Rathenau Instituut Annual Report 2011

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Painful political choices necessary

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Rathenau Instituut

Rathenau Instituut

Mission

The Rathenau Instituut promotes the formation of political and public opinion on science and technology. To this end, the Institute studies the organisation and development of science systems, produces publications on the social impact of new technologies, and organizes debates on issues and dilemmas related to science and technology.

Rathenau Instituut

The Rathenau Instituut is an autonomous organisation which was founded by the Ministry of Education, Culture and Science in 1986. It is still funded by the Ministry, with responsibility for governance falling to the Royal Netherlands Academy of Arts and Sciences (KNAW).

Who was Rathenau?

The Rathenau Instituut is named after Professor G.W. Rathenau (1911-1989), who was professor of experimental physics at the University of Amsterdam, director of the Philips Physics Laboratory in Eindhoven, and a member of the Scientific Advisory Council on Government Policy. He achieved national fame as chairman of the commission formed in 1978 to investigate the societal implications of microelectronics. One of the commission's recommendations was that there should be ongoing and systematic monitoring of the societal significance of all technological advances. Rathenau's activities led to the foundation of the Netherlands Organisation for Technology Assessment (NOTA) in 1986. On 2 June 1994, the organisation was renamed the Rathenau Instituut.

A word from the Chairman

'The Rathenau Instituut had real impact in several areas in 2011. The book *Nier te koop – Baarmoeder te huur* ('Kidney for Sale – Womb to Let') prompted heated political and public debate, and accelerated the legislation process for donor systems and the trade in bodily material in the Netherlands.

'The 'Focus and Mass' report concluded that putting extra money into certain areas of research does not necessarily lead to greater output in those areas. The timing of the report was perfect: it was published just as MPs and government ministries were working hard on a new policy for the country's leading economic sectors. Our report featured prominently in the debates.

'It is also gratifying to look back on a very successful meeting on 'valorisation' – making academic knowledge applicable and broadly accessible. We were able to offer some 300 young academics practical tools to use for valorisation. And we managed to stoke up the debate on 'intimate technology', for example – technology that is literally getting under our skin. A competition in nrc.next newspaper attracted interest from a wide, young audience.

'The challenge for 2012 is to focus on the government's new innovation policy. Will we be able to make clear the effects of the initiatives now being launched? And can we provide building blocks to ensure those initiatives take the most effective form?

'Focusing on issues like this allows us to keep contributing to the debate and keep pace with new developments. Or even anticipate them slightly, because the Rathenau Instituut is best known for being a trailblazer.'

Sander Dekker

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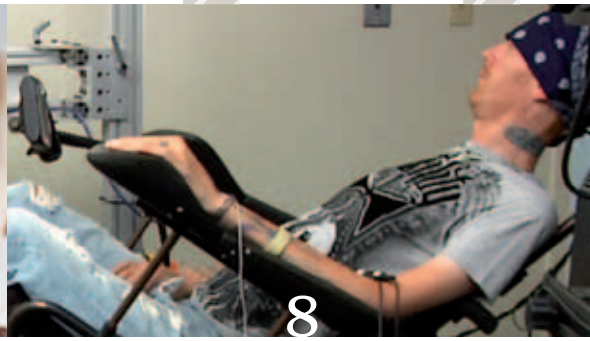

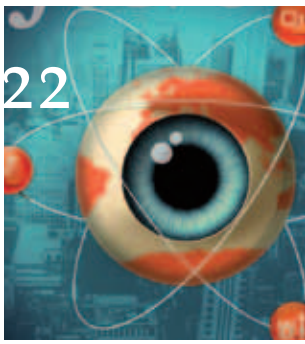

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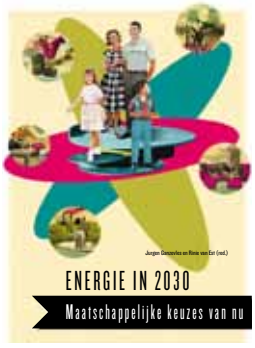
Natural gas extraction 50 years ago.



The book *Energie in 2030 (Energy in 2030)* was launched at a symposium in The Hague on 12 September attended, by energy experts and MPs.

What will we do when natural gas runs out?

'It is generally only technical experts who attend conferences on energy. The Energy in 2030 conference brought academics, politicians and civil servants from all specialisms together. It was a real relief', says Jacques Kimman, who lectures on new energy at Hogeschool Zuyd.

The Rathenau Instituut launched a book entitled *Energie in 2030 (Energy in 2030)* in which 14 energy experts consider how the Netherlands will meet its energy needs, once the Groningen gasfields run out around 2030.

'All the sources of energy that might help us avert a looming energy crisis are controversial', says Jurgen Ganzevles of the Rathenau Instituut. 'Nuclear energy, coal-fired power states and shale gas are all sensitive issues, and biofuels and wind energy meet with resistance from the public, local authorities and environmental groups.' The switch from natural gas to other forms of energy is going to hurt, that much is clear. It will hurt our wallets, the environment or the landscape. 'We have to accept the pain,' says Ganzevles, 'because the easily accessible gas is definitely running out.'

'The symposium got people thinking', believes lecturer Jacques Kimman of Hogeschool Zuyd. 'It's good that a wide range of people were there, because you can't solve the energy problem with technology alone. The solution will need the support of as many different parties as possible.' The Rathenau Instituut could help guide the search: 'I'd say: good report, good symposium – now keep up the good work.'

European Parliament: 'Take up the debate on bioengineering'

'We have to convince people that human dignity will not be undermined by developments in bioengineering', said MEP Vittorio Prodi at the European Parliament's 'Making Perfect Life' meeting.

The meeting was part of the Making Perfect Life project, run by the Rathenau Instituut and a number of European partners. The project explores how biology and technology are becoming increasingly interwoven. 'These developments will give us more opportunity to intervene in biological and cognitive processes,' says Rinie van Est of the Rathenau Instituut, 'and they will give us the chance to create technology with the same properties as living organisms, like intelligence and the ability to reproduce.'

Scientists can already grow living tissue in the lab and make synthetic DNA. 'Tens of thousands of patients worldwide have electrodes in their brain that can influence their behaviour', says Van Est. 'And there are devices that can measure our emotions.' This has major social and legal implications. Who is responsible, for example, when a patient treated with deep brain stimulation should displays extreme behaviour? These developments are a constant challenge to legislation, and politicians must respond in good time. The European Parliament is keen to take up the challenge. 'The *Making Perfect Life* report gives us a framework and a methodology for developing new legislation', Prodi said. 'So let's get on with it.'

