



## **Excursion Report**

### **15th Annual International Sustainable Development Research Conference**

**Utrecht – 5-8 July 2009**

***“Taking up the Global Challenge:  
Analysing the implementation of innovations and  
governance for Sustainable Development”***

Dr. Margien C. Bootsma  
Dr. Walter J.V. Vermeulen  
Etienne Hayem





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## Introduction

Defining, preparing and finding excursions for the Wednesday 8<sup>th</sup> July 2009 was one of the added values of the 15<sup>th</sup> ISDR Conference.

On the Wednesday 8<sup>th</sup> July 2009, the excursion tours took off from the University to visit 7 different destinations in the Netherlands. You will find each excursion in a chapter composed of the original description, the contact and the students report about the day.

We are happy to present short reports and useful background information about the excursions to all participants in this report.

## **Chapter 1: City centre cargo distribution**

### **1.1 Description**

The inner city of Utrecht has the same problem as many other city centers in the world: how to provide shops, pubs and restaurants with cargo without blocking the roads, causing traffic jams, adding abundant exhaust fumes and just plain old bothering the customers and tourists with big ugly trucks.

Well, Utrecht has the solution, actually, Utrecht has two solutions. The Cargohopper is an electrically powered, silent, narrow build 'roadtrain' and distributes shop cargo more effectively and efficiently than any other inner city system. The Bierboot (Beerboat) is a small vessel that transports not just caskets of beer, but all the food and beverages the pubs and restaurants located along the inner city waterways use. No more road traffic, no more blocking the road when off-loading. These two systems together make the inner city of Utrecht a pleasant and clean place to shop, eat and drink and there is always enough in store.

You will go and see how these concepts function in reality and how easy it is to use them in your own city.

### **1.2 Report**

The inner city of Utrecht has a problem, familiar to many other cities: providing shops, bars and restaurants with cargo causes traffic jams and air pollution, and is annoying to the public. Within the city of Utrecht two solutions are being applied, which are an improvement on all three accounts.

This excursion showed how the systems work, what problems are encountered and which solutions may be available in the future.

The excursion group was heartily welcomed at the Province House of Utrecht Province by Bert Roozendaal of Cargohopper and Dick Neuteboom of Utrecht Province. Here we were able to have our first acquaintance with the Cargohopper. After some explanations about this new cargo delivery concept, we were welcomed by the Deputy Governor of the Province, Wouter de Jong during (the organic) lunch. Then Paulo van Cuijck informed us about the efforts Utrecht Province makes on setting up a system for cars to run on Compressed Natural Gas.

Finally we went to the city centre of Utrecht to see Cargohopper at work and to watch another improvement of the Utrecht delivery system, the Beerboat.

This report will inform you on these three projects, not necessarily in the chronological order of the day.

#### **Cargohopper**

While being on holiday in Bratislava, Jacques van der Linden, manager of one of the firms delivering cargo to shops in the inner city of Utrecht, saw a tourist train riding through the city. In his mind he replaced the tourists by cargo and saw a new way of delivering goods to the shops in the small streets of the medieval city centre of Utrecht.



As he is running a commercial enterprise delivering cargo, he wants this new project to be commercially viable as well. So his customers, shops that were previously served by vans, now have their cargo delivered by a very cute looking electrical “train”: Cargohopper. It has one engine car and three cargo cars.

This system is in operation since April 2009. The train is the last link in the supply chain. Goods are being transported in containers to a distribution point, about 11 kilometres (7 miles) outside Utrecht. One smaller truck then brings the goods to the Cargohopper loading area, 300 metres outside the city centre. The cargo is loaded on the cars and delivered to the shops all day round. Utrecht has so called window times for delivery vans in the inner city, but these do not apply to Cargohopper as it is clean and silent. The replacement of five (!) delivery vans by the Cargohopper system saves 20.000 litres of diesel fuel per year.

Cargohopper has a small wheelbase, which allows it to ride between the poles set up to prevent cars from entering certain streets, Mr Roozendaal explained. It has a very small turning circle (“when turning a corner, you cannot see two of the three cars. One can easily do a slalom”), which makes it easy to handle in the city centre, as some of the people on the excursion tried themselves! One excursion goer commented on her driving experience: “It’s an amazing feeling. You can see the cars behind you, but you can only feel the motor car!” Another stated: “It might be useful for Zürich as well.”

Cargohopper has a maximum speed of 20 km/h (13 m/h), and can, after being connected to the electricity network for a night, drive up to 80 km (50 miles). In August 2009 18 m<sup>2</sup> of solar panels will be installed on the roofs of the cars, which lowers Cargohopper’s range to 50 km (31 miles), but this is still easily enough, as it only operates within the inner city. This will make Cargohopper also a unique project as it will become an emission free transport system.

The Cargohopper system is looking for expansion towards the second ring of the city centre, so more shops can be served. For this purpose the company behind Cargohopper hopes to use an electrical van, which runs up to 50 km/h (31 m/h) at a 120 km (75 mile) range. This van, a Dutch design, will be able to carry pallets.

Cargohopper is a commercially run enterprise, with a one time innovation subsidy. At this moment the train is running empty when leaving the city. The plan is to collect dry waste, such as plastic, emballage and carton and transport this out of the city. This may also mean less garbage trucks in the city centre.

