



PBL Netherlands Environmental
Assessment Agency

The future is now
**Assessment of
the Dutch Human
Environment**

2014



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PBL Netherlands Environmental Assessment Agency

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PBL Netherlands Environmental Assessment Agency is the national institute for strategic policy analysis in the fields of the environment, nature and spatial planning. We contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount. Policy relevance is the prime concern in all PBL studies. We conduct solicited and unsolicited research that is always independent and scientifically sound.

Foreword

The Assessment of the Human Environment provides the Dutch Parliament, Cabinet and society with a fact-based description of the current state of the human environment. This biennial ‘environmental gauge’, published by PBL Netherlands Environmental Assessment Agency, shows the extent to which the human environment objectives set by government are being achieved. Article 21 of the Dutch constitution makes it a government task to protect and improve the environment; ‘The government is obliged to secure a habitable country for its citizens and to protect and improve their environment’. Article 22 continues, ‘The government shall take steps to promote public health and is obliged to provide sufficient living accommodation.’ The Assessment of the Human Environment helps the government implement these constitutional provisions. In addition, the Netherlands is a signatory to the Aarhus Convention of the United Nations, which guarantees right of access to environmental information. The Assessment of the Human Environment and the Environmental Data Compendium help fulfil this international task.

The Assessment of the Human Environment is more than just a gauge, as it also gives possible explanations for *why* certain policy objectives are not being met. In the previous Assessment of the Human Environment (PBL, 2012a), PBL assessed the progress made in environmental policy by analysing four systems (energy, food, water and accessibility) and two spatial development issues (rural areas and urban area development). This systems approach enabled identification of the conflicts that arise when government attempts to achieve several different public objectives simultaneously. The Assessment of the Human Environment 2014 includes updates of system descriptions and reports on the progress made in recent years. One new system, the housing market, was added. There is also a section dedicated to the concept of

'natural capital', recently introduced into Dutch policy. Policymakers apply this concept to define the relationship between nature and society in a new way, and PBL has examined the effects of this.

Distinctive element of this Assessment of the Human Environment is its focus on the future. It assesses current developments, taking into account the recognised long-term challenges and the transitions that the Cabinet would like to achieve in various areas. In the case of many long-term objectives, policy action is required *now* to be able to achieve the objectives at a *later* date. This has also been argued by the Oxford Martin Commission for Future Generations in its report *Now for the long term* (Oxford Martin School, 2013), in which the commission highlights 'the increasing short-termism of modern politics and our collective inability to break the gridlock that undermines attempts to address the biggest challenges that will shape our future'.

The motto adopted by this Assessment of the Human Environment is therefore 'the future is now'. However, such a claim gives rise to some critical questions, such as, 'have the desired transition processes already been set in motion?', 'will the Netherlands achieve its long-term tasks and objectives if the current rate of progress is continued over the coming decades?', 'do we need to speed things up, or is there time to wait and see what happens?', and 'what does the government need to do, what will come from society and what kind of policy does all this assume?' These types of questions are addressed in this report.

From the perspective of its own scientific responsibility, PBL draws attention to the major challenges that face the Netherlands in areas such as climate change, biodiversity loss and scarcity of natural resources. Of course, the Netherlands cannot solve these problems alone, but it can contribute to solutions and increase its own resilience to the consequences of such problems. Encouraging developments are being seen in some areas, such as the construction of new climate-neutral buildings, and the fact that the number of endangered species is no longer increasing in the Netherlands. However, there are also causes for concern; in particular relating to the speed and efficiency with which transition processes are being initiated. The governor of the American state of Washington, Jay Inslee, expressed this concern succinctly when he said: 'We are the first generation to feel the sting of climate change and we are the last generation who can do something about it.' In this Assessment of the Human Environment, PBL shows that – given the scale of future problems – there is still too little policy focus on a transition towards a low-carbon energy system in the coming decades.

This Assessment of the Human Environment also includes the traditional evaluations of the Dutch Cabinet's short-term targets. Overviews of the quantitative environmental targets set by the Cabinet (the 'traffic light tables'), as well as the degree to which these are projected to be achieved through current policy are included in an Annex to this report. Background reports (in Dutch) on the systems analysed (housing, energy, food and agriculture, mobility, water (quality and safety) and natural capital) can also be

found on the website. We have chosen to place the additional information on the website of the Assessment of the Human Environment, in order to minimise the size of this printed report.

The first repeat study for the Infrastructure and Spatial Monitor (*Monitor Infrastructuur en Ruimte*; MIR) was published at the same time as this Assessment of the Human Environment, and some information from the MIR has been included in this report. The National Energy Outlook (*Nationale Energie Verkenning*; NEV), published in October 2014, includes analyses of the Cabinet's short-term energy targets (2020/2023). The conclusions drawn regarding these short-term targets are *not* included in this report, although we do address policy discussions relating to energy for the longer term (2030/2050).

The Assessment of the Human Environment is about facts and figures, and their interpretation. The printed report puts interpretation of the figures into words, while the latest figures and additional policy analyses can be found in the digital version (see www.pbl.nl/balans (in Dutch)). The website www.environmentaldata.nl provides the latest policy-relevant data on the human environment (Dutch and English). I hope that you will use these two products together, to supplement one another.

Professor Maarten Hajer
Director-General

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MAIN FINDINGS

MAIN FINDINGS

Main findings

The future is now

The outcome of this Assessment of the Human Environment can be summarised in a single sentence; a reasonable number of policy objectives that were set in the past are being achieved, but the Netherlands is faced with long-term challenges in several areas that require policy initiatives *now* in order to achieve the objectives *later*. Therefore, the future is now. Important measures have been taken in some policy areas (the housing market, flood protection and mobility) to initiate the planned transitions, but the hesitation and slow rate of change in other areas (energy, food and nature) mean that long-term challenges will not be achieved in time. A coherent strategy therefore needs to be drawn up soon to implement the system changes required by policy and government. This is particularly the case for the transition from using polluting fossil fuels to clean, renewable energy. The Dutch Energy Agreement for Sustainable Growth, brokered by more than 40 organisations in 2013, is a significant and unique achievement. Even so, it mainly focuses on achieving intermediary targets for 2020 and 2023. There is hardly any impetus for achieving the planned transition in the years after that, to lead to a sustainable energy management in about 2050. The Cabinet should therefore consider 'policy accelerators'. As an example, to achieve the EU target of a greenhouse gas reduction of 80% by 2050, the renewable energy share will need to increase by 2% per year from 2020 onwards. This is a percentage that is still a long way from being achieved, even for example in Germany, and therefore represents a huge challenge.

In other areas, a cautious, adaptive policy approach is recommended. This applies, for example, to the housing market, taking into consideration the fragile consumer confidence in this market and the uncertainty about whether additional housing

development is required and, if so, how much. New housing development in many cases can no longer be taken for granted, given the expected regional demographic shift (decline, fewer young families, more elderly people) and the uncertainty regarding the increase in the number of households. In large areas of the country, it will be more important to make changes to existing buildings rather than to build new homes. This also includes the redevelopment of offices, shops and other properties. There was a slight increase in the number of unoccupied offices and shops last year, which now seems to be a trend. If this negatively impacts the local surroundings there is a danger that a downwards spiral of degeneration and decline may be set in motion, which creates a social problem and needs to be addressed by the government. This does not mean, however, that drastic action needs to be taken straight away. In certain cases, in the context of redevelopment and transformation, it may in fact be sensible to be patient and wait a little longer.

The slower growth in car mobility and uncertainty regarding its further development also has implications for policy. After all, investments in road expansion will be less cost-effective if there is no corresponding increase in road traffic. It is therefore recommended to also implement a more adaptive policy in this case, to take these uncertainties into account.

Flood protection is a perfect example of a policy area in which ‘the future is now’, and actions are in fact already being taken within this context in this policy area. The Cabinet presented its new policy proposal on flood protection in September 2014, with which it aims to put in place an adequate and effective flood protection system by 2050, also taking into account possible climate change. However, a future-proof delta is about more than just flood safety. It also requires good water quality and ecology, making use of waterways and opportunities for recreation and the recreation economy, and combining water storage solutions with more pleasant surroundings in urban areas. What is more, building dykes is also a cultural act that expresses the ambitions of the Netherlands. The challenge for the coming years is to identify and anchor the opportunities for integrated solutions relating to flood protection projects within the implementation of the Delta Programme.

Transition pain unavoidable but will produce large gains

Transitions take time – a large amount of time; not only to work out how nine billion people are going to live within the bearing capacity of the Earth, but also to overcome opposition from individuals and organisations who have an interest in maintaining the status quo in the short term. Changes to buildings, networks and infrastructure also take a relatively long time. Even so, the decision will need to be taken in some cases to change existing structures before the end of their economic lifetimes. This applies to homes, shops or offices that cannot be sold or rented, pig or poultry farms that negatively affect nature because they are located in the wrong place or coal-fired power stations that no longer have a place in a low-carbon energy system. These are all forms of transition pain. Wind turbines placed in the landscape are another example; clean

energy generation will often, for the time being, be more visible in the landscape than the combustion of fossil fuels such as coal or gas. Wind turbines are new elements in the landscape, just as power pylons or large power stations were in the past. Everyone is now used to these older elements, but the wind turbines are new.

Transitions often break with an existing state of equilibrium. This means that there may also be unintended and unexpected effects. This can currently be seen, for example, on the electricity market, where the effects of the energy transition are becoming evident. After all, no-one had fully appreciated that the increase in solar and wind energy would lead to a decrease in the wholesale electricity price. This may seem to be a positive effect, but it means that investments in solar and wind energy will remain dependent on government subsidies (even if system costs decrease). Combined with low economic growth, overcapacity in conventional power stations and a low carbon price, the result is the early write-off of fossil-fuel power stations. Efficient CHP plants are also becoming uneconomical due to the combination of high gas and low electricity prices.

A transition has also been set in motion in the mobility sector. Various government initiatives have led to a rapid increase in the supply of energy-efficient cars in the Netherlands and high sales volumes; in fact, the Netherlands currently has the highest share of electric and hybrid vehicles in Europe. This has however been accompanied by a considerable decrease in tax revenue of 1 to 1.5 billion euros annually, since 2006. The high sales level of electric and energy-efficient cars can certainly be claimed as a policy success in the Netherlands, but policymakers should also acknowledge the unintended and unexpected effects. One such effect has been the huge interest, certainly among drivers of company cars, in the large subsidy on the purchase of a car that will only drive on electricity for only about 30 kilometres. Policy will be faced more often with unintended and unexpected effects during times of transition. Transition policy implies that policymakers keep a keen eye on the final objective while applying corrective policy to remove any adverse or unintended incentives, although this may sometimes conflict with the aim to be a reliable government by setting fixed policies for a longer period.

Even so, in many cases, it is not recommended to delay setting transitions in motion. It is better to be predictable and where possible to anticipate synergy benefits. For example, taking into account future effects of climate change in urban redevelopment and the replacement of infrastructure could result in huge savings. A second example is that of the search for opportunities for synergy between water (the Ministry of Infrastructure and the Environment (IenM)) and nature (the Ministry of Economic Affairs (EZ)) requiring a revision of water quality policy, and that a distinction is made between functions and spatial priorities. Where in the Netherlands will higher and lower ecological ambitions be pursued in the coming decades? The responsibility for choices about objectives and measures relating to water quality and nature lies primarily with the provinces, the water boards and the municipalities. The spatial reprioritisation of water quality objectives requires an integrated spatial vision for the

Netherlands on water, groundwater, agriculture and nature. National government could, within the context of its system responsibility for spatial planning and water, take the lead in creating such a vision. A third example is that the timely anticipation of demographic changes could reduce the future transformation of the housing market required in certain regions, compared with that in the current shrinkage regions. Such a strategy would prevent unoccupancy and capital losses and increase the attractiveness of these regions. The costs of implementing the transformation would also be lower. Making a policy transformation now can prevent or limit the problems associated with demographic decline and the ageing population.

Room for the future

The Dutch Cabinet has made some far-reaching legislative changes concerning child welfare, lawful dismissal, social security and the housing market. At the same time, the Netherlands slowly seems to be recovering from the recession. This means there is room, energy and optimism to think about the future. This is important, because some drastic changes are needed if society is to continue to sustainably prosper. Now that we seem to be coming out of the recession, we need to make sure that we do not fall back into old habits. It is now that we need to make optimum use of opportunities for renewal, and of existing, modest investment programmes. This is important, for example, in the field of urban development, where we need to take a critical look at where development could best take place. It is also important in infrastructure development; we need to closely consider where the opportunities lie for 'complementary interests' and the redevelopment of existing homes and properties. Because of the recession, there has been less investment in the quality of the living environment. Until recently, municipalities paid for redevelopment and improvements to facilities and public spaces from the profits they made from their active land-use policies. However, the credit crisis and stagnation in the property development market means there is hardly any money to be made from this, which could therefore have repercussions on the quality of the urban environment.

More than ever before, renewal is going to have to come from partnerships and collaborations in the years to come. As far as the human environment is concerned, important decentralisation processes have been set in motion in the fields of spatial planning, water, nature and the environment. This means that time-honoured partnerships will need to be given a new form, with a new allocation of administrative responsibilities. In a small country such as the Netherlands, policy and society can do little with maxims such as 'to each his own responsibility'. After all, organisations are constantly coming into contact with one another. Decentralisation therefore demands plenty of communication and constant policy evaluation. Not only does this present a challenge for national government, but also for the provinces, municipalities, water boards, housing corporations and management bodies.

The Dutch physical environment is in fairly good shape ...

When looking at the various components of the physical environment in the Netherlands, the conclusion would be that things are going pretty well. The air, water and soil are fairly clean, certainly compared with 25 years ago when the first National Environmental Policy Plan (NMP) was published and fully fledged environmental policy was implemented. The damage to human health due to environmental pollution currently represents no more than 5% of the total disease burden, most of which is due to exposure to particulate matter from cars. Just a few decades ago, this figure was about 10% to 15%. International comparisons show that Dutch houses are of a high quality, and the liveability index (*Leefbarometer*) shows that the Dutch have been satisfied with the quality of their surroundings for many years. Road travel time losses have decreased by 40% over the last 5 years, despite an increase in road traffic, and problems with the dykes have been recognised and are being dealt with. The increase in the number of endangered animal and plant species in the Netherlands has halted and recovery is slowly taking place. More than one third of the animal and plant species are on the Red List of threatened species, but no more species are being added to the list and the severity of the threat is decreasing. The use of antibiotics in livestock farming more than halved over the last five years, which means that the policy target of 2013 has been more than achieved. Resistant pathogens are still found in 80% to 90% of farm animals, but there are signs that the prevalence of multiple resistance is decreasing.

... but many targets are not being achieved

Compare actual developments with the targets set by various Cabinets, and the picture is less rosy (see Annex). Some of the table's 'traffic lights' are green, indicating that these targets will be met on time. Many, however – and this also applies to various international obligations concerning air, water and nature – will only be achieved if current and planned policy are intensified (code orange). Some targets, such as for food wastage and the environmental pressure on nature, even require fundamental policy redesign (code red). This should not come as a surprise; after all, it is more or less the same message as presented in a series of Environmental, Nature and Human Environment Assessments published by PBL and its predecessors. What is (relatively) new is the decline in the rate of progress regarding the agreed environment and nature targets in recent years, which means that these targets will not be achieved. Examples of persistent environmental problems in the Netherlands are high levels of nitrogen deposition and nitrate leaching, excessive concentrations of plant protection products in surface waters and the low ecological quality of surface waters. The European Water Framework Directive (WFD) applies a complex 'one out, all out' method to assess the ecological and chemical quality of surface water. Based on this method, the WFD objectives for biological water quality were only achieved in 5% of water bodies in 2013. The percentage of water bodies that met the WFD objectives for ecological quality (based on a combination of biological, physical and chemical targets) was even lower. Measures to improve hydromorphological conditions show the most promise for improving this situation. New river basin management plans for the 2015–2021 period

will be presented at the end of 2014, and this is the perfect opportunity for agreements to be included on additional hydromorphological measures.

The agreed targets are intermediary ones along the way to achieving a clean, healthy, safe environment for the long term. For this to happen, fundamental changes in production and consumption structures are unavoidable. The lack of speed and efficiency with which these transition processes are being implemented, however, is worrying.

Improving the quality of the national environment is sometimes associated with transferring polluting activities elsewhere. Prosperity in the Netherlands has a global footprint, which means that additional effort will be required to ensure that the sustainability aspirations of national policy are realised. The global organisation of 'chains' of food production or resources, or the 'import' of CO₂ that is being emitted outside the Netherlands for prosperity within the Netherlands, are recognised. However, the question is how to shape policy to increase the sustainability of these chains.

The energetic society requires an active and visionary government

PBL has identified a search for a suitable role for government in our rapidly changing society. First of all, the government has committed itself to policy decentralisation in various areas. This, of course, reflects the aim to bring policy closer to the general public. At first glance, there seems to be nothing wrong with a 'subsidiarity principle' that aims to lay responsibility for policy tasks at the door of the lowest functional level. However, in many cases, certain tasks need to be dealt with on a national level, for decentralisation to work properly. Examples are ensuring the good exchange of knowledge and drawing up national reports on international obligations (water, air and nature). Very often, policy decentralisation is based not so much on a vision, but on a strategy that must ensure that a particular objective is achieved. It is important to continually assess whether strategy and implementation still correspond to the vision for the country as a whole.

In second place, the direct relationship between the general public and the government is also changing. Although the concept of the 'participation society' was introduced in the King's Speech in September 2013, PBL has applied the concept of the 'energetic society' since 2011. This is based on the idea that the general public and organisations are becoming increasingly active and assertive, that they want to contribute to solutions and that they actively oppose policy that, in their eyes, is not properly thought through or is not in their interest. The energetic society is a reality that requires a response from government, sometimes to prevent frustration on the part of the general public, but mainly to make use of the intelligence present within society to achieve public goals. Because society has become even less predictable with the emergence of energetic citizens, it is for example recommended to allow plenty of space for corrections in policy implementation. This is a form of 'radical incrementalism', by which the goals may be

ambitious, but the government is making adjustments, continually, to remove unintended adverse effects. The stimulation of energy-efficient and electric passenger vehicles is an example of a policy area in which the energetic society has forced the government to fine-tune policy.

Thirdly, PBL has identified a new need for market regulation. In particular with regard to complex transition areas such as energy, the government is being put to the test due to conflicting market incentives. It would therefore seem to be time for the government to be more assertive in assuming its role of market regulator. It needs to do this not to curtail market forces, but to guide market dynamics within the framework of the public objective of a sustainable energy supply. If the markets are to work properly, the government needs to present a clear vision and develop and apply the right tools, rather than to wait and see what happens. A market economy combined with an energetic society demands an active, participatory and guiding government. This combination can lead to the changes required by society, with the ultimate goal of moving towards a more sustainable economy and society.

In conclusion, the motto 'the future is now' is not a call to start implementing a well-designed plan entitled 'transitions'. The time of blueprints is past. In the 21st century, the main challenges need to be realised together with public stakeholders. However, the government does have a crucial part to play in redefining the playing field. It is therefore rather a call for market regulation, for accelerating the introduction of sustainable products and to be more consistent in penalising wasteful or socially undesirable polluting behaviour. It is about continuing to encourage innovation by tightening standards and removing unintended effects, and recognising how far ahead to think, so that actions taken now will not be regretted later. 'The future is now' is a call to reassess and modernise strategic long-term policy. The time is ripe.

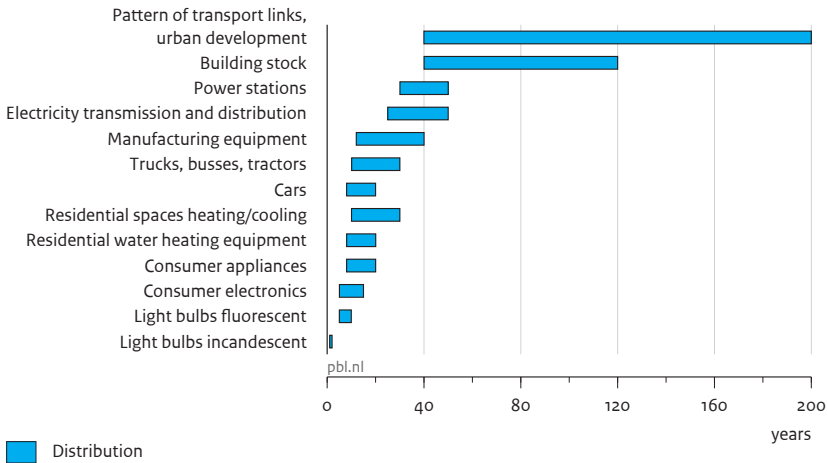
Transitions, systems and the role of government

Transitions and transition management in environmental policy

In 2001, the Dutch Cabinet introduced the concept of transition into environmental policy, in the fourth National Environmental Policy Plan (NMP4; VROM, 2001). In this plan, transitions and transition management are presented both as a challenge and a solution for dealing with persistent environmental problems, such as climate change, biodiversity loss and natural resource scarcity. The Cabinet named the following three transitions in particular in the NMP4: energy, mobility and agriculture. Since then (today about 10–15 years ago), the government's environmental policy has focused on structural, long-term system changes. The Social and Economic Council of the Netherlands (SER) responded positively to the innovative, agenda-setting tone of the NMP4. In its advisory report on the NMP4, the Council emphasised that transition management is a public task, saying that 'detailed solutions should be left to the market; the job of government is to guide the market process in a sustainable direction. The government must set targets, guide, and encourage stakeholders to implement solutions' (SER, 2001). It added that 'this means reaching across policy areas, as well as a willingness to implement long-term policies and resist short-term pressures.' In this Assessment of the Human Environment, PBL has evaluated to what extent policy has managed to remain focused on the long term, while also trying to achieve short-term objectives. One conclusion is that it has certainly not always been successful in this. There are many examples of when a short-term focus has made it impossible to achieve the required transition, and energy policy threatens to become one more such example.