Transcranial magnetic stimulation can be used to treat depression.

A protestor's view on biofuels.

A collection of biofuels

'Plants are for food first, then biofuel'

The 'biobased economy' – the use of crops for fuel, for example – offers good prospects for substantially reducing greenhouse gas emissions. However, crops must be used first and foremost for high-value applications like food. A crop may be used as fuel only as a last resort.

This is all in a manifesto that has been signed by over 40 companies and civil-society organisations, from KLM and DSM to the Worldwide Fund for Nature and Oxfam Novib. The signatories say they drew up the manifesto using the recommendations of the Rathenau Instituut and other organisations as a guide.

In the Rathenau Instituut's *Biobased Economy* report, published in 2011, Lotte Asveld concluded that there are many problems associated with biofuels. 'A lot of biofuel is currently made from food crops like maize, palm oil and wheat', she says. 'This leads to competition between energy and food, which is far from ideal.' So as not to affect the food supply, new agricultural land could of course be reclaimed specially for biofuel production, but the land needs to be available. 'That is not the case in the Netherlands', Asveld points out. 'And in other countries new agricultural land is often created by clearing forest land, which is bad for atmospheric CO_2 levels.'

So there is plenty of room for improvement in what Asveld refers to as first-generation biofuels. The second generation should be obtained from the non-edible parts of food crops, because if a plant is used for food and fuel, it's a win-win situation. 'The government should do more to encourage the development of biofuels. I see it as our job to keep cranking up the debate.'

The English version of *Biobased Economy* was presented at the World Resources Forum in Davos in September.

Biofuel from algae

FRANS BROM, head of the Technology Assessment department and professor of the Ethics of Technology Assessment at the University of Utrecht

TECHNOLOGY ASSESSMENT

We live in a technotope

'Suddenly the building began to shake. Just short bursts at first, then longer. An elderly Japanese gentlemen suggested we went outside. We saw buildings swaying back and forth, windows shattering and there were car alarms going off all over the place. My mobile didn't work, because Japan only has a 3G network: my phone wasn't modern enough. People with smartphones immediately began to receive tsunami warnings, but the part of Tokyo we were in wasn't at much risk, apparently.

'After the meeting we went back to the hotel. There was no public transport and all the bikes in Tokyo sold out within an hour. The gas was shut off, so the restaurant was only serving cold and raw dishes – a Japanese speciality, fortunately. It wasn't until we were back at the hotel and looked at some Dutch websites that we got an idea of the scale of the disaster, the tsunami and the threat of a meltdown at Fukushima.

'An event like that makes you realise what a huge role technology plays in our daily lives. We live in a technotope. It gives us independence, but it also makes us dependent. Technology not only determines our identity, it also determines our survival. And that is why at the Rathenau Instituut we continue to encourage public debate and political decision-making on technology.

The earthquake made me even more aware of how technological systems are becoming more and more interwoven into our society. Communications, IT and utilities are all closely connected, for example. A development in one system often has a major impact on others. We try to reflect those connections in our work programme.'

Trade in bodily

A book entitled *Nier te koop – Baarmoeder te huur* (*Kidney for Sale – Womb to Let*), published in March 2011, caused a stir. Rathenau researchers Ingrid Geesink and Chantal Steegers wrote: 'From eggs and sperm to kidneys and bone, everything is for sale. And it's often available in the Netherlands.' They discovered that many people are astounded by the size of the market.

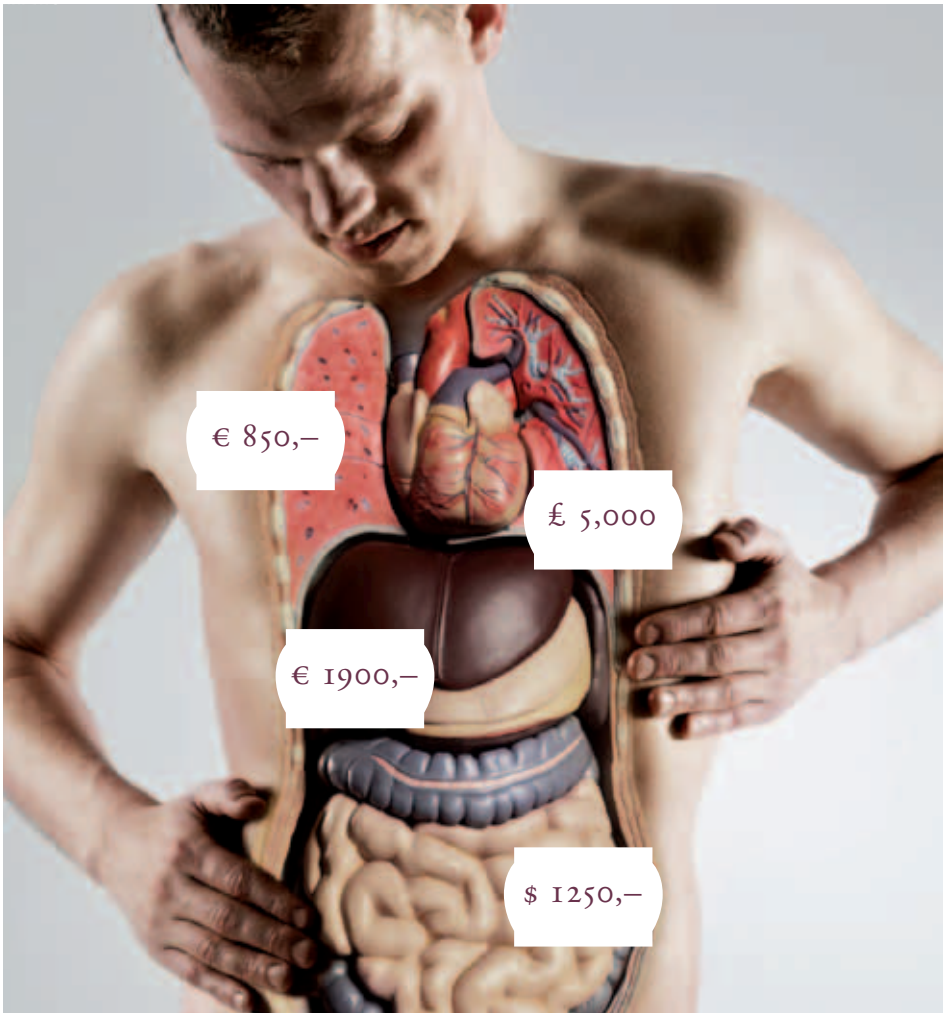
The authors found that Dutch legislation in this field is not compatible with practice. The Netherlands is not an island. If transactions are banned, people just go to another country. 'The Netherlands has a single centre for surrogate mothers, for example, and couples can only go there under very restrictive conditions', says Geesink. Homosexual men are excluded, for instance. 'So they go abroad. There are plenty of surrogate mothers offering their services in America and India.'