### **Compressed Natural Gas**

The Netherlands are suffering from bad air quality and have a hard time complying with EU air quality standards. In the province of Utrecht road traffic is the major cause of air pollution; traffic and transport cause 55% of particulate matter pollution and 78% of NO<sub>x</sub> emissions.

A set of measures is being implemented by the Province to achieve better air quality, mister Paulo van Cuijck, policy advisor to the Province, informed us. Procurement procedures for public transport include green measures; flow measures are being taken such as “a green wave” of traffic lights for trucks; alternative means of transport are being promoted; and driving on natural gas is a priority.

Natural gas here means Compressed Natural Gas (CNG), which is available abundantly right now in the Netherlands, and is among the cleaner fuels at the moment as it contributes minimal to air pollution.

CNG has the advantage above electrical cars that it is now market ready. A distribution network is in place in the entire country. The introduction of natural gas as a transport fuel supports the use of climate friendly biogas and developments towards hydrogen. The infrastructure for CNG is suitable for distribution of both biogas and hydrogen. The problem now is of a typical chicken-egg type. Gas cars are not being purchased without filling stations in the vicinity and filling stations are not erected without gas cars around. The province of Utrecht wants to break that vicious circle by provision of subsidies for realizing gas filling stations and the purchase of gas cars. The aim is to establish at least 8 filling stations, geographically spread over the province, and 2500 to 3000 natural gas vehicles by 2011. In order to convince fleet owners to switch to natural gas, a marketing and communication plan has been made and fleet scans are offered to fleet owners. To set an example the majority of the fleet of the province has been converted to CNG driven cars with a CNG filling station at the Province House.

At this moment the biggest challenges to the project are the consent of local governments, which are not always willing to grant permission for a filling station; the distance of planned locations to the national CNG distribution network (the bigger the distance, the higher the costs of the installation); and the permission of oil companies to the pump holders for supplying CNG.

### **The Beerboat**

The inner city of Utrecht has a lot of waterways, the commercially most important one being the Oudegracht (Old Canal). The Oudegracht houses many pubs, restaurant and shops, both at street level and at dock level, as the waterway is actually several metres below street level. By now all pubs and restaurants on and close to the Oudegracht have their cargo delivered by the Beerboat. This is a commercially operated, city owned distribution system. One boat is being loaded with carts and barrels and sails along the Oudegracht delivering the goods. This is extra useful in the city of Utrecht as the maximum axis load of a car in the inner city is one metric ton, because of all the cellars underneath the streets and bridges.

In a day the Beerboat can thus deliver up to 50 tons, with of course no window times to take notice of. Once a week a run is made with fresh food for all restaurants. The Beerboat can also be rented by the public, when they want to move for example.

The specialty about the Beerboat, Utrecht harbour master mister Jaap de Jong explained, while treating the excursion goes on a beer, is that it is an electrically driven vessel. This cuts emissions for delivering cargo in the inner city by enormous amounts. And the vessel is very silent, which is very pleasant for the public as well as they are enjoying their drinks and meals alongside the canal.

Conclusion of the day is that the city and Province of Utrecht are taking up the global challenge in looking for cleaner ways of inner city cargo distribution.

**1.3 Additionnal Information:**

[www.cargohopper.nl](http://www.cargohopper.nl)

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## Chapter 2: Closing material cycles in practice

### 2.1 Description

Waste can be deposited on landfills or burned in incinerators. Both techniques do not take material recycling into full account. AVR van Gansewinkel, a leading Dutch waste treatment and logistics company is changing its approach and turning waste treatment into nutrient management. Three sites will be visited:

- the site of Coolrec, where domestic and industrial appliances such as fridges, tv's, airconditioners, and ICT-equipment are being dismantled for recycling and reuse.
- the AVI Rozenburg, the main waste incinerator plant where all waste that could not be recycled as raw material will be burned to produce energy
- and the site of Maltha, where packaging glass (jars and bottles) and plate glass (windowpanes, mirrors) are being sorted, crushed and processed into raw material for the glass and glass wool industry.

You will visit these sites to see and hear how this is all done and hopefully you will come to appreciate the benefits of true recycling efforts.

### 2.2 Report

The excursion was divided in three different parts concerning three different firms:

- CoolRec Group
- AUR
- Maltha

Every excursion represented a view on closing material cycles in practices.

The group, even if small, demonstrated a lot of interest by raising questions and showing willingness to debate.

#### 1. CoolRec Group

CoolRec Group is a company which dismantles mainly fridges and television in such a way all the components are separated and reused. The company, which relies on 300 employees, is able to treat on average 2000 fridges and 2000 televisions everyday. Every year, the average reaches 430 000 fridges and 420 000 televisions which in weight means 28 millions kilograms. Most of it is reused and shipped out in tanks to Germany.

After the breakup, materials are separated and sold to others companies.

Each employee must process between 9 and 10 television per hour to meet the required quotas. The materials which are collected are aluminum, plastic, sulfur dioxide, asbestos, steel, insulation material (poly-methane foam).

Toxic materials are picked up and treated by specific separated companies.

There are two separate work lines for fridges and televisions at the end of which there is a person who sorts through a sample for quality control.

It is estimated that almost 90% of the materials are reusable.

## 2. AUR

AUR is the fifth biggest incineration plant in Europe.

