Metropolitan Region, the City of Rotterdam, the Rotterdam Port Authority N.V. and the DCMR Rijnmond Environmental Agency.

The top of the pyramid is formed by the Perception the inhabitants and companies have in the region. This perception determines whether people are willing to live and work in the region. This is of great importance when competing with other regions. Indicators have been included on the basis of the Environmental Perception Survey of the Province of Zuid-Holland and a survey into health perception carried out by the Public Health Service (GGD).

### **Legislation and regulations, and policy**

The way the Netherlands should look, now and in the future, is regulated in spatial plans. Central Government, as well as the Province of Zuid-Holland and the municipalities make these plans. How they are established and revised is regulated under the Spatial Planning Act (WRO). The act was thoroughly revised in 2008. Based on this, in the coming years new provincial and municipal structure visions will be drawn up. The new WRO offers more possibilities to give direction to spatial environmental quality. Many spatial plans must be actualised in the coming years, as they are only valid for 10 years. Furthermore, the new WRO makes it obligatory to make all spatial plans digital, make them available and use them on the basis of the 'Spatial Planning Standards and Rules 2008'.

Environmental and spatial problems will in the future require a more integral approach. The legislator provides for this. For example, in the future, an environmental permit must be requested based on the General Provisions for Environmental Permitting (General Provisions) Act (Wabo). The Wabo integrates 25 rules related to the physical living environment. The Wabo was planned to come into force in 2008, but this has been postponed. The new target date is 1 January 2010. The additional time is required to allow it to be implemented carefully. The legislation and regulations involved and the ICT provisions to be built are very complex and require more time than expected.

In 2005, the 'Spatial Plan for the Rotterdam Region 2020', known simply as RR2020, came into force. The extraordinary thing about this plan is that the RR2020 goes further than simply sketching out the desired picture of the future: the Province and the Rotterdam Metropolitan Region also use this RR2020 to organise

the redevelopment of the region. They do this using a regional development strategy in the form of a ten-point plan. This plan forms the heart of the RR2020 and is described in the review of this chapter.

In 2008, the cabinet vision 'Randstad 2040' was published. The vision concentrates on four major tasks:

- to protect the Randstad from flooding;
- to develop the Green Heart into a Green-Blue Delta;
- to strengthen the international, economic forces in the Randstad;
- to realise lively cities in attractive surroundings.

With this vision, the cabinet wants to ensure, among other things, that the Randstad becomes a competitive region at both the global and European level. The authorities of the southern Randstad (the 'Zuidvleugel' - south wing) are both positive and critical. For instance, they are of the opinion that the unused potential has not been mentioned and that it lacks an investment agenda. Together with the government partners, the Zuidvleugel wants to translate the Randstad 2040 vision into concrete follow-up actions. In 2040, the result of the investment agenda must be a Randstad that optimally benefits from the diversity, unicity and coherence of all powerful sectors, international functions and cities.

### Efforts

In the implementation programme of the RR2020, the ten points of the regional strategy have been operationalised and translated into projects and programmes that are crucial to the success of the RR2020. Responsibility for the implementation is shared between the Province, the Rotterdam Metropolitan Region and the municipalities. The Province of Zuid-Holland is responsible for the implementation of supra-regional affairs, the Rotterdam Metropolitan Region for the regional projects and programmes, and the municipalities for those matters that only occur within the municipality's territory. The progress of RR2020 is monitored by the Rotterdam Metropolitan Region. Here the realisation of spatial plans is mainly addressed, to a lesser degree the realised environmental quality. The Climate Agenda of the Rotterdam Metropolitan Region comprises among other things 13 projects for CO<sub>2</sub> reduction.

The proactive approach to the environmental problems forms an important part of the RR2020. The approach has two main tracks, for which the implementation and effects are monitored. The first track is the regional environmental approach to noise, air, and external safety issues, a regional network for the environment and spatial planning, and the support of municipalities by, among other things, providing guidance. The second track is the environment in spatial plans. This track breaks down into two components: supporting municipal projects and formulating an environmental strategy for RR2020 programmes and projects, in which the Rotterdam Metropolitan Region has the leading role.

The Regional Green-Blue Structure Plan 2 (RGSP2) is integrated in the RR2020. The objective is to realise 993 hectare of 'low-hanging fruit' and 18 km of cycle paths by 2010. Of the 993 hectares, 694 have already been realised and 13 km of cycle paths have been laid. The expectation is that 993 hectare of low-hanging fruit and 18 km of cycle paths can have been achieved by 2010. This underlines the feasibility of the objectives.

Commissioned by the Rotterdam Metropolitan Region, the DCMR has developed maps for the themes noise, external safety and soil, showing bottlenecks to spatial planning. At the end of 2008 the Guidelines air quality in spatial plans was actualised by the Rotterdam Municipality and DCMR.

### Future developments

In Rijnmond, a regional plan has been drafted that will form part of the National Air Quality Cooperation Programme (NSL). The memorandum '*Dat lucht op! Naar een schone lucht in Rijnmond*' [That's a relief! Towards clean air in Rijnmond] that was drawn up in 2008, shows how the set of measures for this area that has already been drawn up (RAP/RAL 2005) and a supplementary set of measures (2008) will solve all of the problems related to particulate matter and NO<sub>x</sub> well before 2020. The obstinate problem areas that remain are the 's-Gravendijkwal, the mouths of the Maastunnel and the interaction between the trunk road network and the underlying road network at seven points. These obstinate problems will be solved in a separate programme. The Climate Agenda also has spatial consequences in the area of climate adaptation and climate mitigation. Climate adaptation is the adaptation to the changing climate; here you can consider changing the dimensions of the sewer system and additional water storage. The climate mitigation programme to reduce climate change is contained in the Rotterdam Climate Initiative. This concerns among other things a reduction in CO<sub>2</sub> emissions, providing space to facilitate CO<sub>2</sub> storage, the use of cold/heat storage, wind turbines, etc. This is addressed in the chapter 'Energy'.

In the context of RR2020 the Rotterdam Metropolitan Region will try, together with the Rotterdam-Rijnmond Public Health Service and DCMR, to name indicators to determine the quality of the living environment. National developments will be taken into account. ■

**Air quality in Rijnmond remains without doubt an important issue. The heavy concentration of industry, the high population density and the accompanying high volume of traffic all make air quality a permanent subject of concern. Nitrogen oxides (NO<sub>x</sub>) and particulate matter form the most important problem areas. Although the DCMR and RIVM (the National Institute of Public Health and Environmental Protection) measurement stations no longer show readings that exceed the legal standards for air quality, locally along the busy urban roads the air quality is still too poor.**

### Legislation and regulations, and policy

Air pollution is pre-eminently something that must be tackled through European collaboration. After all, the emissions from factories, traffic, agriculture and other sources can spread over large distances. The European Union undertakes various actions to address pollution internationally through source policy, for instance by setting emission requirements for cars. In addition, it has set maximum air pollution levels to limit the damage to health and the natural world.

In Europe at the end of 2007, agreement has been reached regarding an additional standard for very fine particulate matter (PM<sub>2.5</sub>). PM<sub>2.5</sub> covers only the finer fractions of particulate matter and this is precisely the matter which is responsible for the adverse effects on health. The directive leaves particulate matter originating from natural sources, such as sea salt, out of consideration. The target value for 2020 is 20 µg/m<sup>3</sup>. Moreover, in 2020 the background concentration of PM<sub>2.5</sub> must be reduced by 15% when compared to 2010. In 2013, the European Commission will evaluate the PM<sub>2.5</sub> target values based on the most up-to-date scientific information. These requirements must also be incorporated into the Dutch Air Quality Act in due course.

In the period 2005-2007, the European directives, in which the maximum pollution levels have been specified, were revised. This was of major interest for the Netherlands, as in spite of taking many measures, it was unable to meet the set requirements. Therefore, the Netherlands argued for more European source policy and more flexibility with respect to achieving the limit values. The revised Air Quality Directive goes a way to meeting Netherlands requests in this respect. For instance, the European Commission will in the near future draw up new proposals for more stringent emission requirements for trucks and factories and will take measures to limit air pollution caused by (maritime) shipping. In addition, a country can, if required, extend the period by which it must meet the air quality requirements (derogation).

The core of the Air Quality Act is formed by the National Air Quality Cooperation Programme (NSL). In areas where the standards for air quality are not being met, the public authorities are going to improve air quality through region-specific programmes. To prevent construction projects not going through or experiencing major delays, in 2007, minister Eurlings appointed the Elverding Commission. This commission reported in the spring of 2008. The main finding was that the time for the decision-making process concerning infrastructural projects can be halved. According to the commission, this can only be achieved if all of the recommendations from the report are implemented. An important recommendation is to employ an extensive exploratory phase that involves inhabitants, local authorities and environmental lobby groups widely and at an early stage and that the approach is targeted at specific areas with clear agreements with respect to time. The commission also proposes

improvements in the official preparations and administrative culture. In addition, the commission recommends the introduction of a completion assessment in which after the realisation of the infrastructure measurements are taken to determine whether the environmental standards have been met. The commission has also identified a number of specific legal problem areas that require an expeditious approach to be taken.

This brings us to the air policy. This policy can be subdivided into three tracks:

1. one track focused on behavioural measures and two tracks for emission policy;
2. one source-oriented emission policy (each company as clean as possible) and
3. a maximum volume of some air-polluting substances (an emission ceiling for all of the Netherlands).

The third track is of particular interest. In the area of emissions, there are already national emission ceilings for nitrogen oxides (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), ammonia (NH<sub>3</sub>) and hydrocarbons; these maximum amounts per substance for all sources in a country have been agreed at the European level. Countries use both existing and new instruments in order to distribute these national ceilings across sectors and companies. An emission trading system for NO<sub>x</sub> has existed since 2005. This system should make it possible in the most cost-effective way to take precisely the measures required to achieve the permitted volume of emissions. The system is still in the start up phase, however. It uses a Performance Standard Rate (PSR) which has been fixed until 2010. However, it appears that the performance standard set is not stringent enough to attain the national emission ceiling by 2010. After 2010, the system can become an important motor to drive down the NO<sub>x</sub> emissions efficiently, as long as the PSR is significantly reduced. The target for sulphur dioxide is to get levels below the agreed ceiling by 2010 using existing instruments (permits and sector agreements). It is expected that this will be more or less achieved. Whether the target for ammonia will be achieved is uncertain; however, in Rijnmond the problem of ammonia does not play a significant role. In recent years, emissions of hydrocarbons have decreased so much that they will certainly drop to below the ceiling; here as well, no new policy has been introduced outside of the existing agreements and rules.

The most important development in the area of air quality in the Netherlands, and so also in the Rotterdam Metropolitan Region, is the National Air Quality Cooperation Programme (NSL). From 24 September through 4 November 2008, everyone could express their opinion about the plan that the government wants to use to make the air in the Netherlands cleaner. These public responses are taken into consideration during the final specification of the NSL.

In 2008, the ministry of VROM amended the Emission Limits (Combustion Plants) Decree (Air Pollution Act) for medium sized combustion plants. This decree makes a considerable contribution to the reduction of NO<sub>x</sub> emissions and with it to the realisation of the obligations from the European Directive for national emission ceilings for air-polluting substances, the air quality and the climate policy. Furthermore, the new decree places requirements on the emissions of hydrocarbons with an eye on the reduction of methane emissions (a very strong greenhouse gas) from gas engines and from combustion plants in which biofuels are used. Medium-sized combustion plants are mainly used in the service sector, in greenhouse horticulture and in industry. The decree is expected to come into force before the summer of 2009.

SO<sub>2</sub> is released during the combustion of fossil fuels. Refineries and power plants form the main sources of SO<sub>2</sub>. Excessive concentrations cause respiratory problems. The time that SO<sub>2</sub> was a problem in the Netherlands and the region is long gone. In spite of this, the minister of VROM, the provinces (IPO) and the energy companies in the Netherlands, represented by the sector organisations VME and EnergieNed signed a covenant in June 2008 that specifies the way in which until 2020 the energy producers will keep the emissions for SO<sub>2</sub> (sulphur dioxide) under a maximum ceiling of 13.5 kilotonnes. To limit the consequences of SO<sub>2</sub> emissions, a maximum ceiling has been agreed in Europe for all member states. For the Netherlands, this ceiling is 50 kilotonnes SO<sub>2</sub> per year from 2010 (currently around 65 kilotonnes). This means that from that moment, all of the sources together cannot emit more than the agreed volume. By concluding the covenant, VROM, the provinces and the electricity producers have made agreements regarding the maximum amount they are allowed to emit, in total 13.5 kilotonnes, and regarding the reduction measures to take. By entering into the agreement, the electricity sector guarantees the realisation of more than a quarter of the national objective. Through this covenant, the Dutch producers assume their responsibility. They sometimes voluntarily take on an extra obligation on top of the existing emission standards. Therefore, the provinces are involved in this covenant.

### Efforts

In order to meet the air quality standards, action is being taken at all administrative levels. Europe has set standards for vehicle fleets and is now devoting its attention to mobile machinery and shipping too. At the national level, the Netherlands made an effort to accelerate implementation of the European vehicle standards in order to bring the standard for fine particulate concentrations within reach. This has been unsuccessful, incidentally. The Dutch government has now asked the European Union to grant a five-year derogation in order to meet the air quality standards.

In Rijnmond, a lot of work has been done on drafting a regional plan that will form part of the National Air Quality Cooperation Programme (NSL). The memorandum '*Dat lucht op! Naar een schone lucht in Rijnmond* [That's a relief! Towards clean air in Rijnmond]', which was drawn up in 2008, describes the contribution made by the

Rotterdam Metropolitan Region and other partners to the Regional Air Quality Cooperation Programme (RSL) for Zuid-Holland. The report mentions the projects that are envisaged in the RR2020 and the remediation task that the Rotterdam Metropolitan Region is facing with respect to air quality. Moreover, the memorandum indicates how the problem areas related to particulate matter and NO<sub>x</sub> can be corrected in time through the use of the set of measures previously established for this area (RAP/RAL 2005) and a supplementary set of measures (2008); these measures are based on the current insights and the current estimate of the effects and costs. Here Central Government has a substantive and financial responsibility for solving problem areas on the national trunk road network, even if the solution interferes with the underlying road network. The Rotterdam Metropolitan Region tracks the effect of the set of measures by monitoring, and where needed it uses supplementary or more efficient instruments. The obstinate problem areas that remain are the 's-Gravendijkwal, the mouths of the Maastunnel and the interaction between the trunk road network and the underlying road network at seven points. These obstinate problems will be solved in a separate programme. In addition to physical measures, communicative measures are also important; these are aimed at increasing knowledge and understanding and generating social support. In this way citizens, companies and non-governmental organisations are called upon to actively contribute to solutions. In the public information project concerning air (PIL) the DCMR and the Rotterdam Public Health Service work together on this issue.

One of the spearheads is to demand that the shipping sector contributes to improving air quality. As ships enter the port of Rotterdam of various ages, sailing under a wide range of flags and coming from ports all over the world, this is not an easy matter. When the ships are docked, they depend on their own diesel engines, which have an environmental impact, for their electricity. If shore power is provided, these engines can be turned off. This already happens for some of the inland shipping fleet. Now ocean-going ships must be addressed. For instance, the Stena Line in Hoek van Holland concluded a covenant with the port authority to move over to shore power in the spring of 2009. To achieve this, a facility is being built on shore, and the ships are also being modified.

In December 2008, the Dutch Accreditation Council performed an external audit of the quality system of the DCMR air quality measurement network. This audit resulted in a number of findings. At the start of 2009, various modifications were made. The Council therefore issued a new certificate for 2009. The quality of the measurements is therefore assured.

Benzene and toluene are substances that are collectively known as volatile organic substances (VOS). VOS is a group of compounds that are present in the air in the gaseous state. The main sources are refineries and storage and transshipment companies. VOS includes various carcinogenic compounds such as benzene. Benzene concentrations no longer pose a problem, but VOS still indirectly plays a role in smog. The substances mentioned above are measured by the automatic air quality measuring network.

### Future developments

The source-based emissions policy will continue to be gradually tightened, in line with the technological opportunities and the economic feasibility of using them. In the European Union, preparations are underway to introduce emission standards for fine particulates. It is not yet clear what this will entail.

At the end of 2007, the EU published a proposal for new emission requirements for commercial vehicles (trucks) (Euro VI). The European Parliament has not yet agreed with this proposal due to the lobbying of mainly the German automotive industry. However, it is still expected that Euro VI can come into force in 2013. With respect to Euro V, which will become effective in October 2009, the emission of  $\text{NO}_x$  will reduce by 80% and the emission of soot by 66%. All proposed limit values agree with the values in the future regulations in the United States. The umbrella organisation of car and truck manufacturers ACEA therefore applauds the new proposal: it is a step forwards for the global truck industry and will result in important cost reductions.