Parallel to the policy focus on transition management, much research has been carried out on this subject (e.g. see www.ksinetwork.nl). Rotmans et al. (2000) defined a transition as a structural change in society resulting from modulating and reinforcing

Figure 1.1
Technical life span of appliances, installations and infrastructure



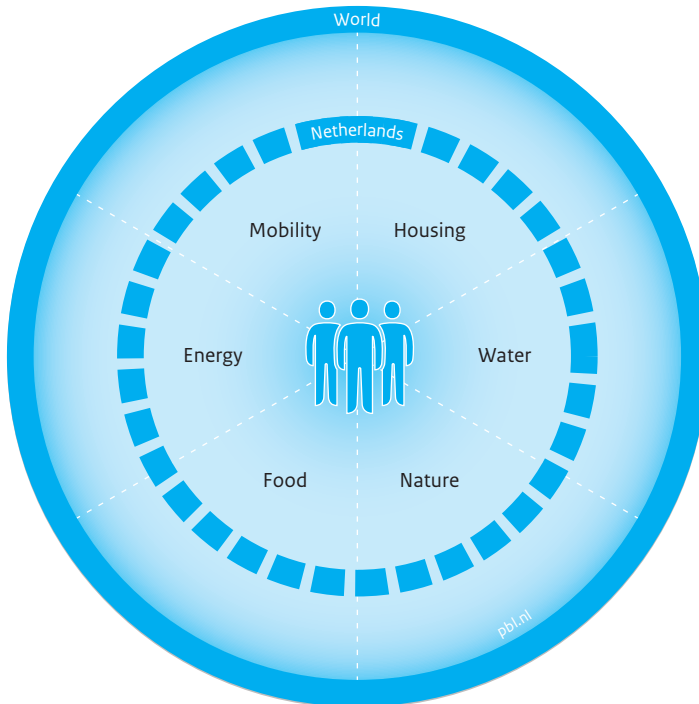
Source: Philibert and Pershing 2002

The high level of inertia in societal systems in society means that major environmental issues need to be dealt with now.

developments in the economy, culture, technology, institutions and the environment. These structural changes take place over some time – at least one generation (25 to 50 years) – and are often the result of radical niche innovations, which need to compete against existing systems or regimes. An example is car-sharing – a practise that is hindered by private car ownership, which is embedded in the existing system (Geels, 2002). Public opposition, habits, vested interests, different political preferences for policy instruments; these all need to be overcome. In addition, changes will also need to be made to buildings, infrastructure, organisations and earnings models, sometimes long before the end of their economic and technical lifetimes (Figure 1.1).

Meanwhile, it is 2014, and the need to get the planned systems innovations off the ground and push them through is greater than ever. It will probably take some time before the effects of environmental problems become so severe that they start to have a significant impact on Dutch society. However, the awareness that society is going to need to make fundamental changes to deal with such problems, and that such changes will take time, makes it crucial that the planned systems innovations are introduced as soon as possible. It is unlikely that attempts to draw even more attention to the urgency of the problems will finally result in the required transition; after all, scientists have been warning of them for years. PBL therefore urges that a different tack be taken; those who recognise the necessity of these transitions need to see them as the new normality. It is therefore no longer a question of government ‘versus’ market, but markets must work

Figure 1.2
Humans and their physical environment



Source: PBL

This report examines the systems of housing, energy, food, mobility, water and nature. The focus is on how these systems work in the Netherlands and, where relevant, their international context is also considered.

to achieve public goals; active participation in the transition must pay off and trendsetters must be rewarded. The focus should not be on threats, but on creating opportunities to move past the bottlenecks – this is the new policy challenge.

The physical environment as a coherent system

The human environment is not a clearly defined subject of policy or policy analysis. This report is about the physical human environment, created and reproduced by modulating systems that enable humans to provide for a number of basic needs, such as food, protection (e.g. housing and dams), mobility, an income and pleasant surroundings (Figure 1.2). This human environment can be read as the history of a ‘cultural act’ – of the adaptation of the physical environment to suit our purpose. This socio-cultural dimension, important as it is, is mostly beyond the scope of this report.

To be able to discern the policy challenges, various sub-systems have been defined, each with its own dynamics and spatial scale. Some systems – such as housing, employment and recreation – take place mainly on a regional scale, whereas others – such as energy – are almost global. The Assessment of the Human Environment 2012 included detailed analyses of the energy, food, mobility and water systems. The 2014 report, however, is largely limited to an analysis of recent developments in the systems described in 2012. This is supplemented with an analysis of the housing system and a discussion on the significance of natural capital as a new concept in nature policy.

A healthy, economically strong, vital society requires the continued reproduction of the physical conditions required for life. A vital society benefits from good spatial cohesion between housing, employment, transport and recreational facilities, and from an environment in which people feel at home. An increasing proportion of the population lives in urban areas, which requires the better organisation of urban metabolism (the many different incoming and outgoing flows of humans, goods, food, water and energy that connect urban life to nature) (Hajer and Dassen, 2014). The challenge facing environmental policy is to steer these developments in the right direction. As already explained, this Assessment of the Human Environment therefore not only addresses whether existing and planned environmental policy will succeed in achieving the current objectives, but also whether policy sufficiently prepares society for the long-term ambitions and for future developments that may undermine the physical conditions for a vital society.

The role of government

The key question is what role government should take in initiating or encouraging progress with regard to the planned transitions. For example, policy could focus on creating the right conditions for the successful introduction of niche innovations, as proposed by Geels and Schot (2007). This involves connecting relevant stakeholders with the innovation, improving price–performance ratios, providing recommendations for further improvements and increasing the market share of the innovation. Rotmans (2005) named the following key words for the new forms of governance that he believes transition management requires: network management, interaction with public stakeholders, pluralism of interests and values, multilevel focus (from local to international) and social learning (understanding each other’s ideas, motives and visions). Transition policy requires a different government role and approach – a government that creates opportunities, reshapes conditions, listens, designs, anticipates, adapts and learns. The Netherlands School of Public Administration (NSOB) and PBL used similar terms in a recently published essay on ‘Government participation in an energetic society’ (Van der Steen et al., 2014). Based on various empirical studies, they believe the main challenge for government is to remove barriers to the successful introduction or continuation of the planned transitions, such as:

- (the power of) vested interests;
- the political accountability culture;

- the risk aversion of civil servants, government officials and politicians; and
- unwritten rules, habits and working practises.

The new role and position of government in a changing society are addressed in more detail in the closing section of this report (Section 9).

Housing and property

Background information and documentation relating to this section can be found in: Van Dam F, Eskinasi M and De Groot C. (2014). Nieuwe uitdagingen op de woningmarkt. Balans van de Leefomgeving 2014 – Part 2 [*New challenges for the housing market*], PBL Netherlands Environmental Assessment Agency, The Hague.

This report and supplementary information can be found at: www.pbl.nl/balans/wonen-en-vastgoed (in Dutch)

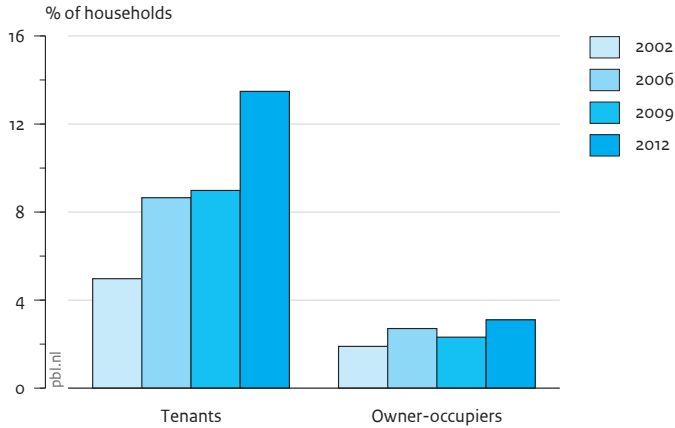
The housing market is a regional market; national government has overall responsibility

Housing markets are regional markets; the match between supply and demand takes place on a regional level. Changes in the housing market are highly dependent on economic developments (such as wealth levels, interest rates and unemployment rates), on demographic developments (particularly in the number and composition of households), on socio-economic developments (the number of double-income families and the flexibility of the labour market) and long-term policy developments. Economic and demographic developments in particular determine the size and nature of regional and local demand for housing. National government is responsible for the housing market system as a whole, and aims to provide sufficient, suitable and affordable housing for all, whereas regional and local governments are responsible for the organisation and spatial planning.

Non-payment risks have increased, particularly among tenants

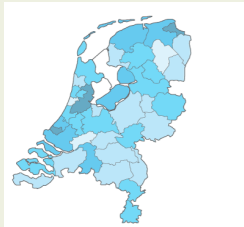
The economic crises is putting an increasing number of people at risk of non-payment of their rent or mortgage, as their disposable income is insufficient to cover rent or mortgage payments as well as the most basic, necessary living expenses. The number of households that run non-payment risks has doubled over the last decade (Figure 2.1), particularly for those who are renting. The number of tenants at risk of rent arrears increased up to 13% in 2012, while the proportion of homeowners at risk of mortgage arrears remained more or less stable. In addition, homeowners that risk mortgage arrears cut costs on the upkeep of their property, which negatively affects the quality of the housing stock. Furthermore, a poorly maintained house can reduce the value of the house as well as that of similar houses in the immediate area.

Figure 2.1
Share of households that have a non-payment risk

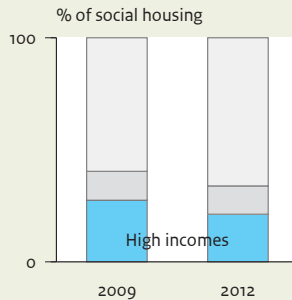


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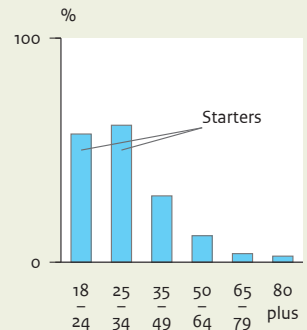
Households with non-payment risk, 2012



High-income tenants in low-rent housing



Potential remaining debt, 2012



Share of housing expenses in household income in European countries, 2012



Source: WBO/WoON; CBS; Nibud; BZK/WB – WoON; adaptation by PBL

www.pbl.nl/balans/tz

The risk of arrears has increased amongst homeowners, and particularly amongst tenants. The highest proportion of households at risk of non-payment is found in the Randstad and in the north of the Netherlands. The proportion (and number) of high-income households in the subsidised rented housing sector also decreased between 2009 and 2012. In the owner-occupied housing sector, 23% of homeowners had a potential residual mortgage debt (when moving house); in the case of young adults this increased to almost 60%. Housing costs are high in the Netherlands compared with other European countries.

Private rental sector needs strengthening

The subsidised rental sector is increasingly becoming the domain of low-income groups, including single young people and the elderly. Although this is who the sector is intended for, the gap that this creates between the rental and the ownership market increases problems for average-income households, particularly in regions (e.g. urban areas) with a tight housing market. A larger private rental sector (both above and below the current liberalisation limit) would smooth out the housing market; however, this segment of the housing market is currently relatively small in the Netherlands. This therefore requires further attention. A larger private rental sector would make it easier for people to move house for their job and could therefore also contribute to a more flexible labour market. The alternative to moving house is to commute, which increases car and train use and thus also the pressure on environmental quality. This issue therefore requires a good level of coherence between housing, employment and mobility policy.

Housing market tax reforms will affect physical housing stock

The regulations concerning mortgage interest tax deduction in the Netherlands were changed on 1 January 2013. This was a huge political breakthrough, as was the introduction of a landlord levy for housing corporations. However, these policy changes, in time, will affect the quality of the housing stock. Housing corporations have said that the landlord levy means they will have less money to spend on renovations and improvements in the areas around their properties, and the stricter conditions mean that new private homeowners need to spend more of their income on mortgage repayments. The result is less money to spend on home improvements and other things. The cut-back of the mortgage interest tax deduction is also expected to dampen future house price increases. The difference between the mortgage debt and the value of the property (the residual debt) will therefore take longer to be absorbed by house price increases and will need to be compensated for through extra mortgage payments.

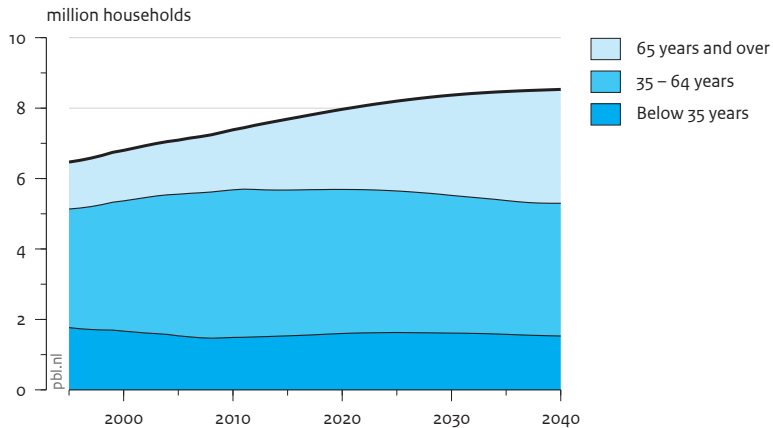
Consumer confidence will benefit from cautious housing policy reform

Housing and housing development policy have become increasingly decentralised in recent years. National government can still adopt a guiding role through financial and fiscal policy (e.g. rent surcharge, mortgage interest tax deduction, landlord levy, general tax policy), as well as at the institutional level through regulations relating to housing corporations, redevelopment and new housing development. Given the increasing financial vulnerability of tenants and homeowners on the one hand, and the vulnerability of the housing market as a whole on the other, the government needs to be cautious in the financial changes it makes. Recently implemented policy measures have removed ambiguity in the Dutch housing market and improved consumer confidence. Both, however, are still too fragile to withstand any abrupt new policy changes.

The housing market is facing a demographic shift

Slowly but surely, the housing market is entering new demographic waters. Increasing numbers of – mainly young – households and high levels of new property development

Figure 2.2
Number of households, according to the age of the breadwinner



Source: PBL/CBS

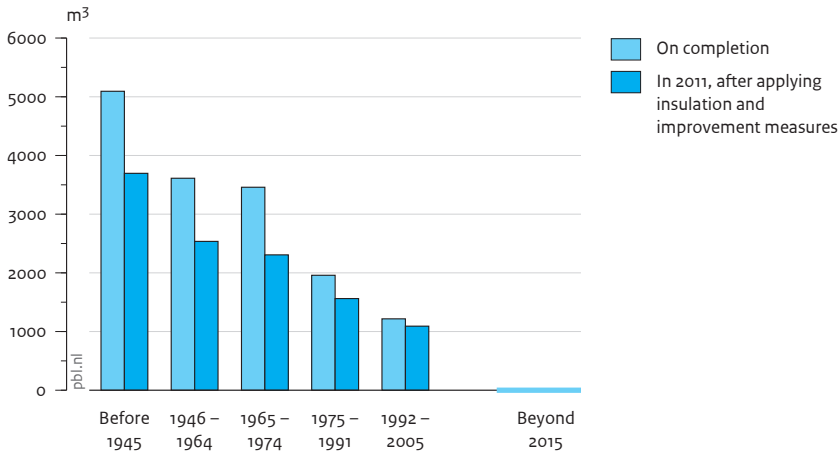
The number of households in which the main earner is younger than 65 will not increase much further, and will decrease after 2020. At the same time, the baby boom generation will gradually leave the housing market. Demand for housing will therefore decrease, and there will be a significant increase in supply. Further information can be found in the digital Assessment of the Human Environment: <http://www.pbl.nl/balans/2201>.

have become the norm in recent decades in the Netherlands. Although the number of households will continue to increase in many regions in the future, this will be mainly due to the increasing number of elderly people (Figure 2.2). In about 10 years' time, the number of young households (people aged 15 to 35) will start to steadily decrease in large areas of the country, also in regions where the pressure on the housing market is currently still high, such as in some cities. At the same time, the large baby boom generation will start to leave the housing market and their properties will become available. Therefore, whereas the demand for housing (by young households) will decrease, the number of existing properties coming onto the market will increase, many of which will require modernisation. Such developments need to be planned for today; the motto 'the future is now' therefore applies in particular to the housing market.

Adapting the housing stock to the demographic shift

The number of people moving house has decreased since the second half of the 1990s, from 12% to the current level of 8%, and this is not expected to increase again at any great speed. Among older households, the percentage of people moving house is less than 5%, and this category will only increase in size in the years to come. Furthermore, demographic changes mean that the demand for new homes will decrease and the supply of existing, private homes (sometimes requiring modernisation) will increase. As a result, the current motto 'build for people moving up the housing ladder' no longer applies, and adapting the existing housing stock to the latest requirements will be more

Figure 2.3
Natural gas use, terraced houses, according to year of construction



Source: Netherlands Enterprise Agency ; adaptation by PBL

The average consumption of natural gas in homes was almost halved during the last 30 years. This reduction can be attributed almost completely to the decrease in gas consumption for heating, as a result of the installation of high-efficiency boilers and better insulation.

important than new housing development. The conversion of existing unoccupied office buildings, shops and other properties may also be an attractive alternative to new housing development. Provinces and, particularly, municipalities need to take into account the predicted changes in household composition on a regional level, which may vary significantly between regions. This will enable needs to be met in the short term, while avoiding overproduction and even vacant properties in the long term, in the least desirable sections of the housing stock.

Quality of urban environment and properties has improved

The Dutch Government has been highly proactive in matching demand and supply on the housing market over the last few decades, first regarding quantity, but later also quality. It has also strongly encouraged home ownership. Together with the rapid increase in the number of households, there has also been a large increase in the housing stock in the Netherlands since the 1970s. Compared with other countries, the Netherlands has seen a remarkably rapid increase in home ownership in recent decades, which now lies at 60%, although this figure is even a little higher in most neighbouring countries. New property development and redevelopment have had positive effects

on the quality of the housing stock and its surroundings, also from an international point of view. The energetic quality of the housing stock has also measurably improved (Figure 2.3). The vast majority of people are pleased with their homes, both in terms of the space in and around their homes and the quality of the construction. They are also generally satisfied with the public parks and gardens, facilities and local public transport, although in 2012 they were slightly less satisfied in several areas than before.

Future improvements in the living environment under pressure

In the past, municipalities paid for redevelopment and improvements to facilities and public spaces out of the profits they made from their active land-use policy. However, the credit crisis and stagnation in the new property development market means profits can no longer be made in this area. Given the predicted negative developments in the number of households (slight growth or even decline) in many municipalities and the corresponding reduction in the demand for housing, this could have repercussions in some municipalities for investments in the quality of the living environment. Increasingly, critical investment choices therefore need to be made on a local level.

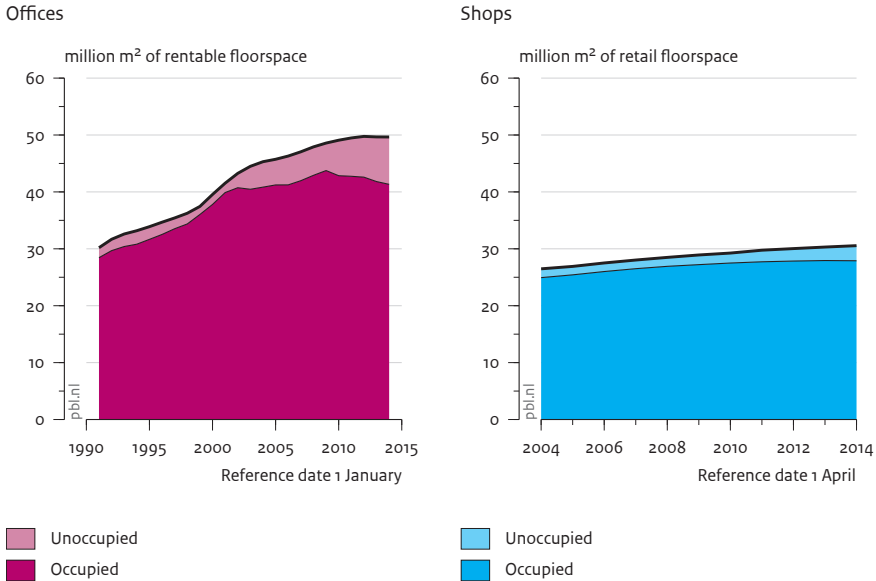
Climate change requires changes to be made to housing stock and town planning

Climate change issues also affect the demands made of houses and urban planning. There is a huge potential for energy saving in the built environment, and making use of this would significantly reduce the emission of greenhouse gases. However, the insulation of existing properties is progressing extremely slowly (also see Section 3). It would also make sense to ensure that urban design anticipates temperature increases and larger fluctuations in precipitation. This can be done, for example, by including public parks, gardens and water features in town planning and by making changes to sewage systems and roads. If municipalities, project developers, housing corporations and private owners consistently take future climate change into account in the investments they make in buildings and urban facilities today, the additional costs can be curbed. Many European cities have experienced flooding in recent years. If in the Netherlands we wait until the manhole covers are floating down the streets before making changes to urban design, this will ultimately cost much more than if we were to combine climate adaptation measures with ongoing spatial investments. It is the municipalities who need to take the lead in this.

Unoccupied shops and offices a structural problem

New figures show that the number of unoccupied shops and offices increased again in 2013. In both cases, the increase totalled 1%. In early 2014, 17% of the office floor space was unused, and for retail this was 9% (Figure 2.4). For both shops and offices, long-term unoccupancy (more than three years) has increased considerably. In early 2014, unoccupied office space was a long-term issue in over 50% of cases; in the retail sector in more than one third.

Figure 2.4
Office and shop stocks and unoccupancy rates



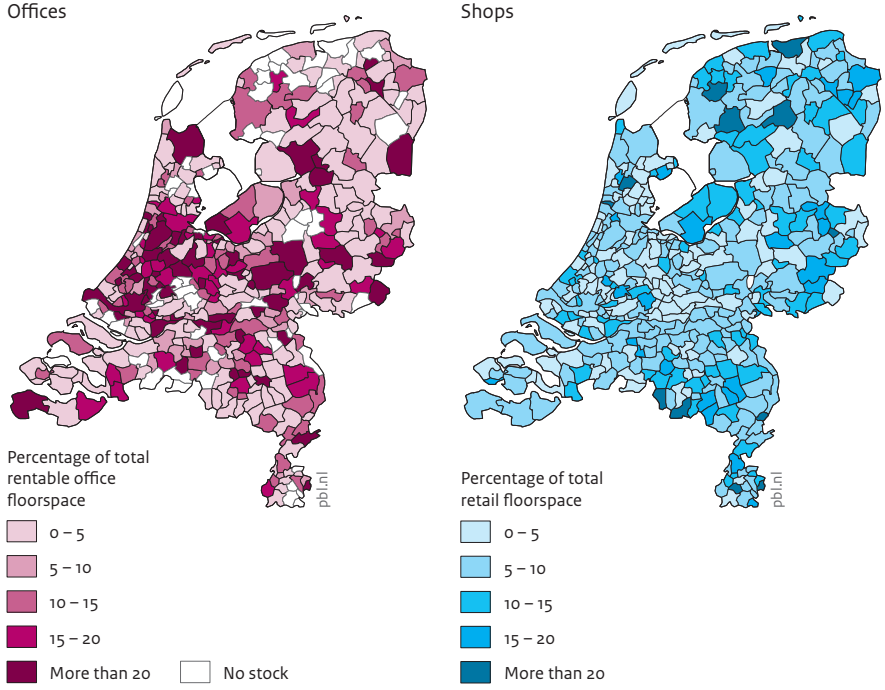
Source: Bak; Locatus; adaptation by PBL

Office and shop vacancy levels increased again in 2013. One of the main reasons for the long-term decline in demand for office space and physical shops is the increasing use of ICT. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/2221.