Some Dutch laws have a counterproductive effect. 'Since 2004, sperm donors have no longer been able to remain anonymous in our country,' Steegers points out, 'because children should be able to find out who their father is. But many donors don't want children turning up on their doorstep later, so Dutch sperm banks are virtually empty. Lots of women go to Belgium, where donors are allowed to remain anonymous, or they buy sperm from Denmark.'

material: scores of reactions

There is a less visible trade in bodily material in the health-care sector, say Steegers and Geesink. 'Biotech companies make products from human bone – particularly the hip joints of patients who receive an artificial hip. They are used to make bone products, but the people they come from often have no idea that their worn bones are being recycled and used in another patient's body. And that there are companies that make a profit out of it. This should really happen more openly.'

In their book, Geesink and Steegers pose the question of how sustainable the current Dutch donor system is. They call for more information and transparency on how bodily material is used. Alternative donation systems could help solve the shortage of donors. And, finally, the taboo on paying donors should disappear, to allow an open debate on what forms of compensation are reasonable and appropriate. The key message is: do offer donors something, because they are needed desperately.



Baby te koop (Baby for Sale) documentary

In the documentary *Baby for Sale*, which was co-funded by the Rathenau Instituut, Sophie Hilbrand follows a married couple, a young gay couple and a single woman trying unconventional ways to have a baby. The documentary was screened on national television in March 2011.

The impact of *Kidney for Sale – Womb to Let*:

- Researchers Geesink and Steegers of the Rathenau Instituut appeared before parliament's Standing Committee on Health, Welfare and Sport to present their findings.
- The book attracted a great deal of media interest, from the news magazine *Groene Amsterdammer* and the national financial newspaper to nightly current affairs talkshow *Pauw & Witteman*. One programme, *Hollandse Zaken*, about topical issues, devoted an entire edition to paid donors.
- Edith Schippers, Minister of Health, Welfare and Sport, promised that the government would respond to the book in early 2012.

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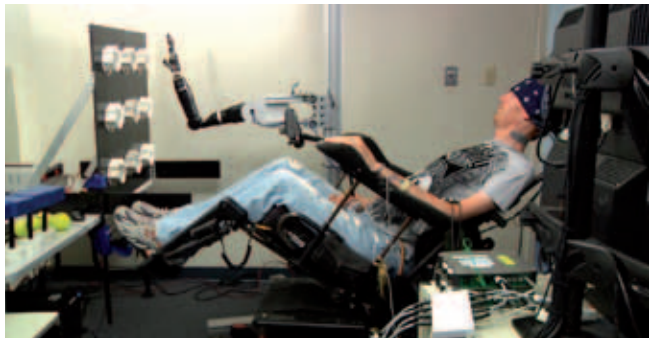


A paralysed man controls a robot arm with his brain.

Human enhancement

'Civil servants and members of the government have no idea about the latest developments in robotics, for example. And academics often don't think about the implications of their work for a ministry like ours. The knowledge forums that we have organised with the Rathenau Instituut bring together academics, politicians and senior civil servants, so they can explore the implications of new developments.'

The words of Jacqueline de Jong, strategic advisor at the Ministry of Security and Justice, discussing the two 'knowledge forums' that she organised with the Rathenau Instituut in 2009 and 2011. At the forums, nine academics brought the top 30 senior staff of the ministry up to speed on developments in robotics and human enhancement – the use of medication, technology and even surgery to 'improve' people.

'The use of human enhancement for socially relevant goals is known as social enhancement', says Ira van Keulen of the Rathenau Instituut. 'A government could try it, but only under certain conditions. The social enhancement of public servants, criminals or groups of citizens must happen strictly on a voluntary basis and in a safe and transparent way.' After the knowledge forum for senior civil servants, a policy seminar on these issues was held for over a hundred other civil servants, and a collection of articles was published for the general public.

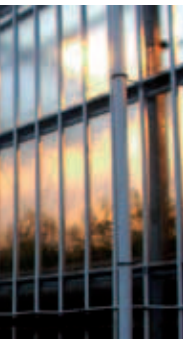
'The two knowledge forums were very well received at the ministry', says De Jong. 'In response to the last one our minister ordered the development of an Intelligent Robots Agenda, to explore the implications of using robots.'

Senate prepares for debate on nature conservation policy

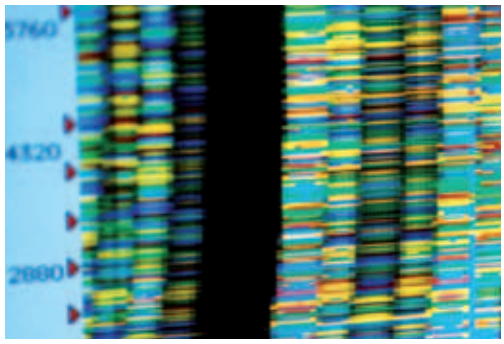
In 2011 the Rathenau Instituut and research institute Alterra (of Wageningen UR) held an expert meeting to prepare members of the Senate for a debate with the State Secretary for Economic Affairs, Agriculture and Innovation.

The Rathenau Instituut invited speakers and produced a memorandum that participants could use to prepare for the meeting. The invited experts spoke about the dilemmas facing nature conservation policy in the Netherlands and possible areas where solutions might be sought. For example, they looked at the tension between nature conservation and the economic interests of the agricultural sector, and at the question of where the responsibility for protecting nature should lie: with central government, provincial authorities or elsewhere?

'The Rathenau Instituut and Alterra had done good groundwork for the meeting, so we were able to have in-depth discussions', says Senator Rein Munniksma of the province of Drenthe. 'And it was also good that there were only representatives of the authorities taking part, as well as academics and civic society organisations. The interactions between individuals and organisations helped Senate reflect properly on the issue. An expert meeting is a really good way of preparing for a debate. This experience inspired me to organise similar meetings in Drenthe.'



Room for nature or for farming? Economic interests and nature conservation are always a dilemma for policy-makers.



Synthetic biology: DNA.