In view of the future air quality standards for  $\text{PM}_{2.5}$ , the measuring efforts will be intensified in the coming years. Together with RIVM and other institutes that carry out air quality measurements, the DCMR will purchase new equipment. This will allow measurements to be made in a similar way throughout the Netherlands. ■



**Noise is an important environmental theme in Rijnmond. A quarter of the region's population claims to be affected by noise; 10% of the population to a serious degree. Of the complaints that are received by the DCMR incident room 65% relate to noise. The MSR 2008 theme report 'Noise, Health and Money' was based on numerous international and national studies, that show that increased noise levels lead not only to annoyance but can also have other health effects including disturbed sleep and cardiovascular disease.**

## Legislation and regulations, and policy

In the Netherlands, the Dutch Noise Abatement Act (WGH) is the main legislation in the area of noise. The WGH contains a system of rules to combat noise pollution and to protect the citizens in their living environment. The rules are intended to as far as possible prevent or reduce the negative health effects that noise pollution can cause. The WGH and the implementation regulations based on it include standards for the highest allowable noise levels from, among others, road traffic, rail traffic and industry. In the WGH, a link has been made with the City and Environment (Experimental) Act and the City and Environmental (Interim) Act. The Interim act makes it possible, under certain conditions, to deviate from the limit values laid down in the WGH.

Furthermore, it has been prescribed that not only the noise from every single type of source must be considered. The cumulative effect of, for instance, road noise and the industry must be considered when assessing building plans. If when considering building on sites that are exposed to high levels of noise no account has been taken of the cumulative effect of the various types of noise, the Council of State will reverse the decision of the local authorities. For instance, the decision made by the Maassluis municipality to realise the 'Vogelwijk' district along the Nieuwe Waterweg canal, has been reversed.

Here, no account was taken of the cumulative effect of noise from shipping and industry.

The WGH was changed on 1 January 2007. The main change concerns the decentralisation of the authority to specify higher values for the highest allowable noise level. Authority has moved from the Provincial Executive to the Major and Aldermen of a municipality. The Major and Aldermen are now authorised to establish higher values for the highest allowable noise level and have a certain freedom with respect to the policy employed. In addition, the grounds for exemption, which were previously set in the old decrees based on the former WGH, have disappeared. Now municipalities have to determine and reason higher value decisions themselves. The effects of this are currently not yet quantifiable. However, the municipalities are advised to draft policy to this end.

The council of ministers has agreed to the bill from Minister Cramer regarding a change in the Environmental Management Act concerned with the introduction of noise production ceilings near national trunk roads and railways (SWUNG 1: Dutch abbreviation for working together on the implementation of noise policy). This bill will probably be submitted for adoption to the Dutch Lower House in mid 2009. The new system for the national infrastructure is based on three cornerstones: controlling noise levels (preventing further uncontrolled growth), reducing high noise levels and

increased use of source-based measures. To control the noise levels, along the national trunk roads and railways a maximum noise emission from traffic will be specified at a reference point along the route. This will in part make the policy on noise pollution less complicated, there will be fewer rules and the standards will be simplified. The new legislation will be transferred from the WGH to the Environmental Management Act.

## Efforts

In June 2007, ten of the sixteen Rijnmond municipalities had produced noise maps and submitted them to the Ministry of VROM. Various municipalities had submitted action plans in 2008 in which they indicate how they are going to tackle problem areas. Some municipalities failed to make the deadline and will send their action plan to VROM in 2009. The municipalities are free to set the threshold value themselves above which a problem is considered to exist. This applies to both the entire municipal area and to specific areas. Municipalities had to involve citizens when drawing up these action plans.

Because of intensive use of space and the wish to retain green areas and "quiet" areas in the Rijnmond region, choices must be made about where building will be allowed and where "quiet" must prevail. Maybe it will be relatively noisier in some places to be able to retain the "peace and quiet" elsewhere in the region. In fact if noise doubles it increases by 3 dB. So 100 more cars on an already busy road hardly increases the level of noise. However, if there is an increase of 100 cars on a road that normally carries 100 cars then the noise from that road will increase by 3 dB! The authorities must decide whether to improve and guarantee the various qualities of certain areas where needed. But it is not always possible to create a win-win situation and certainly not if there are no easy technical solutions available.

Attention still needs to be given to remediating the noise from road traffic. The Central Government will make funds (ISV2 funds) available for the renovation of homes that in a certain year were subjected to high noise levels from a (national) road or railway. Renovation can take various forms, by taking source-based measures (lower speed, quiet asphalt), by taking transference measures (noise barriers) or by taking receiver measures (wall insulation). Many houses in the Rijnmond region have already been insulated and there are still house insulation projects running. Removing the nuisance from national trunk roads and railways is often achieved by erecting noise barriers in the form of screens and banks. For instance, a noise barrier has been erected along the north side of the A20 motorway.

Several municipalities have set up consultation platforms. There is for instance the Nuisance and Safety Platform. The objective is, among other things, to improve the understanding between citizens, companies and authorities. The intended improvements related to the subject of Noise is that residents, companies and authorities will consult in a structured way regarding the possibilities to prevent nuisance including noise. This will also create improved conditions in which to exchange information.

The Rozenburg Consultative Group is drawing attention to the noise pollution caused by freight trains over the Caland Bridge. This is because the bridge will be used more intensively as it is part of the Harbour Railway, which has been drastically modernised within the context of the Betuwe Railway project. The train traffic over the steel bridge has always caused the residents of the nearby Rozenburg a lot of annoyance due to noise. To combat an increase in noise pollution, among other things, noise barriers have been erected; furthermore, the bridge itself was modified. In April 2008, sound measurements were taken at the Caland Bridge for the second time to determine whether the measures had been sufficiently effective. Independent of the results, a study has been started into the options of replacing the current bridge by a new quieter bridge or a tunnel. An investigation into the effects of introducing environmental zoning (low emission zones) in urban areas has been conducted. An important aspect is the enforceability of preventing noisy vehicles entering the zone. In addition, mid 2009 will see the start of continuous measuring of the noise emitted by trains passing a fixed point. Furthermore, Maasvlakte 2 will, as demonstrated in the Environmental Impact Report, result in a further increase in rail traffic. The monitoring programme will shed light on the resulting noise effects.

In 2006, the Province of Zuid-Holland, the Westvoorne municipality, the Rotterdam Port Authority, EMO, ECT, APM, Nerefco, Deltalinqs, TNO, Kuiper & Burgers and DCMR started the study Focus on Noise. With this project, the participants aim to gain more insight into the transfer of noise between the Maasvlakte and Oostvoorne. At the moment there is insufficient knowledge about how this industrial noise is transferred and what, for instance, is the influence of the ground (i.e. the Oostvoorne Lake) and the weather. Intensive research into noise transfer over such distances is unique in the Netherlands. The results will be available mid 2009.

Low-frequency noise, with frequencies lower than 100 Hz, is occurring more frequently. Sources of low-frequency noise include in general machines that operate at a low speed, such as large pumps, or concrete vibrators, but also traffic, the infrastructure, etc. can be sources. The DCMR, in collaboration with the Rotterdam-Rijnmond Public Health Service, is investigating the complaints concerning low-frequency noise. This investigation will establish whether there is low-frequency noise, where it originates and what can be done to tackle it. For people who can detect it, low-frequency noise can lead to severe annoyance. The problem

of low-frequency noise that plays a role in the new Rotterdam district of Nesselande is still unsolved. In mid March 2009, measurements were taken once more at the EON power plant. At the time of the measurements, one boiler was not in use. The results of the measurements will be worked out between the end of March and mid April 2009 and will be discussed with the district and the residents.

DCMR has put together a special team that is tasked with inspecting the catering and entertainment sector. If there is nuisance and complaints, measurements will be taken. If necessary inside the house of the complainant. By acting effectively, the catering sector will provide better information to, among others, the municipality or the incident room if a party is being organised. Enforcement action will be taken against catering establishments that repeatedly cause a nuisance.

#### Future developments

The Noise Expertise Centre has detailed eight project proposals for which subsidies will be requested between mid March and the beginning of April 2009. The Noise Expertise Centre forms part of the BRG liveability projects and has a twofold objective. In addition to reducing the nuisance of noise in the Rijnmond region, the centre also focuses on eliminating/reducing the limitations noise places on the planned intensifying of the use of land and space in the Rijnmond region. Among other things, the following projects will be started in 2009 to reduce the noise emissions from industry and road traffic:

- the development of a quiet road surface for slowly moving traffic (approximately 60km/hour) a large proportion of which is heavy freight transport,
- making moving trucks quieter by making noise-reducing changes to the "side-wings" (the brackets or plates that must be installed between the wheels of trucks to prevent cyclists and moped riders falling under the truck when it takes a bend),
- developing and promoting the use of hybrid vehicles for loading and unloading activities, for instance at container terminals,
- investigating the effects on providing shore power for moored (ocean-going) ships.

Many of these projects do not only reduce noise. Other environmental aspects also benefit, for instance air and energy. ■

**In 2008, Central Government started a new consultation concerning the approach to be taken for urgent remediation cases/ sites, because of the risk to human beings, the soil ecosystem and/or the groundwater. As remediation mostly occurs when sites are being redeveloped, the fear is that the sites that pose the greatest risk are not being tackled in time. The soil remediation budgets are now funded by Central Government as part of the ISV fund (which is meant for urban development) and soil remediation as a part of a redevelopment is seen as the most cost-effective approach.**

### Legislation and regulations, and policy

The entry into force of the Decree and the Regulation on Soil Quality saw the start of the implementation of the new reuse policy for soil and dredge spoil. The standardisation for this has been thoroughly revised; target values are replaced by background values, and the soil use values by maximum values for the functions 'living' and 'industry'. Municipalities can specify their own area-specific standards, as long as they are derived from the methodology of the 'Risk toolbox for Soil'.

A transition policy applies until the memorandum 'Active Soil and Building Materials Management' and the regional Soil Quality Maps have been revised. The intention was to realise these revisions in 2008, but this proved to be infeasible due to low background values, the lack of money and a lack of backing from the municipalities, and too little insight into the advantages and disadvantages of area-specific policy.

Due to the introduction of the Decree and the Regulation on Soil Quality, as of 1 July 2008 the group of substances that both unsuspected and diffusely polluted soils and batches of soil must be analysed for has been revised. Such investigation has been obligatory since 1999, until 2008 under the rules of the Building Materials Decree.

Arsenic, chrome and EOX have been removed from the set of substances, or have been replaced by barium, cobalt, molybdenum and the summed PCBs.

In addition, the Ministerial Circular on soil remediation 2006 has been revised. This includes revised intervention values for soil, and the criteria for determining the urgency of soil remediation have been modified.

The soil remediation target and intervention values related to groundwater were retained unchanged in this Ministerial Circular.

### Efforts

Throughout the entire region, a study has been made of the amount of work associated with locations classified as being urgent due to the risk to man. This study will not be completed in time, that is to say before 2011. Why not?

The national FOCUS project was established to be able to assess locations using much less effort, in a short period of time and at low cost. This procedure is also being followed in the region.

However, shortly after its introduction, the new 'standard package' was already leading to acute practical problems. For instance, the transition policy was not properly arranged and in July the transition policy for the region still had to be developed.

In addition, there are problems related to the standards for antimony,

barium, nickel, cobalt, molybdenum and drins. Here background values are concerned, lower than the natural background values in soil and/or dredge spoil, and strongly reduced intervention values (drins). Negotiations are being held with VROM concerning solutions for the short and long term.

Initially, the Rotterdam policy document on Active Soil and Building Materials Management will be revised, for which proposals have already been developed for area-specific policy including local standard values. Most other municipalities have not yet taken a decision on which policy to choose due to them lacking the time to study the rather complicated new regulations and due to the fact that no extra budget for the implementation could be made available.

Many Dutch municipalities are encountering problems with the introduction of the Soil Quality Decree and Regulations. Bodem+ (Soil+) aims to achieve a sustainable use of the soil. Soil+ is intended to fulfil a role between policy formation by Central Government and the practical implementation by the provinces and municipalities. On the order of VROM, Soil+ started with the 'Impulse for Local Soil Management' (ILB), intended to provide municipalities with consultancy hours for internal communication and for starting to explore policy. The DCMR has submitted an ILB application for almost all municipalities; some municipalities applied for ILBs directly. Every municipality has been assigned 20 consultancy hours in 2009 for the first ILB phase. Coordination is arranged via the Regional Platform for Soil Management Rijnmond.

The new regulations require all of the soil quality maps to be revised (in the long term). They must be based on the 'standard package', and soil function maps must also be drawn up. The soil use maps must then be derived from the soil quality maps of the topsoil and the soil function maps. Rotterdam and Vlaardingeng were the first to start revising their soil quality maps, as these have expired or will soon expire. In any case, the soil function maps must be completed at the end of 2009, otherwise it is only possible to reuse clean soil. In addition to Rotterdam and Vlaardingeng, another six municipalities in the region have started drawing up these maps. The other municipalities have postponed this for the time being due to the costs and because the current maps are still valid. For the municipalities of Krimpen aan den IJssel and Westvoorne, exemption maps are being developed within the framework of the building regulations.

A striking soil remediation project occurred near the Speerdistel in Rotterdam-Ommoord. An old illegal dump was found here more or less by accident. The majority of the site was under public parks and gardens, but there were also areas under back gardens.

This remediation procedure was performed and successfully completed in 2008, although the dump proved to be more extensive than expected.

In 2008, a start was also made on the preparations for the re-remediation of the EMK site in the Stormpolder in Krimpen. This former tar and waste plant was remediated in 1991 by isolating it within a dam/bentonite wall and covering it with asphalt. However, the groundwater management system does not function correctly, the operation costs are too high and the restoration costs in the long term are even much higher. Moreover, the site cannot be used for urban functions. The municipality wants to redevelop the entire Stormpolder industrial estate, and within this context to build on the EMK site. This is only possible if the site is re-remediated.

A soil ecological survey has started at the former dredge spoil depository in Broekpolder, Vlaardingén. The objectives are:

- to be able to determine more accurately the urgency per discharge area
- to support the development of remediation scenarios concurrently with nature development, restructuring of parts of the site and the creation of recreational facilities.

This survey will be completed at the start of 2009.

In 2008 the Metropolitan Region commissioned in the context of RR2020 an inventory of possible soil improvements at building sites in development.

### Future developments

To ensure that the sites that require urgent soil remediation due to the risks they pose to man are tackled prior to 2015, at the start of 2009 a soil remediation covenant must be signed by IPO, VNG, the Union of Water Boards and the Ministries of VROM and Transport, Public Works and Water Management. The other urgent locations (due to ecological and/or the risk of spread) should be remediated or controlled prior to 2030.

The work associated with mapping out the urgent locations will be continued in 2009, with attention being required for all of the dredge spoil depots along the Oude Maas river that have not yet been investigated.

In the soil remediation covenant, agreements will also be made regarding the embedding of area-specific groundwater management in the Soil Protection Act, the detailing of policy and regulations for heat-cold storage and sustainable use of the subsoil. Within this context, the storage of CO<sub>2</sub> is also an important subject for the region.

A point of concern and further discussion is whether Central Government will make sufficient funds available for the implementation of the Covenant. In relation to the raised house-building targets, which are a political priority in Rotterdam due to the technically and socially aged housing stock, the ISV budget is already insufficient. Therefore, the local authorities have assigned additional funds for determining the work required for urgent locations.

In 2009, the discussions regarding substances and standards will continue. Consideration is being given to revising the intervention values for groundwater. In addition, the humus-lutum correction formulas for various problematic substances are being reconsidered.

In 2009, the Soil Quality Regulations and the Ministerial Circular on soil cleanup 2006 will once more be revised. In view of the changed regulations, this also applies to the joint soil remediation policy of Zuid-Holland (BOBEL) and the policy document on Active Soil and Building Materials Management.

At the start of 2009, a statement of intent will be signed for the remediation of the Rotterdam port area by the Rotterdam Port Authority, Deltalinqs, the DCMR Rijnmond Environmental Agency, the province of Zuid-Holland and the ministries of VROM and Transport, Public Works and Water Management, as a first step towards a covenant. In addition, the combined strategy will be elaborated on further.

The Groundwater Directive will be implemented via the Quality and Monitoring Water Decree, that contains the threshold values for groundwater, for the time being with a limited, but extendable, list of substances. Because this decree does not clearly state the relationship between these new standards and the groundwater standards from the Soil Protection Act, the possible role of threshold values in the soil remediation policy will be examined in more detail. In addition, the role of threshold values must be examined as an assessment criterion for the monitoring in and around the port area of Rotterdam. However, no threshold values have been derived for hardly any of the substances that are relevant in the port area. To limit the failure risks for urban redevelopment as far as possible, in 2009 an analysis of sources and the degree of pollution of the freatic (water-bearing stratum) urban groundwater will be carried out in Rotterdam and Schiedam. It is expected that the Groundwater Directive will become part of the Water Act that is currently being prepared.

It is also expected that in 2009 the Framework Soil Directive will as yet be established. Although the final text for the directive is not yet known, there are consequences for the Dutch soil policy:

- there will probably be an obligation to investigate the soil for all soil transactions (soil status report).
- the soil policy must be extended to include other themes, and per theme an inventory must be made of the risk areas. For this region, the following are mainly important: salination, compaction and sealing and the reduction of organic matter. In 2009, it must be established whether additional soil policy for the region must be developed.

Assuming that the ministry of VROM will make a budget available, in 2009 the preparations for the re-remediation of the EMK site will start, with the initial stage being a further investigation. Where possible, use will be made of innovative technology. ■

**Water has a clear influence on our own lives and our living environment. It is becoming increasingly integrated with other policy domains including nature, soil, spatial planning and energy and climate. Examples are space claimed for water storage, environmental effects of cooling water discharge and risks of flooding due to high water levels in rivers due to climate change.**

## Legislation and regulations, and policy

In January 2009, the Water Act was accepted by the Senate. It is expected that the Water Act including implementation regulations and the Implementation Act will come into force in the autumn of 2009. The Water Act ensures more transparency in the regulations and reduces the degree of regulation. In addition, it will include the European regulations (European Water Framework Directive). The Water Act combines and harmonises the Water Management Act, the Flood Defences Act, the Groundwater Act, the Pollution of Surface Waters Act, the Marine Pollution Act, the Land Reclamation Act, the Public Works (Management of Engineering Structures) Act and the Directorate General for Public Works and the Public Works Act 1900.