Long-term unoccupancy becomes a social problem if it negatively impacts the local area, the rest of the town or parts of the town. This may be the case, for example, if several shops remain unoccupied for a long time and this threatens to affect other shops nearby. The danger is that a downwards spiral of degeneration and decline is set in motion. The same applies to office parks in which not just several floors but whole buildings are left unoccupied for a long time. The challenge then is for government, and of course the various owners, to think about how to reverse the process, possibly through redevelopment and conversion (Buitelaar, 2014).

There are large regional differences in vacancy levels of commercial properties (Figure 2.5), with more unoccupied offices in the Randstad and more empty shops in regions along the periphery of the Netherlands.

Figure 2.5
Unoccupied offices and shops per municipality, 2014



Source: Bak; Locatus; adaptation by PBL

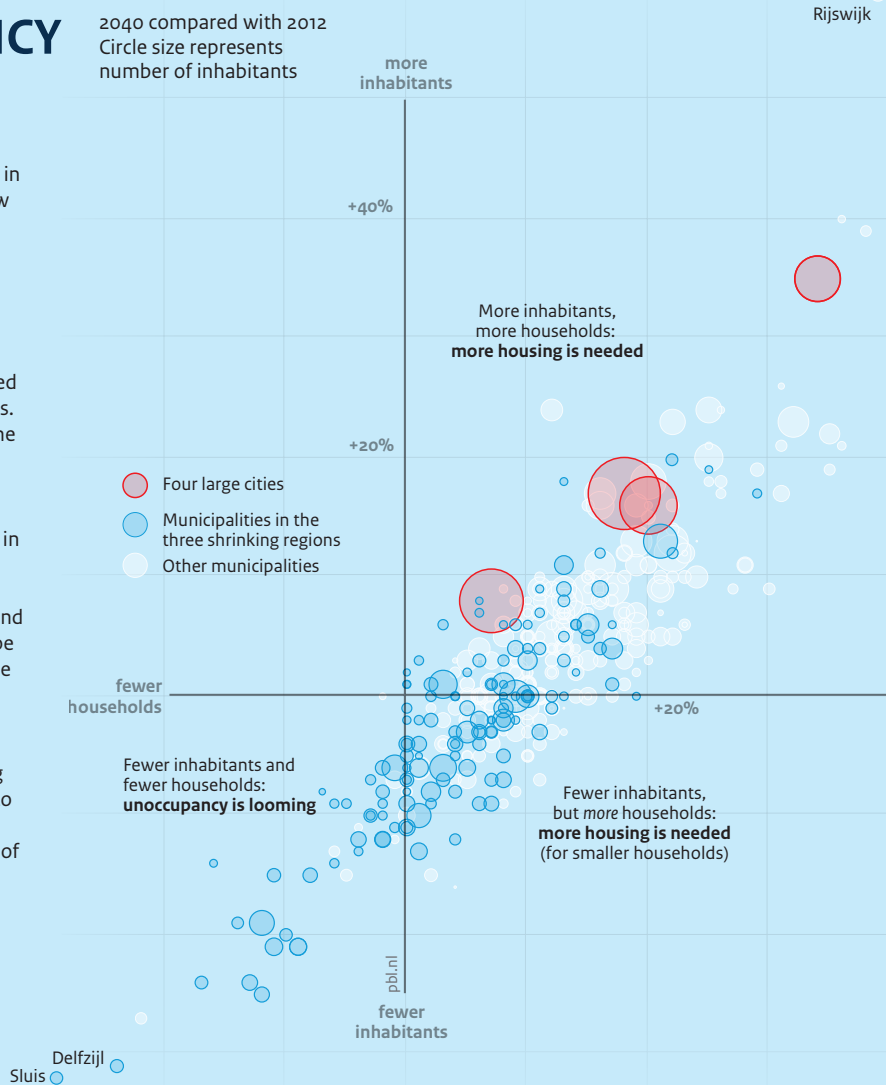
More unoccupied offices are seen in the Randstad and more empty shops in peripheral regions. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/2221.

PREVENT UNOCCUPANCY

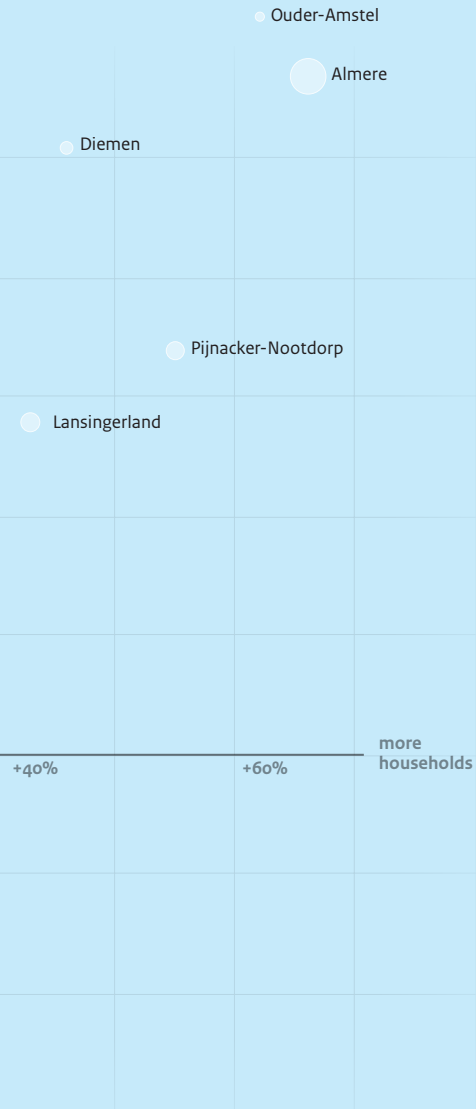
Both the population and the number of households will increase in the decades to come in many municipalities, so that new homes will be required (PBL, 2014c). There will also be municipalities in which both the population and the number of households will decrease; fewer homes will be needed here, and some may need to be demolished to avoid high unoccupancy levels. Finally, in some municipalities the population will decline but the number of households will increase; extra homes will therefore also be needed here – in particular homes suitable for smaller households. Strong growth in both the population and the number of households will be seen in the four large cities of the Netherlands, in some smaller municipalities surrounding the larger cities and in towns in the Randstad. This is because young people looking for somewhere to live will look for a house in the Randstad, as this is where most of the opportunities for work and study are to be found.

Relationship between population and household developments

2040 compared with 2012
Circle size represents
number of inhabitants



Source: PBL 2014



It is however not easy to find a house in the Randstad. This is because many houses are occupied by people who will retire in the coming years – the baby boom generation. Older people are generally less mobile and stay where they raised their families, for example in the new suburban areas of the 1970s and 1980s or in the overspill towns. Few homes will therefore come onto the market in these areas for young couples and families. New development may be one solution, but is particularly expensive in the cities and towns of the Randstad. A huge effort is therefore going to be needed to guarantee a home for everyone in the cities. Decline in both the population and the number of households will mainly take place in the municipalities at the edge of the Netherlands and in rural areas. Home unoccupancy could therefore become a problem in these areas. This can already be seen in large parts of Groningen, where homes are left empty and cannot be sold. To avoid any further problems on the housing market, these ‘rotten apples’ could be demolished. Removing the bottom end of the housing stock leaves the best homes

over, which is good for the quality of the housing stock. However, population decline does not necessarily result in fewer households in a municipality. Although a stable or shrinking population is expected in the smaller municipalities in the Randstad and elsewhere in particular, extra homes will still be required for extra households. The number of households may for example increase as young people buy their own homes or when couples get divorced. The number of houses coming onto the market will be limited as many elderly people will continue to live in their own homes. These homes will of course become available over the coming decades as the baby-boomers slowly leave the housing market. It would therefore seem to make sense to build different types of houses: fewer for families and more for couples and single people.

Energy

Background information and documentation relating to this section can be found in: Ros J and Boot P. (2014). *Recente ontwikkelingen in het klimaat- en energiebeleid [Recent developments in climate and energy policy]*. Balans van de Leefomgeving 2014 – Part 3, PBL Netherlands Environmental Assessment Agency, The Hague.

This report and supplementary information can be found at: www.pbl.nl/balans/energie (in Dutch)

The Cabinet has requested that the Energy Research Centre of the Netherlands (ECN) and PBL publish an annual National Energy Outlook (*Nationale Energie Verkenning (NEV)*; ECN/PBL, 2014). The Energy Outlook focuses in particular on the 2020–2023 period, while also looking ahead to 2030; the 2014 edition was published not long after the Dutch version of the assessment report (in October 2014). In this Assessment of the Human Environment, the analysis concentrates on long-term policy (beyond 2020–2030), with an eye on long-term ambitions for 2050. The energy system is particularly slow, so that decisions taken today often only have an effect later. As far as this system is concerned, therefore, the future is now.

The Dutch energy system has a crucial role to play in limiting national greenhouse gas emissions. This fact was recognised as early as in 2001, when Cabinet announced an energy transition in its fourth National Environmental Policy Plan (NMP₄; VROM, 2001), with the aim to achieve a significant long-term reduction in greenhouse gas emissions. Based on the results achieved since publication of the NMP₄ regarding the renewable energy share and the implementation of innovative processes and products, it is not yet possible to speak of a dynamic transition. Reasons for this are the lack of focus on long-term changes to the system in energy policy as well as the involvement of companies with many interests in fossil fuels (large vested interests).

Meanwhile, it is generally accepted that Western countries will need to reduce their greenhouse gas emissions by 80% to 95% between 1990 and 2050, if they are to limit global warming to 2 °C. In the Netherlands, the most significant results achieved so far have been the reduction in emissions of nitrous oxide from nitric acid factories and methane from dairy farms. CO₂ emissions (mainly from energy consumption and

representing over 85% of all greenhouse gas emissions in the Netherlands) have increased slightly since 1990. The increase in CO₂ emissions due to economic growth were partly compensated by an average annual energy saving of roughly 1%. The Netherlands is therefore still a long way from achieving the reductions required to limit its contribution to climate change.

Consensus approach achieved a broadly supported agreement ...

The Energy Agreement for Sustainable Growth, brokered by more than 40 organisations in 2013, is generally regarded as a significant achievement in the energy field (SER, 2013). The way in which the agreement was drawn up is unique, as not the government, but the Social and Economic Council of the Netherlands (SER), took the lead. However, the agreement looks no further ahead than 10 years, lacks a powerful, universally supported greenhouse gas emission target for 2050 and barely addresses the energy transition. The agreement was not just about climate targets, but also focused on higher levels of investment, more jobs and the strengthening of the economic structure. The cost reductions that this achieved compared with the approach taken in the Coalition Agreement was presented as an important result.

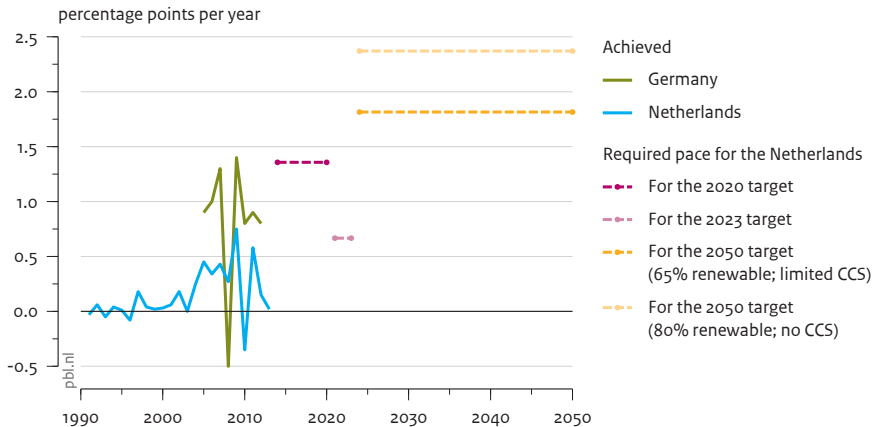
The choices made in the agreement affect the speed with which clean technologies are being introduced. For example, the original Coalition Agreement target of 16% renewable energy by 2020 was reduced to the European target of 14%. The Energy Agreement aims to increase the rate of energy saving to 1.5% per year, which is also roughly in agreement with the European approach to energy efficiency improvements. The National Energy Outlook has analysed whether the planned approach will result in these targets being achieved.

... but these are small steps

The renewable energy share in the Netherlands was 4.5% in 2013. If the Netherlands is to achieve a reduction in greenhouse gas emissions of at least 80% by 2050, a renewable energy share of 40% to 80% will be required as we move towards 2050. The exact share will depend on energy consumption levels and the amount of CO₂ storage. This means that the renewable energy share needs to increase rapidly – much faster than at present (Figure 3.1). The target for 2020, therefore, represents an enormous challenge. If the 2020 target is to be achieved, the proposed follow-up target of 16% for 2023 represents a reduction in speed, which conflicts with the long-term objective.

As shown in Figure 3.1, it will be very difficult to achieve greenhouse gas ambitions without the application of carbon capture and storage (CCS). However, developments in CCS are slowing down as it is not an option that attracts a great deal of interest. Reasons for this include the extra costs involved in CCS, the greater dependence on energy commodities and the safety concerns felt by many. Preparing CCS for implementation also requires large efforts to be made in the form of pilot projects and demonstration projects. This is a necessary, but as yet absent, part of a strategic energy policy.

Figure 3.1
Increase in the renewable energy share and the pace required to achieve policy targets



Source: PBL, CBS, Eurostat

The current rate of increase in the renewable energy share in the Netherlands is too low to achieve the required targets.

The Energy Agreement, however, does no more than announce a vision for the role to be played by CCS. If the Netherlands is to achieve its long-term objectives for greenhouse gas emissions without the use of CCS, the renewable energy share will need to increase by an average of over 2 percentage points annually, after 2020. This is a huge challenge, given that no other country has even come close to achieving such an annual increase, not even countries such as Germany. The dependence on renewable energy sources such as wind and solar could be reduced by using nuclear energy; however this involves large risks to the environment and is not named as an option in the Energy Agreement.

To achieve a renewable energy share of 14% (EU target) by 2020, large investments in wind on land and at sea are required in the short term. In their ex-ante evaluation of the Energy Agreement, PBL and ECN (2013) made the point that this is a very ambitious target, particularly given the local opposition to wind farms on land and the precondition that wind energy at sea needs to be 40% cheaper to be eligible for SDE+ subsidies. Nevertheless, the first progress report (SER, 2014) was optimistic regarding the effort being made by the parties involved. However, the fact that pension provider APG recently pulled out as an investor in wind energy at sea has made the challenge considerably larger. The particular focus on wind energy at sea in the Energy Agreement is nevertheless an important gain. This form of renewable energy must compensate for another precondition, namely that of a reduction in the contribution from co-fired biomass. As it is unclear whether enough sustainably produced biomass can be made

available (there are as yet no sustainability criteria governing this), this is considered a sensible approach in the current context.

Despite this, the Energy Agreement still provides too little prospect of success regarding the challenges facing the Netherlands. These challenges relate not just to a low-carbon energy supply but, more importantly, to a new form of heat supply in buildings and – even more important in terms of scale – industry. A low-carbon heat supply needs to focus on more energy-efficient processes, buildings, vehicles and products, as well as on obtaining more heat from electricity (possibly using hydrogen) and more decentralised electricity supplies based on ambient heat.

As far as energy saving is concerned, not enough concrete agreements have been made in the Energy Agreement regarding the measures needed to achieve the target set in the Energy Agreement for 2020 (PBL and ECN, 2013). The details for the various sectors are yet to be specified. One main point of discussion, however, is that of stricter compliance with an existing provision in the Dutch Environmental Management Act (*Wet milieu-beheer*). This provision obliges all companies to implement energy-saving measures that can be earned back within five years, and already applied prior to the year 2000. Even so, no concrete agreement has been made, and the conclusion can only be drawn that companies do not automatically implement such measures. The financial return is apparently not enough of an incentive, and in some cases even a drawback. The fact that companies would be contributing to the energy transition is apparently also not enough of an incentive.

The potential for energy saving in heating homes and offices is high, although a clear distinction needs to be made between existing and new properties. From 2020, all new buildings must be energy-neutral, which means that the effect of this in terms of total energy saving will depend on the number of new buildings. The effect could be limited, given that the demographic transition will drastically reduce the demand for new homes after 2020 (Section 2). Energy saving in buildings therefore needs primarily to come from the insulation of existing buildings, and this is where policy falters. The government needs to introduce new instruments to encourage tenants and homeowners to insulate their homes. One instrument could be to oblige buyers to ‘upgrade’ any house they buy, with energy-related investments included in the house purchase. However, such a measure is difficult to implement, particularly now that the Dutch Senate has rejected a bill obliging sellers to provide an energy label for their home.

The introduction rate of renewable heat also needs to increase significantly to achieve the long-term objective (Figure 3.1). Heat pumps, green gas, solar heating, geothermal energy, power-to-heat; these are all options that could make a substantial contribution. However, most of these options are still in the development stage. It is not just the technology that can be improved and therefore made cheaper, but consumer awareness of and confidence in such technologies also needs to increase before parties are prepared to implement them on a large scale. This is barely addressed in the Energy

Agreement, which means that the agreement fails to lay the foundations for the required 'heat transition'.

The challenge is to continue what has enthusiastically been started

From the point of view of the energy transition, several positive developments have been set in motion prior to (and in some cases adopted by) the Energy Agreement.

One example is the energy-saving measures that must be implemented in new homes.

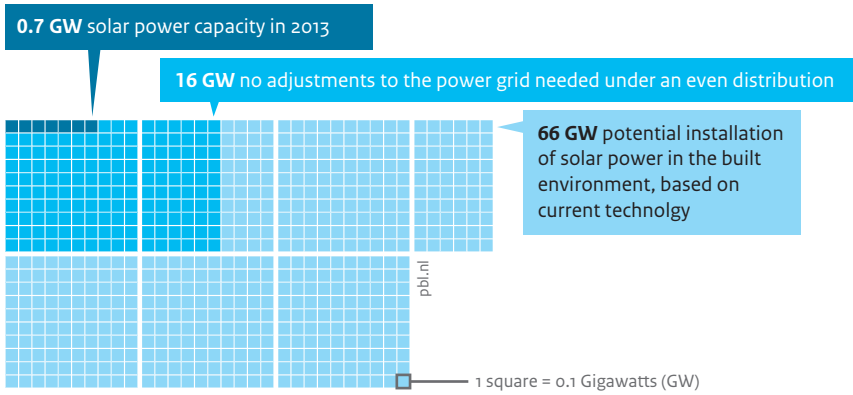
Other examples are:

- the *Stroomversnelling* initiative: 110,000 energy-neutral rented homes in 5 years' time;
- a significant increase in solar power in buildings, due to the net metering scheme and the decrease in the price of panels, representing 0.1% of the total energy consumption in 2013 (Figure 3.2);
- an increase in the number of local energy cooperatives, although the small scale on which they operate means they are limited in their ability to achieve much (Elzenga and Schwencke, 2014). Furthermore, local initiators feel insufficiently supported by the government; for example, with regard to the 'postcode scheme' for solar PV – the possibility of developing the scheme based on practical experiences is currently being examined;
- a rapid increase in the number of electric and – in particular – hybrid vehicles, due to the tax advantage offered (low tax liability for the private use of company vehicles) and a stronger public-private partnership. Even so, more vehicle charging points are required, lease drivers are not interested in charging their cars at home if the employer pays for fuel, and there are still no agreements in place regarding the monitoring of practical experiences required for this transition;
- support for several geothermal energy projects.

These initiatives lay a good foundation for the required energy transition, but an action plan is required for an effective, widely supported next step. This plan of action is also required to ensure that policy is not seen as being inconsistent. However, this does not mean that policy may not change. What is important is that it responds to new insights. Consistent policy assumes a long-term vision; for example, short-term objectives should not get in the way of the planned energy transition. The Energy Agreement includes just a few targets that focus on developing a vision and a plan of action. An important point of consideration for the committee (under chairmanship of former Minister of the Environment, Ed Nijpels) is therefore that the visions also include a short-term plan of action that focuses on the long term and the policy support this requires.

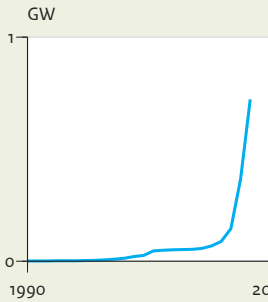
It is important that technologies that are only required after 2020 – or possibly even after 2030 – to achieve the energy transition must actually be available when the time comes. They must also be cheap enough for their large-scale implementation, as only

Figure 3.2
Solar power

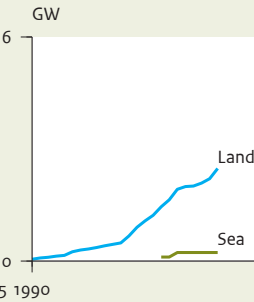


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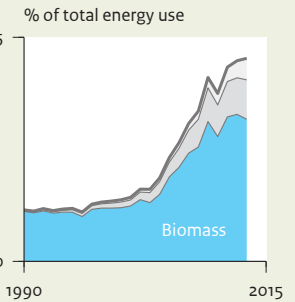
Solar power capacity



Wind power at sea and on land



Renewable energy



Share of renewable energy in European countries, 2013



Source: DNV GL/PBL; CBS

www.pbl.nl/balans/t1

Innovative options for a low-carbon energy system, such as solar power and wind power at sea, were barely represented in 2013 but are important for the future energy supply. Biomass combustion and wind power on land are currently important sources of renewable energy. However, the renewable energy share is very low in the Netherlands compared with other European countries, partly due to the lack of a large-scale hydroelectric power scheme.

then will it be possible to achieve the ambition for 2050 in a cost-effective way. There is therefore still much to be done regarding the development of the required technologies so that they can be implemented as soon as possible.

The energy transition has begun and may be painful

Investments in wind at sea, solar panels and electric vehicles, for example, mainly involve costs in the short term – for the treasury, the general public and energy companies. The benefits come later. This applies of course to any investment, but to the energy transition in particular. The radical renewal of the energy system will not be easy – technically or institutionally – and is certain to hurt. Some compare it to the post-war reconstruction in the Netherlands, or call it an evolutionary revolution. Much of the current energy system is based on coal, oil and gas, and this is unsustainable in the long term, not only because CO₂ emissions need to be drastically reduced, but also because gas reserves will run out in the Netherlands, increasing the dependency on unstable regimes. Strategy therefore needs to focus on reducing the role of fossil fuels, which excludes shale gas extraction. The focus needs to be on more renewable energy, but this still involves high levels of uncertainty. For example, it is unclear what the long-term global potential is for sustainably produced biomass as an energy commodity. It is also unclear how long it will take before wind power at sea is able to compete with conventional power stations. Such prospects and uncertainties already have a large effect on investment decisions; the future is now.