Future politicians and scientists debate synthetic biology

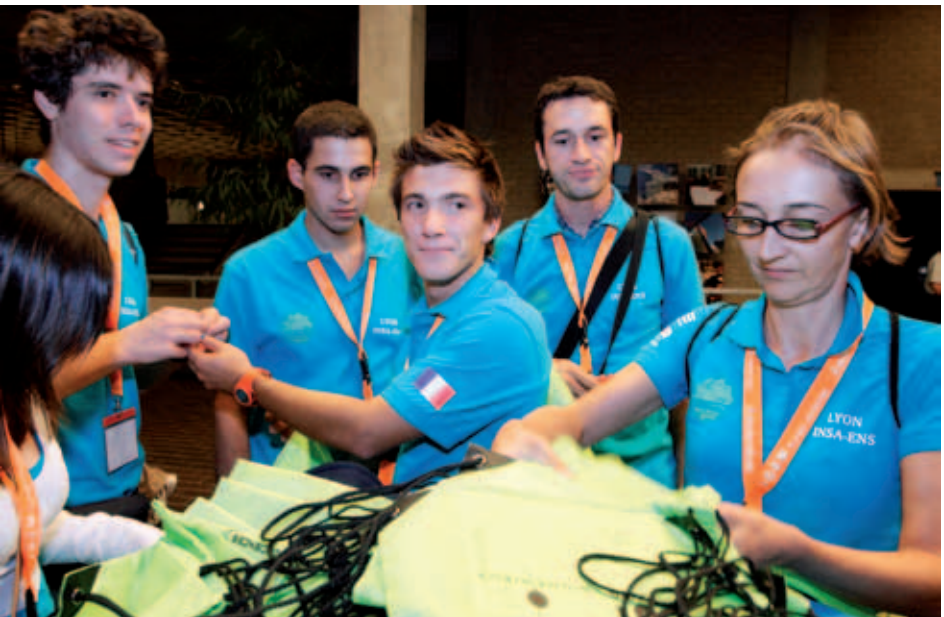
'Politicians know little about synthetic biology – changing existing cells or creating completely new life', says Professor Bert Poolman of the University of Groningen's Centre for Synthetic Biology. 'So it's important to debate it with them. This meeting was the ideal way to do it.'

Poolman attended the Rathenau Instituut's Meeting of Young Minds, an evening of debate between members of Dutch political youth organisations and students participating in iGEM – an international competition in designing synthetic organisms.

It was a lively debate. Gijsbert Werner (of the Young Democrats) thought synthetic biology offered fantastic prospects for resolving energy and food shortages. Arjan van de Waerdt of the youth wing of Protestant political party the SGP said that, while he appreciated the good intentions of scientists, he doubted whether they were always aware of the full implications of their findings.

'It was important that the Rathenau Instituut organised this debate,' said Rebekka Bauer, member of the iGEM team of Imperial College London. 'We scientists mustn't lock ourselves in our labs, we need to hear what people and politicians think about synthetic biology, join the debate. And show that we're not creating monsters.'

A successful meeting, finds Virgil Rerimassie of the Rathenau Instituut. 'The young political activists did a good job. They showed us for the first time what political parties think of synthetic biology. Hopefully established politicians will follow their example.

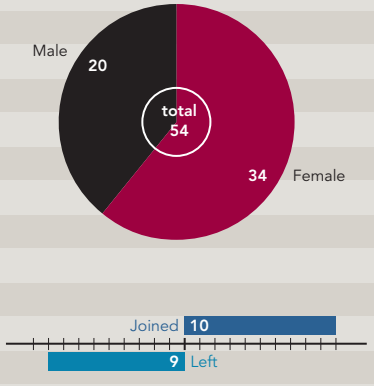


Youth members of political organisations work with students to set an example for the political establishment.

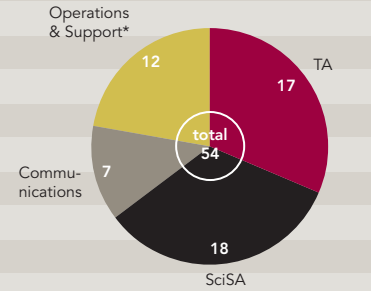
You will find more figures in the appendices on our website: www.rathenau.nl/jaarverslag2011

Staff

On 31 December 2011



By department



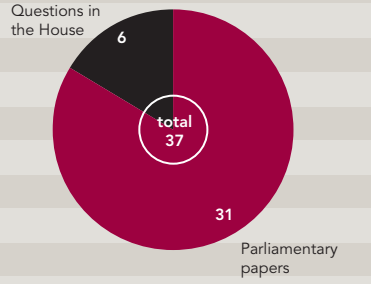
+ Director + 3 professors, 3 guest staff and secondments, 6 interns and trainees

* Operations & Support also work for the Huygens Institute and for DANS (Data Archiving and Networked Services)

In the media

Press	
Opinion pieces	12
TV interviews	3
Radio interviews	35
Other written press (online and offline, including academic papers)	277
Total	**327**

In politics



Rathenau Instituut

COLUMN

Jan Staman's Top 5

Director Jan Staman looks back at 2011 using his personal top 5 terms for 2011, which will continue to set the tone in 2012.

1 **China >** China will be the country of hope, the country that embodies progress, like the United States used to do. The key question for us is: can we connect with the Asian region, with the dynamic and the developments there? Science and technology, the traditional symbols of the Western Enlightenment, are now playing the same role there. That is why I am so pleased about the Global Ethics in Science and Technology (GEST) project, in which we are working with partners from Germany, Britain, China and India to identify a common ethical base for new technologies that will change the world.

2 **Europe >** The big question is: what does the Netherlands want to be in Europe? The European Commission currently sets the Science and Innovation agenda. If our priority is to get as much money as possible out of Europe for our own national problems and interests, we are not likely to get far. We will pay a heavy price if we take that disastrous route. But if we go in with the idea of doing our bit to resolve Europe's social and economic problems, I think there will be plenty of opportunities.