The company's duties consist of collecting separate waste to be recycled, dealing with hazardous waste with a 24 hours clean-up service and consulting other waste management facilities. The revenues come from electricity production, water treatment, biomass energy plant and selling metals from the ash.

The main activities are paper sorting, accepting waste from other companies for processing, treating hospital and hazardous waste so it can be processed as a non hazardous waste. In addition organic waste is converted into compost.

1,2 million tons, 20% of which is represented by domestic waste, are processed every year. Of this amount 40% comes in by truck and 60% by boat.

Waste is weighted, stored in bunker (dimension: 90\*40\*11m deep), separated by magnets and airflows. After it is incinerated for 45 minutes, ash is cooled into water. Nevertheless, there is still non-combustible ash such as: ferrous and non ferrous materials and some other fire ashes that can't be incinerated. This type of ashes since they could represent a source of pollution need to be covered with plastic, if not they can be used for road building.

## 3. Maltha

Maltha is a company which focuses on glass treatment only. The glass is cleaned, chopped up, and prepared for the recycling stage. The first stage is presorting, which means that stones, pieces of ceramic and porcelain are taken out. After this process, the glass is broken and magnets get metal parts out. Plastic parts are taken out as well through a different method called "cyclone". Then an optical sorting blows out some other non glass residues through a laser system. Finally the quality is checked and the glass is stored from 4 to 6 weeks for composting. The major problem during this process is represented by heat resistant glass. Other problems are represented by mixed glass and color separation.

### 2.3 Additional Information

<http://www.vangansewinkel.eu/en/default.aspx>

<http://www.instapinternet.nl/0/97/index.php>

<http://www.maltha.nl/index.php?lang=uk>

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## Chapter 3: Support sustainability: educate, develop and implement

### 3.1 Description

In the Rotterdam area a unique mixture of education, small scale development, municipal policies, market demand and pilot projects has arisen in the last few years. All these aspects need and encourage each other to further develop promising techniques to applied technologies. We will visit the RDM campus in the Rotterdam harbour and talk with pioneering companies and educational institutions how to go from R&D to Applied Technology.

### 3.2 Report

RDM Campus is an innovative project that aims to create a knowledge based match between the manufacturing industries on the one hand, and technical education on the other.



*The RDM Campus at the Heijplaat harbour*

### Short history

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The RDM Campus is located in the Heijplaat harbour of Rotterdam, close to the city center.<sup>1</sup> The Heijplaat harbour experienced its heyday in the 1950s, when it provided employment to more than 5.000 people. Its core business was the construction of ship engines and the installation of these by using a dry dock. High-skilled workers were recruited from outside the Rotterdam area, and were stationed in Heijplaat, the village directly connected to the harbour. Two ships built here have their place in Dutch history. During the 1950s and 1960s, the *Stad Amsterdam* and the *S.S. Rotterdam* transported thousands of Dutch people to the United States and Canada, looking for better chances than post war Europe could offer. Due to ongoing modernization and the construction of an artificial extension of the harbour into the sea (the *Maasvlakte*), the Heijplaat harbour became obsolete. In 1983 it was declared bankrupt.

### RDM Campus

Recently, the development of the RDM Campus project has given new stimulus to the Heijplaat harbour. Collectively, the *Hogeschool Rotterdam*, the *Albeda college* and the *Port of Rotterdam* took the initiative to bring together students and businesses in their search for sustainable innovations. In practice this means 11.000 m<sup>2</sup> available for students and 12.000 m<sup>2</sup> for businesses, on which they together pursue research on new concepts and search for advanced techniques of maintenance. Once a company is in the prototyping and testing phase of a product, it can rent a lot in the Innovation Dock. A knowledge agreement with the educational institution will clarify the terms of cooperation. In the following period of about 3 years, the company and the students will work on optimizing the product. This is open source development in which dynamics will lead to a better product and mutual learning. When the product is ready for the market and mass production, the company has to leave the RDM Campus. The Innovation Dock has space for about 30 businesses simultaneously. Students do a college program or follow a vocational training.

### Benefits

The RDM Campus is attractive for business parties that want to shorten their ‘time to market’ phase in the product cycle. The period between acquiring a patent and the actual production and sales of a product usually covers a couple of years. During this phase, the company faces only (increasing) costs and therefore risks a bankruptcy of the project. By assisting the company in optimizing its product, the ‘time to market’ phase can be shortened. Hence, the product will start generation revenues earlier, making the project more profitable. Furthermore, businesses are directly in contact with students, which give them the opportunity to look around for potential employees (knowledge pool).

Also the students and the knowledge institutions benefit from the cooperation. For students it is an ideal learning environment that directly connects them to practice. They have the opportunity to work on innovative products and to get to know relevant companies. In addition, a very practical advantage of the Innovation Dock is that the harbour allows for more experiments (e.g. explosions) than a normal school building. Simultaneously, the knowledge institutions are able to provide up to date and state of

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<sup>1</sup> For the exact location click on the following link: [http://maps.google.nl/maps?client=firefox-a&rls=org.mozilla:nl:official&channel=s&hl=nl&q=heijplaat&um=1&ie=UTF-8&split=0&gl=nl&ei=kZxXSqHBH9P3-Qbq1fXIDQ&sa=X&oi=geocode\\_result&ct=title&resnum=1](http://maps.google.nl/maps?client=firefox-a&rls=org.mozilla:nl:official&channel=s&hl=nl&q=heijplaat&um=1&ie=UTF-8&split=0&gl=nl&ei=kZxXSqHBH9P3-Qbq1fXIDQ&sa=X&oi=geocode_result&ct=title&resnum=1)

the art knowledge and projects to their students. Normally, there is an incompatibility between the rapidly changing needs of business parties on the one hand, and the time it takes a school to adjust its programmes to what these businesses are looking for.