The permitting systems associated with the Acts that are combined in the Water Act are bundled into one water permit. The permits are issued by the water authorities.

In September 2008, the Delta commission presented its report on Collaborating on Water, which included measures that must be taken to make the Netherlands climate proof in the future. Due to climate change, the Netherlands is faced with rising sea levels, greater volumes of water to be discharged by the rivers, a shortage of freshwater, ground subsidence and the salination of the soil. In 2009, the government wants to submit a draft Delta Act that will form the basis for implementing the recommendations in the Delta Commission report. The Delta Act addresses the basis of the Delta Programme, the tasks, powers of authority of the Delta director and the manner of financing the required measures.

The National Water Plan (NWP) was established at the end of 2008. This plan describes the measures that must be taken to keep the Netherlands safe and liveable, also for future generations, and to use the opportunities that water has to offer. Important parts of this plan are the policy in the area of water safety and the river basin management plans based on the Water Framework Directive (KRW).

At the end of 2008, the government established the draft river basin management plans for Eems, Maas, Rhine Delta and Schelde. The Rijnmond region lies in the Rhine delta region. The Province of Zuid-Holland has specified its water policy in the Provincial Water Plan 2010-2015. This plan will come into force on 1 January 2010 and will replace the current provincial Water Management Plan, which is now part of the Provincial Policy Plan Green Space, Water and the Environment (2006) and the Groundwater Plan 2007-2013. The European Water Framework Directive, the National Administrative Agreement on Water and the National Water Plan have been translated into strategic objectives in the Provincial Water Plan and focus on setting frameworks and arranging supervision.

The National Administrative Agreement on Water (NBW) was updated in 2008. In the updated agreement, agreements have

been made regarding tackling climate change, the urban water task, the developments in residential building and infrastructure, and the realisation of clean and ecologically healthy water. More attention is given to the implementation of the Water Framework Directive. It was once more agreed in the National Administrative Agreement on Water - updated (2008), to mainly employ the water assessment process in the case of water quantity (flooding) in relevant spatial plans and decisions of the Central Government, Provinces and municipalities. The water assessment process is mandatory for, among other things, a land-use plan, an integration plan and exemptions for a land-use plan. With the introduction of the Water Framework Directive and climate change, in the water assessment process attention must also be given to water quality, water shortages and water safety.

The implementation of measures for water safety, water quality and water management is the responsibility of all water authorities, for both regional and national waters. The Delfland Water Board drafted a Water Management Plan 2010-2015. The Water Framework Directive (KRW) part of the Water Management Plan was created by the Schieland and Krimpenerwaard District Water Board and the Hollandse Delta Water Board, and in 2009 an integral plan will be drawn up. The new Management and Development Plan for the National Waters (Design vision) was drawn up for the national waters. The Management Plan for National Waters (BPRW) describes the management of the national waters for the period 2010-2015 and comprises six interrelated water systems including: the major rivers, the major canals and the south west Delta. The BPRW was drawn up within the context of the European directives and national legislation and policy.

On 1 January 2008, the Municipal Water Management Act came into force that includes new tasks and responsibilities for municipalities. The municipality is tasked with locally making space for the measures and has a duty of care for urban waters. This duty of care covers waste water, rain water and groundwater. This has led to an extended Municipal Sewerage Plan.

## Efforts

The Oostvoorne Lake Quality Impulse is bearing fruit. The provisions are in operation and the measures have been completed. In October 2008, the management of the saltwater installation in the Oostvoorne Lake was transferred from the Rotterdam Municipality to the Hollandse Delta Water Board. This officially completed the Oostvoorne Lake Quality Impulse project and the lake, which is in demand as a recreational location, can develop into a unique brackish water ecosystem. Desalination would have made the lake vulnerable to algal growth and there was the threat that a unique brackish ecosystem would have been lost. Starting in the summer of 2008, pumps have pumped salt water from the Beer Canal into the lake where it mixes with the brackish water. This

will continue until the salt level is high enough for nature to blossom once more. The Hollandse Delta Water Board also worked on the streams plan Voorne-Putten, Voorne coastal restoration, natural banks, drains in rural Westvoorne, salination of the Oostvoorne Lake, and the Nieuw-Helvoet water storage polder.

At the end of 2009, the new Water Act will come into force. From that moment, the Delfland Water Board will be the manager of its regional water system, including the groundwater. To be able to perform this task properly, policy must be formulated and tasks delineated with the other authorities involved. The draft policy document on Delfland groundwater management 2009-2012 was available for inspection in March 2009.

The water tasks are also imbedded in plans at the municipalities. At the start of 2009, the public could respond to the plans of Schiedam, Vlaardingen and Maassluis. According to the European Bathing Water Directive, eight percent of the bathing water in inland waters comply with the standards. The Netherlands has until 2015 to raise the quality of bathing water up to the legally required level. For every location the causes of the pollution and measures to improve the quality (see indicator 3048) must be sought.

### **Future developments**

The Rotterdam Climate Initiative (RCI) initially focused on reducing CO<sub>2</sub> emissions to combat climate change. Now the RCI also includes a component referred to as Rotterdam Climate Proof (RCP) in which preparations are made to accommodate the flood water resulting from climate change. Within this context, green roofs and water plazas, among other things, are being constructed.

The draft river basin management plan for the Rhine delta distinguishes various sub-areas. The Rijnmond region falls under the Rhine West region. Appendix Q of the draft river basin management plan for the Rhine delta contains a list of the municipalities that will take KRW measures in the period 2010-2015. In the Rijnmond region these are Bernisse, Capelle aan den IJssel, Hellevoetsluis, Krimpen aan den IJssel, Lansingerland, Maassluis, Ridderkerk, Rotterdam, Schiedam, Spijkenisse, Vlaardingen and Westvoorne.

In Rotterdam, the Schieland and the Krimpenerwaard District Water Board is working on realising sufficient water storage in (in particular the centre of) Rotterdam by creating water plazas and other creative solutions.

Up to 2015, the task of the Directorate General for Public Works and Water Management (RWS) is to obtain a better picture of the salination problems, to identify promising measures for freshwater provisions and to estimate the cost effectiveness of the measures. RWS Zuid-Holland in collaboration with the RWS Water research department is carrying out research into the effects of climate change on the salination in southwest Netherlands. The preliminary conclusions show that it is not cost effective to correct the problem of salination by taking expensive technical measures. Salination is not a problem for the quality of the water itself, but for the various user functions that depend on fresh water. Research into innovative technology can be useful (for instance research into salt-tolerant crops). This research is ongoing and will lead to a package of measures that will be included in the BPRW. ■

**‘Green’ (public parks, gardens, etc.) is important in the societal respect and according to the Health Council it has a positive effect on the welfare and well-being of people. Green plays an important role in improving the living environment and the health of the inhabitants. In the municipalities of the Rijnmond region, Green is on the administrative and political agenda and will remain so in the coming years.**

## Legislation and regulations, and policy

This subsection addresses legislation and policy, first in the European context, followed by national, regional and local contexts.

There is considerable legislation and regulations in the area of Green, at the European, national as well as the regional level. The European wildlife and green spaces legislation – Natura 2000 – has been embedded at a national level into the Flora and Fauna Act and the Nature Conservation Act (NB Act). In addition to legislation, the European Union has also developed subsidy schemes, which may be used by not only national, regional and local authorities but also by international, private and non-governmental organisations. An example is the LIFE+ programme, which co-finances the development, implementation, monitoring, evaluation and communication of the European environmental and nature policy and legislation.

The Dutch Flora and Fauna Act (Fw) aims to protect wild plants and wildlife and includes the duty of care. The amended Nature Conservation Act (NB Act) came into effect on 1 October 2005. Whereas the Flora and Fauna Act is aimed at protecting species, the Nature Conservation Act is specifically targeted at the protection of areas including protected nature reserves and parts of the National Ecological Network (EHS). The Netherlands has substantiated this by designating the Natura-2000 areas. This regime includes among other things the areas and wetlands covered by the Birds and Habitats Directive (Haringvliet, Voordelta, Oude Maas, the Voorne Dunes, Staelduinse Bos and the dunes at Kapittel in Hoek van Holland).

The Water Framework Directive also influences the water-based nature. By 2015, all of the surface waters in the Netherlands must be in good ecological condition. Habitats must be of sufficient quality to accommodate the various species and plants and there must be sufficient characteristic species per water type. More information can be found in the Chapter Water.

With Randstad 2040, Central Government presents a new vision for the spatial planning of the Randstad. For green spaces, this is mainly about protecting and developing differentiated landscapes and the development of green living and working environments. These are linked to the ‘green-blue’ task, the development of green-blue qualities near the cities in the form of metropolitan parks and agricultural transition areas.

The policy document on the implementation of the water table draw down policy of Zuid-Holland gives an overview of the measures that the Province will take up to 2013 to combat water table draw down. This is happening in the 21 most important areas that suffer water table draw down (the TOP areas). This is

necessary because the quality of the green spaces deteriorates due to the drop in the water table. Water table draw down is the most urgent environmental problem facing nature areas.

The policy document describes per TOP area: the draw down problems, the proposed measures, the plan, the status and the costs.

At the regional level, the Regional Green-blue Structure Plan 2 is integrated into the umbrella programme, the Spatial Plan for the Rotterdam Region 2020 (RR2020) (see also the Chapter Spatial development). The Regional Green-Blue Structure Plan 2 (RGSP2) gives an overview of the tasks facing the region with regard to landscape, cultural heritage, water, nature, recreation and agriculture, and translates these into a coherent vision of the green-blue structure. From the spatial viewpoint, RGSP2 provides the guiding principle for the Chapter Green. The RGSP2 is a joint product from the Rotterdam Metropolitan Region and the Province of Zuid-Holland. Due to the integration of RGSP2 in RR2020, the latter has become both a Regional Structure Plan (RSP) and a regional plan that lays down the spatial development planning for the Rotterdam region for the period up to 2020 with a further view to 2030. There is an implementation programme for the RGSP2 that states how and which (in particular quantitative) objectives will be realised. When the (new) Spatial Planning Act came into force, the plan figure - regional plan - lapsed. It is replaced by the provincial structure vision. The regional plan applied to the Rotterdam Metropolitan Region. The Metropolitan Region wishes for the RR2020 to be integrally included in it.

## Efforts

In the Netherlands, the LIFE+ programme has been translated into a number of subsidies, including the Vital Countryside Long-range Programme. Various plans in the Metropolitan Region can expect finance within the context of this long-range plan, such as the further expansion of the National Ecological Network (EHS), new nature areas in buffer zones and the construction of large-scale recreational green area around the city.

Under the Deltanatuur umbrella, Central Government, the Provinces of Zuid-Holland and Noord-Brabant, and a number of local authorities and non-governmental organisations will work together until 2010. By that time, 2,400 hectares of new wet habitat must have been created. Projects within the Rijnmond region are Strypse Wetering and Holle Mare. Projects where agricultural land is converted into nature areas sometimes appear to gain little support from local inhabitants and authorities, as was recently seen for the nature development in the Zuidpolder near Zuidland (municipality of Bernisse). The designation of the Natura-2000 areas in Rijnmond brings with it responsibilities. They now have to be managed as such. The management plans of Natura 2000, depending on the area, are made by Central

Government for instance for the large bodies of water, or by the Province, for instance for the dunes.

There are a number of TOP areas within Rijnmond suffering water table draw down. These are:

- The dunes of Voorne: the management plan procedure N2000 will be started in 2009. Concrete actions will follow from this management plan.
- Vlaardingen Vlietlanden: a project was run in this TOP area (not a Natura 2000 project) to hydrologically disconnect the area from the 'boezem' (polder outlet) and so allow the water table to rise during the winter.
- Kapittel dunes and Staelduinse Bos: The Natura 2000 management plan process is running.

In the Negotiation Agreement regarding a Visibly Greener Zuidvleugel, Central Government, the Province of Zuid-Holland and the regional authorities, in consultation with those directly involved, have created conditions for developing around 4, 200 hectares of new recreational green areas in the Zuidvleugel.

Projects that are of direct importance for Rijnmond are:

- 750 hectares of green and recreational areas within the framework of the Project Mainport Rotterdam (PMR),
- liveability projects in the existing Rotterdam area (BRG, also in the framework of PMR),
- The Integral Development Delft-Schiedam,
- the Rotterdam Central project and
- the Noordrand Rotterdam project.

These projects form part of RR2020 and RGSP2.

In January 2008, Haringvliet was supposed to become a brackish estuary once more (Decree on opening the Haringvliet dam).

However, this will be delayed because the fresh water provisions for agriculture must first be completed. In addition, the problem areas related to the inlet points for drinking water and freshwater for industry must be solved. The Haringvliet sluices, part of the Delta Works, will now be partially opened from 1 December 2010. This will recreate a salt-water - freshwater transition area.

Because the water in the Haringvliet will flow once more, less silt will be deposited, which will also be the case in the Hollands Diep and in the channels of the Biesbosch. By restoring the salt-water - freshwater transition areas, lost plants and wildlife will return to the area. Migratory fish such as salmon and the trout will then be able to pass through the sluices.

1 November 2007 saw the official start of the quality impulse project for the Oostvoorne Lake, one of the most important recreational sites in the region. The water quality of the lake will be raised by supplying salt harbour water from the Beerkanaal (a canal). As a result, the lake will recover its original brackish water character. Furthermore, the recreational banks and provisions will be tackled. At the end of 2008, the activities were more or less completed.

The coherent vision the RGSP2 presents of the green-blue structure means in concrete that the highest priority projects related to this

structure covering 2,450 hectares must be completed in 2015 and the second and third priority projects must be completed in the next five years. Of the projects that are designated as being 1<sup>st</sup> priority, a quarter, expressed in area, will face a delay. Here financing is the main problem. The green projects in the framework of RGSP2 for "low-hanging fruit" are on track. Of the originally planned 993 hectares by 2010, 694 have already been realised. With the laying of 13 km of cycle paths, the objective of 18 km (the Voorne route) is considered to be completed.

Information regarding the presence of protected species can be found at the Nature Information Agency (GAN). In the longer term, via the National Database Flora and Fauna (NDDF), the agency will provide companies, municipalities and other parties with reliable information regarding:

- the distribution of protected species in the Netherlands and
- information about locations where efforts are being made to re-establish endangered populations (the natural habitat approach).

In connection with the National Database Flora and Fauna, in 2007 and 2008, the municipality of Hellevoetsluis carried out a flora and fauna inventory. The results concerning mice and fish are available, and a start has been made on inventorying nesting birds, and research into plants, bats and amphibians.

In the area of the Flora and Fauna Act (Ffw), site managers, municipalities and port authorities have made efforts to be able to work in the outdoor space. This is in particular important when developing sites that are still to be released. Furthermore, within the port, work is done according to the Ffw code of conduct for managing the outdoor space.

For the Rotterdam municipality, the City Nature Rotterdam bureau (bSR) maintains a very extensive database containing information about almost all groups of species within the city boundaries.

This is continually updated with data from inventories and observations. For spatial planning, it is converted into a species distribution map.

Green as a contributor to health and welfare is gaining a lot of attention. It is sometimes referred to as "vitamin G". Green provides rest and relaxation, encourages exercise and promotes social contacts. Efforts in the area of youth education are made through foraging excursions organised by the Zuid-Hollands Landscape foundation on the Brienenoord Island. In the Programme Environment Rotterdam 2008 – 2012, green is explicitly mentioned as an aspect of the strategic objective "A healthy living environment". During the Rotterdam Green Year 2008, numerous events were organised and additional publications made.

#### **Future developments**

In the near future, the status of the National Ecological Network (EHS) will be tightened up. A better guarantee must be given of the sustainable maintenance of biodiversity in the EHS. This can possibly lead to changed boundaries if the nature hectares and

ecological connection zones prove to be ineffective. An important aspect in this area is that the Nieuwe Waterweg, like all major national waters, is regarded as being part of the EHS. This will mean that the Directorate General for Public Works and Water Management can carry out various ecological restoration projects for the benefit of migratory fish.

At the regional level, the Province of Zuid-Holland wants to take a step back (province new style: more management from a distance) and allow the various bodies to collaborate to achieve the recreational and nature objectives. This collaboration is required as the probability of fragmentation is high. Now there are many different bodies at work, including the Forestry Commission, the municipalities of course and the recreational boards. An example of fragmentation is corridors not connecting.

The construction of the Maasvlakte 2 has consequences for nature. Within the framework of the Environmental Effect Plan Maasvlakte 2, measures are taken to limit the adverse nature effects as far as possible. To this aim, agreements are made concerning supplementary source-based measures for industry on the Maasvlakte 2 or concerning mitigating measures elsewhere in the region. As a precaution, the expected negative effects resulting from the construction and use of this new port and industrial estate will be compensated. This compensation is being arranged via the Project Mainport Development Rotterdam (PMR). The compensation projects include a soil protection area of 25,000 hectares in the Voordelta and a 35-hectare area of dunes for the coast of Delfland. Certain activities are excluded within this soil protection area.