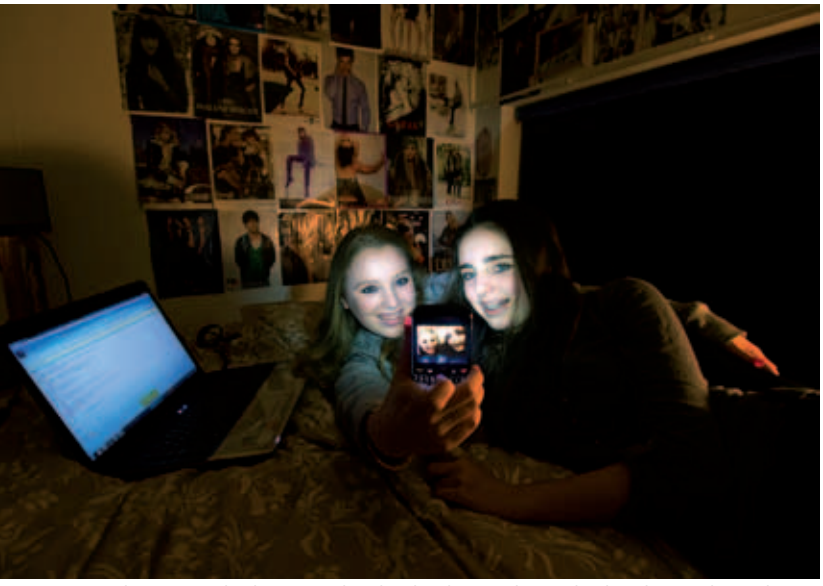
3 **Excellence >** 'Excellence' – a real buzzword in the university world – has had its day – if it only refers to rankings. Because to me, however the universities might seek to justify it, excellence, in terms of simply parading your ranking, is not excellence. I'm waiting for the first university to stand up and say 'Get rid of the rankings. Get rid of this "excellence" philosophy. We're choosing our own strategy, our own profile.'

4 **Innovation >** In 2011 the academic world received a radical challenge to engage in an accountable way with innovation, when it was faced with the question *'How can academia contribute to economic innovation and solutions to social problems?'* This appeal was new, extremely powerful and highly compelling. It marks the beginning of a process that will have major implications for the universities' social legitimacy. The universities will have to reinvent themselves, not only in the Netherlands, but all over the world.

5 **EPD >** The Dutch abbreviation for 'Electronic Patient File', which was supposed to have arrived on the scene in 2011. But as with many major IT infrastructure projects, everything that could go wrong, did go wrong. Fortunately, the Senate intervened. Maybe, as it gets its second chance, the EPD will become the first major IT infrastructure project that is implemented successfully. I'm glad the Rathenau Instituut was able to contribute.

25TH ANNIVERSARY: INTIMATE TECHNO

A visitor being scanned by an actor from theatre company Powerboat, which performed an act during the launch of the anniversary celebrations.



Young people contact each other via social media. This photograph was taken by Adrie Mouthaan, who was commissioned to produce a series on intimate technology.

Researcher Leonie van Drooge tells a visitor at the Valorisation Show how you can tell other people what you know.

A week of intimate technology on Holland Doc

To mark its 25th anniversary, the Rathenau Instituut wanted to highlight 'intimate technology', which is creeping further and further under our skin.

So the institute got together with documentary channel Holland Doc 24, which in June screened a week of films on the relationship between people and technology. It also showed an interview with Rinie van Est and Ira van Keulen of the Rathenau Instituut. They explained how technology is becoming more and more a part of the world in which we live.

Holland Doc screened the documentary *Emoticons*, in which Heddy Honigmann portrayed people for whom the virtual world has become more important than the tangible one. She follows several people, such as Sanne (aged 16), who is lonely during the day, but meets scores of friends online in the evening. The documentary channel also showed documentaries on the humanisation of robots (*Mechanical Love*), on personal information in databases (*Erasing David*) and on people sharing their joys and woes on Facebook (*Friends for Life*, 2011).

Valorisation Show: learning how to explain your research

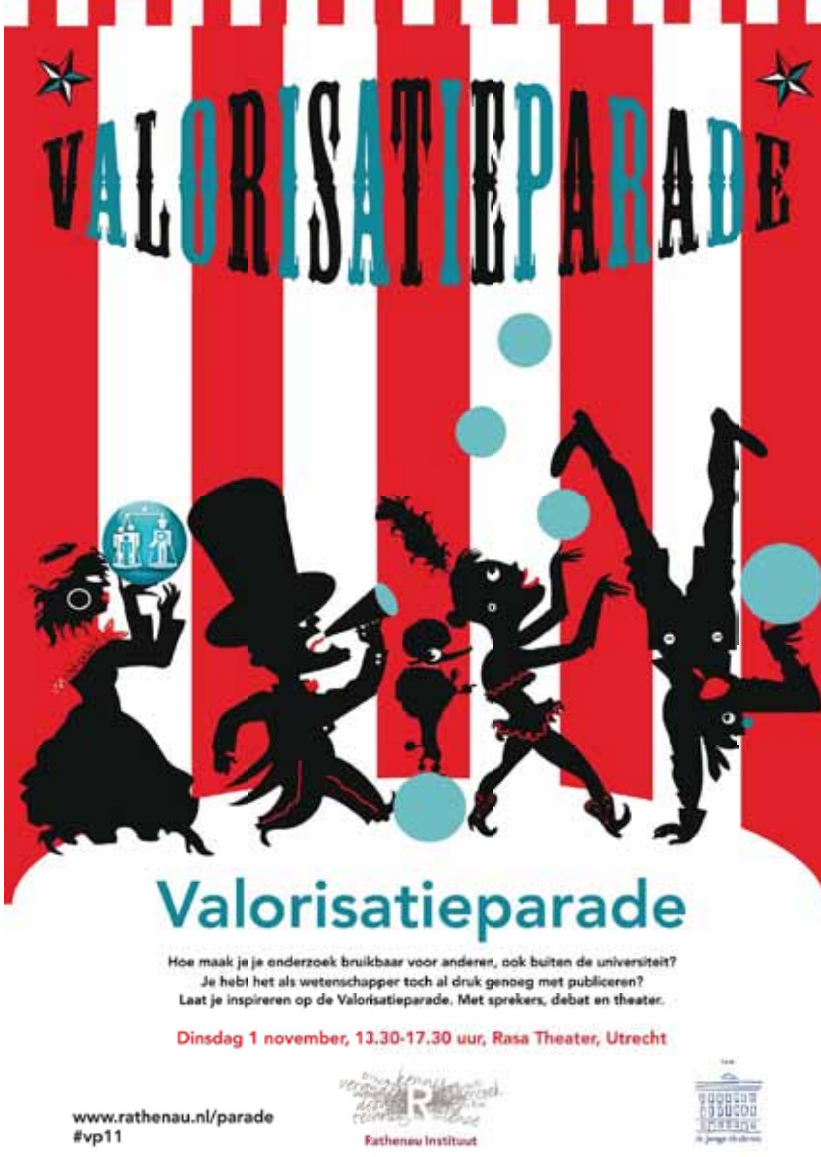
'This is your big opportunity to get your research into the papers. Who's interested?' There were many raised hands at the workshop given by Martijn van Calmthout, journalist with national daily *De Volkskrant*, at the Valorisation Show.