### **Themes and examples**

The work of the RDM Campus centers around three themes, namely: *future mobility, smart energy, and sustainable building*. Related to the first theme, people are working on the *Formula Zero* project.<sup>2</sup> The objective is to build a racing car that runs on a fuel cell/ hydrogen. Earlier prototypes have already participated in Zero-emission races. Another project is connected to the theme smart energy. The *Ampelmann* is ‘a ship-based self stabilizing platform that provides safe, easy and fast access to a wide variety of offshore structures by actively compensating the wave-induced motions of an offshore vessel’.<sup>3</sup> Finally, another group is working on floating houses in the Rotterdam harbour, as part of the sustainable living program.

### **Current events**

After an experimental phase, the knowledge educations have moved into the Innovation Dock in February 2009. Several companies (e.g. Eneco, Imtech, BAM rail) have decided to start a cooperation with the RDM Campus and more are considering the option. Since mid-2008, the Heijplaat harbour is connected again to the city center of Rotterdam by way of a ferry. Currently, the RDM Campus is receiving (project)subsidies from the European Union, the Dutch Ministry of Education, the municipality of Rotterdam and several foundations.

### **3.3 Additional information:**

<http://www.rdmcampus.nl>

[http://www.cityportsrotterdam.com/uk\\_index.html](http://www.cityportsrotterdam.com/uk_index.html)

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<sup>2</sup> <http://www.formulazero.nl/> (in Dutch)

<sup>3</sup> <http://www.ampelmann.nl/>





## Chapter 4: Waste = Energy!

### 4.1 Description

When treating our waste, we produce «free» energy. Solid waste is often incinerated and is reasonable to use the excess energy that is generated. Waste water is filtered and treated biologically, before being discharged on to surface water. The left over sludge is digested to produce 'green' gas, which can be used to generate electricity, can be burned for heating or be used as fuel for natural gas powered vehicles.

We will visit two companies in Amsterdam , the waste incineration company Afvalenergiebedrijf (waste-energy-company) and the waste water treatment facility of Waternet which are co-operating on waste treatment and energy reclamation.

### 4.2 Report

In this excursion a small group of researchers and students paid a visit to the *Afval Energie Bedrijf* (Waste and Energy Company) and the adjacent *Waternet* facilities in the Westpoort area of Amsterdam in the Netherlands.

The Afval Energie Bedrijf (AEB) is a waste treatment facility whose primary objective is to incinerate municipal solid waste from the city of Amsterdam as opposed to land filling it. This is because land constraints are very large in the Netherlands and so incineration is a much more attractive option. For this reason, AEB has been in existence in some form since the early 20<sup>th</sup> century! However, waste incineration is only a minute part of the work and products of AEB. As a by product of waste incineration, electricity and heat are produced as well as salvaging of many precious materials which may be reused. It is AEB's mission to get maximum benefit from waste. Maximum benefit in terms of energy from waste and the recovery of useful products in the waste.

AEB's facility is owned by the city of Amsterdam, which over 125 years ago started to concern itself about the health risks associated with waste generation in the growing city. After dumping of waste was deemed unacceptable, it was decided to burn the waste in furnaces which would subsequently produce steam which was passed on to a neighboring power station in order to produce electricity. This was the forefather of the modern AEB. In 1969 the second generation waste incineration plant was built in the same site abiding to the stricter standards of the time. In 1993 AEB transferred to its current location and build the 3<sup>rd</sup> generation Waste-to-Energy (WtE) plant, and was extended in 2007 to include the 4<sup>th</sup> generation high efficiency Waste Fired Power Plant (WFPP). These two plants work in parallel (under the AEB) and have the ability of processing 1.5 million tones of waste and sewage sludge per year. The plants are well within environmental standards. In fact, new plants being built elsewhere which meet all standards operate at a lower efficiency and higher emission levels than AEB plants!

Concerning the technical superiority of the AEB facilities, it is worth quoting that the electrical efficiency of the new AEB plants is 30%. This is 8% higher than the 22% of the average waste-to-energy facility in the Netherlands. Outputs include 1 million MWh of electricity per year (enough for 320,000 households) as well as 300,000 GJ of heat (enough for 8,300 households). From another vantage point, each ton of processed waste, besides providing 850kWh of electricity, further provides: 5kg of aluminum, 25kg of iron, 125kg of clean sand and sludge, 100kg of pottery and glass granulate, 7kg of salt and 5kg of gypsum. All these may be re-sold and re-used. Furthermore, AEB takes pride in the technology it uses as many innovative technologies and patents have been used in flue-gas cleaning process and the bottom ash recovery (the fluegases exiting the tall stack is almost 100% water steam).