An inventory is being made of any effects of the sand extraction for the Maasvlakte 2 by an extensive monitoring programme in which a baseline survey of fish species from 2007 is being used. The survey will be repeated during the sand extraction and the results will be compared. In particular, the survey focused on juvenile fish, as it is expected that any effect of the construction of Maasvlakte 2 will first be noticeable in this category. Finally, the researchers will map out the life on (epifauna) and in (infauna) the sea bed. ■



**The waste management policy is aimed in the first place at prevention: preventing waste being created. In addition, the authorities seek as far as possible to find opportunities for recycling and reuse. Many parties are involved in the implementation of the waste management policy. The Province grants permits to waste processing companies, the municipalities collect waste and waste processors wish to process waste effectively and efficiently. Moreover, the business community now also plays a large role in waste collection.**

## Legislation and regulations, and policy

When the European Waste Framework Directive 1996 came into force, the key terms waste material, disposal, useful application and other terms were harmonised and principles and frameworks for waste management were established. The objective of the sixth European Environmental Action Programme is to ensure that the use of, whether or not renewable, natural resources does not exceed the capacity of the environment. Therefore it is necessary:

- to decouple economic growth from the use of resources,
- to improve the efficiency of the resources and
- to produce less waste.

The waste objective is to reduce the final volume by 20% in 2010 and by 50% in 2050. The implementation of the Sixth Environmental Action Programme started in 2001 and will end in 2010.

In 2002, new municipal targets for sorting waste were specified. These targets depend on the degree of urbanisation and their feasibility, and are laid down in the National Waste Management Plan (LAP). The basic principle of the national policy is to achieve the original target percentages; the most important one is the percentage of waste that is sorted when collected. The current LAP ceases to be valid in March 2009 and the drawing up of the National Waste Management Plan 2009-2021 (the second LAP) is now at a very advanced stage. The public inquiry round has been completed and the plan was discussed on 30 March in the Lower House.

A change to the Environmental Management Act gives municipalities more freedom to move away from the obligation to collect organic waste every week from every property. Municipalities can also decide to collect organic waste separately only in certain parts of the city or to stop collecting sorted organic waste from districts consisting of high-rise buildings. The two municipalities of Krimpen aan den IJssel and Rotterdam are making use of the liberalised permitting options.

On 1 August 2004, the European Union laid down the EU Directive 2004/12 for packaging and packaging waste in order to harmonise the regulations with regard to packaging and packaging waste in Europe. The Directive contains rules to drive down the amount of packaging waste. It has been implemented in the Netherlands in the Management of Packaging, Paper and Cardboard Decree. In this Decree, the producers are made responsible for the waste that is released with their product. Agreements with the municipalities to tie into their existing collection structure have been laid down in the framework agreement for packaging and litter for the period 2008-2012. The objective is to introduce the collection of plastic packaging from households nationally. To this aim, the municipalities must establish sorted collection systems,

allowing the achievable recycling percentage of plastics to rise to 38% in 2009. The costs for this will in the main be paid from the packaging tax that is paid by the commercial sector, which charges it on to the consumers. The introduction of a national collection system should have started in 2008, but it was delayed due to differences in opinion between municipalities and the commercial sector regarding the compensation of costs. The parties have now reached agreement and it is expected that in 2009 many more municipalities will start the collection of plastic packaging. Moreover, municipalities can choose to use post collection technology. In 2010, a national system for the collection of plastics must be operational.

Hazardous waste is waste that poses a danger to humans, animals or the environment. The European list of waste materials (Eural) provides an overview of all waste materials and indicates for each material whether or not it is classified as hazardous waste. The solvents decree and the IPPC directive are targeted at limiting the use of substances that pose a risk (very hazardous for the environment and/or human health) wherever possible. 1 June 2007 saw the phased introduction of REACH, the new regulations concerning substances. The reason for this new policy is that there is insufficient knowledge of the degree to which many substances already on the market are hazardous to man and the environment. As a result it is difficult for companies, consumers and employees to take the proper measures to safely handle these substances.

New regulations were also drawn up in 2008 for batteries and accumulators. The regulations were drawn up to reduce the danger posed by batteries and accumulators as far as possible and to ensure that as many batteries and accumulators as possible are collected and recycled. The reason for these new regulations were the amended European regulations in this area.

## Efforts

A waste management plan is a useful instrument for municipalities to determine how to further improve the sorted collection of household waste. In addition to their usual efforts to collect various waste streams from citizens, municipalities are trying to reach a higher standard in sorted waste collection by using other instruments. The municipalities made a lot of effort.

In the region a pilot was run in Ridderkerk to trial collecting bags containing plastic waste. The municipality of Bernisse set up a collection system. Hellevoetsluis placed district containers. Schiedam decided to employ post collection of plastic waste. This is because there is little space for additional containers due to the high building density and the reintroduction of a bag collection system is undesirable due to the probability of litter.

Rotterdam has calculated the costs of operating a collection structure for plastic domestic waste. The results made clear that the compensation offered is insufficient to cover the costs. The compensation has been raised and now it might be cost-effective to invest in containers. The Roteb is having research being done into the environmental benefit. What is more profitable: collection, with all of the associated traffic movements (and what is the expected sorting behaviour of the citizens) or burning together with the residual waste in the new waste incineration plant (AVI). In recent years, the environmental benefit from sorted waste collection in Rotterdam for among other things organic waste has not been optimal. In addition, insufficient processing capacity has been created in the Netherlands to recycle all of the plastic packaging. Large waste processors such as Essent and Omrin recently participated in the discussions. They indicate that post sorting has the greatest potential.

As of 2009, Barendrecht will once more introduce a fixed charge for waste and will therefore drop the system which charged for every bag of waste. There will also be no charge for waste that is taken to the garbage and recycling station. The garbage and recycling station will remain open for longer on Saturdays, as a trial period established the need for this.

The AVR will modernise the waste incineration plant in the Brielselaan. After the changes have been made, the Waste Energy Plant (AEC) will be able to supply electricity in addition to heat to Rotterdam's district heating network. The plans include the construction and installation of new incinerators, steam boilers and a power station. On an annual basis, the Waste Energy Plant can supply 240,000 MWh to the grid, which corresponds to supplying 80,000 households. The heat generated can heat and supply hot water to approximately 45,000 households. This means an annual reduction of 72 million m<sup>3</sup> of natural gas.

AVR Afvalverwerking BV (a waste processing company) has built a biomass power station (BEC) near Rozenburg. The purpose of the BEC is to generate sustainable energy by incinerating biomass. This is mainly wood and wood-related waste flows including waste wood (B-wood), excess compost, pruning waste, residual flows from the food and beverage industry (e.g. cacao pods) and other residual flows from agriculture and horticulture. Depending on the net heating value of the waste, 160,000 to 200,000 tonnes of biomass will be processed annually. Using biomass will reduce the use of fossil fuels and considerably reduce the fossil CO<sub>2</sub> emissions. The expectation is that the BEC will prevent the generation of 110,000 tonnes of CO<sub>2</sub> emissions annually.

### Future developments

From 2007, the borders have been opened also for European waste intended for incineration. This offers opportunities for the waste processing companies and thus for the environment. If companies can expand, the expectation is that they will be more prepared to invest in new technologies and methods than in a shrinking market. This means for instance that more energy can be generated.

Currently regional waste is also used as fuel in power stations. This concerns not only energy generation by co-incinerating biomass, but also by incinerating B-class wood; this is wood that cannot be reused as it has been painted or glued.

The post sorting technology used when processing waste flows is continually improving, enabling more fractions to be isolated from the waste flows.

Raw materials play a major role in the future of waste treatment. The period of boom due to the economic rise of China, India and Latin America resulted in record prices for raw material such as food, fibre, wood, oil and steel. As a result, establishing systems to recycle raw materials and extracting raw materials from more difficult to exploit and lower quality sources (for instance oil from tar sand) is becoming profitable. However, we now see that the market for raw materials has dropped as a result of the credit crisis. This has direct consequences for the economic feasibility of recycling flows, including paper and glass, and the economic incentive for waste prevention (see preview).

Biomass is an important waste flow that can be used to reduce the dependency on fossil fuels. Techniques including fermentation and pyrolysis make it possible to convert biomass into easy-to-use fuels. The first generation of biofuels were made from edible crops (controversial) and often hardly benefited the environment. Now considerable research is being done into second generation biofuels and the processes are being scaled up. These biofuels are made from special energy crops that are not suitable for consumption or from the waste fraction of food. Energy from algae is referred to as the third generation biofuel. ■

**The attention given to energy and climate continued unabated last year. The 'climate crisis' is also getting attention outside of the environmental field, in part in relation to the financial crisis and the degree to which they can reinforce or dampen down each other.**

## Legislation and regulations, and policy

Throughout the world, the main issue in the energy field is the continuing high price of oil and gas. The demand for energy and its price have dipped as a result of the financial crisis and its economic consequences, but the underlying structural increase is widely acknowledged. However, solutions at the global level are still a long way away. In December 2008, consultations took place in Poznan regarding the principles of the climate agreement that must be concluded at the end of 2009 in Copenhagen. Little progress has been made on a new international climate agreement, although there are some positive points, for instance the more constructive attitude shown by the United States. The Kyoto protocol operates up to 2012. The new agreement must address the emission of greenhouse gases up to 2050.

In 2008, the environmental ministers of the European Union gave the green light to the commission proposal concerning the reduction of CO<sub>2</sub> emissions in the coming years. The European Commission's ambitious plan must lead to a reduction in the CO<sub>2</sub> emissions in the European Union of at least 20% in 2020. For the Netherlands, this boils down to a 16% reduction in CO<sub>2</sub> when compared to 2005 (-22% when compared to 1990) and an increase in the proportion of renewable energy to 14%. In the programme Clean and Efficient, the Dutch government formulated energy targets for 2020: a 30% reduction in greenhouse gas emissions, a 2% energy saving per year and 20% sustainable energy. As one of the effects of the energy objectives, in 2008 the EU announced a ban on the sale of conventional light bulbs per 1 September 2012. Furthermore, other household products, including large-screen televisions, will encounter restrictive requirements.

In March 2008, the Stimulation Regulation for Sustainable Energy Production (SDE) came into force. This regulation subsidises the operation of new projects in the area of sustainable energy. This means that the regulation subsidises the production of renewable electricity and renewable gas. The SDE focuses on wind on land, solar cells (electricity from sunlight), biomass, waste incineration and green gas. The SDE is designed to provide a long-term guarantee of the return made by projects. To this aim, a system has been established that compensates the difference in cost price between fossil and sustainable energy: if sustainable energy from a project provides an insufficient return, it will be supplemented by the SDE. There is a limited budget every year, therefore the applicants are not certain about being awarded compensation in advance.

As of 1 January 2008, sellers and parties that rent houses must be in possession of an energy label when transferring the dwelling. The energy label for dwellings is similar to the energy label for refrigerators and other equipment. Based on model dwellings, the

housing associations in Rotterdam (that account for 60% of the local dwellings) made an overview of the labels applicable to their housing stock by the summer of 2008. After wide-ranging criticism of the quality and comparability of the labels, the system will be improved in 2009.

The Province encourages the use of industrial heat in the built-up area and in greenhouse horticulture. In addition, the storage or useful use of CO<sub>2</sub> is encouraged. Sustainable energy options including wind energy, cold-heat storage (KWO), geothermal energy and biomass also receive attention from the Province, among other things through subsidies. Finally, attention is given to economic and clean energy options in traffic and transport and through the issuing of permits to companies.

## Efforts

The covenant 'More with Less' that was signed on 23 January 2008 is the first sectoral agreement of the programme 'Clean and efficient; new energy for the climate'. The target is to reduce energy consumption by thirty percent in 2.4 million existing dwellings and other buildings by 2020. 'More with Less' focuses on allowing building owners and lessees to save energy as simply as possible and without incurring higher monthly costs.

Research carried out by the Province of Zuid-Holland and SenterNovem shows that municipalities in Zuid-Holland can considerably reduce the energy consumed by public lighting by replacing old lamps, reducing the time the lamps are on and, where possible, dimming the lamps. These measures can result in the municipalities saving on average eighteen percent. This is a CO<sub>2</sub> reduction of 14,000 tonnes, a saving that is equivalent to the electricity consumed by seven thousand households. In the coming years, Minister Cramer from VROM wants municipalities and provinces to implement savings from public lighting: fifteen percent in 2011, twenty percent in 2013 and thirty percent in 2030. Together with six other provinces, the Province of Zuid-Holland is committed to being the first province to realise this. The Province will introduce its own policy programme to implement savings from the public lighting along provincial roads. The public lighting project is one of the projects in de Climate Agenda of the Metropolitan Region.

The Rotterdam Climate Initiative (RCI) gained a regional face in 2008, because the Metropolitan Region has committed itself to realising a 40% CO<sub>2</sub> reduction by 2025. The Rotterdam Metropolitan Region carried out a baseline survey in 2008. The region emits approximately 3 megatonnes more than Rotterdam on its own. The difference is caused by the emissions from glasshouse horticulture and the additional emissions from all other sources (companies, traffic and the built-up area). In 2008, RCI reinforced the mitigation programme (combating

climate change) by focusing on sustainable energy and also included the adaptation programme (adapting to climate change).

At the end of November 2008, together with six regional authorities, State Secretary Huizinga for Transport, Public Works and Water Management gave the go-ahead for six pilot projects for clean, efficient and sustainable public transport buses. Two of these pilot projects for innovative buses are being run at present in the Rotterdam Region.

Commissioned by the Rotterdam Metropolitan Region the project Clean Vehicles is running at present. This project aims at cleaner techniques for vehicles and fuels to improve the air quality as well as reduce CO<sub>2</sub>-emissions.

An important subject for the Rotterdam Climate Initiative is CO<sub>2</sub> capture, storage and transport. In order to achieve the CO<sub>2</sub> reduction target, it is necessary to encourage energy saving, increase the use of sustainable energy, but also to capture and store CO<sub>2</sub>. In April 2008, Minister Cramer officially opened TNO-CATO's test installation for the capture of CO<sub>2</sub> at E.ON on the Maasvlakte. At the same time, the founding of the CCS taskforce was made known, members of which are representatives of the business community and the environmental movement. In Barendrecht, NAM wants to realise a small-scale underground storage facility for CO<sub>2</sub>. This will then be one of the demonstration projects as preparation for the large-scale storage of CO<sub>2</sub>. Both the residents and the local authorities of Barendrecht have raised considerable objections to this trial project within the municipal boundaries.

The largest commercial energy consumers have concluded a covenant with the cabinet to realise a 2% energy saving per year. Within the Rotterdam industrial cluster, Deltalinqs is working to create support for the intended energy saving and to identify opportunities for accelerating the introduction of sustainable production. The Deltalinqs Energy Forum that was established to this aim organised eight workshops and master classes for the industry in 2008. During these classes, the latest insights into improving energy efficiency were presented. With the support of the RCI, the companies are given the opportunity to have part of their company installation scanned to identify improvement projects. In 2008, for instance, scans were carried out into the opportunities for Process Intensification (PI) and increasing energy efficiency. With the establishment of an E-team consisting of energy specialists, Deltalinqs and RCI provide support to companies to further elaborate their ideas for energy saving projects. An important development for the sustainable future of Rotterdam is the preparations for the arrival of a TechnoPark that will house demonstration projects for sustainable innovations in the process industry. Furthermore, a large degree of support has arisen in the industrial sector for further planning and the introduction of the reuse of residual heat and steam.

It is envisaged that the residual heat from AVR Brielselaan will now serve as the source of heat for the Rotterdam heat network. In the new ownership relationship, the municipality is a 90% shareholder of the Heat company. Other shareholders are the Province of Zuid-Holland and the Woonbron housing association. In addition, there is an obligation for a number of areas in Rotterdam to connect to the (still to be completed) heat network. The supply of and demand for heat are therefore guaranteed.

### Future developments

The European Union agreed in the Biofuels Directive that in 2010 approximately 6% of the fuel at the pump must consist of biofuel. In 2020 this must be at least 10%. A step further is the introduction of the flexifuel car. The engine of this car is able to use both normal fuel and E85: a mix of 85% bio-ethanol (alcohol) and 15% petrol. Rotterdam will have special E85 pumps. Furthermore, the Municipality of Rotterdam wants to set a good example by employing flexifuel cars in its own fleet. The project entitled Bio-Ethanol for Sustainable Transport (BEST) wants to have at least 950 cars in Rotterdam powered by bio-ethanol and twelve pumps by 2009. Within the framework of the Rotterdam Climate Initiative, work is being done on certifying biomass.

Another development in the transport area is to realise fully electric transport. Here as well, the developments are progressing rapidly. Preparatory steps are being made for the creation of the required infrastructure and charging locations.

It is as yet unclear whether all technologies will exist alongside each other. Still, it is necessary to focus on all of these approaches to determine which technology(ies) will finally replace the conventional petrol engine.

To be able to build in an energy neutral manner in 2020 – the ambition contained in the Clean and Efficient government programme – the energy performance coefficient (EPC) for the residential building sector will be reduced to 0.6 in 2011 and to 0.4 in 2015. In 2020, the EPC should be 0.