At the meeting in November 2011, academics could discover what 'valorisation' – disseminating academic knowledge and making it applicable to society – can do for them. At his 'How do I get in the

papers?' workshop, Van Calmthout assessed the academics' proposals against journalistic criteria like 'topicality' and 'clarity'. 'To make the papers, you have to be able to make clear precisely what you are researching and why,' says Van Calmthout. 'And the results must be newsworthy. I had to disappoint an awful lot of people, but that was also the point: to teach people how not to do it'.

Van Calmthout is pleased that the Netherlands has an 'external thinktank', as he calls it, like the Rathenau Instituut, which focuses on science and society. 'Though I do think the Rathenau Instituut comes across as elitist sometimes – they're formal and proper. They should just go down to the market; ordinary people should think about science too.'

As well as workshops there was also the Valorisation Show, which was attended by over two hundred academics, policy-makers and communications experts, who had plenty of opportunity to talk to each other. 'We managed to reach a whole new audience,' says Ira van Keulen of the Institute, 'academics who can make practical use of our ideas about spreading their results and making them applicable.'



Self-test for academics

Your university has put a news item on your publication on the website. You could point visitors to it via Twitter, Facebook or LinkedIn. What do you do?

This is one of the questions in the *Relevance Indicator* designed by the Rathenau Instituut in collaboration with the Young Academy. The self-test enables academics to find out how open they are to valorisation: distributing academic knowledge and making it applicable.

'At the moment valorisation is too much a subject for policy visions, strategy memoranda and performance targets', says Barend van der Meulen, head of Science[>]

Wim van Velzen (right) retired as chair of the board of the Rathenau Instituut when his term came to an end in 2011. He had held the post since 2004. Under his management, the Rathenau Instituut opened its Science System Assessment department. It also began to focus more on publicising research results and encouraging debate. Halbe Zijlstra, State Secretary for Education, Culture and Science, appointed Hague councillor Sander Dekker (left) to replace Van Velzen.

During Museums at Night 2011 the Rathenau Instituut staged a show and presented photographs from the Intimate Technology series.

The relevance indicator (self-test) was filled in over a thousand times. It can still be accessed on the site.

[<] System Assessment at the Rathenau Instituut. 'There is still too little discussion with and by academics.'

Through the *Relevance Indicator* (which went online on the Rathenau Instituut's website in September 2011), academics can find out in ten minutes which 'valorisation type' they are. From 'fan' (very keen on valorisation) to 'pure researcher' who wants little to do with it. In the first three weeks, almost seven hundred people did the test, and the results were presented at the Valorisation Show on 1 November 2011.

The playful test showed that academics increasingly engage in valorisation activities as their career progresses, says Petra van Alphen of the Rathenau Instituut. 'A professor does more valorisation than a post-doc, and a post-doc more than a PhD student', she says. 'It's only natural: the further you are in your career, the more experience you have of your subject and the larger your network both in academia and the world outside of it.'

Intimate Technology blog

'Virtual agents' – virtual people who answer clients' questions on a website – are taking on more and more human traits. Their programming can be so advanced that they develop a type of moral awareness and the ability to take decisions independently. How should we respond?

This question is posted by Stijn Friedrichs, a PhD student in psychology at the Open University, on the Rathenau Instituut's Intimate Technology blog. From October 2011 to February 2012, weekly items on the technology that is increasingly getting under our skin appeared on the blog. The subjects ranged from breastfeeding to *Avatar*.
The 2011 bloggers included academics Sabine Roeser (professor of technology

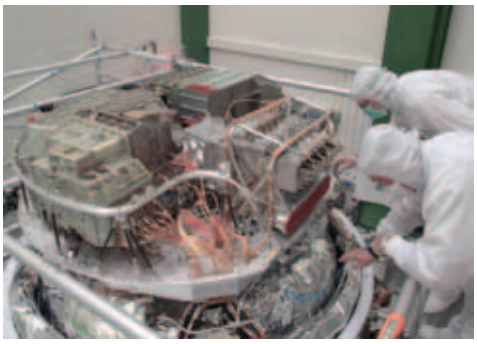
and ethics at TU Delft and the University of Eindhoven), Eric Berkers (researcher at the Foundation for the History of Technology), Merel Kindt (professor of clinical psychology at the University of Amsterdam) and Toine Pieters (associated with VUmc, Utrecht University and the University of Groningen, and specialised in the history of pharmacy).

Mindreading app wins prize

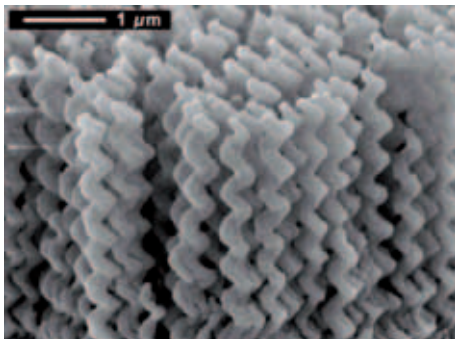
An app that allows you to tell whether someone is lying: the winning entry to a competition on Intimate Technology run by the Rathenau Instituut and *nrc.next* newspaper.

Technology is getting under our skin more and more. How does it affect us? And when will we start to feel uncomfortable about it? To explore these questions, the Rathenau Instituut and *nrc.next* organised a competition entitled 'Design your own intimate technology'. Participants were challenged to think about the technology of the future. What technology is likely to get just too close for comfort? Which app will cross the line? The winner, Rachel van Staalduinen, devised a mindreading app, a programme that helps you fathom the thoughts and emotions underlying a person's behaviour. Whether such an app will ever be produced remains to be seen but, discomfiting or not, it would be in great demand.

The report *Waardevol* (*Valuable*) was published in July. It includes sample charts listing valorisation indicators.



A spectrometer on board the Herschel satellite. An example of the use of scientific knowledge.



A valuable report on 'valorisation'

'This gives us good, firm foundations on which to build, especially when we come to put valorisation in a more international context.'

The words of Nico Klaasen, secretary of the National Valorisation Committee, in response to the publication of *Valuable*, a report produced by the Rathenau Instituut, STW Technology Foundation and Technopolis.

The report's main conclusion is that 'valorisation' (social and economic use of academic knowledge) can be fostered in many ways and at many levels. 'Companies, organisations like the Netherlands Organisation for Scientific Research, universities and *hogescholen* all have their own role to play in making academic knowledge applicable', says Leonie van Drooge of the Rathenau Instituut. 'Companies can seek contacts with academics, but it doesn't have to be an entire multinational. It can be enough simply for one dynamic division of the company to make contact with a university.'

Valorisation can also take place at different levels within a university. 'A board of management can create the right conditions for valorisation, a research leader can decide to put valorisation on the agenda at team meetings', says Van Drooge. 'And finally, individual researchers can also forge ties with companies or government bodies.'