AEB's facilities are located near Amsterdam and so are easily accessible by municipal waste trucks but are also accessible by sea and by train, which makes delivery of waste even easier. The electricity output is used to power buildings of the City of Amsterdam. Even Amsterdam's trams, subways and street lights run on AEB's sustainable electricity. And the heat is used to heat (district heating) surrounding industrial buildings and houses. The aforementioned Waternet facilities which process Amsterdam's waste water and sewage are also located adjacent to the WtE and WFPP and supplies them with Biogas in order to aid in the electricity production and in turn receives electricity and heat from AEB. In the larger picture, this synergetic effect is a cornerstone of the city of Amsterdam's environmental and industrial policy with the creation of Eco-Port<sup>®</sup> Amsterdam. Eco-Port<sup>®</sup> Amsterdam consists of a series of projects which interact with each other in a series of ways. Facilities dealing with non-ferrous materials, building materials, sand, gravel, chemical waste, appliance recycling and many more have a part to play in the same picture.

The excited crowd asked if this technology which seems to solve a number of real issues can easily be transferred to developing nations. This is where the importance of planning as well as the necessary government institutions and organizational requirements were made clear. AEB staff clearly stated that there is no sustainability, or even good logic in just setting up a waste incineration plant and burning our rubbish in order to produce electricity and heat. Neither is waste incineration a substitute for recycling but rather works in synergy with it. Thus, areas where this technology is to be applied have to have existing waste management guidelines where non-recyclable waste only is incinerated. Thus incineration is one step after recycling has taken place. Also since the investment costs of such a power plant are enormous, it is important that it operates at a very high load factor, and so a continuous stream of municipal waste is necessary. Thus accessibility is a prerequisite, as well as a smooth functioning waste collection service. The plant can easily be held hostage as a result of monopolistic waste collection trade unions, however this is not an issue in the Netherlands.

Since waste is the fuel of AEB power plants, one could also talk about *security of supply* of the fuel. This may be challenged by reduction of waste streams (a goal for sustainable development via greater recycling and reduced consumption). AEB staff recognized this issue however stated that massive reduction are not expected in the next few decades and there is more than enough rubbish to go around. Furthermore,

the highly accessible location with rail and sea links makes outsourcing of waste possible.

The importance of location is not only illustrated by the accessibility of waste, but also to allow for efficient heat distribution and also for possible synergistic effects with neighboring industries. Such synergies can be illustrated by the production of biogas from the Waternet facilities. Via the digestion of wastewater, Waternet provides a certain amount of biogas. The biogas could be burnt within the Waternet facilities in order to produce electricity and/or heat, however due to the limited volume of biogas the process would be very inefficient. In fact it would be more cost effective to simply flare the biogas. Since AEB plants are located right next door, this biogas is easily transported to AEB to produce electricity and heat which is fed back to Waternet for its use. All of this makes both involved companies work more efficiently, and come closer to a realized sustainable pattern.

AEB together with its WtE and WFPP facilities and the neighboring industries provide a clear image of the reality of energy in a sustainable world. The technology is not only proven, but even surpasses current standards. The economics works under correct regulation (high taxation of land filling, ownership of plants), but the story does not end there. The diligent planning (geographical, technical and organizational) of the AEB facility, the thorough and meticulous process where every retrievable item is retrieved and re-used, the elaborate recycling facilities and separation of household waste on the user side, the organization of the Dutch municipal waste collection services which provide safety of supply of waste and many more aspects are needed to make waste-to-energy a success story. As admitted by the staff of AEB, the Dutch mentality where each city sets its own local environmental standards rather than an overall national standard, and the fact that environmental awareness comes from bottom up as well as top down is necessary in the success of this undertaking. Jumping to the conclusion that such plants are the future is incorrect. In order to work, lots of actors from government all the way down to individuals have to behave in a way which would make waste-to-energy a sustainable reality.

### 4.3 Additional information:

[http://www.afvalenergiebedrijf.nl/main.asp?subsite\\_id=2](http://www.afvalenergiebedrijf.nl/main.asp?subsite_id=2)

[http://www.waternet.nl/algemene\\_onderdelen/english](http://www.waternet.nl/algemene_onderdelen/english)

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## Chapter 5: Using rising water for nature development

### 5.1 Description

The Netherlands have history of fighting and working with water. We often look to the sea for potential problems, but nowadays, the rivers are becoming a great concern. The Netherlands is situated in a delta and although river water levels have always fluctuated, the risks of flooding have become greater, partly due to heavier rainfall, but mainly due to the fact that more and more buildings, and thus people, are situated nearby rivers. The build up area has to be protected of course, but it takes special precautions and bold decisions to deal with rain and river in a densely populated delta.

You will visit two sites where special measures have been taken. The Blauwe Kamer is a protected nature area along side a river. In 1992 part of the summer dike has been removed on purpose, to allow the river to flood the area regularly. Not only nature has benefited from this decision, as you will see, smell and hear on this sunny day in July, but the risk of flooding in other areas has been reduced, due to the 'retention area' that was thus created. The second site is within the newly build city / suburb, Leidsche Rijn, near Utrecht. Here, special precautions have been integrated into the texture and lay-out. Usually, the clean rain running off the roofs, gardens and streets, is directed into the sewers and is transported along with the sewage waters to a waste water treatment plant. Leidsche Rijn has a series of so called 'Wadi's', which store rain water temporarily and help transport it to creeks, ponds and other surface waters. Now the clean rainwater can be directed to nature areas and be used for infiltration during long dry periods. The wadi's also let the rain water seep through to the groundwater to improve groundwater levels. Though these wadi's are a nice technological and infrastructural feature, people living in the neighbourhoods don't always know or appreciate how they work and why they are installed. Special efforts had and have to be made to 'teach' people to live with this system.