In 2009, five innovative programmes in the area of energy will start. The Energy Innovation agenda contributes to realising the government objectives as specified in Clean and Efficient. This concerns the programmes ADEM (Advanced Dutch Energy Materials Innovation Lab), built-up environment, sustainable mobility, heat and green raw materials. Together, these programmes have been awarded almost 110 million Euros. ■

**Environmental care means that in its daily operation, an organisation takes account of the consequences for the environment. Environmental care involves activities that reduce the pressure put on the environment and that are not regulated through legislation and regulation, but via covenants and self-regulation. Partly due to this, most of the indicators in this chapter generally have a broader perspective than the other indicators. Since initiatives are often involved that do not apply to the entire region or the whole country, it is not easy to come up with clear-cut and prominent indicators for these.**

The sustainability policy of organisations is increasingly based on the cradle to cradle principle (C2C). The central thought behind the cradle to cradle philosophy is, however, that after their life in one product, all of the materials can be successfully used in another product. Although the concept must be worked out in more detail, the region already has various initiatives based on C2C. The municipality of Schiedam will use this concept as the principle for the policy for energy and climate; the Metropolitan Region also uses this concept when making agreements with housing corporations for the period to 2020, it also plays a prominent role in the development of Stadshavens.

### Legislation and regulations, and policy

The Ministry of Housing, Spatial Planning and the Environment (VROM) has worked out the concept of sustainability in the fourth National Environmental Plan (NMP4) and has expressed in this plan the ambition for the Netherlands to be a sustainable society by 2030. For instance, the Sustainable Decisiveness programme is the Dutch substantiation of the agreements made in Johannesburg in 2002 at the World Summit on Sustainable Development (WSSD). Themes that are important for sustainable development at a global level were nominated: water, energy, health, agriculture and biodiversity. The core of the national component is that the Dutch government will endeavour to aim at sustainable development in all its activities (from policy development to, for example, its own office buildings).

To this end, VROM is initiating, among other things, a 'location's sustainability profile' (DPL). Sustainability here comprises the three Ps: people, planet and profit, in other words quality of life, environment and the economy. The DPL instrument can help in the realisation of sustainable districts. Using this computer model, municipalities can work out the sustainability profile of a district on their own, compare it with a different, randomly chosen district, and thus reveal the strong and weak points of a district's profile. In this way, DPL with the aid of indicators creates a concrete image of what is deemed a sustainable district. Municipalities can base their policy on this when developing new districts or carrying out urban renewal.

### Efforts

There are many ways in which households can help to reduce the pressure put on the environment. For example, they can purchase energy-efficient appliances and solar panels, separate waste and use public transport. Information about these topics may be found in chapters 2, 9 and 10. In addition, they can switch over to green saving, make green investments, and use green energy. We do not provide any information in this document about the

degree to which households participate in this because there is no data available. For information about activities which households themselves can develop in order to do their bit towards reducing environmental problems, we refer you to [www.milieucentraal.nl](http://www.milieucentraal.nl). Milieu Centraal is an independent agency that provides households with information about opportunities in this area.

"Milieuzorg Overheden" supports and inspires local authorities and other authorities when implementing environmental care in their organisations. It is a website containing information and examples of environmental care at local and other authorities. In addition, you can find links to environmental care networks for authorities and sources of information. It is a site for and by authorities. It contains, among other things, sections in the area of transport, public lighting, environmental care systems, the approach to environmental care and sustainable policy ([www.milieuzorgoverheden.nl](http://www.milieuzorgoverheden.nl)).

There is also a lot companies can do. To start with, they can introduce an extensive corporate environmental care system (BIM). In this way, they make environmental care part of the normal company process. Having a BIM has now become a permanent element in determining the adequate level of measures; the indicator for this is presented in the chapter on Environmental Permitting and Enforcement; this is why we will not deal with it any further here. From 2007, the MKB Environmental Barometer can be used via [www.milieubarometer.nl](http://www.milieubarometer.nl). This measurement instrument allows the environmental costs and load to be seen. From January 2008, the CO<sub>2</sub> emissions are also presented. Other examples are the environmental reports. Environmental reports include the environmental annual report (MJV), the environmental impact report (M.E.R.), the strategic environmental assessment and the report under the European directive for Integrated Pollution Prevention and Control (IPPC Directive).

On 16 September 2008, the new declaration of intent entitled AquaReUse was signed. Authorities and the commercial sector are working together on a unique and innovative water chain project for an 85-hectare greenhouse horticulture region in the Overbuurtse Polder in Bleiswijk. Together, almost 1.2 million Euros will be spent to reduce and reuse the wastewater flows in the area. By collecting and turning the wastewater in the area into irrigation water, a cost saving for authorities and companies can be combined with environmental benefits. The wastewater is collected centrally and treated in a helophytes filter. Clean irrigation water is made from the treated water. The irrigation water is stored in the soil, from where it can be extracted. The treatment concept provides a threefold barrier to germs and

undesired salts are removed from the water. The irrigation water must offer an alternative for the water that now, in addition to rain, is used in the greenhouses.

ENECO Energy and the Port of Rotterdam Authority have reached agreement regarding the supply of shore-based power to inland shipping in the Maashaven to limit the emission of air pollution. This concerns a total of twenty electricity supply cabinets with 120 connections for ships. Stena Line and the Port Authority will install shore power at the terminal in Hoek van Holland, which will allow ocean-going ships to no longer depend on their own diesel engines for their electricity supply. This will provide the ocean-going shipping sector with the first shore power connections in the Netherlands.

Companies not only work on sustainability within their own organisation but this also happens on the scale of industrial sites. In various municipalities in the Rijnmond region, the business community and the local authority are cooperating on making their industrial sites more sustainable. These efforts are aimed at improving both the environment and the investment climate. For example, through sustainable building and the regeneration of industrial sites, they are attempting to remedy the shortage of industrial sites in the Rijnmond region. The planning aspects for this have been incorporated into the RR2020.

On 5 June 2008, the regional authorities established the outlines of the regional climate agenda, which has much in common with both energy and environmental care. Of the 40%, the local authorities are responsible for a 20% reduction in CO<sub>2</sub> emissions through the ten key points covered by this regional climate agenda. The other 20% will be realised through measures taken by the EU, Central Government and changes to the local climate policy in the next administrative periods. The key points from the regional climate agenda are:

- residential building (energy saving measures and more stringent energy performance requirements for new houses);
- companies (cost-effective energy saving measures and including energy performance as a criterion for establishing the business at a certain location);
- greenhouse horticulture (facilitating the restructuring in the sector and including energy performance when considering issuing land and the spatial planning for the efficient use of heat and cold in the subsoil);
- promoting sustainable energy (creating additional space for wind turbines and supporting initiatives for biomass and solar energy);
- environmental care in the local authority organisation (energy saving in municipal buildings, making public lighting more sustainable and the purchasing of sustainable energy);
- traffic and transport (bringing into line with measures from the regional vision on sustainable mobility and the measures from the regional approach to air quality).

Local authorities and provinces are members of the Climate Alliance that aims to set an example in the area of sustainability. This is a platform in which provincial and local authorities take climate and environmental policy to a higher level by providing each other with information, assistance and, where necessary, jointly developing activities. The Dutch association is affiliated to the International Climate Alliance. The Province of Zuid-Holland and the municipalities of Capelle aan den IJssel, Hellevoetsluis, Krimpen aan den IJssel, Maassluis, Ridderkerk and Schiedam are members of this organisation.

Minister Cramer of Spatial Planning and Environment has declared sustainable procurement to be one of her priorities. By 2010 at the latest, Central Government wants to sustainably procure all products and services. Provinces and water boards have already indicated through the climate agreement that they will sustainably procure 50 percent in 2010, for municipalities this will be 75 percent. The document '*Aan de slag met duurzaam inkopen!*' - start procuring sustainably' provides information and practical examples about how this can be done and how sustainable procurement can be embedded in an organisation.

Efforts in the area of limiting energy consumption are addressed in the chapter on energy. The Province will introduce its own policy programme to implement savings in the public lighting of the provincial roads.

### Future developments

For the development of the Stadshavens, the Erasmus University, TU Delft, knowledge institutes including TNO and KNMI, Rotterdam, the ministry of the environment and companies work together in the area of energy transition, climate change and water management. This cooperative agreement was signed on 7 May 2008. Stadshavens, a 1600-hectare area that consists of Waalhaven, Eemhaven, Maashaven, Rijnhaven and Vierhavens, must become an international trial site for sustainable and climate-proof delta development. Around 2025, it will be possible to live in the new district.

The Province of Zuid-Holland sees major opportunities to make the glasshouse horticulture sector sustainable by laying down environmental rules, encouraging cooperation between companies and stimulating and facilitating the exchange of innovative knowledge. Eventually, these activities should result in a sector that, among other things, makes no use of fossil fuels, is self-sufficient with respect to the use of irrigation water, uses no chemical pesticides/herbicides/fungicides and emits virtually no light pollution. To achieve these goals, clusters of glasshouses must be created with common provisions for energy provision and water storage. ■

**External safety is an issue that in recent years has developed substantially as an autonomous policy area. External safety concerns controlling the risks posed to the surroundings when using, storing and transporting hazardous materials such as fireworks, natural gas and ammunition by road, water and rail and through pipelines. The risks of using airports also fall under external safety.**

## Legislation and regulations, and policy

Major Accidents (Risks) Decree (BRZO 1999) came into force on 19 July 1999. This decree is the Dutch implementation of the European SEVESO directive and concerns companies where considerable amounts of hazardous substances are kept on the premises and is aimed at reducing and managing the risks involved in the production and storage of these substances. To this end, requirements are laid down for both the companies and the authorities involved. These authorities (the competent authority as intended in the Environmental Management Act, the Labour Inspectorate, the Fire Brigade and the Water Quality Board) jointly monitor the companies covered by the BRZO (BRZO companies). The objectives and (cooperative) agreements that apply when monitoring the companies covered by the BRZO are laid down in the BRZO 1999 Region West 2007-2011 Inspection Programme. The decree identifies two threshold values:

- Some companies must develop prevention policy and lay it down in a 'Prevention of Major Accidents document' (PBZO document). These companies are called PBZO companies. PBZO companies are companies (that are subject to the prevention of major accidents (PBZO) procedures) that exceed the 'low' threshold value. Moreover, they must have an effective safety management system in which the safety aspects are safeguarded via procedures.
- A number of companies must also draft a safety report (VR). These companies are referred to as VR companies. These are companies (that are subject to VR procedures) that exceed the 'high' threshold value.

To improve the operation of the authorities, the programme BeteRZO was executed and concluded in 2006. One of the problems is to organise the implementation on a scale at which the quality of the implementation is sustainably guaranteed. All of the authorities involved participated in this programme. Key words are improving the implementation for the aspects

- timeliness,
- uniformity,
- correctness,
- justice,
- unambiguousness.

To ensure that the improvements are permanent and have a national character, a national organisation has been established, the national coordination team for BRZO (LandelijkAfstemmingsTeam BRZO (LAT-BRZO)). To this end, the authorities of the Provinces of Noord-Holland and Zuid-Holland have recorded the agreements in the Inspection Programme BRZO'99 2007-2011.

Another relevant piece of legislation is the External safety of industrial premises Decree (BEVI), dated 27 October 2004. This Decree imposes safety standards on local authorities that take

decisions about companies which form a risk for people outside the premises. These companies sometimes conduct hazardous activities in close vicinity to houses, hospitals, schools (so-called vulnerable locations) or near to shops, pubs and restaurants and sports centres (limited vulnerable locations). This creates risks for people who live or work in the neighbourhood of such a company. Since its entry into force, the Decree has imposed a duty on municipalities and provinces to ensure that they take account of external safety when issuing environmental permits, making transport decisions and drawing up spatial planning plans. This means that account must be taken of a hard and a soft standard.

- The hard standard stipulates that houses must be located a certain distance away from an activity that poses a risk.
- The soft standard is called the justification of the group risk and entails weighing safety against economic, spatial and political interests.

Even if all of the activities that pose a risk meet the hard standard expressed in the permits, casualties (even fatal ones) can be caused if a major accident occurs. However, the probability of this happening is very small. This must be justified by the competent authority (for the Environmental Management Act and/or Spatial Planning) whenever a change occurs in or around the activity that poses a risk. Together, these two competent authorities are responsible for the correct balance between the desired safety level, economic growth and local opportunities. Communication regarding these considerations to the inhabitants of the municipality is new and is facilitated from the Rotterdam-Rijnmond Safety Region (VRR).

Another important document is the covenant on LPG that was signed by the State Secretary for the Environment and the Association for Liquefied Gas (VVG) on 22 June 2005 in order to improve the safety at and around LPG filling stations. In 2010, all filling stations must comply with new, more stringent safety standards.

Much transport and distribution in the Netherlands occurs via cables, pipelines and electromagnetic fields. In 1984 and 1991, circulars were published for respectively high-pressure gas pipelines and fuel pipelines that laid down safety distances to sensitive and semi-sensitive objects.

## Efforts

Efforts are being made in the area of establishment and non-establishment-bound activities, including those concerning spatial planning. A large proportion of this additional effort caused by the entry into force of the BEVI is compensated by a subsidy granted by the ministry of VROM, called the Programme Financing of External Safety. Its objective is:

- to stimulate the implementation of the external safety policy,
- to implement the External safety of industrial premises decree (BEVI),
- to promote cooperation between local authorities, provinces and regional joint ventures in the area of external safety.

The subsidy will be made available up to and including 2010, after which it will be made available for another couple of years (three to five) via the Province funds. After that the money will be distributed over Municipality funds and Province funds.

#### *Activities that are bound to industrial premises*

In their safety report (VR), the companies subject to VR procedures need to demonstrate once every five years that they have made all reasonable and legal efforts to minimise the chance of incidents and their effects. The VR reports are assessed and audited for topicality and correctness. Companies subject to PBZO procedures are also inspected.

The efforts associated with BEVI related to issuing permits have been concluded by the DCMR Rijnmond Environmental Agency. Efforts for justifying group risk in the issuing of permits are progressing successfully.

The Rijnmond region participates in the LAT Brzo due to the large number of BRZO companies in the region. To be able to implement these agreements, all Zuid-Holland municipalities and environmental agencies that have BRZO companies in their area and the Province of Zuid-Holland established an organisation that can perform high-quality BRZO tasks. The DCMR is responsible for the daily management of this organisation. The geographic boundaries are the borders of the province of Zuid-Holland. The organisation is characterised by the fact that while the knowledge, experience and implementation capacity is bundled, individual responsibilities of the participants remain intact. This organisation became operational on 1 January 2008.

#### *Activities that are not bound to industrial premises*

The Province of Zuid-Holland has published a risk map for the Province on the internet as an instrument. The maps for external safety are available to everyone via [http://geo.zuid-holland.nl/risicokaart\\_publiek/](http://geo.zuid-holland.nl/risicokaart_publiek/). All of the Provinces have developed these risk maps because the fireworks disaster in Enschede in 2000 showed that a lot of residents did not even know that there was a fireworks factory in the area. As a result of the disaster, the government decided that every member of the public should be able to find out about the risks in their own neighbourhood. In addition to the Province, various municipalities including Rotterdam, Maassluis and Barendrecht have also developed risk maps. The risk map was updated in 2008.

The Rotterdam-Rijnmond Safety Region (VRR) is the organisation in which municipalities, Fire Brigade, Ambulance services and Medical Assistance in the event of Accidents and Serious Incidents (GHOR) work in close cooperation with the police, the Port Authority, the DCMR Rijnmond Environmental Agency and the Public Prosecution Service. The primary aim is to offer

the public safety and care through efficient and effective round-the-clock support facilities as well as through the high quality combating of serious incidents and disasters.

An important instrument for obtaining integral insight into the risks within a municipality is an external safety vision. Such a vision must be based on the provincial vision on external safety entitled 'Risks in balance', with regional plans worked out for the Rijnmond region. The vision shows how the policy domains of external safety, the economy and spatial development are intertwined. It forms the framework that will be used to tackle external safety in relation to regional spatial planning in the coming years. The municipalities of Hellevoetsluis, Spijkenisse, Rozenburg and Rotterdam are already at an advanced stage in drafting such an external safety vision. Other municipalities within Rijnmond have also started or want to start drawing up an external safety vision.

The implementation of the BEVI has consequences for spatial planning and the environment as account must be taken of location-bound risks (the hard standard) and the group risk (the soft standard). For this purpose, external safety recommendations are drawn up by the DCMR Rijnmond Environmental Agency and the Safety Region whose legal task it is (see indicator 3066). The proactive environmental approach of the Rotterdam Metropolitan Region is also important within this framework. More about this approach can be found in Chapter 3, Spatial development.

#### **Future developments**

In the area of the Major Accidents (Risks) Decree (BRZO 1999), companies will continue to be monitored to ensure that they adhere to the decree. This monitoring will be extended to include aspects such as safety culture and inherent safety. This concerns the safety of designs.

An important development is the one concerning the transport of hazardous substances, called the Basisnet. Here, interests in the area of transport, spatial developments and safety play a major role. The Basisnet is a project that is executed by the Ministry of Transport, Public Works and Water Management together with the Ministry of VROM, municipalities, provinces and the business community. The Basisnet consists of three maps on which existing railways, shipping routes and national trunk roads are shown divided into three categories of route and is established in legislation and regulations.

The circulars for high-pressure gas pipelines and fuel pipelines lay down safety distances to sensitive and semi-sensitive objects. New insights have led to an investigation into the safety distances employed. The preliminary results show that in a number of cases the safety distances must be greater than the accepted distances. As a result, in some cases this could lead to safety problem areas. The consequences are currently being researched further by the RIVM. The intention is to publish a new circular. ■

In this chapter, we are going to take a closer look first at environmental permitting and then at enforcement. The same order is used for the indicators, first environmental permitting and then enforcement.