Electricity from renewable sources makes the electricity supply vulnerable to fluctuations in wind and solar power that are beyond our control. To be able to compensate for such fluctuations (and guarantee a constant supply) the Netherlands currently depends on flexible gas- and coal-fired power stations. Renewable energy is also more expensive per kilowatt hour; electricity from solar cells and wind farms at sea is currently two to four times as expensive as electricity from a coal-fired power station. In addition, the gas- and coal-fired power stations will produce less electricity per year if a large amount of wind energy is produced in the Netherlands (and is in fact already being imported from Germany). This will only increase the annual interest and depreciation costs per kilowatt hour. However, we must not let this put us off. After all, the costs will go down again once wind turbines and solar panels become cheaper and more efficient and as the electricity network becomes more flexible and cheaper electricity storage technologies are introduced.

A smart energy innovation policy can significantly reduce the cost of the transition to renewable energy sources. Such a policy requires international agreements regarding subsidy schemes and electricity networks, new partnerships in production chains and national coordination between R&D and the implementation of clean technologies. Coordination on an EU level will undoubtedly take longer, so that it would be quicker to aim for further coordination within north-western Europe.

Innovations in wind turbine technology will not prevent wind turbines from negatively affecting the landscape. This is where the transition pain lies for the general public, as people are attached to their view or are affected by the shadow and the noise of the turbine blades. It has been shown that if people have input into the location of turbines and a share in the financial benefits of the wind power generated, this can help compensate for these negative effects. As described in the Energy Agreement, participation plans therefore need to be drawn up before a project is started – a provision that will also be included in the new Environment and Planning Act (*Omgevingswet*).

In addition to technological innovation, institutional market innovation is also required. After all, in the current, liberalised electricity market, an increase in solar and wind energy will result in a lower wholesale price for electricity. This means that investments in solar and wind energy will remain dependent on (unpredictable) government subsidies, even if the system costs begin to go down. This low electricity price is currently reinforced by low economic growth, an overcapacity in conventional power stations and low carbon credit and coal prices. As a result, gas-fired power stations are being closed. Unfortunately, these are the power stations with relatively low CO₂ emissions that are suitable in the short term for compensating for the fluctuations in wind energy. Here the transition pain is expressed as loss of capital due to the forced write-off of fossil-fuel power stations. Even efficient CHP plants are becoming uneconomic due to the combination of high gas and low electricity prices.

This is, to some extent, an unavoidable part of any radical transition. However, the government can also intervene to soften the blow. If it considers it undesirable to close gas-fired power stations before coal-fired power stations, this requires specific policy, such as changes to the European Emissions Trading System to increase the price of CO₂. If this takes too long, legislation could be an alternative. To encourage the energy transition, it is important to focus on the options of the future, such as energy storage, power-to-heat or power-to-gas, and on a better match between electricity supply and demand with our neighbouring countries. Changes are also required on the electricity market, to make it more flexible, to reward a clean, reliable supply and to reassure investors in renewable energy that they will earn a return on their investment.

Sustainable energy; large commitment required now

Transitions demand courage and leadership; for example, in the form of a clear, strongly supported objective for the long term. Although examples of this can be found in Germany and Denmark, such a long-term objective cannot yet be seen in the Netherlands. Transitions also take time; time to develop new, affordable technologies, time to overcome the opposition of vested interests and time to construct and implement new systems. These elements make it almost impossible to achieve the original target of 16% renewable energy by 2020. The fact is that this objective was embarked on much too late. The introduction rate of renewable energy must, as was said earlier, increase.

It is important that the government deals with the transition pain in the right way. Should transition pain be a reason to slow down the change process, or does it present challenges for which solutions can be found to continue the transition? Some of the struggle that this entails was seen during negotiations for the Energy Agreement. The result is not the final decision as far as the transition is concerned, but at the most the prelude, which quickly requires further development.

If we are to continue to make the required progress, there needs to be a greater focus on the development of affordable low-carbon technologies than is currently the case in the Energy Agreement and the Energy Top Sector. Of course, not all this technology needs to be developed in the Netherlands, but it is crucial that the Netherlands takes part in the process so that it can rapidly implement innovations and ensure that its companies can make use of the opportunities they provide. Without robust European policy, however, this will not be possible. Furthermore, plans (for example concerning the energy infrastructure) need to be coordinated throughout north-western Europe. Finally, the Netherlands could do more to implement energy-saving measures that are already profitable. This applies in particular to existing buildings and companies that do not participate in the emissions trading system (ETS).

Food and agriculture

Background information and documentation relating to this section can be found in: Van Grinsven H, Van Eerdt M and Westhoek H. (2014). Landbouw en voedsel [*Agriculture and food*]. Balans van de Leefomgeving 2014 – Part 4 (in Dutch), PBL Netherlands Environmental Assessment Agency, The Hague.

This report and supplementary information can be found at: www.pbl.nl/balans/voedsel-en-landbouw (in Dutch)

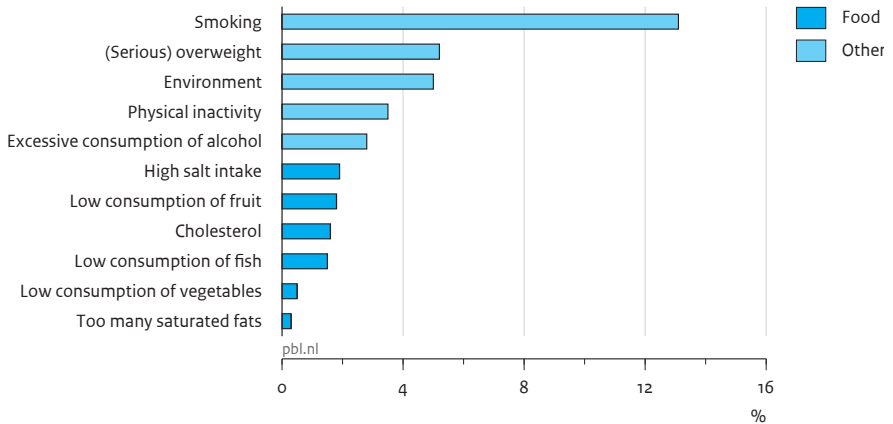
Food production has a large impact on the human environment

The current food production system (both in the Netherlands and the rest of the world) affects the environment in many different ways. Worldwide, food production is responsible for more than 60% of global biodiversity loss to date, about 25% of global greenhouse gas emissions and a large proportion of the algal blooms and dead zones in the marine environment. The growing world population and the growing middle class in developing economies switching to a Western diet means that food production levels in 2050 will need to be 50% to 70% higher than in 2010. At the same time, greenhouse gas emissions need to be reduced and biodiversity loss (in accordance with the UN Convention for Biological Diversity) must be halted. This therefore represents a huge challenge; in the first place, because sufficient, healthy, tasty food is one of the bare necessities of life. In addition, the food business is an important economic activity, also in the Netherlands.

Production of imported food and feed harms biodiversity in other countries

Dutch agricultural and horticultural activities use an area of 1.85 million hectares. About half of this is used for Dutch food consumption; the other half is used for export and the production of non-food crops. In addition, over 1.5 million hectares of agricultural land in Europe are used for Dutch food consumption, as well as almost 2 million hectares outside Europe (mainly in South America, Southeast Asia and Africa). This means that a quarter of a hectare (a third of a football field) is required to produce the food for each person in the Netherlands. Although this land-use area is steadily decreasing as production efficiency increases, the greatest risk to biodiversity loss is direct and indirect land use outside Europe, where increased production often results in the

Figure 4.1
Contribution of risk factors to disease burden



Source: RIVM 2014

Food-related factors are responsible for 5% to 10% of the disease burden in the Netherlands. Further information can be found on the webpages of the Assessment of the Human Environment: www.pbl.nl/balans/4000.

excessive use of plant protection products and the conversion of species-rich natural areas such as tropical rainforests.

Food is of high quality, but dietary choices harm health

The food produced in the Netherlands is of a high quality. Food products are available in large quantities and consumers can choose from a wide range of products at relatively low prices. Food is also generally safe for consumption. Nevertheless, unhealthy food choices can damage health. For example, the Dutch consume too much protein (70% more than the recommended amount on average), not enough vegetables, fruit and fish, and too many calories and saturated fats. These poor dietary habits are responsible for 5% to 10% of the annual disease burden (Figure 4.1). A reduction in the consumption of animal products is in line with the Health Council of the Netherlands' advisory report *Guidelines for a healthy diet: the ecological perspective* (Gezondheidsraad, 2011). It is interesting to note that the government does very little to influence dietary habits, in contrast to its attempts to influence consumer behaviour relating to environmental pollution and alcohol consumption, which have a smaller effect on the burden of disease (about 5% and 3% respectively).

Dietary changes can increase the sustainability of the food supply

Changes in production methods as well as consumption may reduce the environmental pressure caused by the food system. If the Dutch were to halve their consumption of meat and dairy products, the amount of land required for food production would be

reduced by a quarter (PBL, 2013a). This would also lead (on a global level) to a reduction in greenhouse gas and nutrient emissions. Reducing meat and dairy consumption (and increasing that of fruit and vegetables) would mean less land would be required to produce a more healthy range of food, which would benefit both public health and the environment. A reduction in food waste would also reduce the pressure on the environment. Currently, about 13% of the food purchased (excluding bones and peelings) is not consumed, and more than two thirds of this is either not prepared or is thrown away untouched.

The certification of products and product chains helps consumers distinguish between more and less sustainable products. In general, it is the more environmentally aware consumer who is prepared to pay extra for a more sustainable product. The market share of organic and animal-friendly food increased from 2.7% in 2009 to 6.1% in 2013, mainly due to a rapid increase in meat produced at livestock farms that ensure higher animal welfare. One of the reasons for this increase is that some supermarket chains now only sell pork with a certification label. In 2013, 30% of all pork had an animal welfare quality standard mark. From 2020 onwards, Dutch supermarkets want to sell only pork and poultry with an animal welfare certification label. It is however unclear whether this will greatly improve animal welfare. What is known is that animal-friendly meat requires more feed per animal and therefore more land for feed production. The example of pork illustrates how important it is to increase the demand of supermarket chains for certified products. In some cases, however, it is not enough. For example, 40% of the global coffee production is sustainable (certified or verified), while only 15% is sold as such (Panhuysen and Pierrot, 2014).

Experimental behaviour research (Vringer et al., 2013) shows that consumers are prepared to pay more for sustainably produced food, in particular if more people buy sustainable products, increasing the sustainability gain. Introducing standards is therefore more effective than informing the consumer. There is little opposition to the introduction of standards; particularly if the government explains why it is introducing the standards, applies reasonable criteria and ensures that everyone adheres to the standard.

The government and organisations can encourage more sustainable food consumption

Changes to consumption patterns can have large social benefits, such as improved public health and fewer environmental impacts. Most changes need to be made to the diet in general (the amount of meat, fruit and vegetables consumed per person), as well as to individual products. Organisations and governments are reluctant to point out the effects of food choices to consumers. After all, organisations do not want to lose customers and governments do not want to limit people's freedom. There are however exceptions. For example, there are retail chains that only sell 'higher standard' products, such as sustainable fish (MSC) or products that are more animal-friendly. The Dutch Guild of Chefs encourages a 'Dutch cuisine' that uses more fruit and vegetables,

less meat and fish and more regional products, and supermarkets are looking for ways to increase the sustainability of the food chain on a voluntary basis. In 2013, the Sustainable Food Alliance (*Alliantie Verduurzaming Voedsel*), which includes key partners from agriculture, retail and catering industries, presented an agenda for the 2013–2016 period that included ambitions to improve the sustainability of the meat production chain and reduce wastage. This agenda could help increase the level of responsibility for sustainability both felt by and support by the business community. It is however important to ensure that increased sustainability is not determined by the slowest link in the chain and that difficult choices are not put off.

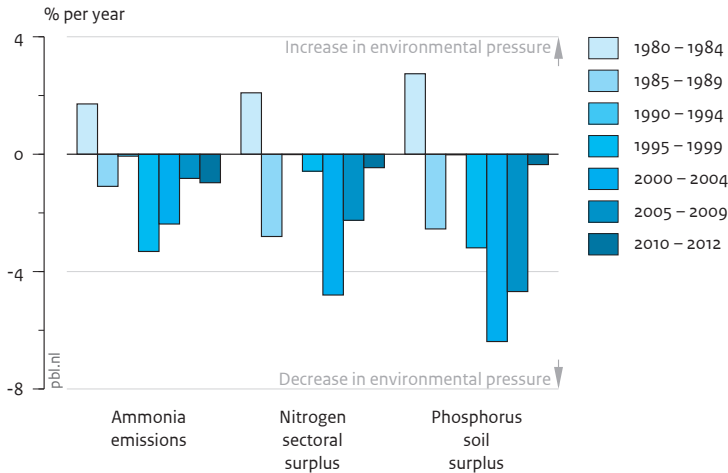
There are several ways in which the government can contribute to a more sustainable and healthy diet. One such way is to follow European initiatives and make it clearer to consumers and organisations what the environmental footprint is of different food products. It could also draw up agreements with supermarkets and restaurants to reduce the environmental footprint of food and encourage the consumption of healthier food. The various parties could then develop these ideas, by changing diets, cutting food wastage (also by consumers) and/or improving production methods and product formulations.

Environmental footprint of Dutch agriculture greatly reduced but now levelling off

Specific demands are made of food production in the Netherlands, through legislation (EU and national), from public organisations and through the purchasing decisions made by organisations and consumers. Such demands relate for example to the emission of pollutants, the housing and treatment of animals (animal welfare, use of antibiotics) and the impact on the landscape (outdoor livestock farming, factory farms, wild field borders).

Pollution from agriculture was reduced considerably between 1990 and 2005. However, emissions of nitrogen, phosphorus and ammonia decreased much less over the last 5 to 10 years than in the previous period (Figure 4.2). Nitrate concentrations in the upper groundwater have also remained more or less constant since 2002, but in the southern sandy region they are still 1.5 to 2 times higher than the EU nitrate standard. Nitrogen concentrations in waters affected by agriculture have decreased by about 30% over recent years; phosphorus concentrations on the other hand have shown no further significant decrease since 1995. The pollution of surface waters by plant protection products has not decreased much since 2000, despite standards often being exceeded. The number of locations at which standards were exceeded remained constant since 2010. As far as substances subject to the European EQS standard are concerned, this is 25% of the monitoring sites. The use of antibiotics in livestock farming more than halved over the last five years, which means that the policy target for 2013 was more than achieved. Resistant pathogens are still found in 80% to 90% of farm animals, but there are signs that the prevalence of multiple resistance is decreasing.

Figure 4.2

Change in environmental pressure from agriculture and horticulture

Source: Statistics Netherlands (CBS); Pollutant Release and Transfer Register (PRTR); adaptation by PBL

Annual emissions of ammonia, nitrogen and phosphorus increased up to 1987, after which fertiliser and ammonia policies ensured a period of significant emission reductions. Annual emission reductions have decreased since 2000.

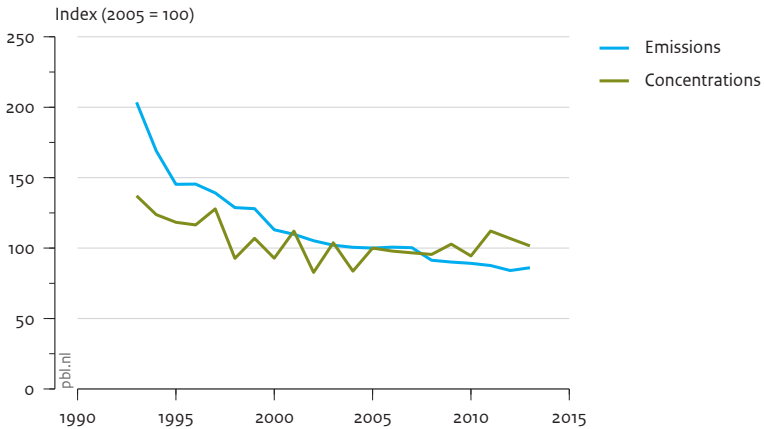
Emission reductions limited by financial capacity of the agricultural sector

Increasing the sustainability of agricultural production often leads to higher production costs that farmers are usually unable to pass on to their buyers. This is one of the greatest barriers to improving sustainability in this sector. Although farmers may be able to compensate for the extra costs incurred by emission limits and animal welfare improvements by reducing average production costs through expansion, this is not always an option. Furthermore, expansion often negatively impacts the countryside. While the environmental demands made of the agricultural sector have increased over recent decades, the financial capacity and international competitive position of the sector have also constantly been taken into account. For example, it is not possible – at the express request of the Dutch parliament (Van der Vlies & co. motion (Dutch House of Representatives, 2007)) to oblige the agricultural and horticultural sectors to take any more measures to meet the objectives of the Water Framework Directive.

Are ammonia emissions really decreasing?

A discrepancy has developed over recent years between calculated ammonia emission trends and the concentrations measured in the air (Figure 4.3). This calls into question the effectiveness of (and compliance with) ammonia policy, the accuracy of calculation models and the representativeness of the measurements. From 2009 onwards, emission calculations have assumed partial compliance with regulations governing the use of air scrubbers in animal stalls. In addition, full compliance with regulations

Figure 4.3
Ammonia emissions and concentrations



Source: RIVM 2014

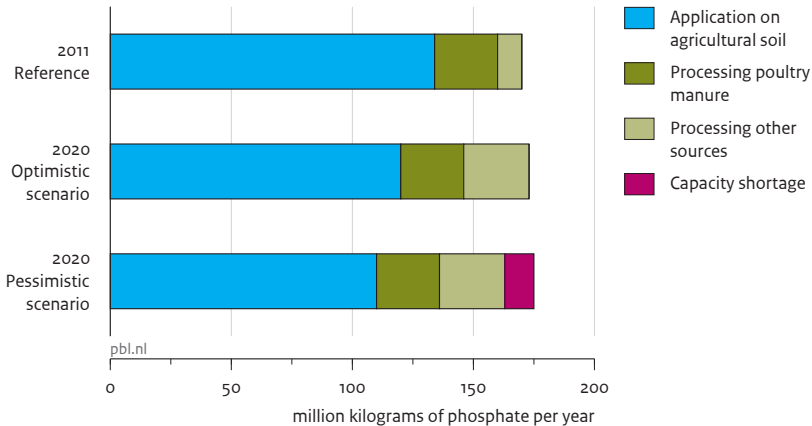
Measured ammonia concentrations in air have remained more or less constant since the end of the 1990s, despite a decline in calculated ammonia emissions. This discrepancy is the subject of further research. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/4005.

governing low-emission fertiliser application is assumed, despite indications that this is not the case (De Haan et al., 2009). Further research should reveal the reason for the discrepancy and what this means for the emission calculations.

Implementation of fertiliser policy under pressure

The inadequate environmental conditions in nature areas (water stress, overfertilisation) can largely be attributed to the agricultural sector. For this reason, policy was introduced in 1984 to reduce overfertilisation. Important changes were made to the fertiliser policy in 2013, which now requires livestock farmers to send some of their manure to manure processing plants. This allows them to expand their herd, at the same time limiting the amount of manure (phosphate) that they can spread on their land. In anticipation of the abolition of the milk quota system in 2015, the dairy herd has already increased by 12% since 2007. Up to 2012, this did not cause an increase in phosphate excretion in manure, mainly due to the implementation of feed regulations. However, phosphate excretion increased in 2013, and phosphate levels in concentrates increased rather than decreased, as had been agreed in a covenant. The delays in the construction of new manure processing plants (Willems et al., 2013), the considerable tightening of manure application standards from 2014 and the uncertainty about decreasing phosphate levels in concentrates means that it is extremely uncertain whether sufficient capacity will be available for manure processing from 2015 (Figure 4.4). This is primarily a risk for livestock farmers who need to be able to dispose of their manure in a manner according

Figure 4.4
Manure application and processing



The milk quota system will be abolished in 2015, and pig and poultry production rights may follow in 2017. There is a risk that the increase in manure processing will not be enough to deal with the expected amount of manure produced from 2015. Further information can be found on the web pages of the Assessment of the Human Environment (www.pbl.nl/balans/0026).

to regulation, and who can otherwise not expand their herds. It is also a risk for the environment, as experience shows that conflict between agricultural and environmental interests can lead to a relaxation of environmental standards or poor compliance, and therefore an even greater delay in the recovery of the environment in natural areas.

Massive boost required for a more sustainable agricultural system in the Netherlands

Although the environmental footprint of the Dutch agricultural sector has significantly decreased in the last 25 years, and the sector is often efficient when measured per unit product, the total environmental footprint is still high. The main challenges are to significantly reduce the dependence on plant protection products and antibiotics, to close nutrient cycles, to reduce greenhouse gas emissions, to improve animal welfare and to increase biodiversity levels in rural areas. In order to increase the total eco-efficiency, it is important that current yields and feed efficiencies are also maintained.

Private parties can have an important role to play in this; for example, supermarkets can provide farmers with the financial incentive to increase the sustainability of their operations and can even control the quality of the products of other parties in the meat production chain. Consumers are also increasingly demanding more sustainably produced food. In some cases, financial compensation will be needed, for example to improve animal welfare. Organisations can also develop innovations, although many of

the necessary innovations will be difficult to bring to market. To ensure research can be carried out into these innovations, therefore, continued support is required from the government and sector organisations. There are various ways in which the government can accelerate improved sustainability; through legislation, by subsidising the introduction of innovations, by setting targets in consultation with the sector and by facilitating their implementation. The sustainable livestock farming agenda (*Uitvoeringsagenda Duurzame Veehouderij*) is one example of this. In this programme, the partners agreed in 2013 on minimum requirements for the production of pigs and poultry to be sold in Dutch supermarkets from 2020. Now this needs to be implemented.

Mobility

Background information and documentation relating to this section can be found in: Nijland H. (2014). *Mobiliteit en bereikbaarheid [Mobility and accessibility]*. Balans van de Leefomgeving 2014 – Part 5, PBL Netherlands Environmental Assessment Agency, The Hague.