### 5.2 Report

With thick drops of rain coming out of the sky, we sat safe and dry in the bus on our way to Wageningen. We left the University at a quarter past nine in the morning to see two places where they manage sustainable development. First we visited the Blauwe Kamer, a protected nature area along side a river. The Netherlands is not only scared for the rising sea level, the river water level is also rising and the risk of flooding is becoming a big problem. The rise of the river water level is partly due to the climate change, but most of all it's due to the agriculture in the Netherlands and Germany. To control the ground water level in the fields, the farmers dig out trenches so that rainwater can quickly drain off. With this drain off, less water is stored in the ground and the river water level is rising. Another factor to the rise of the river water level is the growth of buildings along side the river, because of more surface runoff. For minimizing the risk of flooding, a part of the summer dike has been removed in 1992.

After driving in the bus for an hour, we arrived at the Blauwe Kamer where forester Hugo Spitzen welcomed us. A slide show gave us a nice introduction of the beautiful

nature in the Blauwe Kamer. Outside it was still raining cats and dogs, so Hugo starts his story in the visitor centre. Coming to the point how the rise of the river water level is becoming a problem in the Netherlands, the question was: how to solve it? The idea was to remove a part of the summer dike. In times of extreme rainfall leading to higher river water levels, an agriculture area will flood. This idea had a lot of attention in de media, because damaging a dike seems very risky for the people living around that area. But the plan pulled through, the farmers had to leave and where seventeen years ago agriculture fields filled this area, beautiful nature has developed. With the flooding around twelve times a year, new sand is leading to this area and vegetation could start growing again. The vegetation in the Blauwe Kamer attracts many different (bird) species. The low water amount give rare bird species, like the spoonbill, the opportunity to search for food.

Armed with umbrella's we walked to an observation post where we could spot the different bird species. On the slippery way, because of the Dutch weather the path was becoming mud, we saw some bulls and horses. At the observation post, Hugo told us about his job. A big part of it is to maintain the biodiversity. The different species living in the Blauwe Kamer is important for the Netherlands. To keep these species where they are, it is important to prevent the area of becoming a forest.



*Fig 1. A bull in the Blauwe Kamer*

Next we headed to Leidsche Rijn, a new suburb of Utrecht. When we arrived back at Utrecht, there was a typical Dutch lunch with sandwiches and “krentenbollen” waiting for us. When we finished this, Cas Verhoeven gave a presentation about the water management in Leidsche Rijn. The biggest difference in water management in Leidsche Rijn and the rest of the Netherlands is the fact that the rain water doesn't go

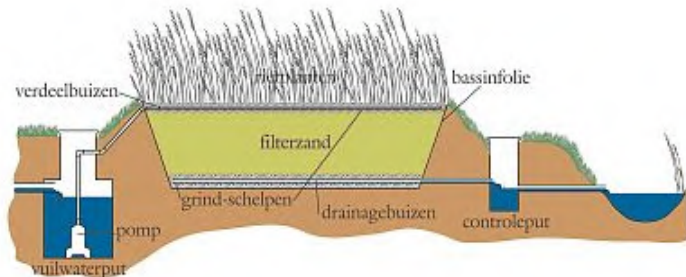


Fig. 2 Basin filled with sand, iron and lime

into the sewerage, but it has a recycling system of its own. When the rain water falls down, it ends up in the ground, because the runoff from the houses is relocated to the ground and all the streets are

permeable for water. In the suburb is also a lot of

surface water for recreation present, this is where the rain water is supposed to end up. But the rain water isn't clean enough to be used for recreation, so it has to be cleaned first. The target was a one meter visibility in the surface water. To achieve this goal, the amount of algae in the water has to be limited. By reducing the availability of fosfor in the water, alge can't grow. So they build special basins where iron and lime is present, both are capable to adsorbe fosfor. Rain water sinks through the ground and arrive a couple of months later at those basins. Four huge pumps are spreading the clean water back into Leidsche Rijn. The surface water is full of clean water and can be used for recreation purposes.

Fortunately it wasn't raining at all in Utrecht and after the presentation we went on a guided tour by bike through Leidsche Rijn. Here we saw the new water management plans in action. Also we could enjoy some of the newest architecture in the Netherlands. The hour that was planned for the tour was too short, so at half past four we had to rush back to the bus. The bus driver dropped us at the University and that was the end for this excursion.

### 5.3 Additional information:

<http://www.utrechtslandschap.nl/p3.php?RubriekID=2198>

[http://www.hdsr.nl/thema%27s/water\\_en\\_milieu/waterschap\\_en\\_milieu/uniek\\_watersysteem](http://www.hdsr.nl/thema%27s/water_en_milieu/waterschap_en_milieu/uniek_watersysteem)

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## Chapter 6: Nature development in an unnatural country

### 6.1 Description

We visit the Hoeksche Waard (a polder south-east of Rotterdam), coming face to face with typical Dutch landscapes. We meet a landscape of polders, dikes, meadows and trees, visiting an agro-biodiversity project in the 'Hoeksche Waard', where arable farmers get paid to grow flower borders on their fields. On a 400 hectare subsystem, a network of permanent field margins sown with different grass and wild flower mixtures has been laid down. Field margins can attract and conserve predators and parasitoids, and thus contribute to pest suppression.