## Legislation and regulations, and policy

The Environmental Management Act is the most important environmental act related to permitting and enforcement. The act determines which (legislative) tools can be used to protect the environment. The most important instruments are environmental plans and programmes, environmental quality requirements, permits, general rules and enforcement. The act also contains the rules for financial instruments such as levies, contributions and compensation. An important part is the new Activities Decree, which came into force on 1 January 2008. The Activities Decree places general rules on certain companies. These companies no longer need an environmental permit. The decree reduces the administrative burden. In the first phase of the Activities Decree, 12 decrees were combined, including the Marina Decree and the Dentists Decree. In the second phase, more companies will be covered by the effect of the decree. Before the Activities Decree came into force, eleven 8.40 Governmental Decrees each covered its own sector. When developing the new Decree a new approach was taken: instead of regulations per sector, regulations per activity. Three types of company are identified, these are the light regime companies, the companies that are obliged to notify the authorities and the companies that must have permits. The light regime companies are no longer obliged to notify their activities. The municipality or water quality manager can impose limited tailored regulations on these companies. The principle used is that the new rules will not reduce the level of protection offered to the environment. It has also been made easier for the other companies: they can submit their notification digitally. The Activities Decree also applies to companies that discharge to national waters, which will also reduce the number of permits issued by the Directorate General for Public Works and Water Management Zuid-Holland.

In the Rijnmond region, more than 2,700 companies no longer need to request permits but can make do with a notification based on the Activities Decree. This notification is done by filling in a digital form on the VROM website. The data is then automatically forwarded to the DCMR. These notifications are always forwarded to the water quality managers (water board and/or the Directorate General for Public Works and Water Management Zuid-Holland).

## Efforts

During inspections, the DCMR is moving increasingly to achieving benefits for the environment instead of issuing high numbers of permits and performing high numbers of inspections. To this end, the DCMR started a project "Environmental targets". A spearhead analysis was performed as the first phase in the project. This analysis maps out the environmental problems in the Rijnmond region. Then an indication is given of the main sources that cause each environmental problem. The second phase consisted of the formulation of targets for the company-oriented tasks. To achieve environmental targets at companies, instruments other than

issuing permits and enforcement can be used. These are referred to as being "soft" instruments, such as providing information. In some cases, these "soft" instruments have proven to be more effective and efficient than hard instruments. The agreements with the municipalities and the Province have already been amended with respect to the use of these instruments.

The DCMR has made various efforts to reduce the consequences associated with the Activities Decree coming into force. For instance, it provided information to industrial sectors, sector associations and other authorities. Moreover, a helpdesk has been established and advice is given to Infomil, the information desk for authorities concerning environmental policy that is part of SenterNovem.

At various levels, under the term 'modernising supervision', efforts are being made to reduce the burden of supervision at companies. One of the reasons for this modernisation was a motion adopted in the Lower House, the 'Aproot Motion'. A large number of bodies are working together in the region to further substantiate modernised supervision. These bodies include the DCMR, departments of the Rotterdam municipality, Directorate General for Public Works and Water Management, VROM, district water boards and the Province of Zuid-Holland. The objectives are to draft a combined programme, to harmonise inspections, to appoint a coordinating supervisor and to form common front-offices, with a start being made with a pilot project for the chemicals sector. Furthermore, pilots are running in the waste sector and in greenhouse horticulture. In 2008, a greenhouse horticulture pilot was run in Lansingerland. The pilot demonstrated that the objective of the pilot set in advance, being the reduction of the quantitative and qualitative supervisory burden on entrepreneurs, can be realised. The horticulture sector experiences the new working method as a reduction in the supervisory burden. In addition, the supervisors experience the joint inspection as being pleasant. It proved to be feasible to improve the efficiency and effectiveness of the supervision in greenhouse horticulture.

The water quality managers (the water boards and the Directorate General for Public Works and Water Management Zuid-Holland), the DCMR and the Rijnmond Cooperation (SKP) regularly meet to discuss the subject of the developments concerning indirect discharges. In the near future, they will be only covered by the Environmental Management Act and then by the Environmental Permitting (General Provisions) Act (Wabo). Therefore it is necessary for the parties mentioned above to reach agreement regarding indirect discharges.

SKP Rijnmond has put a lot of energy into professionalising information exchange and information analysis. By means of information-directed supervision, it is possible to take advantage

of various national developments. Information exchange is an important instrument for chain enforcement. For instance, the SKP Rijnmond is analysing the asbestos chain in cooperation with the Labour Inspectorate, the Rotterdam-Rijnmond Police and various municipalities. This cooperation, which started in 2008, wants to gain a clearer picture of the illegal removal of asbestos.

Furthermore, an “experimental area” has been established within the Public Prosecutions Department (OM). Part of it are agreements between the OM and the enforcement partners regarding key regulations and incidents, as well as information exchange. Moreover, discussions are held about the use of administrative law or criminal law. Criminal law is mainly used if moderately serious to serious environmental criminality is concerned. The basic principle for incidents is that if there are no injuries, fatalities, or severe social unrest, the initiative for investigating an incident lies with the authorities.

In 2008, the police force of Rotterdam-Rijnmond started the regional implementation of the national Police Environment Plan 2001 ‘The developing environment’. This is a national plan that contains the outlines of the environmental policy of the Dutch police forces. The police in Rotterdam-Rijnmond will, together with other partners in the environmental chain, gain more insight into and get a tighter grip on the serious forms of (organised) environmental criminality.

In 2008, the attention of all investigation departments, in consultation with the National Public Prosecutor’s Office for Financial, Economic and Environmental Offences has been focused more on so-called meaningful environmental offences. It has been agreed that in 2008, files concerning a total of 350 suspects will be supplied to this National Public Prosecutor’s Office for Financial, Economic and Environmental Offences. Initially 500 suspects were concerned, but this number has been reduced to be able to give more priority to the number of meaningful cases. These cases are selected by the Interregional Selection Meeting (ISO). This provides clarity regarding the production scope and the course to follow. In general, meaningful cases concern the more serious forms of environmental criminality. This is to distinguish them from so-called standard cases. The DCMR participates in their selection. The districts will concentrate on environmental offences and on relatively simple environmental crimes that have a direct influence on life in the districts.

In 2008, important steps were taken within the framework of sharing information with enforcement partners. Collaboration takes place in a ‘experimental area’ for so-called “nodal orientation”. The objective of this working group is to gain a clearer picture of the problem areas that play a role in possible environmental criminality.

## Future developments

The most prominent future development in the near future is the Environmental Permitting (General Provisions) Act (Wabo). The Wabo simplifies the application procedure for living, spatial and environmental permits and reduces the time needed for the permitting procedure. The Bill includes a standardised regulation for the All-In-One Environmental Permit. The new permit stemming from the Wabo reduces the administrative burden on companies, residents and municipalities, provinces and water boards. The intended purpose of the new permit is to combine the various permits that are required if a citizen or a company wishes to demolish, (re)build, or use a particular site. As such, the All-In-One Environmental Permit is an integral permit for building, housing, heritage, nature and the environment. This permit replaces the separate permits for, for instance, demolition, tree felling, building, housing, the environment and nature protection. This means the applicant only has to deal with one office, one application, one competent authority, one procedure, one permit, and one procedure for objection and appeal. The actual assessment frameworks of the various parts of the All-In-One Environmental Permit remain. The intention is that the Wabo will come into force on 1 January 2010. The municipalities, the DCMR, the province and the fire service are discussing the new working agreements together. Pilots are already running. ■

The previous chapters described all of the themes of the annual Environmental Monitoring of the Rotterdam Metropolitan Region. The Nicis Institute, as an 'informed outsider', has been asked to write a concluding chapter with a review, an analysis and a preview.

## Review

What has been achieved in the past fifteen years in the various environmental themes? In this review we are looking for trends. Here we mainly rely on the indicators; this is because they give us the 'hardest' picture of what has actually changed in the past fifteen years. Then we show a reasoned but rough picture of the environmental themes that are and are not on track and the associated trends. We adhere to the sequence of the previous chapters.

## Analysis

Why have some environmental objectives been achieved and others not? We analyse which (underlying) factors have influenced whether or not the thematic environmental objectives have been achieved.

## Preview

What will happen to the environment in the coming fifteen years?

In this preview, we take account of trend and scenario developments and investigate what can be learned from them.

## Nicis Institute

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## 14.1 Review: what has been achieved?

### Introduction

People often think that objectives have been 'achieved' as soon as there is a plan, legislation and regulations have been drawn up, authorities have reached agreement, a covenant has been signed, etc. However, it is very important to make a clear distinction between objectives, (policy) measures and final effects. For instance: awarding subsidies can have a final social benefit, but just awarding the subsidies does not mean that progress has been made.

We understand 'achieved' to mean that there has been a positive effect on the environment: cleaner air, biodiversity, clean water, etc. In other words, whether a *social benefit* has been achieved. Or, put simply, whether we have achieved what we want to achieve.

Indicators help to establish what has been achieved in the past fifteen years with respect to social benefit. This succeeds in particular when objectives have been formulated for an indicator and the value of the indicator moves over time away from or towards the formulated objective. This makes a trend visible. Objectives are not always explicit and therefore we also base our opinion on trends and information from MSR experts.

### Spatial development

In the Rotterdam Metropolitan Region, for the theme of space the envisaged social benefit is to find a good balance between urbanisation and the quality of the living environment, both qualitatively and quantitatively. However, it is difficult to find unambiguous indicators that indicate this. This is because the quality of the living environment depends largely on the

developments in other environmental domains with a spatial component (green, air, water, soil, external safety, noise and waste).

Benchmarks, which compare regions with respect to the quality of their living environment and their competitive strength, do however give an indication. For instance, a benchmark carried out by TNO in 2008 showed that the southern Randstad, of which the Rotterdam Metropolitan Region is a part, requires a strong quality stimulus. The main points to consider here are cohesion of mobility and the housing market, administrative solidarity, nature and landscape values, and climate preparedness. The indicator 'perception of the living environment' shows that how the inhabitants of Rijnmond appreciate the region has been rather constant through the years. However, this appreciation has declined somewhat since 2001.

■ *Not sufficiently on track, little improvement visible*

### Air

For the theme of air, the objective is to improve the (perceived) air quality, to minimise negative health effects and to prevent nuisance due to odour. MSR concludes that in recent years the air quality has improved because the concentrations of various substances has reduced; these remain below the set limit values. In addition, the negative health effects of poor air quality have in general reduced. This also applies to the nuisance due to odour. Opposed to this is that the relative contribution of the shipping sector has increased, that the industrial emissions of particulates and the emissions of hydrocarbons and acidifying substances are

still above the target values and that odour nuisance still regularly occurs. Furthermore, the high traffic volumes, in particular on busy roads in the urban area, ensure that locally the air quality is still not good enough.

If the air quality *index* is used as an indicator, the improvement appears to be less unambiguous. Nevertheless, this indicator shows a slight improvement in recent years. We show this for SO<sub>2</sub> (Figure 1) and NO<sub>2</sub> (Figure 2).

■ *Improvements visible, with challenges for the future*

Figure 1 Sulphur dioxide in the Rijnmond Region from 1970 up to and including 2008

Figure 2 Nitrogen dioxide in the Rijnmond Region from 1973 up to and including 2008

**Noise**

The objective for the theme of noise is to limit nuisance due to noise as far as possible, in particular for homes. However, various indicators, including complaints about the noise from aircraft, industry and traffic, show that no progress has been made in recent years, in spite of the efforts made. For instance, the number of complaints is increasing (see Figure 3). In particular in urban centres and along major trunk roads, people live in areas with high noise loads. More than 10% of the inhabitants of Rijnmond live in an area where the noise loads are higher than that permitted. Exemptions are granted increasingly frequently for a higher noise category for homes where the noise standards are exceeded. 'Quiet areas' are scarce.

■ *Adrift and facing further deterioration*

Figure 3 Noise complaints from 1994 up to and including 2008

**Soil**

In short, the local authorities are trying to map out the areas where there is contamination in the soil and then remediate these areas based on their urgency. They have made some progress. For instance, the soil quality maps that have been drawn up by all of the municipalities in the region allow the reuse of (contaminated) soil to be optimised where possible. Due to the improved records and the accessibility of soil data, it is also becoming easier to exchange soil information. Progress has been made in urban areas with remediating soil concurrently with building projects. In addition, the approach taken for soil contamination at gasworks, closed filling stations, operating filling stations and private underground tanks has been successful. All closed filling stations in the region have been remediated (see Figure 4).

Figure 4 Subat Soil Remediation Programme from 1994 up to and including 2005 (completed)

However, insufficient progress has been made in the area-specific approach to soil contamination in the port area and the approach to new cases of soil contamination. The concrete targets are that

all urgent cases must be known before 2010. All urgent cases must then be remediated or controlled before 2015, due to the risks to human health. And finally, by 2030, all other urgent cases must have been addressed, due to the threat to the ecosystem or because of them spreading via the groundwater. According to experts, the rate of soil remediation has been too slow in recent years to realise these objectives, although partial improvements have been realised.

Real results of the approach to soil contamination are only achieved when soil excavated from construction pits for underground infrastructure and/or soil remediation projects is optimally reused or if soil contamination is no impediment to spatial developments in the region. According to the experts, at the current rate, these intended effects will not be achieved for a long time.

■ *Insufficiently on track and only a partial improvement*

**Water**

The objectives in the area of water differ strongly: on the one hand they relate to water quality (clean water), on the other to the water system (flood protection, salination and adaptation to climate change). The MSR report mainly concentrates on water quality. Various indicators show that this has improved in recent years and that the beds of water courses and lakes have become cleaner. In addition, the amount of severely contaminated dredgings has decreased impressively (see Figure 5) and industrial discharges (phosphate and nitrogen, see Figure 6) have been successfully driven back.

Figure 5 Dredgings from the Slufter from 1994 up to and including 2008

Figure 6 Phosphate and nitrogen discharges by major companies from 1994 up to and including 2007

Although the trend is improving, not all quality objectives have yet been achieved. This mainly concerns the concentration of (heavy) metals, the eutrofication of surface waters and organic micro contamination. MSR confirms that the improvements have stagnated in recent years. The figures above show this stagnation.

■ *Progressing in the right direction and improving*

**Green Spaces**

The objective for the 'green' theme is to achieve a certain level of biodiversity and a certain degree of naturalness. The indicator for urban green (parks and gardens) shows a rising trend through the years, both in the total hectareage and in natural urban green. The total hectareage of green and wildlife areas has increased through the years. Moreover, experts report that the biodiversity in the Rijnmond region is declining less fast than was previously the case. For some species, there is even a fragile rising trend (the common seal, birds breeding in the reeds, water fowl and birds in open water). For other species, the situation is stable; this applies, for instance, to the trend for birds breeding in established broad-leaved forests and birds breeding in thickets and young forest. Other species, however, show a downward trend

(butterflies, meadow- and field-breeding birds, bats). All in all, it is difficult to obtain a clear and uniform picture of the development of the various species. This is due to, among other things, the natural variation and the influence of weather conditions, but also because there is still no biodiversity index.

The implementation of RGSP2 is on schedule: of the objective to have 993 hectares of low-hanging fruit in 2010, 694 hectares have been realised.

■ *Progressing in the right direction without spectacular improvement*

### Waste

The main objective is to prevent the creation of waste (prevention). This social effect has not been achieved: there is no progress towards relative decoupling, let alone to absolute decoupling (see Figure 7).<sup>1</sup>

Figure 7 Development of income and waste from 1994 up to and including 2007

The total volume of waste produced mainly increases through the years. Of course, local authorities attempt to reuse waste where possible or to use it usefully otherwise, and to incinerate or dump as little as possible. According to the Lansink Ladder, dumping is the least desirable option<sup>2</sup>. The Rijnmond region has been successful in developing systems for sorted waste collection and processing of waste flows (see Figure 8). Nevertheless, based on the indicator of sorted collection of domestic waste throughout the region, the set objectives have not been completely achieved.

■ *Progressing in the right direction, breakthroughs necessary for further improvement*

Figure 8 Sorted collection of domestic waste from 1994 up to and including 2008

### Energy

Central Government wants to combat climate change by saving energy, using sustainable energy and reducing CO<sub>2</sub> emissions. Until a few years ago, there was little political or administrative attention given to energy and possible climate change and little progress was made. Since then, at all administrative levels, energy and climate objectives have been formulated; for this region, these objectives are formulated for 2020 (Province) and 2025 (Rotterdam Metropolitan Region and municipalities) and therefore it is still too early to determine whether they will be achieved.

In the area of energy, in recent years there has been a limited degree of relative decoupling: the CO<sub>2</sub> emissions increased in the last fifteen years, but less quickly than economic growth. This increase can be seen for industry and road traffic, in spite of the step-by-step improvements in the efficiency of combustion engines. For homes, emissions are reducing somewhat due to improved insulation and a gradual rise in outside temperature.

See Figure 9 and also the CO<sub>2</sub> monitors of the Rotterdam Climate Initiative and the Rotterdam Metropolitan Region on the websites concerned.

Figure 9 Trend of CO<sub>2</sub> emissions if the policy remains unchanged

The provincial, 2010 objective for the generation of wind energy in the region has been achieved. An increasing number of municipalities in the region use green electricity.