This report and supplementary information can be found at: www.pbl.nl/balans/mobiliteit (in Dutch)

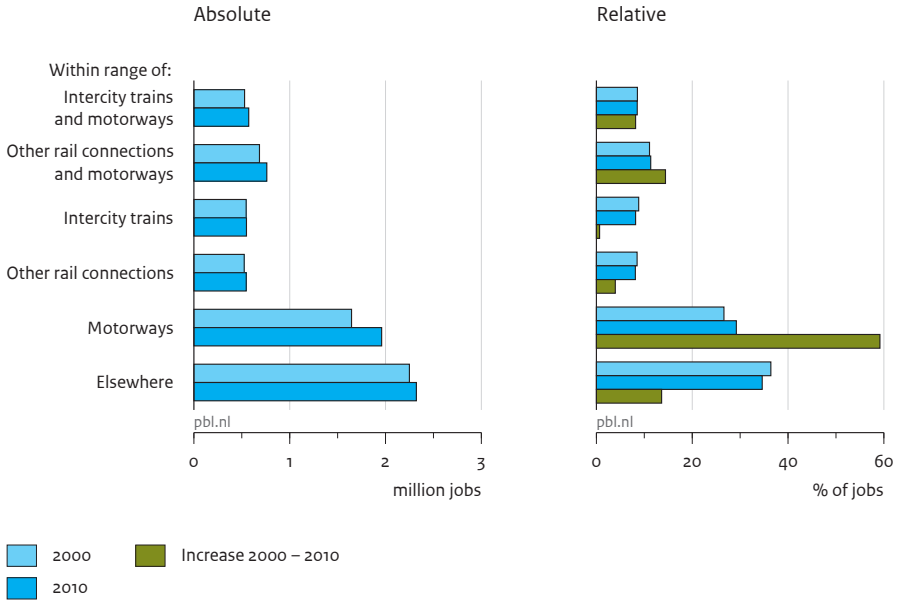
Mobility is not an objective in itself, but a means to an end. A way of reaching a certain location. These locations are connected by infrastructure. In the National Policy for Infrastructure and Spatial Planning 2012 (SVIR), the Dutch Cabinet formulated 13 national targets for the coordination of infrastructure, spatial planning and mobility. These targets, for example, include the aim to increase competitive power by strengthening the spatial-economic structure of the Netherlands, to improve accessibility and to ensure pleasant, safe surroundings.

Accessibility of employment locations is stable

Being able to travel quickly is often considered beneficial to accessibility. However, proximity is just as important. Within the Netherlands, people living in the west of the country are able to reach the most jobs per unit of travel time. The average travel speed may be slightly lower in the Randstad than in the rest of the country, but the proximity to large numbers of jobs more than compensates for this. On average, commuter distances in the Netherlands have remained fairly stable in recent years, as have travel speeds. Proximity has increased due to a rise in the number of jobs and urban population growth, but it also has decreased in certain locations, as these changes mainly took place in city suburbs.

Very few residential areas and business parks were developed between 2000 and 2012 in locations with good access to rail and road connections (the locations with so-called multimodal accessibility), even though this was a government target. Instead, increases in numbers of residents and jobs occurred mainly at locations alongside motorways (Figure 5.1). Spatial developments (largely decentralised) and transport (primarily governed by national infrastructure policy) in the last decade, therefore, have

Figure 5.1
Jobs, according to location accessibility



Source: LISA, NWB

The number of jobs near motorway slip roads showed the greatest increase since 2000. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/6002 (in Dutch).

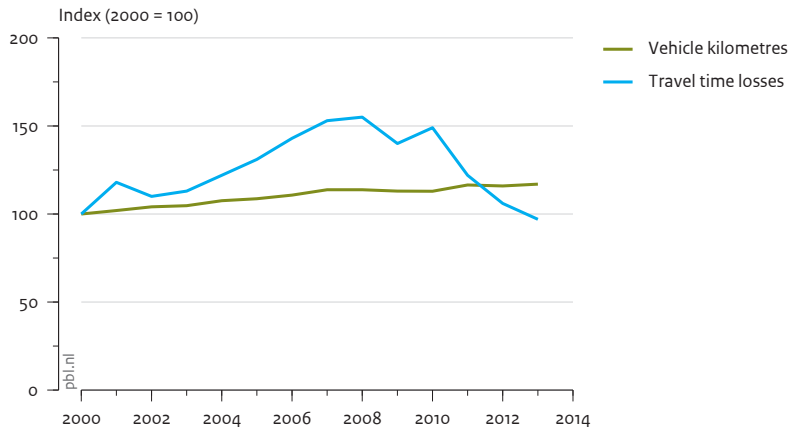
sometimes developed in opposing directions. National infrastructure policy and decentralised spatial development policy need to be better coordinated to become more efficient and more effective.

Car use is levelling off, rail and air travel is increasing and the electric bicycle is on the rise

Although car use has increased rapidly in the last few decades, it recently seems to have levelled off. The uncertainty regarding future developments in road traffic has policy implications. After all, investments in road expansion will be less cost-effective if there is no corresponding growth in road traffic. It would therefore make sense to implement a more adaptive policy that takes this uncertainty into account; reserve space for road expansion but do not lay the tarmac until road traffic increases become more certain.

About one quarter of all journeys are made by bicycle. The Dutch are cycling more and over longer distances, mainly due to the increasing popularity of the electric bicycle. In 2012, 16% of the more than 1 million new bicycles sold was electric. About one million

Figure 5.2
Performance major road network



Source: RWS 2014

Loss in travel time has been reduced to below 2000 levels. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/2500.

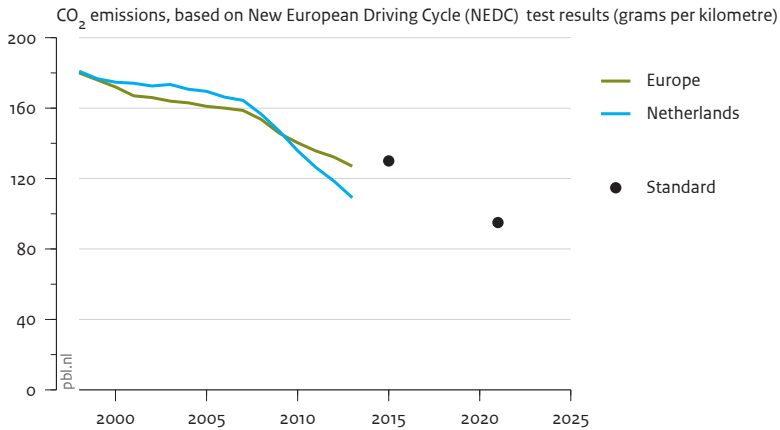
people in the Netherlands owned an electric bicycle in 2012, which was more than twice the number five years before. The electric bicycle is increasingly used for commuting, primarily replacing the normal bicycle (in 33% of the cases) and, to a much lesser extent (16%), the car. The Dutch are also increasingly travelling by train and aeroplane.

The increase in goods transport has levelled off since about 2005. Road freight has particularly suffered due to the economic crisis; in 2012 the weight of goods transported by road dropped for the fifth year in a row.

Far fewer traffic jams despite increase in motorway traffic

Mobility also has its downside, such as impacts on health and nature, due to accidents, air pollution, noise pollution and greenhouse gas emissions. In the Netherlands, there were almost 600 road fatalities in 2013, and more than 19,000 people were seriously injured on the roads. The target of there being no more than 10,600 serious road injuries in 2020, therefore, is still a long way off. Excessive traffic also causes traffic jams and congestion, particularly on motorways. This results in longer and unpredictable journey times, putting pressure on the accessibility of the main economic areas. In 2013, 65 billion kilometres were travelled on the motorway network (RWS, 2014). This is more than ever before, and about 1% more than in 2012. However, the increase was only seen at rush hour times, and, although there was more rush hour traffic, the total loss in journey time and the severity of traffic congestion decreased by about 8%, thus making it lower than in the year 2000

Figure 5.3
CO₂ emissions new passenger vehicles sold



Source: RDW, EEA

National stimulation policy means that, since 2009, emissions per kilometre in the Netherlands officially are lower than the EU average. More information can be found in the Environmental Data Compendium: www.dlo.nl/nl0134 (in Dutch).

(Figure 5.2). In 2009, decreases were mainly due to the economic crisis; in later years additional lanes and improved traffic management were key contributors.

Reduction in CO₂ emissions from new cars considerably less than expected

There was a slight decrease in total CO₂ emissions from road traffic over the last 10 years, despite an increase in road traffic volume over the same period. The main reason for this decrease is that, on average, CO₂ emissions from new cars sold in the Netherlands were reduced by about 30% in recent years (see Figure 5.3). This reduction was larger than in other EU Member States, where relatively fewer energy-efficient cars were sold, and was due to the Dutch Government's fiscal stimulation of the more efficient cars. The emission reduction was calculated on the basis of emission data from standardised tests, and showed a decrease of 3% over all vehicles.

Monitoring studies, however, showed that actual CO₂ emission reductions were only half those shown by the test results. Furthermore, the difference between test values and monitored values has increased in recent years. Therefore, the conclusion is that CO₂ policy on passenger vehicles has been less effective than expected. A new test method is currently being developed on a European level. Furthermore, it should also be noted that, for NO_x emissions, test results a few years ago already were found to be much more positive than the actual monitoring data.

The government has successfully stimulated the purchase of energy-efficient and electric vehicles, but at a high price

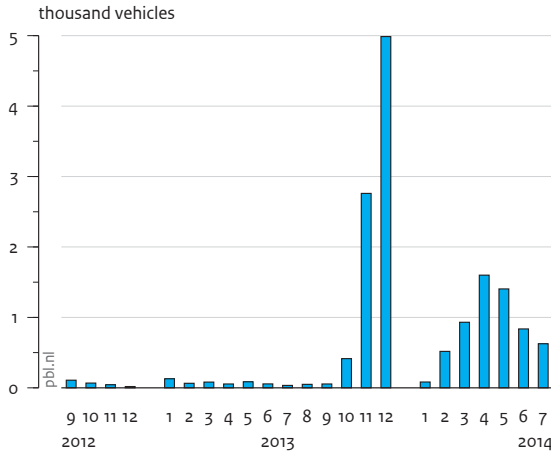
The purchase of efficient passenger cars has been encouraged since 2006 by offering fiscal advantages on purchase tax (BPM), road tax (MRB) and the tax liability for the private use of company vehicles ('bijtelling'). From 2010 onwards, the most efficient passenger vehicles were even exempt from BPM and MRB. These fiscal advantages have resulted in a rapid increase in the range of energy-efficient passenger vehicles on offer, as well as in high sales volumes. The Netherlands currently is a frontrunner in Europe with respect to the sales numbers of energy-efficient passenger vehicles with low CO₂ emissions. However, the increase in the sale of tax-exempt vehicles has resulted in a drop in tax revenue; the annual tax income from BPM has decreased by 1 to 1.5 billion euros since 2006 (Figure 5.4). In addition, there is the effect of the economic crisis on vehicle sales. The CO₂ emission levels of the new passenger vehicles were about 2% lower than of the vehicles that would have been sold had the tax scheme not been in place; this represents about half the expected reduction. On the one hand, these disappointing results were due to the reduction in CO₂ emissions in practice being lower than predicted by test results. On the other hand, tax benefits resulted in increased car sales and increased car use.

Sales of electric and hybrid electric vehicles have also increased significantly in the last two years as a result of tax exemptions and reductions. For example, vehicles with CO₂ emissions of up to 50g/km were subject to a 0% additional tax liability, so that drivers who also use their company car privately do not need to pay any additional tax for a period of five years. Furthermore, business owners have benefited from a combination of different tax stimulation schemes. The large fiscal advantages resulted in an unexpectedly large increase in the sales of electric and hybrid electric vehicle.

Several lessons can be learnt from this case regarding the fiscal stimulation of the purchase of environmentally friendly products:

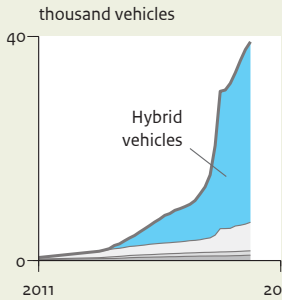
- Tax deductions can encourage manufacturers to market new products that meet the new environmental standards. As manufacturers are more aware of what is technically achievable than are governments, it is difficult for the latter to set standards in such a way that the costs (reduced revenue) offset the benefits (improved product performance).
- A combination of schemes can produce a large consumer response.
- Tax measures need to take into account the wider context of existing regulations. The automobile industry has made agreements with the European Commission concerning the reduction in average CO₂ emissions from the total number of cars sold each year. As a result, the extra sales of cars with low CO₂ emissions in the Netherlands will probably lead to fewer sales of these kinds of cars in the rest of the EU, as the car manufacturers have achieved their targets in the Netherlands. The effect of the tax measure in the Netherlands on European CO₂ emissions is

Figure 5.4
Mitsubishi Outlander sales

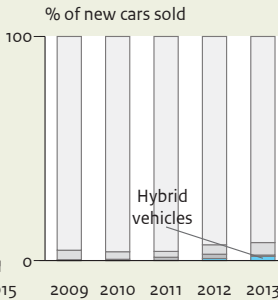


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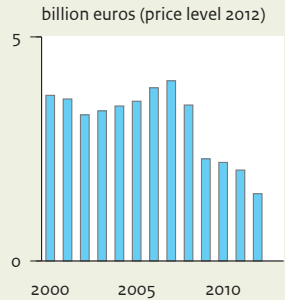
Number of electric vehicles



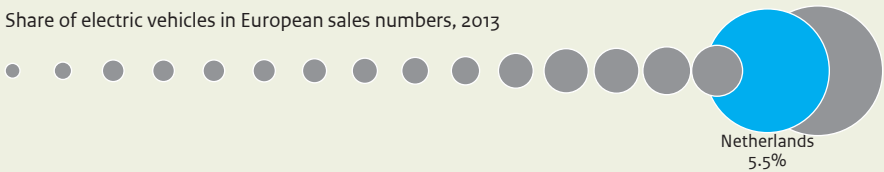
New vehicles, according to type of technology



Purchase tax passenger vehicles



Share of electric vehicles in European sales numbers, 2013



Source: RDW; adaptation by PBL; Dutch Budget Memorandum; Statistics Netherlands (CBS)

www.pbl.nl/balans/tq

With more than 12,000 models sold, the Mitsubishi Outlander PHEV is the best-selling electric car. The share of electric and hybrid electric vehicles in total sales, however, still remains limited. The greening of purchase tax on new vehicles has resulted in 1.5 billion euros less in annual tax revenues from BPM alone since 2007. The share of electric vehicles in the total national fleet is high compared with other European countries.

therefore probably very small. Such considerations will be taken into account in the new road tax plan for 2016–2019, which the Cabinet is expected to announce in its communication on passenger vehicles ('Autobrief 2.0') in the autumn of 2014.

- We advise that legislation be consistently and systematically revised (dynamic legislation). This can be made possible, for example, by regularly adjusting the categories for BPM exemption or the exemption percentages. This prevents excesses and reduces the extent of lost tax revenues. It is important, however, that the Cabinet makes it clear that legislation will be revised in the intervening period, as the buyers, users, importers, dealers and lease companies of passenger vehicles all benefit from stable legislation.

Water quality and flood protection

Background information and documentation relating to this section can be found in: Ligtvoet W, et al. (2014). *Waterkwaliteit en -veiligheid [Water quality and water safety]*. Balans van de Leefomgeving 2014 – Part 6, PBL Netherlands Environmental Assessment Agency, The Hague.

This report and supplementary information can be found at: www.pbl.nl/balans/water (in Dutch)

6.1 Water quality

Surface water quality has significantly improved and is suitable for human use ...

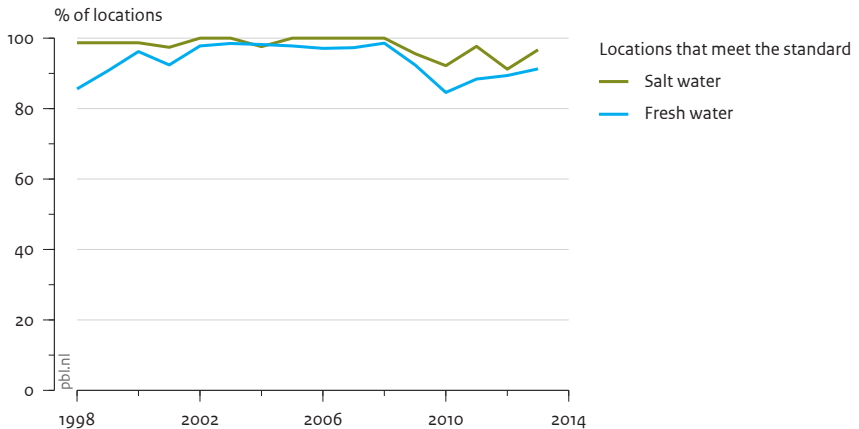
There has been a significant improvement in surface water quality in recent decades in large areas of the Netherlands, so that it is now suitable for many uses, such as drinking water production, agriculture, shipping, swimming and other forms of recreation (Figure 6.1; PBL, 2012b). This improvement is mainly the result of general environmental policy implemented from the 1970s onwards. In particular, strict legislation in the Surface Water Pollution Act (Wvo) and corresponding taxes have encouraged Dutch companies and water boards to build large water treatment plants (PBL, 2013d).

... but ecological quality objectives have not been achieved in many waterbodies

The European Water Framework Directive (WFD) applies an elaborate method to assess the ecological and chemical quality of surface water. The final ecological status is made up of assessments of a large number of chemical substances, several physical and chemical properties and four biological indicators, which are combined following the 'one out, all out' principle. This therefore means that the final score is equal to the poorest sub-score. As this principle can mask improvements in particular areas, it is also possible to report on the separate biological indicators (IenM, 2014b; Figure 6.2).

The number of waterbodies with a good score for one biological indicator (algae, water plants, macrofauna or fish) increased by 4% to 12% compared with 2009. Over 20% of the assessed waterbodies scored well on water plants and macrofauna and almost 40% scored well on algae and fish. Despite tighter nitrogen and phosphorus

Figure 6.1
Swimming water quality



Source: EEA

Almost all water locations for swimming in the Netherlands meet EU standards. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/oqo1.

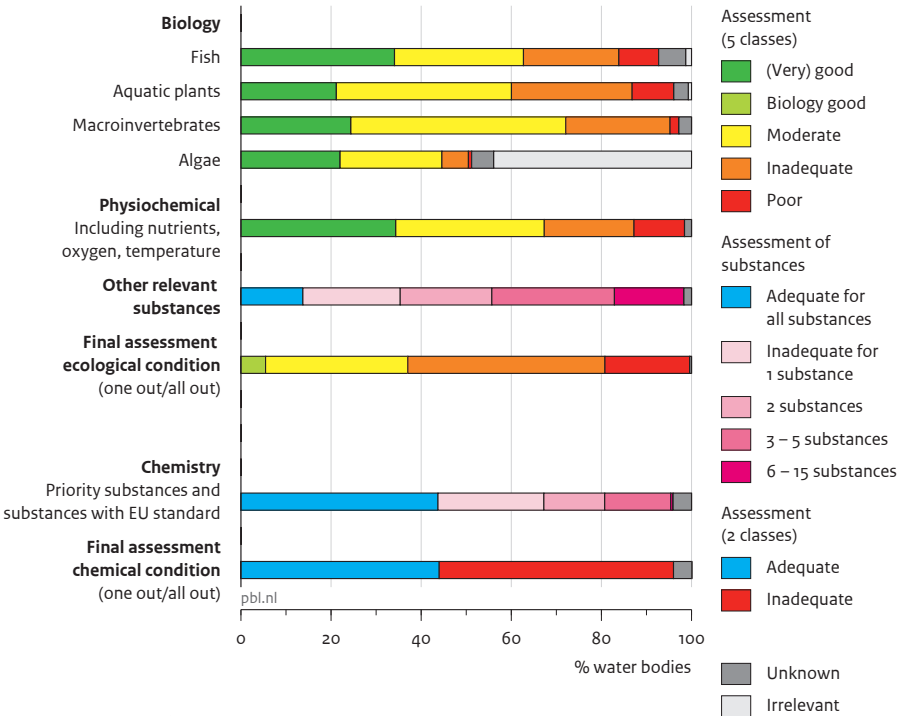
standards, almost 50% of the waterbodies met these standards, as they did in 2009. There was a drop in the score on chemical quality; from 70% in 2009 to 52% in 2013. The main reason for this is tighter standards for various substances.

According to the one out, all out WFD assessment, 5% of all WFD waterbodies complied with the biological WFD objectives in 2013, compared with 3% in 2009. Despite the improvement, therefore, the WFD biological water quality objectives have not yet been achieved in many waterbodies. The ecological quality score, based on a combination of biological, physical and chemical objectives, is even worse under the one out, all out rule; almost all waterbodies scored moderate or poor. Only a few waterbodies (less than 1%) obtained a 'good' score.

Design measures offer most opportunities to improve ecological water quality

The water boards and Directorate for Public Works and Water Management (RWS) introduced a first package of measures in the river basin management plans to coincide with the introduction of the WFD (2009). These measures should ensure that almost 40% of waterbodies meet all WFD objectives by 2027 (PBL, 2012a), in accordance with the WFD one out, all out assessment. The main barriers to achieving the ecological targets are nitrogen and phosphorus pollution from the agricultural sector and artificial water features, as many water courses have been straightened, natural riverbanks removed and dams constructed, in recent decades.

Figure 6.2
Assessment of surface water quality according to the Water Framework Directive, 2013

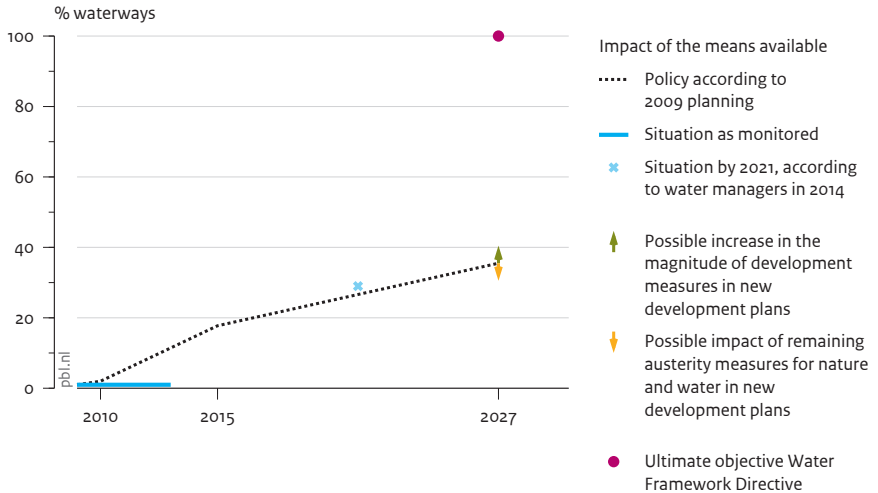


Source: IHW; adaptation by PBL

The European Water Framework Directive (WFD) applies an elaborate method to assess the ecological and chemical quality of surface water. The final ecological status is made up of assessments of a large number of chemical substances, several physical and chemical properties and four biological indicators, which are combined following the 'one out, all out' principle. More information can be found in the Environmental Data Compendium: www.clo.nl/nh1q12.