We will have our lunch at the 'Knowledge Centre National Landscape. Next, we turn to the island of Tiengemeten, located in the Haringvliet, an estuary formed by the rivers Rhine, Maas and Schelde in the southwest of the Netherlands. The island covers 300 hectares of grassy marshes and reed outside the dikes and inside the dikes roughly 1000 hectares of pastureland, which is spectacularly reformed into a natural area. The island is divided into three main areas: Weemoed ('wistfulness'), Weelde ('wealth') and Wildernis ('wilderness').

The island's metamorphosis has cost nearly 6.8 million euros. The project's objective was to create a 1000-hectare freshwater tidal region, made up of freshwater tidal pools, reed and rush marshes, willow tidal brush lands and tidal forests broken up here and there by grasslands.

### 6.2 Report

Being roughly on time, Wednesday morning at approximately 9:15 a.m. we headed off with our 21 participants into the direction of the Hoeksche Waard. Although at that time it was still raining, all participants seemed to look forward to the happenings of the day. After we welcomed our guests and briefly announced the schedule of the day, our driver took us safely to a bus station in the Hoeksche Waard, where we picked up our guides, among which Johan Dam, farmer and secretary of the Agricultural Nature Board and Menko Wiersema from the Province of South-Holland. They were the ones who would later show us the surroundings and provide us with information about how a merely agricultural area was transformed into a natural reserve.

From 10:20 a.m., when we picked up our guides, until approximately 12:10 we drove around in the region, passed villages and landscapes and found out some facts of its cultural and natural special features. All the information was very interesting. We learned that the Hoeksche Waard is a unique natural landscape located only 15 minutes from Rotterdam.

Agrobiodiversity is used as driving force of sustainable rural development. There are various projects involved in this plan of which one of the most crucial ones are the flower borders and strips. They are used to control pests and protect the crops without the use of chemicals. As it is an expensive undertaking, tourism is promoted. One time we had the possibility to leave the bus for a bit of a walk into a small nature reserve.

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From 12:10 p.m. to approximately 1:10 p.m., we had a break in the Knowledge Centre National Landscape to have lunch. There was a bit of mismanagement as the lunch was planned at the same time as the ferry trip: 1:00 p.m. Our guides helped us to reschedule the ferry to 1:30, so that it was possible to have a relaxed lunch before. We checked this change of plans before with the bus driver as well as with the participants, as this meant that we would also arrive back in Utrecht half an hour later. The catering was quite good, next to bread with cheese and ham there were also salad and scrambled eggs.

Afterwards, the bus driver took us to the ferry terminal and we went onto the boat that would bring us to the island of Tiengemeten. Here we had to organize the payment of the ferry, since we had heard already from the organizer that the ferry fee was not included in the costs of the excursion. Apart from the fact that this came as an unpleasant surprise to our participants, it was also a bit difficult to organize because up to the moment where we got on the ferry we had no idea how much it would cost exactly. While on the ferry, our guides first offered to pay the fee for the whole group in advance as the ferry staff did not want to collect it from each of our participants. In the end, we decided to collect the € 2.00 from everybody to facilitate a one time payment of the ferry trip, which worked very well.

As a museum had just been opened on the island the ferry was quite crowded and there

was even a small band playing during the boat trip. We did a short walk on the island and could see some of its lovely landscape which is also an example of the projects of regaining biodiversity in the region.

In the end, we caught the ferry at 2:20 p.m., which confirmed with the excursion schedule.

Being quite early, the guides offered us to do a bit of a detour with us to show us another project of them which was interesting. Afterwards, we brought them back to the bus station where we picked them up and drove safely back to Utrecht. We arrived around 4.15 p.m. Generally, the excursion was a success in terms of content. All in all, the participants liked it a lot, the weather was lovely (if a bit windy) and we learned a lot about the initiative in the Hoeksche Waard to promote biodiversity.

### 6.3 Additional Information

<http://www.hwl.nl/>

<http://www.tiengemeten.com/html/English>

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## **Chapter 7: Beyond sustainability: paper products and the Cradle to Cradle philosophy**

### **7.1 Description**

Using the brand name Satino, the Van Houtum factory in Swalmen, in the south-east of the Netherlands produces paper towels, tissues, and other products for personal hygiene. They use waste paper to produce biologically degradable hygienic paper products.

By focusing on the three P's (people, planet and profit) equally, they have become a good example of business according to the Cradle Cradle philosophy. To put it in simple terms, they use waste products, clean them, make biodegradable products out of the main materials and sell or use the by-products from the cleaning process to other producing companies.

They show it is possible to have a profitable company while helping the environment and the people. With this excursion you will here and see for yourselves what they do, how they do it and why.

### **7.2 Report**

“When the architect does not know what he should draw, he draws a circle.” With this sentence the Dutch designer Joost Backus introduced his presentation on the concept 'cradle to cradle'. The idea is very simple and sounds too good to be true: “We have to adopt the principle of nature. Every single 'product' of nature will never end up as useless waste. Instead, it will be reused after consumption and serve as 'food' for new products. Thus, all components flow in a constant circle. Our technical production should mimic this circle. Products have to consist of non-toxic components which can be separated very easily and used for the creation of new items.”