■ *Insufficiently on track, but with improvements*

### Environmental care

The objective of environmental care is to ensure that organisations take (more) account of the environmental consequences of their activities in their daily operations. The intention is to reduce the environmental load in the widest sense by regulation through covenants and self regulation, instead of through legislation and regulations. Unambiguous and illustrative indicators are hard to draw up for the theme of environmental care. On the one hand there is a lot of thematic overlap and on the other, environmental care often consists of concrete initiatives that do not apply to the entire region (or the entire country). Projects concerned with this theme are part of the RCI programme and the climate agenda of the Rotterdam Metropolitan Region.

According to MSR there is a positive trend. In recent years, awareness has grown (Brundtland, Rio, Kyoto, Al Gore's Inconvenient Truth, etc.), concepts including 'cradle to cradle' are emerging and households have been informed about green saving and green investment and are buying green electricity. Informative websites including 'milieucentraal.nl' (households), 'milieuzorgoverheden.nl' (authorities), and 'milieubarometer.nl' (medium and small-scale businesses) make a positive contribution to environmental care.

In recent years, there has also been more attention given to sustainable building, the municipal energy-saving policy and environmental information services, although this policy is not been taken up en masse. According to the MSR experts, reasonable progress has been made with respect to environmental care. However, the concepts and plans need to be 'translated' to determine what this progress actually entails.

■ *Progressing in the right direction with far-reaching improvements*

### External Safety

External safety focuses on the prevention of (large-scale) accidents and disasters. This happens by controlling the risks for the environment when using, storing and transporting hazardous substances. Furthermore, controlling the risks posed by airports forms part of this theme. It is difficult to establish unambiguous and illustrative indicators for external safety to assess what has been achieved in recent years. This is because this theme concerns prevention and it is hardly possible or impossible to determine which accidents have been prevented.

<sup>1</sup> Relative decoupling is when economic growth increases faster than the environmental pressure, absolute decoupling is when economic growth is accompanied by a reduction in environmental pressure.

<sup>2</sup> The Lansink Ladder has the following 'steps': prevention, reuse (recycling), incineration and dumping.

The attention given to external safety has increased markedly in recent years. Experts report that companies are now better informed of the risks, although this cannot be demonstrated in the quantitative sense for Rijnmond. Various risks have been mapped out using risk maps: risk contours of companies, trunk pipelines, shipping risks and the routing of hazardous substances. In recent years, based on these inventories, increasingly more spatial planning advice has been issued. This has established a trend in the direction of the professional control of risks. However, the chance of an accident involving hazardous substances in the region will remain; after all, absolute safety does not exist.

■ *On track, without further improvement*

### **Environmental Permitting and Enforcement**

The intended social effect of environmental permitting and enforcement is to reduce the environmental load, to improve the environmental performance of organisations and citizens, and to prevent environmental criminality. In recent years, the focus was on improved regulations, less bureaucracy and reduced administrative load on companies and citizens. Deregulation, tailored permitting and risk-oriented enforcement are seen to be successful. The frequency of company visits and the depth and scope of inspections have been increasingly more aligned to the generic risks posed by the sector and to the specific situation of the company itself (for instance rewarding companies that act proactively).

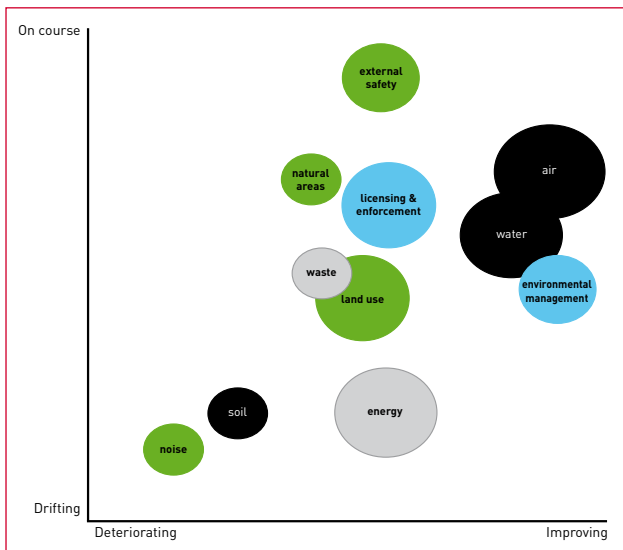
The effect of permitting and enforcement on the reduction of environmental load is however hard to isolate. MSR experts take the position that the reduction of emissions and effluent is in part thanks to good environmental acts and the associated permitting systems and enforcement, and not just to permitting and enforcement itself. Furthermore, there has been nothing much to show in the area of the reduction of costs and administrative load around the permitting process, for either the applicant or the authorities. Detecting and effectively fighting environmental criminality also remains a complicated task.

■ *Progressing in the right direction, new challenges for the future*

## 14.2 Analysis: What caused the objectives to (not) be achieved?

What caused the objectives to be or not be achieved? When discussing the realisation of objectives, it is important to bear in mind that their realisation is also influenced by autonomous intervening factors, such as changing world trade requirements, liberalisation of the energy market, incidents and major accidents, and major changes to the surroundings (including the construction of the Second Maasvlakte).

Nevertheless, in these sections we are looking for the 'explanatory' underlying factors that have been of influence on whether or not the intended social effects have been achieved.



The figure above initially summarises the state of affairs and the trend. The black circles represent the traditional environmental compartments of air, water and soil. The grey circles represent the environmental themes related to waste and energy. The green circles represent the environmental themes related to perception and space: external safety, noise, green and space. The blue circles relate to management, environmental care, permitting and enforcement.

MSR does not place any weight on the relative importance of the individual themes. We have done so in the above figure, by differentiating the size of the circles. Incidentally, the overlap between the themes has no substantive meaning.

### Spatial development

A better balance between urbanisation and the quality of the living environment finds its origin in *plans*. This balance has been improved in the plans; for the Rotterdam Metropolitan Region, RR2020 is the most important plan. Furthermore, the possibility of finding a good balance has been improved by improved availability of information. Environmental maps make it possible

to trace and address potential environmental problem areas in a timely fashion when implementing the plans, including RR2020.

That more attention is being given to the theme of space is also demonstrated by new *legislation* concerning other environmental themes: The External Safety of Industrial Premises Decree (BEVI, 2004), the new Housing Act (2007) and the Air Quality and Noise Abatement Act. This has benefited the balance between urbanisation and the quality of the living environment.

However, in the end, (strategic) plans and legislation won't bring universal happiness either. Different and conflicting interests in the region will time and time again ensure that no agreement will be reached about what is a good balance.

### Air

Legislation and regulations have hugely contributed to the successful improvement of air quality. By setting maximum emission/concentrations (targets and limit values) for each substance, Central Government laid the basis of a successful approach. Effective source policy then led to the limit values being achieved. Source policy in industry has contributed substantially to removing sulphur from emitted gases and to reducing the sulphur content of fuels. Refineries also changed from using oil to using gas, which further reduced the emission of sulphur dioxide and particulate matter. Central Government has made progress by linking care for air quality to spatial planning procedures. Source policy for products and traffic (appliances, central heating boilers, trucks) also delivered results. These are step-by-step improvements that have had on balance a great effect.

The limit values for nitrogen dioxide (NO<sub>2</sub>) and particulate matter, however, appear to be difficult to achieve. Local and regional road traffic is still the main cause of the levels of NO<sub>2</sub> being exceeded. It was only later that the health damage caused by particulate matter was seen to be substantial, in particular when lots of the smallest particles (PM<sub>2.5</sub>) occur.<sup>3</sup> The problem seems to be moving towards particles of an ever smaller diameter.

### Noise

Measures including the zoning of industrial noise, the renovation of houses faced with high noise levels, very porous asphalt, quiet tyres, quiet engines, etc., proved to successfully reduce the noise nuisance. The industrial sources of noise cause less nuisance as a result of the zoning. In addition, municipalities are better at assessing where noise is worst, because 10 of 17 Rijnmond municipalities have now produced noise maps. In part as a result of this, on balance the noise levels have not increased.

However, sound and noise are created by sources. Due to an increase in the number of sources, the actors have not succeeded in achieving the various objectives of limiting noise; this applies in particular in the city. An important aspect is the autonomous increase in the number of cars and the greater

<sup>3</sup> The MSR theme report on Air Quality and Health (2003) addresses the health effects of air quality.

number of kilometres they travel. Noise measures only relieve the nuisance. In addition, the subject does not have sufficient (political) priority. It appears to be difficult to maintain the political focus on the environmental problem of noise, even if noise causes considerable negative health effects.<sup>4</sup> This is expected to change in the near future due to the regional action plan.

### Soil

Tackling the problem of soil is still in its infancy. Some domains have seen partial successes; for instance, soil remediation in urban restructuring projects, gasworks, filling stations and private oil tanks. The improved information provision (research, soil quality maps) has, however, not yet led to an improvement in the control and remediation of soil contamination in the region. It appears that there is a lack of a feeling of urgency, in part because soil contamination has no priority with respect to health. Subsidies are not very successful and the level of collaboration between the actors (companies, Central Government, province) leaves room for improvement.

### Water

The degree to which the objectives have been achieved is in part dependent on the objectives being shifted over time. For instance, objectives have shifted for the maximum permissible risk level (MTR), the negligible risk level (VR) from the substances package of the ministry of VROM, the STOWA methodology and the standards in the Water Framework Directive (KRW). In the course of time, the objectives have differed per year, per substance, per type of water body and per policy domain.

The improvements have mainly been achieved because the political system, the business sector and citizens have started to realise more and more how important it is to improve water quality. However, the most important improvements have been realised by the 'traditional' environmental approach of setting limit values combined with source policy.<sup>5</sup>

It is proving difficult to make further improvements in the *water quality* of rivers and coastal waters; this is because in the Rijnmond region two thirds of the load on the national waters and the coastal zone is generated by foreign sources. Moreover, source measures within the dikes are not easy, because the water quality is influenced by diffuse sources from agriculture, industry, air, shipping, etc. An important positive effect can be expected from the new Water Act and the Water Framework Directive. However, further improvements are only possible by implementing a generic policy, technological solutions and more intensive collaboration between the actors.

In spite of separate sewage systems and decoupling initiatives, there are still important improvements necessary and desirable in the *water system*. These improvements are in particular necessary with respect to adaptation to accommodate climate change, the issues of salination, water safety and coastal

protection. An important flaw is that there is still no total overview of the measures to take and that tens of organisations are involved in the solutions. There is still insufficient coordination.

### Green spaces

The increased awareness is the result of the Flora and Fauna Act, the Nature Conservancy Act (Nbw), the regulations (Natura2000) and the improved information provision. These have resulted in important improvements<sup>6</sup> in particular in public parks and gardens. The implementation of the Nature Conservancy Act (through designation orders and the management plans of Natura2000) is still in full swing. Further improvements are not clearly visible; due to financing problems and high land prices, the acquisition rate of new 'green' is falling behind with respect to the plans. In addition, there is a lot of resistance in the agricultural sector to transforming agricultural land into nature areas, but this is an activity that is associated with the National Ecological Network (EHS).

### Waste

The most important measure to realise improvements here is the establishment of sorted collection systems for waste. In various municipalities – although not in all of them – the target percentages for sorted waste have been achieved. In addition, the processing of (sorted) waste has improved markedly. Furthermore, the tariffs that are employed in waste processing appear to be the right stimulus to use higher forms of processing, in line with the Lansink Ladder.

What has not succeeded at all up to now is the decoupling of economic growth from an increase in the volume of waste; prevention has lagged behind and considerable innovations are still needed to achieve even relative decoupling.

### Energy

Up to two years ago, there was little political attention given to possible climate change and energy savings. The administrative ambition was limited and consisted in the main of promoting and communicating. In view of the very limited relative decoupling, the effect of the policy efforts has been very limited. What is striking is that the decoupling of the emissions of air-polluting substances from industry and road traffic has been much more successful.

In the absence of regulations and target agreements, the energy price and the CO<sub>2</sub> trading price are the dominant factors in realising the energy and climate objectives. The energy price was low, with the exception of in 2007/2008. The CO<sub>2</sub> trading price has been insufficiently high to cause any change in direction.

The great attention given to energy and climate issues in recent years has started many things moving, but the effect of them will only be visible in a few years. The ambitious plans in the region are now being translated into measures and implementation. On all fronts, this can lead to a reduction in CO<sub>2</sub> emissions, as

<sup>4</sup> For more information about, for instance, health effects, see the MSR theme report on Noise, Health and Money (2008).

<sup>5</sup> 'It all starts with clean water' (2006) is the (English) title of the MSR theme report that addresses this subject.

<sup>6</sup> In 2000, the MSR theme report was written with the title 'Licht op Groen' [The green light].

long as politicians continue to focus on the theme. The effect on industry will also depend heavily on the oil price and the CO<sub>2</sub> trading price.<sup>7</sup>

#### **Environmental care**

Companies have become much more aware of the importance of environmental care. They are realising more and more their social responsibility for a healthy, clean and safe living environment. Almost all larger companies now have an internal environmental care system and they are held liable for their behaviour by – in addition to the system of permitting and enforcement – bodies such as residence platforms. Environmental care at companies is not infrequently a strategic consideration for future developments.

Further improvements are only possible through a customised approach to environmental permitting and simplified procedures for small-scale businesses. The fact that environmental care is not on track is in part due to the lack of (political) priority. In particular for municipalities, the attention given to sustainable procurement, sustainable building and internal environmental care is lagging behind that desired. However, some attention is given to sustainable procurement and the theme of sustainable building is addressed within the framework of local and regional climate policy.

#### **External safety**

To an important degree, external safety is being promoted thanks to the legislation and regulations that have been implemented from the end of the nineties. The European Seveso II directive, translated into the Major Accidents (Risks) Decree, was an important starting point. In later legislation, external safety and spatial planning have been coupled in the form of the External Safety of Industrial Premises Decree (BEVI). The associated regional programme that was established proved to be a critical success factor: to include external safety in the formation of the spatial plan at the earliest possible stage. Furthermore, awareness has played a major role: local authorities have started to acknowledge the relevance of external safety, be accountable for the acceptability of risks and be transparent in the associated decision making.

#### **Environmental Permitting and Enforcement**

Improvements in permitting and enforcement have been achieved by organisational and procedural interventions that have led to professional and smart government. Environmental rules have been made uniform and simplified. The inspection load has decreased, by, among other things, the establishment of front offices (points of contact), the coordination of programmes and introducing uniformity of supervision. By coordinating environmental permits with other permits, such as building permits, the permitting authorities can form a more integral picture of the impact that the (industrial) premises will have on the living environment. In addition, the conflicting elements in the permitting system are more visible and as such can be avoided. Finally, drivers for success are the enabling of integral (risk-oriented) approaches and customisation.

<sup>7</sup> An extensive reflection on the theme of energy can be found in the MSR theme report 'Energie in Rijnmond' (2007) [Energetic in Rijnmond].

### 14.3 Preview: What does the future hold in store?

Finally, here we examine what the future holds in store based on the achieved results, the trends, the long-term scenarios of Welfare and Living Environment of the various planning bureaus<sup>8</sup> and expert opinion. The background to the long-term scenarios of Welfare and Living Environment are shown in the table below.

#### Scenario Regional Communities in 2040

- Immigration limited to immigrants seeking asylum
- Population decline starting in 2020
- No further European integration
- Continuing to maintain trading blocks
- Lowest economic growth
- Effective national environmental policy
- Emphasis on public provisions

#### Scenario Global Economy in 2040

- Immigration important
- Highest population growth
- European economic and monetary integration important
- World-wide free trade
- High economic growth
- No effective international environmental policy
- Emphasis on private provisions

In this summary of the expectations for the coming fifteen years, we place the emphasis on environmental themes that are of great importance for the future. After all, it is exactly for these environmental themes that far-reaching improvements and trend breaks are desirable, it is also desirable that improvements are accelerated. The MSR monitoring system should also be able to focus to an increasing degree on these environmental themes.

#### Air

Problems are mainly associated with the emissions of substances by road traffic (NO<sub>x</sub> and particulate matter). Along many of the motorways and busy urban roads, the limit values are regularly exceeded, while it is precisely these standards that will become stricter. It is good to note here that the Netherlands has received a derogation (this is a delay, not an exemption) to be able to allow it to meet the European standard.

The reduction of traffic emissions due to the new European standards for vehicles will be cancelled out by the increase in the number of kilometres driven by trucks and cars. In particular in the scenario with the highest economic growth, extensive air quality problems are expected. In short, this is a great challenge, certainly if specific air quality measures are announced that go further than the national and European policy.

Furthermore, the expectation is that in the coming fifteen years complaints about odour will increase. The tolerance of the residents of Rijnmond to odour will decrease because the people will place higher demands on the quality of their living environment. Here, intensifying the source policy and promoting technological solutions are the challenges for the coming fifteen years. An autonomous favourable effect can be expected from the (possible) introduction of road pricing. For DCMR, it is important that the measurement efforts, including the air quality standards for PM<sub>2.5</sub>, are intensified in the coming years and that attention is given to the results of research into the health effects of particulate matter and the policy for PM<sub>2.5</sub>.