Now that the water quality has improved so much in many waterbodies, recovery of the ecology is an effective measure for structurally improving the biological water quality (PBL, 2012b). The focus in the river basin management plans is, quite rightly, on design measures such as natural riverbanks, remeandering, the restoration of streams and the placement of fish ladders. Because of the phosphorus accumulated in agricultural land, the effect of general source measures is not expected to achieve very much in the coming decades (PBL, 2008; 2012b). The new general fertiliser policy (Fifth Dutch Action Programme concerning the Nitrates Directive) does not seem to offer many opportunities for substantially increasing the water quality of regional waterbodies (Schoumans et al., 2013).

Figure 6.3
Realisation target for ecological water quality according to the 'one out-all out' assessment of the Water Framework Directive



Source: PBL 2013

The policy impact for 2021 recently estimated by the water boards is in line with PBL calculations based on the original plans from 2009. The objectives achieved in 2013 were below target. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/0027.

Not all WFD objectives will be achieved by 2027

The WFD has been in force for several years, and most of the planned measures should be realised by 2015 (IenM, 2014b). Water and nature policy budget cuts implemented in 2008, although largely reversed, are likely to negatively affect implementation of measures after 2015 and therefore the objectives for 2027. Often, WFD measures are included as part of a larger project with several different objectives and multiple funding sources. Budget cuts in water and nature can therefore have a negative cumulative effect in regional projects, as the loss of one source of funding puts the whole project at risk (PBL, 2013c).

New draft WFD river basin management plans for 2015 to 2021 will be presented at the end of 2014. According to these plans, all WFD objectives should be achieved in almost 30% of waterbodies by 2021. This is in line with calculations based on the original plans from 2009 (PBL, 2008). The objectives achieved in 2013 were below target (see Figure 6.3). One possible reason for this could be the lag in the effect of measures due to the storage of nutrients in the soil or the delay in ecosystem response. An initial analysis of the measures proposed in the draft plans suggests an increase in the number of design measures such as natural riverbanks. This could result in more objectives being achieved

than calculated based on the plans from 2009. However, it will not be possible to achieve all WFD objectives in 100% of Dutch waters by 2027.

Efficient resource use; synergy where possible, clear spatial choices elsewhere

The transition towards integration with other fields (nature, agriculture and recreation) began earlier in water quality policy than in flood protection policy, and this integration is clearly reflected in the regional processes that are part of the WFD. These processes involve exploring synergies with other objectives and policy areas, such as nature and recreation. However, synergy is not always possible. For example, it is often impossible to provide natural areas with sufficient protection from water stress and overfertilisation, particularly in areas in which agriculture and nature are closely intertwined, and therefore a clear decision needs to be made: agriculture or nature. In such cases, more can be achieved through spatial differentiation than through current policy. For example, the decision can be made to focus on a nature or agriculture objective depending on which can be achieved with the least effort or at the lowest cost. Furthermore, establishing spatial priorities makes the more efficient use of available resources possible so that, at a minimum, high quality nature can be achieved in nature areas that are typical of the Netherlands.

Government responsible for future water quality policy

The water quality policy strategy needs revising. If the quality ambitions for water and nature are to be achieved, a distinction needs to be made between functions and spatial priorities in the strategy. This distinction is in line with the synergy desired by the Cabinet between water (Ministry of Infrastructure and the Environment (IenM)) and nature (Ministry of Economic Affairs (EZ)). Such a distinction means that specific choices need to be made about the locations at which higher and lower ecological ambitions are to be achieved in the coming decades in the Netherlands. The responsibility for choices about objectives and measures relating to water quality and nature lies primarily with the provinces, the water boards and the municipalities. The spatial reprioritisation of water quality objectives requires a transparent, well-founded decision-making process in the form of an integrated spatial vision for the Netherlands for water, groundwater, agriculture and nature. As it has overall responsibility for the spatial and water systems, the national government could take the lead in outlining such a vision, together with the provinces, water boards and municipalities. In doing so, it could ensure a continued focus on the synergy between water and nature. Such a spatial vision can ensure that the right conditions are created within which optimum use can be made of the knowledge, innovation and energy available in the regions, such as initiatives from the Water management for agriculture Delta plan (LTO, 2013).

Close interaction between the EZ *Natuurvisietraject* (nature vision strategy) and the process leading to the third generation IenM, provincial and water board river basin management plans would provide the perfect opportunity for making these spatial and prioritisation choices when applying the WFD to the regional water systems (Section 7).

Such prioritisation could also take place when drawing up national and provincial area plans.

6.2 Flood protection

New flood protection policy being developed

Since the completion of the Delta Works, the Netherlands is commonly recognised as the safest delta in the world. National flood prevention policy applied following the last major flood event in 1953 has therefore been very successful. However, in recent decades, there have been significant increases in both the number of people living behind dykes and the value of the assets that the dykes protect. In addition, knowledge about dyke failure mechanisms has improved, as have estimations of the consequences of flooding, and climate change also needs to be taken into account. These are all reasons why the Minister of IenM has drawn up a new flood protection policy. The aim of this is not only to further reduce the chance of a flood occurring, but also to improve protection of the general public and to consider how, if a flood does take place, to minimise the disruption (IenM, 2013; 2014a). Prevention is and remains the core of policy.

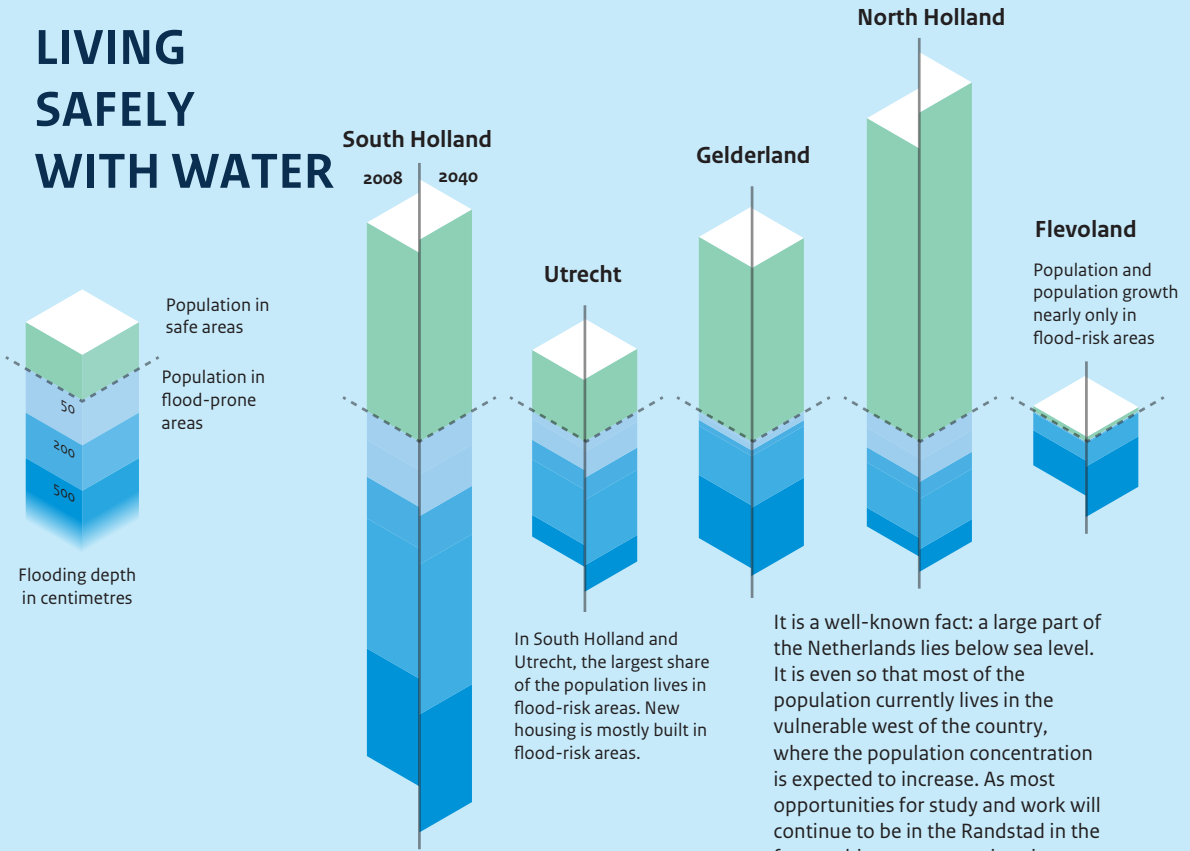
New standard; further decrease in flood risk

The underlying principle for the new standard for dykes, dams and storm-surge barriers is a certain minimum protection level for everyone living behind the structure. This standard (risk of death due to a flood no more than 1/100,000 each year) has been tightened in areas in which there may be high numbers of victims, high levels of economic damage or damage to vital and vulnerable infrastructure of national importance (IenM, 2014a). Implementation of the planned policy will result in a significantly higher level of flood protection in the Netherlands. Furthermore, the flood risk will be substantially lower than in the current situation. What is new is that the standards have been set for individual dyke sections rather than complete dyke 'rings'. From an economic point of view, this means that investments can be applied much more efficiently.

Policy focusing on limiting the effects of flood damage requires further development

Despite the high level of protection in the Netherlands, a flood that causes many thousands of victims cannot be completely ruled out. In addition to preventing floods, policy also aims to limit the effects of and the social disruption due to flooding (IenM, 2014a). Concrete options are available, as described in the PBL study *Kleine kansen – grote gevolgen* (Low risk, large repercussions) (PBL, 2014a). Recent advisory reports published by the *Adviescommissie Water* (Advisory Committee for Water), the Scientific Council for Government Policy and the Council for the Environment and Infrastructure also point out that more needs to be done to manage the consequences of a flood disaster and to improve communication on floods with the general public (AcW, 2014; WRR, 2014; Rli, 2014).

LIVING SAFELY WITH WATER

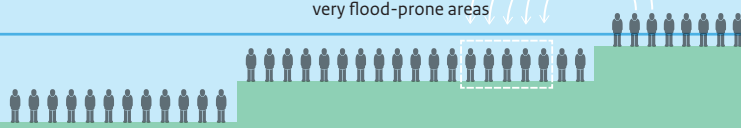


In South Holland and Utrecht, the largest share of the population lives in flood-risk areas. New housing is mostly built in flood-risk areas.

It is a well-known fact: a large part of the Netherlands lies below sea level. It is even so that most of the population currently lives in the vulnerable west of the country, where the population concentration is expected to increase. As most opportunities for study and work will continue to be in the Randstad in the future, this area attracts immigrants, young people and families, and their children will probably stay there. According to the PEARL population forecast, the population in the Randstad (the provinces of Noord-Holland, Zuid-Holland, Utrecht and Flevoland) will therefore

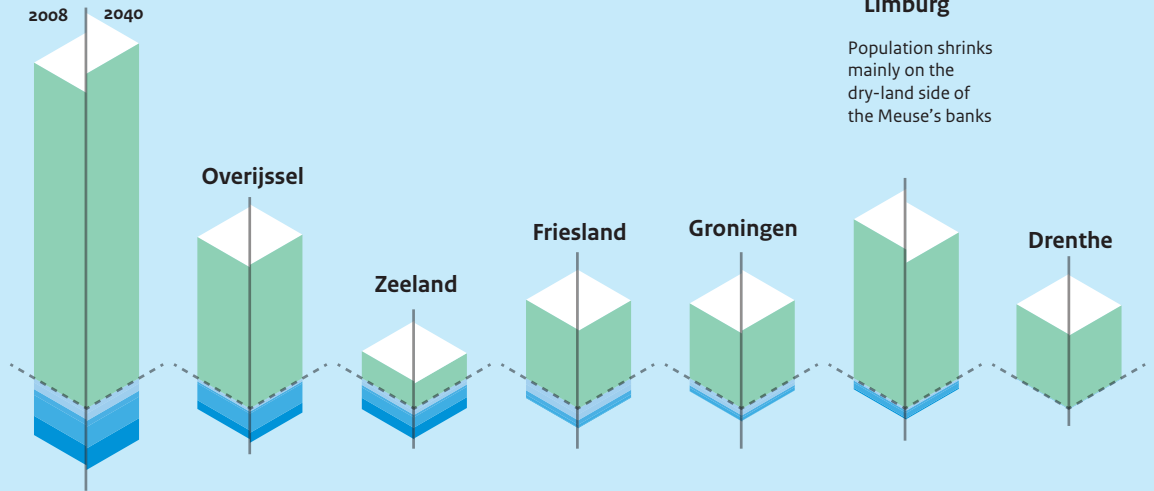
Compared to today, by 2040 5% more of the Dutch population will live in very flood-prone areas

The Netherlands in 2040:



Source: PBL 2014

North Brabant



Limburg

Population shrinks mainly on the dry-land side of the Meuse's banks

increase from 7.9 million in 2012 to 8.9 million in 2040 (PBL, 2014c). International and national organisations also choose to locate their offices in the Randstad – the metropolis with a pleasant Green Heart and an abundant supply of client networks and highly-educated workers. The Dutch government has also calculated that every invested euro, for example in infrastructure, produces the most return in the Randstad. This highly-populated and productive part of the country is protected by kilometres of dykes, dunes and water defences, and is the most protected delta in the world.

The chance of wet feet is therefore small, but the consequences of a flood if it were to occur would be very large. As the Randstad continues to grow in terms of population concentration and international competitive position, the possible effects of a flood only increase. Despite the high level of protection, a flood in the west of the Netherlands is always possible. Many Dutch people live in an area that could flood, one way or another. The Netherlands has learned to live with water over the years and various flood scenarios have been developed. The Worst Imaginable Flood (Ergst

Denkbare Overstroming; EDO) is a scenario that shows how big a flood disaster could be (RWS, 2008). It shows that more than one in three Dutch people risk a flood in his or her home; this applies to 4.2 million people in the Randstad. Given the expected population growth up to 2040, another 800 000 people will therefore be faced with this, of which more than 700 000 in the Randstad. It is worth noting that population growth in the provinces of Zuid-Holland, Utrecht and Flevoland will mainly take place in flood-risk areas.



The Minister of IenM adopted several suggestions from the PBL study in the policy document of June 2014. One example is to increase the range of options open to people in the event of a flood. People also need to be encouraged to look for a safe place, such as the upper floors of their homes or a high building (vertical evacuation; Figure 6.4). With this in mind, the Minister would like to develop an app and a platform to provide basic information for experts in the field. The Minister would also like a greater focus on keeping vital functions (such as electricity and water supplies and ICT networks) up and running during and after a flood, to increase the resilience of society and to limit disruption. With this in mind, the Minister is organising interdepartmental meetings to discuss vulnerable national functions and working together with decentralised government agencies to increase the resilience of vulnerable local and regional functions to flooding. The Minister is also planning to discuss the suggestion to consider the usefulness and necessity of recovery plans with experts. Finally, the Minister is awaiting proposals from the Delta programme regarding a standard partly based on the large number of victims that can be expected at certain locations in the event of a flood.

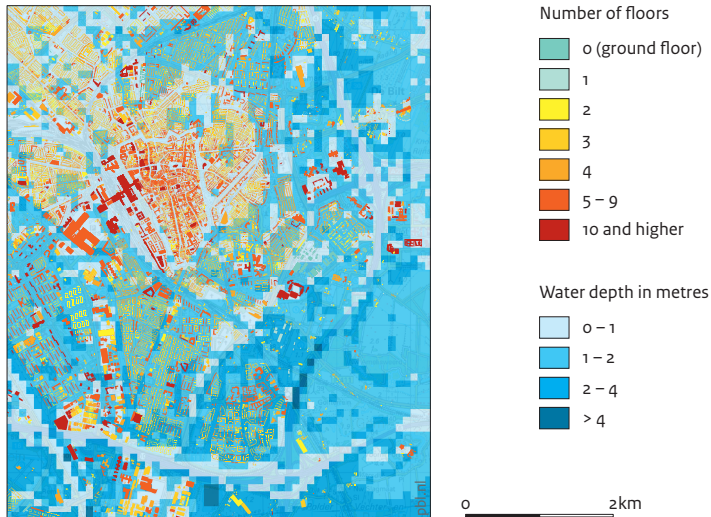
It is still unclear to what extent policy will focus on strengthening critical locations in dykes and – where necessary – creating enough safe shelters in particular areas. Both measures would increase the options available to people in the event of a flood and, if combined with improved risk and evacuation communication systems, significantly reduce the number of victims (PBL, 2014a).

Clear flood prevention objectives will be set in new policy (new flood risk standards) and a large budget has been made available (the Delta fund). No concrete objectives were announced in the recent policy document (IenM, 2014a) regarding limiting the effects of a flood by adapting dykes, spatial planning (refuges, decreased vulnerability of vital infrastructure at various scales) or the evacuation strategy. It is also still unclear whether extra funds will be made available for any spatial planning changes. Recognising that prevention is the foundation on which flood protection policy rests, the Advisory Committee for Water also appealed in its recent advisory report for a less permissive policy that focuses on limiting the effects of a flood. It recommended, for example, making results-based demands of emergency planning and, more specifically, anchoring building requirements in vulnerable areas and the Water Test in legislation (AcW, 2014).

Flood protection policy transition increases interaction with region and society

There is a transition taking place in flood protection policy, from a policy focused exclusively on flood prevention to a policy that also focuses on limiting the effects of a flood. This transition means that much more interaction is required with other government agencies and actors as far as spatial development and emergency response is concerned. This interaction is necessary to increase awareness of and communication about flood risks in the Netherlands. Much also needs to be done to improve communication with the general public regarding flood risks and the actions to take in order to reach a safe area in the event of a flood (vertical evacuation, Figure 6.4; PBL, 2014a).

Figure 6.4
Utrecht: building height relative to possible flooding depth



Source: PBL

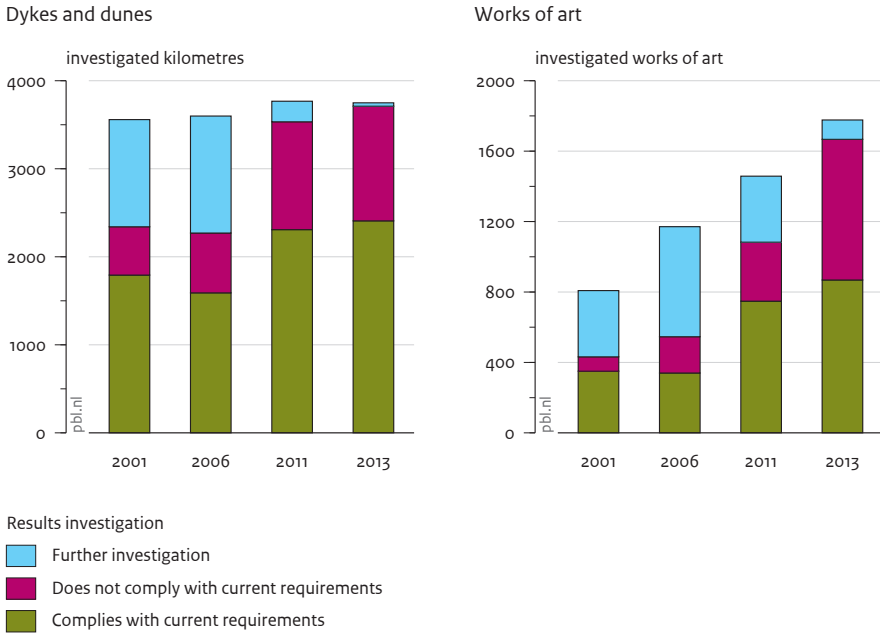
An analysis made for the city of Utrecht shows that, if the Lek River were to flood with water depths of up to four metres, buildings could provide a safe shelter for at least 90% of the population at the district level. The inclusion of this vertical evacuation into contingency plans could significantly reduce the number of victims, although it requires sufficient shelters and the adequate provision of information.

Not all dykes, dams, sluices and storm-surge barriers are in good order

Flood protection has been improved in recent years. Even so, many kilometres of primary water defences (dykes, dunes, dams and storm-surge barriers) do not meet current safety standards. The percentage of sub-standard water defences increased from 15% (549 kilometres) in 2001 to 35% (1,302 kilometres) in 2013 (Figure 6.5). This increase is partly due to new knowledge and partly due to the extra kilometres of water defences and the increase in the number of engineering structures included in the assessment. In 2013, 45% (799) of the engineering structures (dams, sluices and storm-surge barriers) were sub-standard. Dykes and engineering structures will be brought up to standard as part of the High Water Protection Programme and reassessed between 2017 and 2023, based on the new standards.

The aim of the Dutch Cabinet is for flood protection to meet the new standards by 2050. Despite the fact that improvements are being carried out each year on water defences and engineering structures as part of the High Water Protection Programme, it is still unclear how many of the dykes and engineering structures will meet the new standards. Information about this and a review of the required changes will be made available

Figure 6.5
Condition of the investigated primary dykes and damming works of art



Source: Human Environment and Transport Inspectorate (ILT), 2013

Flood protection is not yet at the required level. Despite continued investment, 35% of the inspected primary dykes and dunes did not meet the safety criteria in 2013. Of the inspected engineering structures, such as sluices, 45% did not meet current standards. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/o400.

between 2017 and 2023. Because of these uncertainties, and because an extreme weather event could take place at any time, it would seem useful to make plans soon to limit the effects of a possible flood. In the short term, changing the evacuation strategy and contingency plans, making use of sufficient shelters and reviewing communication with the general public could all contribute to reduced disruption in the case of a flood (PBL, 2014a).

Focus required on synergy between flood protection and nature in Delta Programme

Achieving synergy between water and nature is an important part of the new flood protection policy. In the Room for the River programme, flood protection and spatial quality/nature were secondary objectives. Funding was also made available for spatial development measures. In the Delta Act, the primary focus is expressly on flood protection and there is no money available in the Delta fund for nature and/or other spatial quality measures. Co-financing with other parties is required to implement

integrated projects. The Cabinet published the National Nature Vision earlier this year, which focuses on synergies between nature and flood protection, for example. The Ministry of EZ is also preparing a report entitled *Natuurambitie grote wateren* (Nature ambition for large water bodies). Through the Delta fund, the Minister of IenM has provided 200 million euros for river-broadening measures that contribute to improved flood protection (IenM, 2014a). In theory, the timeframe required to implement flood protection improvements (completion by 2050) should provide enough time to discuss where and how synergy between flood protection and nature can best be given form with other government agencies and actors (e.g. private parties, public organisations).

A broader look at flood protection policy

The Cabinet presented its draft flood protection policy in September 2014, the key objective of which is to achieve good flood protection by 2050, taking into account the effects of possible climate change. Flood protection is therefore a perfect example of a policy area in which ‘the future is now’. Furthermore, it is a policy area in which actions are already taken within this context. Concrete objectives have been set for water defence improvements and a large budget made available through the Delta fund. However, a future-proof delta is more than just a flood-proof delta (PBL, 2014b). There are more issues to be considered, such as how to ensure an ecologically healthy delta that continues to provide the Netherlands with high quality water, how to ensure the optimum use of waterways, and how to improve the quality of cities and reduce their vulnerability to flooding. The challenge for the coming years will be to increase the social relevance of the flood protection projects implemented within the Delta programme. This is of course the aim of the Delta programme, but will not come about of its own accord (WUR & UU, 2014). If the Netherlands wants to benefit in the future from these new investments in delta protection it needs to ensure that it takes an integrated approach, creates active partnerships between government agencies and other parties, and provides additional financial resources where required.