Valuable contains 'valorisation charts' that identify different phases and potential benefits of valorisation for different parties (like a university of technology, or a *hogeschool's* knowledge network). 'The charts are an excellent tool that allow different parties to agree what they can achieve with valorisation and how they then measure whether the goal has been achieved', says Klaasen. 'The methodology needs further development, but this report is an important start. I'm very pleased with it.'

Academic leadership vital for outstanding performance

Academic leadership is vital for outstanding academic performance, as revealed in the study for which Maaike Verbree of the Rathenau Instituut was awarded a PhD by Vrije Universiteit Amsterdam in November 2011.

Verbree interviewed three hundred research leaders conducting research into health and medical issues. She identified two factors that have a positive impact on the performance of a research group. Leadership turned out to be a crucial factor. Academic leaders can set a good example by showing strong commitment and setting the standard. Another key factor is network management, how academic leaders profile their group in its academic and social setting. The results of the study had already been used to train young research leaders at several university medical centres.

Verbree's thesis has been published by the Rathenau Instituut.

Nano-particles can be used in all kinds of ways.

A good mentor can make all the difference to a young academic's career.

'Give young academics a mentor'

Young academics should be given an experienced mentor who can help them plan their career. Career training should also become mandatory for PhD students.

These are two of the conclusions of the debate on academic careers held at the Rathenau Instituut in March 2011. The sixty participants included researchers, HRM directors, career coaches and staff of NWO, KNAW, VSNU and the Ministry of Education, Culture & Science.

The meeting was prompted by the Rathenau Instituut's *Op het juiste moment op de juiste plaats (Right Time Right Place)* report, which showed that chance plays a major role in the careers of young academics. 'Whether an ambitious researcher progresses in academia sometimes depends on whether vacancies become available', says Pleun van Arensbergen of the Rathenau Instituut. 'And academics themselves are not always very active in their career planning.'

Some universities are trying to change all this by introducing tenure tracks, for example. They include firm agreements on the career paths of talented young researchers. The report shows that the attitude of professors is also important. 'Coach a young academic, give them the opportunity to keep developing', Van Arensbergen recommends.

A debate on academic career opportunities and problems was held in Utrecht on 18 March.

BAREND VAN DER MEULEN, head of the Science System Assessment department

SCIENCE SYSTEM ASSESSMENT

The importance of innovation

'In 2011 the government designated ten leading sectors that are expected to make a major contribution to innovation and economic growth. The public research institutions are expected to work closely with companies and the authorities in those leading sectors to ensure this is the case. And the idea is that companies should make substantial investments in research. Critics believe that this method of funding will be detrimental to fundamental research which does not produce directly applicable results. But things may turn out differently, as there is still funding for fundamental research outside the leading sectors policy. I am however worried about research for social goals, like public safety, which don't fall within an economically defined leading sector. The private sector is not likely to compensate for the cutbacks all that readily, nor are the specialist ministries likely to do so, judging by their budgets.

'The Rathenau Instituut tries to ensure its projects tie in with the leading sectors policy and benefit innovation. In our *In Search of a Technological Match* project, for example, we are investigating what benefits science-industry collaboration leads to. How does knowledge flow around science parks, for instance?

'We also plan to focus more on research conducted outside the universities. All kinds of institutes, like TNO and ECN, engage in research that is also important for innovation in industry.

'And right now we need rules for converging technologies – combinations of nanotechnology, life sciences, ICT and neurosciences. This field is undergoing such rapid development that the parties involved are waiting for practical and statutory frameworks to define what they can and may do. Rules could foster innovation. Here at the Rathenau Instituut we enjoy helping to resolve such issues.'

Focus and mass more volume?

The policy of stimulating specific areas of research is failing, according to the *Focus and Mass* report which the Rathenau Instituut presented to the House of Representatives' Standing Committee on Education, Culture and Science in March 2011.

The 'focus and mass' policy assumed that, since a small country cannot excel in all fields of study, the Netherlands would have to be selective. Over the past few years, therefore, extra money has been put into certain areas that are regarded as particularly important for the economy or society, such as nanotechnology and ICT. However, the extra money did not always raise the output of academic papers in these areas. Indeed, in international terms, our position is declining in a number of fields of research.

'A strange effect', says researcher Edwin Horlings of the Rathenau Instituut. He and Peter van den Besselaar charted the output from a large number of areas in their report *Focus and Mass*. 'You'd think that, if a country focused on a particular area of research, the mass of that area would increase. Though the areas that were given extra money have produced more academic publications, their share within Dutch research as a whole has not increased.'

There are a number of possible explanations. 'The first is that we should have put even more money into

in science: more money, more output,

some areas', says Horlings. 'That's unlikely, however, because an awful lot of money has been spent on this.'

The second possible explanation considers how other countries do things. 'Academic output in the Netherlands is evenly distributed over the various fields of study', explains Horlings. 'Asian countries, on the other hand, are currently focusing very heavily on research in areas like ICT and nanotechnology. So Dutch research still lags behind in those areas.'

The third possibility is that Dutch universities and research centres have a great deal of freedom to decide how they distribute the money within the organisation. As a result, it has not always ended up where the government wanted it to. 'A university that put a lot of its own money into nanotechnology could for example decide to fund research in that area from focus and mass resources, and use its own money for other research,' Horling explains.

If we lived in a country with a centrally managed economy, we could easily find a solution, Horling believes. 'In the Netherlands we are used to academics deciding for themselves what to research, and finding funding themselves. But the government could award the funding in a different way, by saying "these are our research questions, and researchers will be paid only if they specifically investigate these issues".' Horlings is not really in favour of this model, however. 'Dutch researchers have a great deal of autonomy, and there's a lot to be said for that. But at the Rathenau Instituut we would like to do more research on this issue. Look into how the universities spend their money, how they devise a research agenda. Several of our researchers are already working on this, and I hope that universities will be willing to let us take a look behind the scenes to see how these things work.' Halbe Zijlstra, State Secretary for Education, Culture and Science is also no advocate of centrally controlled research, as he made clear in a written response to the Rathenau Instituut's report. 'I am very keen on the autonomy of research institutions. They have to decide where their strengths lie, what profile they want to adopt, and who they want to work with. This is where the challenge now lies.' Horlings is pleased with all the attention the report has drawn. 'We wanted to get people thinking, so that our findings are considered in new policy.'

Focus en massa

'You'd think that if a country focused on a particular area of research, the mass of that area would increase'

Bei Wen is mapping the Dutch water sector, in collaboration with KWR Water Cycle Research.