#### Water

In the coming fifteen years, much more attention must be given to adapting the water system to meet the demands resulting from climate change. There are important demands in this respect in every scenario. However, in the scenario with the highest economic growth, in the coming thirty years more than 2,000 hectares of additional water storage must be found than in the scenario with the lowest economic growth. In all of the scenarios, the measures to prevent flooding, to protect the Dutch coast and to combat salination must be intensified. The many parties that are involved here (such as the Province, municipalities, water managers, the Directorate General for Public Works and Water Management, the Rotterdam Port Authority, and district and local water boards), must cooperate more intensively, must improve the delineation of their roles and responsibilities, and must search even harder for integral solutions. The regulations have now been amended to a large degree to allow this to be done (the Water Framework Directive, the Water Act, the Provincial Water Plan, the National Administrative Agreement on Water, the Management Plan for National Waters and the Municipal Water Management Act). It makes sense to focus the MSR monitoring activities strongly on these future challenges.

#### Soil

It has been clear for thirty years that considerable investment is required to tackle the urgent cases of contamination. A sufficient budget is the crucial factor to bring the remediation to a timely conclusion. Until now, only partial successes have been booked. However, the citizen's support for soil remediation has not changed and remains high. In the coming fifteen years, all of the parties involved (competent authorities, Central Government, private individuals, project developers and companies) must exert themselves to ensure that soil remediation actually occurs. However, at the moment it is uncertain whether the urgent remediation projects will be completed by 2015. Greater emphasis on the policy related to this theme is therefore desirable. In the coming decades, the limited financial resources can no longer be used as a reason to do nothing. The study and research phase must become relatively less important and budgets must be reallocated.

<sup>8</sup> The planning bureaus (Central Planning Bureau, the Environmental and Nature Planning Bureau and the Spatial Planning Bureau) have identified four long-term scenarios. These are placed in one of the quadrants on the dimensions 'international versus national' and 'public versus private'. The scenarios differ with respect to a wide range of variables (economic growth, population growth, migration, use of space, etc.). This has different consequences for living, working, mobility, agriculture, energy, the environment, nature and water. The two scenarios (Global Economy and Regional Communities), that create the greatest bandwidth for these dimensions are used by MSR when considering the coming fifteen years.

### **Energy and Climate**

It is clear that in the coming fifteen years, much more attention will be given to the reduction of CO<sub>2</sub> emissions. Therefore, according to the experts, in the scenario with the highest economic growth (Global Economy) the requirement is 80% higher than in the scenario with the lowest economic growth (Regional Communities). In addition there are concerns about the dependence on imported energy and the finite stocks of fossil energy. Due to this interaction of factors, the widely-held belief has arisen that a course change is required in our energy provisions, an energy transition. The lines along which this must happen are clear: energy saving, sustainable energy production and use, the high-quality use of fossil energy, if possible combined with CO<sub>2</sub> capture and storage. The latter is seen as a 'temporary' (for several decades) and necessary solution until sufficient sustainable energy is available. High ambitions have already been formulated in all of these areas.

These policy objectives will only be realised in the long term. There are several causes for this. Energy is used more or less everywhere and many systems that use energy have a long life. In addition, we cannot achieve the policy objectives with the current measures, assuming a more or less comparable social context. Therefore, there is still development and innovation required in the area of energy, for instance for the production and climate efficiency of biomass, for sustainable vehicle technology and for the production capacity of green electricity. Many of the changes that are required for the energy transition are developments that must occur on a national or wider scale. The freedom the region has is mainly in the more intelligent handling of energy and the realisation of heat and CO<sub>2</sub> infrastructure.

The monitoring of emissions, of energy generation and use is important to be able to track the effects of policy measures and innovations. The current indicators do not allow the transformation to a sustainable system of energy provision to be effectively monitored. The MSR monitoring of energy and climate will be amended to achieve this. Consider here indicators that measure the kilowatt hours of energy 'returned' to the mains network (from solar panels and wind turbines owned by private individuals), energy generated decentrally, the capacity of combined heat and power plants and measuring the effects of energy saving measures (megawatts).

### **Living environment and space**

It is becoming increasingly important to intensify the policy efforts to improve the living environment (noise, soil, space, green, nature, connecting red-green and blue). After all, the inhabitants of the Rijnmond region attach increasing importance to the quality of their living environment. This challenge has been taken up in the RR2020. This means that the region has entered a new phase of its development, a phase of more quality, more variation and more speed. For instance, work is being done to establish attractive, varied and liveable residential neighbourhoods and modern economic centres. According to the experts, the demands differ

considerably, dependent on the assumed scenario. In the scenario with the lowest economic growth (Regional Communities), the increase in the number of households in the region can be accommodated in the current building plans. However, in the scenario with the highest economic growth (Global Economy), in the coming thirty years, more than 200,000 additional homes must be created. This pressure on the existing area can only be accommodated through rigorous spatial choices or extremely large scale high-rise accommodation.

In addition to the demand to realise improved residential neighbourhoods and modern economic centres, the region will dedicate itself to retaining and improving accessible green areas and more space for water. This can be achieved relatively simply in the scenario with the lowest economic growth, but will be a major challenge in the scenario with the highest economic growth.

To be able to track progress and the environmental effects and policy efforts, MSR could focus its reports more on indicators that are relevant to the changes that are about to happen in the living environment (for instance, attention for water storage and green roofs), in part in view of the major differences in the challenges that are dependent on the assumed future economic growth. ■



# Overview indicators per page

## The environment in the greater Rotterdam region 2009

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| 7005      | 14C  | 2       | map  | Health survey 2008  |
| 7076      | 14D  | 2       | bar  | Environmental complaints police                                   |
| 3085      | 15A  | 2       | line | Complaints about odour, dust and noise                            |
| 3059      | 15B  | 2       | line | Antenna   |
| 9005      | 15C  | 2       | line | Index environmental pressure road traffic                         |
| 3028      | 15D  | 2       | line | Number of car kilometres driven                                   |
| 4021      | 16A  | 2       | bar  | Kilometres travelled by public transport passengers               |
| 4036      | 16B  | 2       | bar  | Number of users public transport                                  |
| 4020      | 16C  | 2       | bar  | Rail passengers (stations)  |
| 4027      | 16A  | 2       | bar  | P+R-terrain (parking places)                                      |
| 7101      | 17A  | 2       | map  | Public transport by water   |
| 7066      | 17B  | 2       | map  | High quality public transport                                     |
| 9004      | 17C  | 2       | line | Index environmental pressure major industries                     |
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| 5023      | 21D  | 3       | pie  | Noise 2010 (inhabitants %)  |
| 5068      | 22A  | 3       | pie  | Noise (area %)  |
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| 9003      | 27A  | 4       | line | Index air quality   |
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| 3073      | 28A  | 4       | line | Ozone   |
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| 3067      | 28C  | 4       | line | Benzene   |
| 3082      | 28D  | 4       | bar  | Smog  |
| 3083      | 29A  | 4       | bar  | Signalling codes  |
| 3002      | 29B  | 4       | line | Odour, complaints   |
| 3087      | 29C  | 4       | map  | Odour, complaints per municipality                                |
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| 4029      | 30A  | 4       | line | Experienced air quality   |
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| 1058      | 30C  | 4       | line | Hospital admissions caused by fine suspended particles            |
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| 3025      | 31A  | 4       | line | Emission particles   |
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| 3086      | 32A  | 4       | line | Emission factors road traffic  |
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| 4032      | 35A  | 5       | map  | Environmentally protected area's noise   |
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| 4034      | 35D  | 5       | map  | Noise, complaints per municipality (Rotterdam Airport)                               |
| 4035      | 36A  | 5       | map  | Noise, complaints per municipality (excluding Rotterdam Airport)                     |
| 3056      | 39A  | 6       | bar  | Soil clean-up: results in hectare  |
| 5046      | 39B  | 6       | bar  | Clean-up of new contaminated soil  |
| 5058      | 39C  | 6       | bar  | Soil protection act  |
| 5049      | 39D  | 6       | map  | Soil clean-up former gas work sites  |
| 5060      | 40A  | 6       | bar  | Use of soil clean-up possibilities   |
| 5041      | 40B  | 6       | bar  | Destination of contaminated soil   |
| 1036      | 40C  | 6       | bar  | Soil clean-up subsidy scheme for companies   |
| 8004      | 40D  | 6       | map  | Availability of soil quality map   |
| 9007      | 43A  | 7       | line | Eutrophication of surface waters   |
| 9008      | 43B  | 7       | line | Heavy metals in surface waters   |
| 1039      | 43C  | 7       | line | Heavy metals in sludge   |
| 1040      | 43D  | 7       | line | Organic micro pollutants in sludge, national waters                                  |
| 2022      | 44A  | 7       | bar  | Quality surface waters, canals   |
| 2023      | 44B  | 7       | bar  | Quality surface waters, ditches  |
| 2024      | 44C  | 7       | bar  | Quality surface waters, lakes and pools  |
| 4004      | 44D  | 7       | bar  | Quality surface waters, brackish waters  |
| 3048      | 45A  | 7       | pie  | Quality surface swimming water   |
| 1025      | 45B  | 7       | bar  | Intake stops Meuse water (drinking water production)                                 |
| 1030      | 45C  | 7       | line | Discharges heavy metals by major industries  |
| 1032      | 45D  | 7       | line | Discharges benzene and chlorides   |
| 1007      | 46A  | 7       | line | Discharges oil   |
| 1004      | 46B  | 7       | line | Discharges phosphate and nitrogen  |
| 3102      | 46C  | 7       | bar  | Efficiency of waste water purifying plants   |
| 3057      | 46D  | 7       | pie  | Complaints inland waters Delfland  |
| 4013      | 47A  | 7       | bar  | Complaints inland waters Hollandse Delta   |
| 4046      | 47B  | 7       | pie  | Complaints inland waters Schieland en de Krimpenerwaard                              |
| 1047      | 47C  | 7       | map  | Wildlife-friendly riverbanks   |
| 5014      | 47D  | 7       | line | Quantity of sludge   |
| 2020      | 48A  | 7       | bar  | Use of ground water  |
| 1046      | 48B  | 7       | bar  | Industrial use of ground water   |

| Indicator | page | chapter | type | name   |
|-----------|------|---------|------|--|
| 5055      | 51A  | 8       | line | Number of butterflies  |
| 1049      | 51B  | 8       | bar  | Number of seals  |
| 4026      | 51C  | 8       | line | Number of sand lizards                                       |
| 8029      | 51D  | 8       | bar  | Number of bats   |
| 1050      | 52A  | 8       | bar  | Number of common terns                                       |
| 1052      | 52B  | 8       | bar  | Number of redshanks  |
| 1051      | 52C  | 8       | bar  | Number of water birds  |
| 8031      | 52D  | 8       | line | Number of breeding birds in open water                       |
| 8032      | 53A  | 8       | line | Number of breeding birds in reed                             |
| 8033      | 53B  | 8       | line | Number of breeding birds in young forest                     |
| 8034      | 53C  | 8       | line | Number of breeding birds in deciduous forest                 |
| 8035      | 53D  | 8       | line | Number of breeding birds in farmland                         |
| 8036      | 54A  | 8       | bar  | Number of breeding birds in urban environment                |
| 4045      | 54B  | 8       | bar  | Qualifying species Haringvliet                               |
| 5035      | 54C  | 8       | map  | Natura2000 areas in the Rotterdam region                     |
| 8023      | 54D  | 8       | map  | Ecological structure   |
| 3098      | 55A  | 8       | bar  | Realisation new natural areas RGSP2                          |
| 5037      | 55B  | 8       | bar  | Nature reserves  |
| 3031      | 55C  | 8       | bar  | Urban green in Rotterdam                                     |
| 4602      | 55D  | 8       | pie  | Natural and recreational areas, number of visitors           |
| 8019      | 59A  | 9       | map  | Municipal Waste Plan per municipality                        |
| 8020      | 59B  | 9       | map  | Municipal waste analyses per municipality                    |
| 5010      | 59C  | 9       | bar  | Domestic waste   |
| 5004      | 59D  | 9       | bar  | Separated collected domestic waste                           |
| 6011      | 60A  | 9       | map  | Separate waste collection per municipality (separated)       |
| 6006      | 60B  | 9       | map  | Separate waste collection per municipality (paper)           |
| 6007      | 60C  | 9       | map  | Separate waste collection per municipality (organic)         |
| 6008      | 60D  | 9       | map  | Separate waste collection per municipality (glass)           |
| 6009      | 61A  | 9       | map  | Separate waste collection per municipality (textile)         |
| 6010      | 61B  | 9       | map  | Separate waste collection per municipality (small chemicals) |
| 6014      | 61C  | 9       | line | Composition domestic waste (total)                           |
| 6013      | 61D  | 9       | bar  | Composition domestic waste (packaging)                       |
| 5044      | 62A  | 9       | pie  | Composition domestic waste (Rotterdam 2008)                  |
| 3060      | 62A  | 9       | line | Development income and waste deposition                      |
| 3074      | 62B  | 9       | pie  | Bio-fuel from waste  |
| 3081      | 65A  | 10      | pie  | Use of sustainable energy (percentage)                       |
| 8012      | 65B  | 10      | map  | Use of green power per municipality                          |
| 3080      | 65C  | 10      | map  | Transition management project (progress)                     |
| 3051      | 65D  | 10      | bar  | Transition management project                                |
| 8021      | 66A  | 10      | map  | Wind energy (locations)                                      |
| 8028      | 66B  | 10      | line | Wind energy (production)                                     |
| 2008      | 66C  | 10      | map  | Cooling water discharges                                     |
| 5067      | 66D  | 10      | bar  | Emission CO <sub>2</sub> Rijnmond                            |

| Indicator | page | chapter | type | name   |
|-----------|------|---------|------|--|
| 3006      | 67A  | 10      | line | Emission CO <sub>2</sub> major industries                          |
| 2017      | 67B  | 10      | bar  | Other greenhouse gases   |
| 5066      | 67C  | 10      | bar  | Emission CO <sub>2</sub> road traffic                              |
| 4005      | 67D  | 10      | bar  | Energy saved by participants MJA-2-programme                       |
| 8015      | 71A  | 11      | map  | Municipal Environmental Policy Plan per municipality               |
| 7081      | 71B  | 11      | map  | Sustainable purchasing policy                                      |
| 7079      | 71C  | 11      | map  | Implementation internal environmental care per municipality        |
| 7077      | 71D  | 11      | map  | Sustainability meter   |
| 4111      | 72A  | 11      | line | Environment barometers, participants                               |
| 2707      | 75A  | 12      | map  | Risk contour shipping  |
| 2012      | 75B  | 12      | map  | Carriage of Dangerous Goods Act                                    |
| 1033      | 75C  | 12      | map  | Risk contour companies   |
| 2019      | 75D  | 12      | pie  | Hazardous companies  |
| 4031      | 76A  | 12      | line | Experienced safety   |
| 3066      | 76B  | 12      | bar  | Spatial planning advices related to external safety                |
| 3063      | 76C  | 12      | pie  | Enforcement Hazard of Major Accidents Decree                       |
| 3062      | 76D  | 12      | pie  | Review of safety reports   |
| 7103      | 79A  | 13      | line | Licenses provincial industries                                     |
| 7102      | 79B  | 13      | line | Licenses municipal industries                                      |
| 7080      | 79C  | 13      | bar  | Effective level of measures (major industries)                     |
| 7024      | 79D  | 13      | line | Enforcement municipal industries                                   |
| 7111      | 80A  | 13      | line | Sampling Directorate General for Public Works and Water Management |
| 7110      | 80B  | 13      | line | Preventive controls  |
| 7112      | 80C  | 13      | line | Summons  |
| 6015      | 80D  | 13      | line | Sanctions  |
| 7113      | 81A  | 13      | line | Research complaints and incidents                                  |
| 7106      | 81B  | 13      | bar  | REOV   |
| 3099      | 81C  | 13      | bar  | Enforcement soil clean-ups   |
| 3054      | 81D  | 13      | bar  | Enforcement soil protection act (percentage)                       |
| 7094      | 82A  | 13      | bar  | Enforcement by police (small misdemeanours)                        |
| Fig. 1    | 84A  | 14      | line | SO <sub>2</sub> in air   |
| Fig. 2    | 84B  | 14      | line | NO <sub>2</sub> in air   |
| Fig. 3    | 84C  | 14      | line | Complaints about noise   |
| Fig. 4    | 84D  | 14      | bar  | Soil clean up former petrol stations                               |
| Fig. 5    | 85A  | 14      | line | Quantity of sludge   |
| Fig. 6    | 85B  | 14      | line | Discharges phosphate and nitrogen                                  |
| Fig. 7    | 85C  | 14      | line | Development income and waste deposition                            |
| Fig. 8    | 86A  | 14      | bar  | Separated collected domestic waste                                 |
| Fig. 9    | 86B  | 14      | bar  | Trend CO <sub>2</sub> emission greater Rotterdam region and target |
|           | 88A  | 14      |      | Trends on course/not on course                                     |
|           | 93   | BY1     | map  | Municipality borders and number of inhabitants                     |
|           | 99   | BY2     | map  | Water quantity boards  |





MILIEUMONITORING STADSREGIO ROTTERDAM

This report describes the state of the environment on a regional scale. Some indicators contain information per municipality.

This report is produced by the cooperation initiative MSR. Partners in this cooperation are:

DCMR Rijnmond Environmental Agency

Rotterdam Municipality

The Rotterdam-Rijnmond Public Health Service

The higher water board of Delfland

The higher water board of Schieland and the Krimpenerwaard

Rotterdam-Rijnmond Police

Province of Zuid-Holland

Directorate General of  
Public Works and Water Management,  
Directorate Zuid-Holland

Rotterdam Metropolitan Region

District water board Hollandse Delta