In a recent report about increasing synergy within the Delta Programme, PBL advised the Minister of IenM to present both an inspiring and realistic ambition. It is also important to create a number of new iconic projects together with other government authorities and partners, to encourage the wide, integrated implementation of the Delta Programme (PBL, 2014b).

Nature

Background information and documentation relating to this section can be found in: Dirkx J and De Knecht B. (2014). *Natuurlijk kapitaal als nieuw beleidsconcept [Natural capital as a new policy concept]*. Balans van de Leefomgeving 2014 – Part 7, PBL Netherlands Environmental Assessment Agency, The Hague.

This report and supplementary information can be found at: www.pbl.nl/balans/natuur (in Dutch)

Nature policy taking a new course with the Nature Vision 2014

Much has changed in nature and landscape policy since the previous Assessment of the Human Environment (2012). The main objective of nature policy implemented from 1990 onwards was ‘the sustainable conservation, recovery and development of nature and landscape values’. To achieve this, a National Ecological Network (the former Dutch *Ecologische Hoofdstructuur* (EHS)) was designed; a network of nationally and internationally important nature areas in the Netherlands. The aim was to improve the quality of, expand and connect existing natural areas. The former EHS was to be completed in 2018 and encompass an area of about 728,500 hectares. The EHS areas were protected and environmental policy was implemented to improve environmental quality and encourage recovery.

The first Dutch Cabinet of Prime Minister Rutte (2010) made a number of policy changes; national nature responsibilities were transferred to the provinces (decentralised) and landscape policy was deregulated. National government and the provinces then made a series of decisions and agreements concerning ambitions and funding, resulting in the so-called Nature Pact (*Natuurpact*) of 2013. In this Nature Pact, national government and the provinces set out their new ambitions for the period up to 2027 with regard to the development and management of nature in the Netherlands. The main aim of the Nature Pact is to achieve international nature targets. National government remains responsible for achieving these international targets; the provinces are responsible for the management and development of the new National Ecological Network (*Nationaal Natuur Netwerk* (NNN)) and the Natura 2000 areas (the internationally protected areas).

In its 2014 National Nature Vision (*Rijksnatuurvisie 2014, Natuurlijk verder*), the Cabinet has outlined its vision for nature policy for the next 10 years. Central to the vision is a change of approach; nature must be given a place in the centre of society. The Cabinet is therefore looking for 'nature combinations' that benefit both the economy and biodiversity. In the vision on nature, a distinction is made between the 'foundation', whereby the provinces aim to protect and develop nature, and the supplementary 'structure', which focuses on the sustainable use of nature. In the 'foundation', the focus lies on giving space to natural processes; in the 'structure' the focus is on nature combined with business, agriculture, spatial development, housing and employment.

Three international nature objectives for the Netherlands

National government and the provinces have indicated that they aim to observe existing international agreements. The most important international agreements as far as nature is concerned are the United Nations Convention on Biological Diversity (CBD) and the EU Birds and Habitats Directives (BHD). The CBD, which has been ratified by the Netherlands, has as its main objective to slow down global biodiversity loss. An agreement has been made within the EU to stop biodiversity loss altogether. The BHD makes it obligatory for EU Member States to create a Natura 2000 network of protected areas. It also aims to halt the decline in nature quality in these areas and to recover and maintain species and habitats protected by the BHD in a 'favourable conservation status'. The result should be the continued existence of these species in the future. Based on European law, the BHD has been transposed into Dutch law.

The CBD and BHD have both short-term and long-term objectives. In the short term, they aim to slow down or halt the decline in natural quality. In the longer term, they focus on sustainable conservation and nature recovery. There is no target date for the long-term objectives. The CBD measures performance using several general indicators that show the current status of plant and animal species, ecosystems and environmental conditions. One important indicator is the Red List. The Red Lists show how many species are threatened either because they are rare or because their numbers are declining. The short-term objective of the Dutch Government is that the Red List does not get any longer or turns redder. Various shades of red are covered by the list, which represent severely threatened, threatened, vulnerable and sensitive. The list turns redder if more species move into a higher threat category.

More concrete objectives are applied in the BHD. One of the main ideas in the Habitats Directive is the objective to achieve a 'favourable conservation status'. This is achieved if distribution, population size and habitat of a species are no longer in decline and if the sustainable, continued existence of the species seems possible. The following indicators are used to assess Dutch nature policy: protected species (in particular the Red Lists), ecosystems and the conservation status of species and habitats in the BHD.

The number of threatened species is no longer increasing in the Netherlands, but status far from satisfactory

Spatial, environmental and nature policy are beginning to bear fruit. The size of natural areas has increased, recovery measures have been implemented and environmental quality and water quality have improved. As a result, there has been no further increase in the number of threatened species since 2005. Earlier reports have described how the Red List of threatened species is becoming longer. Now, however, it is becoming shorter. Although over one third of all Dutch species are on the Red List, the percentage of threatened species on the list has decreased in recent years by about 1%. The severity of the threat has also decreased. This means that there are more species in a less severe category. For the first time, therefore, the Red List has become slightly shorter and slightly less red. However, this improvement is not being seen in all species groups. For butterflies and amphibians, for example, the average trend is still negative. The downward trend is also levelling off for most ecosystems, and for marshlands an improvement can even be seen.

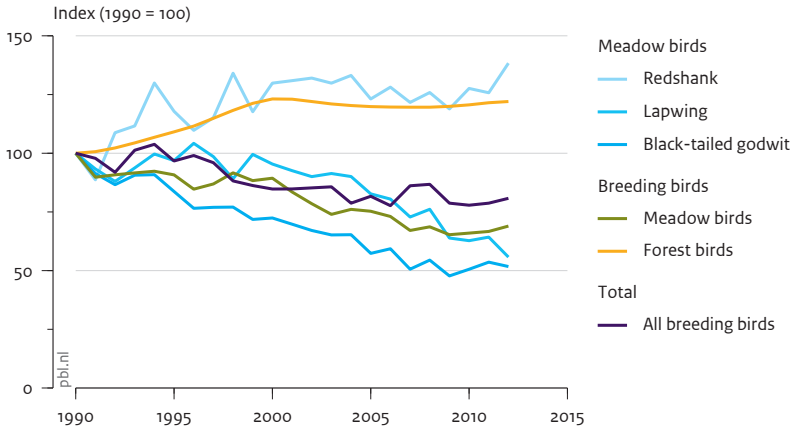
According to the short-term BHD objective, the Netherlands is obliged to take immediate, suitable measures to prevent any further decline in species and habitats that are of EU-wide importance. The conservation status of these species and habitats may therefore not decline any further. Three quarters of the protected species and almost all habitats included in the EU Habitats Directive have a very poor to moderately poor conservation status in the Netherlands (Figure 7.1). The conservation status of all protected habitats and species remained fairly constant at the national level between 2006 and 2012; it became less unfavourable for some species and more unfavourable for others. This means that the Netherlands has still not met the objective to ensure and maintain a favourable conservation status for species and habitats. The unfavourable conservation status and further decline may present a barrier to spatial and economic development; after all, in cases of legal dispute, the courts will be critical of the effects of such developments.

On average, the decline in protected nature has slowly levelled off and now seems to have stopped. However, 'on average' means that there are also species and ecosystems that are still experiencing decline. Policy aims to stop and even reverse biodiversity decline for *all* protected species and ecosystems.

Reduction in environmental pressure on nature has slowed down in recent years

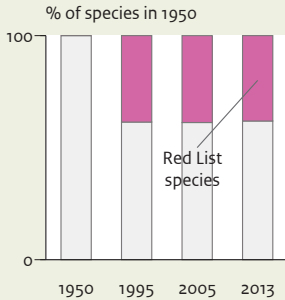
Overfertilisation, water stress and fragmentation of the natural environment are the main challenges when it comes to improving the quality of natural land areas (Figure 7.2). Learning more about these challenges will help in drawing up measures to achieve the objectives. If these challenges can be overcome, it is more likely that species conservation can take place. Environmental and water policies have significantly reduced emissions and discharges, and nature has benefited. Environmental conditions have improved since 1990, but the pressure on the environment is still so high that the quality of the habitats of many species is still not optimal.

Figure 7.1
Breeding birds in meadows and forests

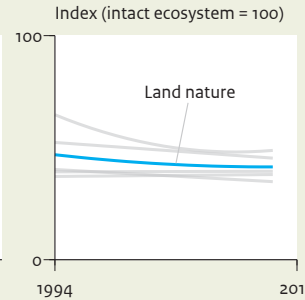


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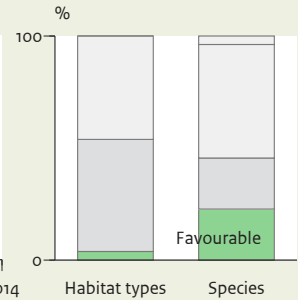
Red List species



Ecosystem quality



Conservation state, 2012



Share of the favourable conservation state of species in European countries, 2006

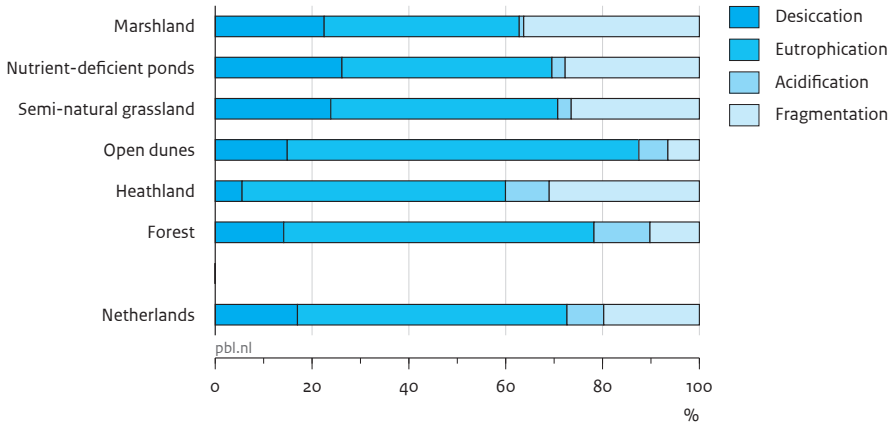


Source: NEM (provinces, Sovon, Statistics Netherlands (CBS); Ministry of EZ, EU; PBL; Alterra

www.pbl.nl/balans/t3

Breeding forest birds are doing well but for many meadow birds the situation is worrying. The number of threatened species on the Red List has remained more or less stable for many years. The average quality of many ecosystems has decreased since 1994, but luckily this has levelled off in recent years. The conservation status of almost all protected habitats and three quarters of protected species in the BHD at national level is unfavourable, and this has barely changed in recent years. Compared with the rest of Europe, the situation in the Netherlands is average.

Figure 7.2

Bottlenecks in environmental and spatial conditions in nature areas, 2013

Source: Alterra, Wageningen UR

Overfertilisation, water stress and the fragmentation/lack of suitable habitats are the main challenges to the recovery of nature in nature areas. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/1102.

The quality is in fact low and many Dutch species are still under threat. The decline in nitrate leaching has slowed down in recent years and, under loess and sandy areas in North Brabant and Limburg, nitrate concentrations in groundwater are 1.5 to 2 times the recommended maximum. The concentration of ammonia in air has remained more or less constant since 1998 (Section 4), which probably means that there has been no further decrease in nitrogen deposition on natural areas in recent years. Water stress in natural areas is a persistent problem; provincial figures show that, in 2006, 220,000 hectares of nature areas in the former EHS suffered from desiccation – more recent data is not available.

Implementation of the Nature Pact will protect more animal and plant species

Dutch Government, provinces and public partners have drawn up agreements in the Nature Pact (September 2013) regarding nature development and management. For example, it has been agreed that the provinces will complete the nature network (*Natuurnetwerk Nederland*, NNN) to include at least 80,000 new hectares of nature (compared to the already-realised former EHS areas) between 2011 and 2027.

A brief analysis of the effects of the Nature Pact (PBL, 2013c) shows that, by 2027, conditions may be satisfactory for about 65% of the analysed species included in the BHD. This represents an improvement on the situation in 2010, when conditions

were satisfactory for 45% of the analysed species. Even after the Nature Pact has been implemented, however, conditions will still be unsatisfactory or may even decline, for some species. The international long-term objective of achieving a good conservation status by 2027, therefore, remains beyond reach.

The agreements made in the Nature Pact are ambitious and enable large steps to be taken towards achieving international biodiversity agreements. However, this requires decisiveness on the part of the government to move the plans from the drawing board into actual practice. Furthermore, the objectives will not be fully achieved based on these agreements. In other words, a policy challenge will remain for the future. The ambition of the National Nature Vision is to fill this gap. However, there are still no concrete plans or long-term visions that will achieve the set objectives. Such plans are however required if the Nature Pact and National Nature Vision are to be completely successful.

Natural capital

Background information and documentation relating to this section can be found in: Dirkx, J. & B. de Knegt (2014), *Natuurlijk kapitaal als nieuw beleidsconcept* [Natural capital as a new policy concept]. Balans van de Leefomgeving 2014 – Part 7, PBL Netherlands Environmental Assessment Agency, The Hague.

This report and supplementary information can be found at: www.pbl.nl/balans/natuur (in Dutch)

Cabinet introduced concept of natural capital into Dutch policy

Dutch nature policy has traditionally been aimed to protect nature and biodiversity from the negative effects of economic activities. As mentioned in the previous section, the decline in protected nature on average is slowly levelling off – partly due to implemented spatial, nature and environmental policy – but biodiversity targets have still not been achieved. Furthermore, global biodiversity loss continues unabated.

In the Natural Capital Agenda (*Uitvoeringsagenda Natuurlijk Kapitaal*; EZ, 2013) and the recently published National Nature Vision (EZ, 2014), the Dutch Cabinet has broadened the aim of nature policy from a focus on conservation to a focus on the benefits provided by nature. With this, Cabinet has introduced the concept of natural capital, ‘a transition towards a more sustainable world economy is needed – with more sustainable production, lower emissions and more recycling – to safeguard our natural capital for future generations and secure the foundation for prosperity and well-being.’ Therefore, policy no longer aims just to protect biodiversity from human activities, but focuses more explicitly on the benefits that nature can provide for society. After all, humans depend on nature for their survival and this should – the Cabinet believes – be enough to motivate the general public, business community, public organisations and government agencies to help preserve natural capital.

Natural capital is about the ability of nature – whether in a nature reserve, a city park, a field or a business park – to provide, for example, fertile soil for food production, resources such as wood or biomass, water storage or space for recreation. The goods and services that nature can provide together form the ‘ecosystem services’. There has been a greater focus worldwide on these services, influenced by studies such as the

Millennium Ecosystem Assessment (MA, 2003) and *The Economics of Ecosystems and Biodiversity (TEEB, 2010)*. As the authors of these studies point out, the degradation of global ecosystems means that ecosystem services are also disappearing, which could result in a decline in prosperity.

There is concern about the way in which the global economy uses natural capital and the pressure that a growing human population and its increasing prosperity place on it. Targets have therefore been drawn up to preserve ecosystem services, on a global scale in the Convention on Biological Diversity (UNEP, 2011) and in the EU Biodiversity Strategy (EC, 2011).

The target to ‘preserve natural capital’ requires further elaboration

With ‘natural capital’ Cabinet has introduced a policy concept that focuses more on the benefits provided by nature. The concept, although not yet elaborated into great detail, has the potential to create more support for, and increase the involvement of society in nature conservation. The advantage of this current lack of detail is that it provides an opportunity for many people to feel involved in the process; the disadvantage is that it is still unclear what the Cabinet exactly hopes to achieve.

Natural capital can be regarded as the stock from which a flow of goods and services – the ecosystem services – can be provided. In other words, natural capital can be summarised as the total sum of physical and natural resources on Earth able to provide ecosystem services. Natural capital is the stock and ecosystem services the flow. Ecosystem services could be regarded as the interest, so to speak, yielded from natural capital; a capital that, as with other forms of capital, needs to be used and managed wisely if it is to continue to provide interest.

The Dutch Cabinet has focused on the conservation and sustainable use of this natural capital. However, this can take different forms, and these forms have different consequences for the extent and quality of the natural capital and the ecosystem services it can provide. For example, is it about harvesting no more trees from a forest than it could regrow, thus maintaining the size of the forest? Or is it about the forest providing other ecosystem services in addition to wood, such as water retention and carbon sequestration? If it is important that a forest retains water or carbon, this may mean that it can provide less wood. Similar trade-offs are seen in almost all ecosystem services. It is therefore important that the Cabinet is clear about its objectives as far as the conservation and sustainable use of natural capital is concerned, and about the consequences for other uses. Otherwise, there is a risk that the ecosystem services that benefit only individual parties will prevail above ecosystem services that are of interest to the general public.

The Natural Capital Agenda and the National Nature Vision do show that the Cabinet aims to achieve biodiversity conservation through the conservation of natural capital. The Cabinet apparently regards the conservation of natural capital as a means of

biodiversity protection. However, the ambition to conserve natural capital would also seem to aim to ensure sufficient biotic resources, both from the Netherlands and abroad, to support the Dutch economy, also in the long term. Current policy does not clarify how these two ambitions are to be combined.

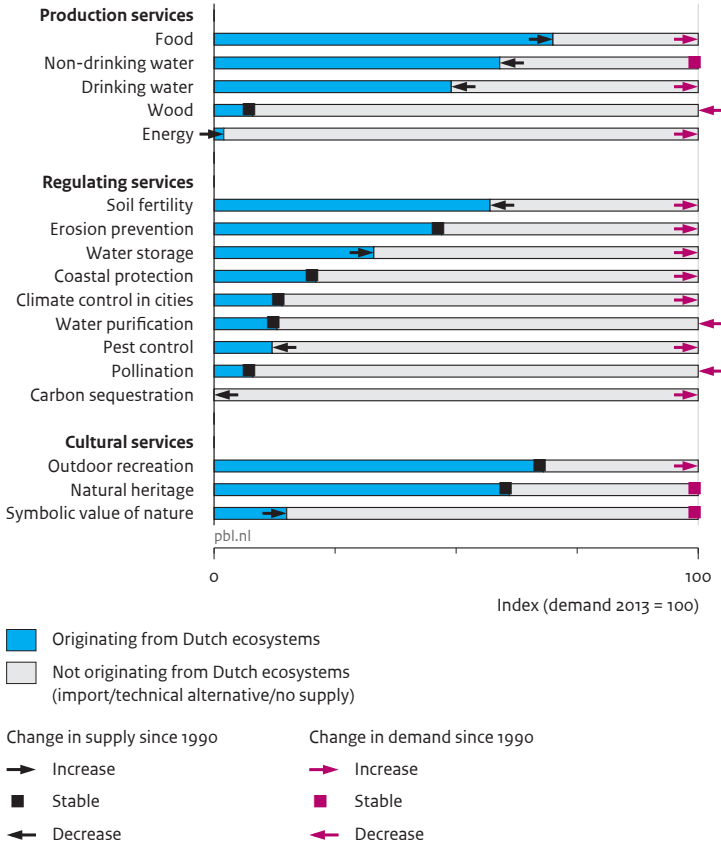
There are benefits to be drawn from integrating nature conservation and economic targets. If, through the sustainable use of natural capital, the economy would have fewer negative effects on biodiversity, this could contribute to its conservation. Also, if ecosystem degradation in producing regions would be halted, natural capital conservation could help ensure sufficient biotic resources for the Dutch economy in the future. However, it does not necessarily follow that the sustainable use of natural capital will also help achieve biodiversity conservation targets. After all, while it is still unclear whether all plant and animal species are actually needed in the provision of the ecosystem services envisaged, a focus on the benefits of nature may not necessarily lead to biodiversity conservation. Additional policy is therefore still required to achieve the internationally agreed biodiversity targets.

Natural capital difficult to quantify

One of the ambitions of the Natural Capital Agenda is to quantify natural capital in the Netherlands, in monetary or other terms. The idea behind this is to ensure that natural capital receives the attention it deserves in the decision-making processes of the general public, the business community and government agencies. Making trends in natural capital measurable can be useful in various phases of the policy cycle. Attempts have been made in international studies to quantify the monetary value of ecosystem services (Costanza et al., 1997; 2014), though not without some controversy. Nor do the studies apply to the specific situation in the Netherlands. Other approaches are those of the Natural Capital Digital Atlas (*Digitale Atlas Natuurlijk Kapitaal*; DANK), with which the Dutch Government currently works, various TEEB studies and a natural capital accounting framework currently under development. PBL and Wageningen UR, together, developed an indicator, 'Goods and services from ecosystems in the Netherlands'. The aim of this indicator is to quantify the extent of and changes in the goods and services provided by Dutch ecosystems. The initial results are presented in this report and should help contribute to the further development of natural capital policy.

The indicator provides information about 17 very different types of ecosystem services, classified in accordance with the Common International Classification of Ecosystem Services (CICES; Haines-Young and Potschin, 2013). It has not yet been possible to combine the data to produce an indicator for all ecosystem services, as a whole, and to draw conclusions about trade-offs between ecosystem services. It is therefore also not possible to draw conclusions about changes in the extent and quality of natural capital in the Netherlands.

Figure 8.1
Supply of ecosystem goods and services



Source: PBL; Alterra, Wageningen UR 2014

Changes in the availability of goods and services from Dutch ecosystems over the last 25 years or so differ per ecosystem service. The arrows show whether there has been an increase or a decrease since around 1990. Please refer to the digital Assessment of the Human Environment and the relevant background reports for an explanation of how these goods and services were measured. Further information can be found in the digital Assessment of the Human Environment: www.pbl.nl/balans/1109.

Several Dutch ecosystem services have declined

Changes in the availability of goods and services from Dutch ecosystems over the last 25 years or so differ per ecosystem service (Figure 8.1). In most cases, the demand for ecosystem services has increased. An increase in provided goods and services can be

seen in the production service category; in particular regarding the provision of food and energy. Decline has been seen in the provision of drinking water and water for other uses (e.g. in agriculture and industry) and in the regulatory services category; in particular soil fertility, carbon sequestration and pest control. Reasons for this are changes in natural areas and the removal of natural elements from agricultural areas. In many cases, the identified decline is compensated for by using artificial alternatives, such as dykes, chemical plant protection products or wastewater treatment plants. Often, such technical solutions are chosen because they are cheaper or more reliable than natural systems, certainly in the short term. The question then is whether the decline in these ecosystem services is really a problem. Problems may however arise if the technical alternatives have undesirable side-effects, such as those of plant protection products on water quality. There may also be no suitable technical alternatives for some ecosystem services, such as pollination over large areas of new crops. In such cases, it may be important to use and protect natural ecosystem services, which would also involve lower costs to society.