Prize for 'Best PhD Paper'

Researcher Bei Wen of the Rathenau Instituut won the 2011 Best PhD Paper prize awarded by SIG/MET (Special Interest Group for the Measurement of Information Production and Use)

Bei Wen worked with KWR Water Cycle Research Institute to map the Dutch water sector, identifying clusters of researchers, who is collaborating with whom, what the sector's research infrastructure is like, and what factors influence the form and dynamics of networks. She also considered what research fronts exist in the water sector, and how the Netherlands is positioned.

Bei Wen received the SIG/MET prize for her paper *Mapping science through bibliometric triangulation: an experimental approach applied to water research*, in which she used a variety of bibliometric methods (such as indexing keywords and citations) to identify connections between research areas, specialisations and researchers.

Less money for research

Over the next few years, the government will be cutting its spending on research, the Rathenau Instituut concluded in April 2011, in 'Total Research Funding 2009-2015' (TOF).

'Although the full scale of the austerity measures was not yet clear in early 2011, we tried to estimate the impact of the coalition agreement as well as we could', says Jan van Steen of the Rathenau Instituut. 'Our estimate showed that total government spending on research is likely to fall from five billion euros in 2009 to 4.6 billion in 2015. This will however be partly compensated for by tax breaks that make it more attractive for companies to fund research and development.'

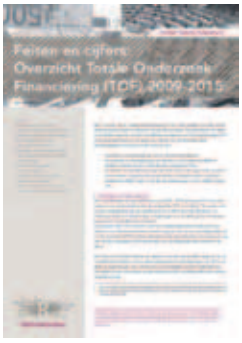
A new TOF will appear in 2012, because Van Steen produces new calculations every year. Before 2011 he did so at the Ministry of Education, Culture & Science. 'Then the figures did not attract so much interest, they just got sent to parliament by letter. Now the research is conducted at the Rathenau Instituut, the conclusions draw a much wider response.'

Role play: young civil servants become academics

Imagine you're an academic who discovers that the government's standards for fine particulates in the air are much too lax, but the government is your client, and your findings might mean that a major construction project has to be suspended. What do you do?

Participants at the 'Young Civil Servants' Seminar' were able to get their teeth into this thorny question, at a workshop run by the Rathenau Instituut. 'Evidenced-based policy and working with academic knowledge are becoming increasingly important for civil servants', says Tjerk Wardenaar of the Rathenau Instituut. 'We used the event to allow people who work for the government to experience the opportunities and pitfalls of working with academics. How do academics think, what interests do they have to safeguard? And how do you reconcile their way of thinking and working with the political pressure under which civil servants work?'

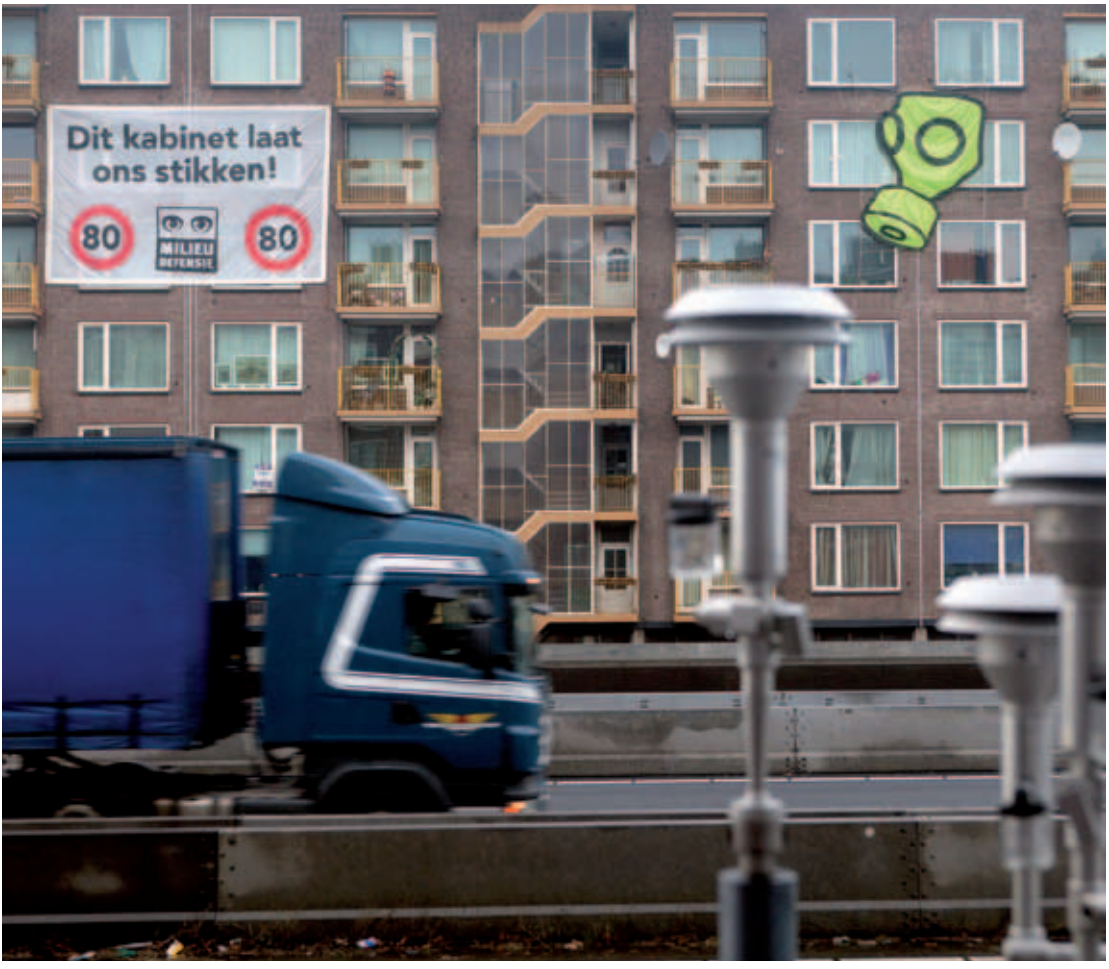
Water treatment at Nieuwegein.



There will be less money for research. This will be partly compensated for by tax breaks for companies that fund research.

Particulates mask.

'That workshop caused us some blood, sweat and tears', says Dirk van der Burgt, who assesses infrastructural and sewerage plans for De Dommel water authority. 'I have noticed that we civil servants are far too concerned with each other, and far too little with academics and companies, whereas we could all in fact help each other. A workshop like that gives you new ideas about working together.'



Protest against particulates. Motorways too close to built-up areas cause unhealthy air quality.

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