The idea was born as a counteragent to the 'cradle to grave' paradigm which describes our current unsustainable production and consumption patterns producing a lot of unused waste. The 'designer concept cradle to cradle' has been developed and promoted by the German Professor of process engineering Michael Braungart. His idea attracted wide attention in public and scientific debates in the recent years. On our excursion we discussed the idea itself and visited a Dutch paper plant and the Q4 – a quarter of the city Venlo – which both try to apply the idea of 'cradle to cradle'.

We came upon a very convincing example in the 'Van Houtum Papier B.V.' - a Dutch paper factory located near the city Venlo. After a warm welcome, the CEO, Mr. Henk van Houtum introduced his company as an independent family business. He sees the long-term success of his company as a proof for its innovative culture and sustainable approach based on the three 'P' concept – people, planet, profit. Founded in 1935, the 'Van Houtum Papier B.V.' nowadays has 200 employees. The company offers its 'washroom solutions' in business to business relations and is not engaged in retail. The main customers, for example Hilton and Meggle, profit not only from the products

itself. Instead, 'Van Houtum Paper B.V.' provides a full service package contract: hand towels, toilet paper made of 100% waste paper as well as the respective dispensers are delivered, replenished and maintained. In their daily business the company relies on long-term relations to all business partners. For instance waste paper is purchased from local companies which also profit from the services of 'Van Houtum Papier B.V.'. In addition, for the company useless by-products are passed to neighbouring companies and vice versa. Thus, waste is avoided or reused. One striking example is a by-product generated by a local potato crisps business. Discovering that it makes wet paper towels more elastic, the by-product is used as a substitute for ecologically harmful chemicals. Purchasing energy from renewable sources as well as generating own electricity and heat, the company attach great importance to energy efficiency.

Besides the quite progressive initiatives, 'Van Houtum B.V.' has just developed a paper product, which was certified as complying with the 'cradle to cradle' principle. The product itself is again made of 100% waste paper. For the processing harmful substances are fully banned. Instead, the company uses substitutes for all 30 ordinary chemicals, which are widely utilized in the paper industry. However, the company does not impose a take back system for the used paper towels. Mr. Henk van Houtum points out that hygiene concerns prevent them from doing so. "It is true that the production of the paper towels must be described as a down-cycling process. But the dumped product made of 100% cellulose is totally harmless for the environment. The only problem is that we do not convey it to nature. Instead, it takes the conventional route of our waste. That is still a critical issue." In September, the product will be introduced on the market. Due to the high investments in the research and development as well as the higher prices for the biodegradable substitutes it will be a little more expensive compared to the products. But Mr. Henk van Houtum is very optimistic that the new product will be a success.

As a next station we visited the quarter 4 (Q4) of the Dutch town Venlo. Once well known for illegal coffee shops and a high crime rate, it is nowadays a highly attractive location for designers, artists and small innovative enterprises. With orange juice served in cups made of biodegradable plastic and organic snacks we were invited to a discussion with Dutch Creative entrepreneur Joost Backus and Maarten Kuypers of 'Koekoek B.V.', a place where interested people develop products and ideas relating to 'cradle to cradle'. On behalf of the municipality Venlo 'Koekoek B.V.' supports creative initiatives which want to settle in the Q4. We had the opportunity to see some of the developed products as for example pinafores made of biodegradable plastics and a glasses frame cut off a bonnet from an old car.

But do these products fit into the 'cradle to cradle' idea? One participant concluded that she would still buy a washable pinafore instead of a plastic one. Some critical and sceptical statements of Jost Backus slow down the enthusiasm. There are still lots of questions open: First, products consisting of easily divisible components which can be used to create new products must be transported to the customer and returned to the producer. This will cause a logistical nightmare. Furthermore, following the concept of Braungart, products should not contain any harmful substances. But what are harmless substances? What about metals like aluminium, copper, iron and coltan?

These materials are essential components of several electrical and mechanical devices. But they are harmful for the environment. In addition, these materials also face degradation processes and cannot be kept in an up-cycling process, i.e. their preservation and usage for the same or similar purposes. Thus, down-cycling will be the logical consequence after a certain time. Finally, the flow and circulation of resources in nature is highly complex and often very sensitive to external influences. Its adoption to our technical production is therefore a direfully ambitious intention.

Although, our discussions did not find a way out off these dilemmas the talks in the bus on the way back home revealed that the group looks back on an interesting and inspiring excursion. It is still questionable that the 'cradle to cradle' principle will revolutionize our production and consumption. There are still lots of questions to answer. The dim feeling is still present, that the easy theory of the never ending cycle of resources cannot be easily adopted. However, entrepreneurs like Mr. Henk van Houtum demonstrate the importance to watch out for local opportunities to cooperate with other companies for a better ecological and economical performance. His company strikingly presents a success story of this approach. Q4 and 'Koekoek B.V.' have taught us, those creative initiatives, as we saw them in Venlo, inspire a lot of people and fuel a lively debate on solutions for a sustainable development.

7.3 Additional information:

<http://www.vanhoutumpapier.com/Default.aspx?page=1>

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