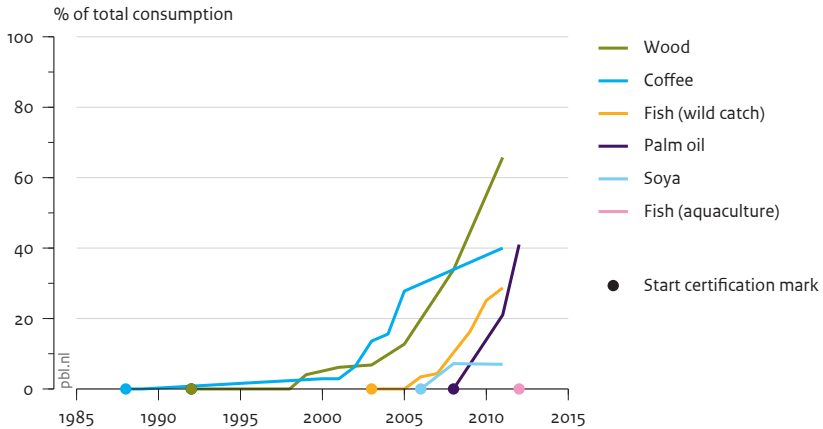
Private co-funding of natural capital requires attention

In the National Nature Vision 2014, the concept of natural capital is also reflected in the changing role of national government. By focusing more on the benefits of nature, the Cabinet also wants to increase public involvement in nature policy. For example, attractive natural areas could increase profits for hotels and restaurants in rural areas, and farmers who plant their fields to create natural borders profit from the pollination of their crops and natural pest control. The Cabinet hopes that this kind of awareness will increase the willingness of companies and the general public to contribute to the management of natural capital. Whether it will is as yet unclear. After all, it is not just those who pay for natural capital who benefit from it. The government can contribute to an increase in natural capital, and at no extra cost, by encouraging nature combinations; for example, in the construction, recreation and agricultural sectors. Opportunities for nature combinations can also be found in infrastructural investments in roads and dykes. The combined costs of a joint project would be lower than if the projects were to be implemented individually. Successful nature combinations could even develop into an export product, as has been the case with projects such as 'Room for the River' and the 'Sand Motor'. However, it is difficult to achieve the desired synergy with natural capital.

Business chains more sustainable but still a long way to go

The Dutch not only use the natural capital in their own country, they also use a great deal of foreign natural capital. In its current form, this is usually associated with the conversion of land for agriculture. This takes place at the cost of nature and therefore contributes to global biodiversity loss. The Cabinet wants to reduce the impact of the Dutch economy on natural capital outside the Netherlands. The Netherlands is a large importer of renewable resources, such as soya, wood, cocoa and palm oil, and therefore in a good position to look for ways to increase the sustainability of the natural capital used worldwide.

Figure 8.2
Market shares of sustainably produced resources in Dutch consumption



Source: PBL 2013

The market share of certified, sustainably produced raw materials has increased considerably, over the last 10 years, thanks to the concerted effort of the business community, public organisations and the government.

There are, in theory, several ways in which this could be done, such as by increasing the amount and sustainability of agricultural production per hectare, by using resources more efficiently and by reducing resource and product waste. It is not possible for the Dutch Government to force exporting countries to improve their production conditions, but the companies that buy these products can and do. There has been a considerable increase in the market share of sustainably produced resources during the last 10 years (see Figure 8.2). Even so, most resources on the Dutch market are not being sustainably produced.

Companies that improve sustainability initially incur additional costs, so that companies that do not do so have a competitive advantage. It is therefore important that the costs of sustainability are offset by benefits in the form of higher market prices for sustainable products, improved market access or reputation benefits. If these benefits do not exist, sustainability will be hard to achieve. Governments can help by setting minimum requirements for products that may be sold in their countries, within the margins of world trade agreements (PBL, 2013a). An example of this is the Forest Law Enforcement, Governance and Trade Facility (FLEGT), through which the EU prevents wood that has been illegally logged from entering the European market.

Biobased technology can also increase resource use efficiency

There are many ways in which the production of renewable resources can be carried out more efficiently or with less harm to natural capital. For example, biological pest control

used on vegetables growing in greenhouses makes chemical pest control unnecessary. The success of this can serve as an example for the use of natural mechanisms in other production processes. High-tech agricultural systems can be applied in more areas of the world, and organic farming can also be expanded. Eco-friendly technology used on wood from temperate regions can reduce the import of tropical hardwood, the development of salt-tolerant crops increases production potential, and modern algae cultivation looks promising for the production of biodiesel and other raw materials for the biochemical industry. In fact, this industry is one of the most promising sectors in which the Netherlands can achieve green growth (PBL, 2013d).

Natural capital a promising nature policy development

The focus on the benefits provided by nature offers opportunities for the further integration of nature policy with other policy fields, so that nature policy becomes more firmly entrenched in Dutch society. If – in addition to government agencies – the general public and the business community would also want to make an effort to conserve nature, this would not only help strengthen the ecosystem services, but also benefit the international policy objectives for biodiversity conservation. After all, the long-term biodiversity objectives are still out of reach (Section 7) and the trend is still negative for many ecosystem services; the supply of services provided by nature are in decline while demand is increasing.

The success of the new approach will depend on the extent to which the Cabinet succeeds in developing this policy. To make use of the potential provided by the policy concept of natural capital, it is important to further develop the policy objectives and measures. For example, it is not at all sure that parties motivated by the benefits that nature provides will also want to take biodiversity conservation into account. Furthermore, individuals and companies that do want to conserve natural capital find themselves faced with all kinds of barriers along the way. It is important to ensure that the current energy present in society is not lost because individuals and companies are so discouraged by these barriers. By showing where it wants to go and that it wants to work with these parties to establish the necessary framework conditions, the Cabinet could get the general public and businesses onboard and work with them to achieve the management and sustainable use of natural capital.

In summary, therefore, the introduction of the new policy concept is a useful but as yet inadequate condition for achieving a transition. It is a start, but the concept needs to be developed further if the policies based on this concept are to be implemented successfully.

The changing position and role of government

For the government to achieve a large number of their long-term objectives, policy must be implemented *today*. This is the main finding of this Assessment of the Human Environment – the future is now. The government, in particular, needs to act on this motto, although its ability to take meaningful action varies from case to case. The government has the power to create a new playing field, to ensure that societal activities are directed towards the new objectives. This should not be confused with a government that does everything itself. Certain matters need to be addressed by the government, but in other areas it can create the preconditions for objectives to be achieved by others (e.g. citizens or the business community).

The first task for the government is to set politically legitimised objectives. The government should however be aware of compartmentalising policy areas, so that this does not present a barrier to effective transitions and to prevent existing interests from standing in the way of strategic long-term policy.

One of the main conclusions to be drawn from this report is that there is often a lack of coherent strategy for implementing the system changes desired and required by policy; how to get from A to B? At the same time, it cannot be denied that a transition has already been set in motion in some policy areas. However, whereas traditional ‘blueprint’ reasoning may have been based on the idea that a transition could be ‘rolled out’ following a plan, we now see the government being confronted by one dilemma after another due to the need for transitions. This is part of the ‘transition pain’, but it is also due to the activities of energetic citizens making use in unexpected ways of newly created opportunities. A clear, broadly accepted strategy would enable transitions to be completed and a new – more sustainable – equilibrium to develop.

Society is changing, rapidly and fundamentally; from a top-down, hierarchical, centralised society to a bottom-up, horizontal, decentralised society. The role and position of government is also changing, partly in response to this. The government is looking for new approaches that better suit the current network and participation society. In other words, it is searching for its role in the energetic society. Changes in society and therefore in the relationship between government and society essentially form a continuous process of mutual adaptation. Early this year, the State Secretary for Infrastructure and the Environment, Wilma Mansveld, announced in her letter on the ‘modernisation of environmental policy’ (IenM, 2014c) that the Cabinet wants to ‘make use of the energy present in many parties in the country with regard to the environment and sustainability, more than it has done so in the past’. She recognised that it is not just up to the government to find answers to ongoing and new challenges, but that this requires new coalitions. She also wants to ‘provide real opportunities for anyone to take action who believes in the importance of sustainability and to inspire sustainable activities’.

In the Nature Vision 2014, Cabinet also announced its intention to involve society in policy development by stating that ‘The Cabinet believes it is very important to respond to the growing engagement of the general public and other green business developments, and therefore to focus on the creative, responsible citizen and, by extension, the energetic society’. Also in the field of flood protection, the government is interested in active interaction with regional authorities and the general public. The key question is how the government can successfully develop its new role and position.

The energetic society requires an active, facilitatory government

The NSOB and PBL described in a recent essay (Van der Steen et al., 2014) how the energetic society requires an active, facilitatory government; a government that invests substantially in its learning potential, uses society and involves it in the search for solutions, dares to experiment, and is open to new insights gained along the way. Also a government that stays on course, is consistent, but is also prepared to fine-tune policy if it produces friction or negative effects. This is a government that believes in the innovative capacity of society, rewards front runners, corrects for undesirable side-effects and encourages learning by showing what works elsewhere, and why. In summary, key words are experiment, learn and scale up. Given the challenges facing the government, it will also need to dare to declare some practises and technologies no longer suitable due to their negative effects on society. After all, in the words of the late Ad Geelhoed (former Secretary-General of the Ministries of Economic Affairs and General Affairs), policy sometimes also means suffering. If the government actively helps search for affordable alternatives, then the transitions will also gain public support.

In the initial phase, transition policy mainly involves searching, experimenting and learning. It is in the next phase that hard choices need to be made, also by government, and in which the emphasis is on selecting and scaling up. This may hurt – the so-called

transition pain. In a number of areas, the Netherlands currently is in the phase where this hurt is still to come or already is being felt. If, however, the government avoids making these difficult choices, the transition pain will only be put off until a later time, with the increased risk that, when it does come, the pain will be even worse. The vested interests that defend their position and power are therefore going to have to surrender some of that power to upcoming groups and interests.

Beyond the barriers

The main barriers to successfully engaging and making use of the energetic society and implementing the planned transitions are currently:

- (the power of) vested interests;
- the risk aversion of civil servants, government officials and politicians, and the political accountability culture;
- the internal organisation of the government;
- unwritten rules, habits and working practises;
- scepticism and normative criticism.

The Netherlands is failing to achieve its own objectives, due to the barriers named above. If the Netherlands wants to move beyond these barriers, and for example expand and scale up local initiatives, then the government is going to have to take on a different role – not just government officials and civil servants, but politicians, too. This requires a government with ambition that provides direction and encourages initiatives. It is therefore about encouraging radical innovation and hybrid combinations between the new and the old order, removing barriers and obstacles, and providing direction. In essence, therefore, it is about building a new structure, culture and mode of operation. This requires new competences and people who listen, are outward-looking and able to make connections, also within government. Working in and with the energetic society must become the new routine.

This means leadership and utilisation, which requires government action at these four levels:

1. formulate, communicate and sustain ambition and vision;
2. ensure system intervention by changing defaults;
3. influence choices made by individuals and companies by enticing and encouraging;
4. encourage energy by challenging and making use of the power of dynamic legislation.

The 21st century requires an innovative government. After all, there is no stable situation, nor will there be. The new government will constantly need to decide 'how best to act in a certain situation'. It will experiment and enter into new alliances and partnerships without knowing what the outcome will be. It will celebrate its successes and learn from its mistakes, and this will require daring and courage.

The energetic society also demands a facilitatory government, with a much more horizontal network culture; no longer ‘that’s not my responsibility’, but ‘how can we work together?’. A government that is trusting without being naive and that looks for broad coalitions to solve the complex sustainability issues (PBL, 2013b).

Decentralisation requires greater systems responsibility from national government

There has been a considerable move towards decentralisation over recent years, also in human environment policy. Examples are nature policy (decentralisation to the provinces) and spatial planning (to the provinces and municipalities). Decentralisation is consistent with the increase in regional diversity in the Netherlands (PBL, 2011). Because decentralisation is also taking place in the social domain, local authorities in particular are seeing an increase in their responsibilities. From the point of view of the energetic society, this is – in theory – a positive development. After all, of all the government agencies, people have always had the most contact with the municipality, and the recent decentralisation of policy areas increases this contact. The municipality must therefore be considered to be in the best position to assess and make use of the potential of the local population. However, municipalities must also be able and willing to take on this new responsibility. This is where national government can help, by providing knowledge or by forming ‘horizontal partnerships’ between national government, municipalities and private parties, based on experiences with urban policy.

Ongoing decentralisation is not the only change taking place in the relationship between national government, local governments and society. After all, deregulation and privatisation has also been seen in the past decades. However, the national government is now searching for a new role within these developments. It will therefore be further removed from direct policy implementation, but still responsible for the correct functioning of the policy system as a whole (PBL, 2013b). In policy speak this is ‘the systems responsibility’ of national government. This includes a wide range of responsibilities:

- Monitoring Dutch EU policy obligations, such as Natura 2000, air quality and water quality. National government needs to monitor regional policy results to ensure that European targets will be met.
- Matching decentralised policy to centralised policy in adjoining sectors. Urbanisation policy is decentralised, but the main infrastructure falls under the responsibility of national government. Better regional coordination can be achieved by encouraging municipalities that work together to make choices and by better synchronising sectoral budgets (Hamers and Snellen, 2014).
- Promoting an effective, efficient policy system. In the case of decentralised policy areas such as spatial planning and nature, this type of system can be encouraged through the transfer of knowledge and experience and by conducting policy evaluations to make policy more effective and more efficient.

- Preventing the negative impacts of decentralisation and privatisation. The public enquiry into housing corporations revealed such impacts; high-risk investments, irregular activities and exorbitant salaries. The corporations were given greater policy freedom 20 years ago; it is now clear that such freedom demands tighter regulations and stricter control.

Decentralisation and privatisation can be useful in many areas but greater system responsibility on the part of national government can help prevent negative effects and problems. ‘Analyse everything and keep what works’ would be a good motto.

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Annex

Assessment of human environment policy objectives

This annex provides an overview of the extent to which national environment, nature or spatial planning policy objectives are expected to be achieved once all declared and officially proposed policy measures have been implemented. The four colour codes (see key below) provide a quick overview of the assessment of policy progress. The main recent policy developments/options are named in the right-hand column of the table. Major developments in the various human environment policy sub-areas are described in more detail in Chapters 2 to 7 of this report and in the indicators in the digital assessment – the website for this report (www.pbl.nl/balans2014 ; in Dutch).

Legend



Policy implementation will probably result in target being achieved.



Expected developments will probably result in target being achieved, a more robust policy would allow for setbacks.



Expected developments will probably not result in target being achieved, may be possible if policy is intensified.



Expected developments will probably not result in target being achieved, fundamental review of current approach required through application of different policy instruments or different targets.





















Not yet possible to ascertain.





















This analysis has not yet been carried out.

















Climate and energy	Assessment 2012	Assessment 2014	Additional information
Kyoto target, 2008–2012			The Netherlands has more than enough emission rights to meet its Kyoto commitments.
Greenhouse gas emissions, EU target, non-ETS sectors, 2020			According to the NEV report (ECN/PBL, 2014), full implementation of the Energy Agreement will limit cumulative emissions over the 2013–2020 period to 808–811 Mt CO ₂ equivalents; well below the target of 897 Mt.
Renewable energy, EU directive, 2020 National target, 2023			According to the NEV report, the share of renewable energy in 2023 is expected to rise to between 13.1% and 15.9%; likely to remain below the target of 16%.
Wind on land, 2020			According to the NEV report, the installed capacity of wind turbines on land is expected to increase to between 4 and 6 GW by 2020, while the target is 6 GW.
Wind at sea, 2023			According to the NEV report, the installed capacity is expected to increase to between 2.0 and 4.4 GW by 2023, while the target is 4.45 GW. The range covers the uncertainties on reductions in expected costs of this technology and the lead time of projects.
Energy saving, 2020			According to the NEV report, average annual energy saving will increase to between 1.0% and 1.4% in the period up to 2020, while the target is 1.5% per year.





















Air pollution	Assessment 2012	Assessment 2014	Additional information
NO _x emissions from 2010			In 2012, nitrogen oxide emissions were 12 kt (5%) below the EU emission ceiling, as applicable from 2010 (NEC).
SO ₂ emissions from 2010			In 2012, 16 kt (32%) below the EU emission ceiling.
NH ₃ emissions from 2010			In 2012, 8 kt (6%) below the EU emission ceiling.
NMVOC emissions from 2010			In 2012, 35 kt (19%) below the EU emission ceiling.
Local air quality, PM ₁₀ , 2011			Data not yet available.
Local air quality, NO ₂ , 2015			50 km of national main roads not yet meet the standard; strong improvement since 2000.
PM _{2.5} exposure index			Data not yet available.

Agriculture and food	Assessment 2012	Assessment 2014	Additional information
Manure production ceiling			Nitrogen production well below manure production ceiling of 2002. Phosphate production increased again in 2013 due to growth in dairy herd and increased phosphate levels in concentrates. Unclear whether nutrient tracking will be effective enough to limit manure production to 2002 level.
Nitrates in upper groundwater			Southern sandy region and loess region remain problem areas even after 2013.
Exceedance of surface water quality standards, crop protection products			Substances subject to an annual average EQS (EQS-AA) standard exceeded that standard in about 25% of the monitoring locations, in both 2010 and 2012. This was 50% for substances subject to a maximum allowable risk level (MTR). MTR levels will eventually be replaced by AA and MAC (maximum concentration) EQS levels.
Ammonia emissions, agriculture, 2010, 2020			Ammonia emission levels are decreasing; the 2010 NEC target has already been achieved. The NEC target for 2020 (-13% compared to 2005) may also have been achieved, but emission projections are uncertain.
Antibiotic use in livestock farming, 2013, 2015			Antibiotic use in livestock farming is decreasing; 50% reduction target between 2009 and 2013 already was achieved in 2012. The reduction target for 2015 is 70%.
More sustainable meat, 2023			Consumption of 'more sustainable' meat increasing, but current rate of increase still too low to achieve 2023 target.
Sustainable animal housing, 2015			10% fully sustainable housing; target achieved by more than 8%.
Food wastage, 2015			National target: reduce total food wastage by 20% by 2015, compared to 2009 levels. Waste at consumer level – largest contributor – is not yet decreasing.
Overweight and obesity			Half of all Dutch adults are overweight, increase in the number of Dutch with serious overweight has been halted.

Water	Assessment 2012	Assessment 2014	Additional information
Surface water quality, 2027			Between 5% and 40% of surface water bodies to meet all WFD targets by 2027.
Water shortages and freshwater supply, 2015			Sufficient water for most users in normal and dry years.
Swimming water quality			2015 objective – ‘all locations acceptable quality’ – almost achieved but no further improvement in recent years.
Flood protection			Flood protection level not yet up to the desired standard. New flood protection policy being developed within Delta programme.

Mobility	Assessment 2012	Assessment 2014	Additional information
Travel speed			In 2013, the travel speed target was met on 94% of motorways. Travel time losses due to traffic jams were reduced below the 2000 level.
Home-work proximity			Proximity levels have roughly stayed the same, as most new jobs and population growth occurred in urban areas.
Road safety			Significant decrease in number of road deaths, but reduction target for serious injuries will not be achieved.
Emissions of air pollutants from road traffic			Implemented measures resulted in decreases in particulate matter and nitrogen oxide emissions, despite an increase in vehicle kilometres.
CO ₂ emissions from traffic, 2020			According to the NEV report (ECN/PBL, 2014; p.93), CO ₂ emissions from traffic will decrease to between 30 and 37 Mt by 2020; clearly above the target of 25 Mt.

Competitive power	Assessment 2012	Assessment 2014	Additional information
Competitive power of regions and sectors			Baseline assessment (European regions) available.
Nature and biodiversity	Assessment 2012	Assessment 2014	Additional information
New NNN acquisition			Nature Network Netherlands (NNN, formerly EHS) targets in Nature Pact recently reviewed; increase in NNN area.
Environmental pressure on nature areas			The environmental pressure on nature has decreased considerably, since 1990, but is still above the level required for sustainable conservation.
Decline in threatened species			Fewer species threatened; severity of threat decreasing, on average.
Conservation status			Many of the species and habitats included in the European Birds and Habitats Directives have an unfavourable conservation status in the Netherlands.
Ecosystem quality			Decline in average quality of many types of nature since 1994. The rate of decline has levelled off in recent years.
Ecosystem service provision			The provision of various national ecosystem services has decreased over the last 25 years or so, while demand has increased. Policy targets have not yet been described in sufficient detail to allow evaluation.
Removal of ecological barriers through construction of national infrastructure			Still insufficient clarity concerning solutions for problems in former main ecological links.

Environmental quality, urban environment	Assessment 2012	Assessment 2014	Additional information
Noise from road traffic, 2010			Data not yet available.
Problems with noise from motorway traffic, 2020			Data not yet available.
Noise from trains, 2010			Data not yet available.
Problems with noise along railway lines, 2020			Data not yet available.
Noise, Schiphol			Threshold values for noise pollution not exceeded at enforcement points since 2009.
Safety risk, Schiphol			Based on total risk weight safety standard.
Waste generation, 2015			Waste production relatively stable in recent years, below waste generation ceiling.
Waste recycling, 2015			Target achieved in 2010.
Household waste recycling, 2015			Percentage of collected sorted waste increased slightly, from 45% in 2000 to 50% in 2012.
Waste incineration and landfill			The reduction target for dumping of combustible waste will probably be achieved. However, amount of waste sent to landfill increased considerably in 2012.

The Assessment of the Dutch Human Environment is PBL's biennial assessment of the Dutch Government's objectives for the quality of the human environment and whether these are likely to be achieved within the set timeframe. This assessment does more than merely gauge; where policy targets are unlikely to be achieved, PBL also provides possible explanations.

The assessment provides the Dutch Parliament, Cabinet and society with a fact-based insight into the current quality of the human environment. This report presents the main conclusions; more elaborate analyses as well as the underlying statistical data can be found on the website: www.pbl.nl/balans (in Dutch).

In this assessment, PBL explicitly and more so than previously focuses on the future. The subtitle 'The future is now' points to the fact that steps must be taken today, if we are to deal with long-term issues. The Netherlands currently is insufficiently prepared for far-reaching changes – in demographics, climate, biodiversity, and resource availability – that may present themselves over the coming decades.

Important measures already have been implemented in certain areas (the housing market, water safety, mobility) to kick-start the envisaged transitions. In other areas, such as energy and nature, the current pace of change appears insufficient for achieving long-term objectives, or the government is hesitant about providing direction, for example, with respect to food. Will the government succeed in developing a coherent strategy in order to implement the required systems changes? Achieving this will unavoidably involve some 'transition pain'.

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