

## KNOWLEDGE CENTRE FOR BEST AVAILABLE TECHNIQUES CELEBRATES ITS TWENTIETH BIRTHDAY

*Exactly twenty years ago, the Knowledge Centre for Best Available Techniques (BAT) was created within VITO. As an independent link between technology, policy and information, the centre performed pioneer work in its initial years. Over time it has steadily grown in prominence, including at the European level.*

In the last twenty years, the BAT Knowledge Centre has disseminated information about hundreds of environmentally-friendly and energy-friendly measures for the industry. It also selected the Best Available Techniques for dozens of sectors. As such, the Knowledge Centre has helped embed BAT into Flemish environmental legislation and in environmental permits. More than 1,500 users visit the website of the energy and environment information system of the Flemish Region (EMIS) every day. VITO founded EMIS at the same time as the BAT Knowledge Centre was set up.

**Diane Huybrechts of VITO:** "When BAT and EMIS were created in 1995, environmental measures in the Flemish industrial sectors were in need of a lot of improvement. As such, the first BAT studies were real pioneering work. Today, we revise and update studies to solve specific problems. And sectors that are connected to each other through specific production chains – like paper producers and the publishing world – can synchronise their environmental measures with our studies."

**Jan Baeten of the Flemish Department of Environment, Nature & Energy (LNE):** "The Flemish Knowledge Centre charts techniques that have already proven to be effective. On the other hand, the BAT studies also point out innovative technologies. This gives companies a good idea of what's coming in terms of environmental and energy technology. BAT is also growing in importance at the European level. The BAT Knowledge Centre is playing an increasingly prominent role."

More information:  
[www.emis.vito.be/bbt](http://www.emis.vito.be/bbt)  
[diane.huybrechts@vito.be](mailto:diane.huybrechts@vito.be)

Cover photo: Jan Baeten (LNE) - Diane Huybrechts (VITO)



# vito VISION

VITO VISION / VOLUME 2015 / SEPTEMBER EDITION

VITO AND SOUDAL PAVE  
THE WAY FOR NEW  
EMISSION STANDARDS

FLEMISH CITIES CHOOSE  
CLIMATE CARD

WORLD FIRST: SAFETY  
STANDARDS FOR  
STATIONARY BATTERIES



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More information: [vito@vito.be](mailto:vito@vito.be) – [www.vito.be](http://www.vito.be)

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Dear reader,

VITO is investing today in the sustainable world of tomorrow. Along with our team of creative experts, we work on smart technologies and market-based solutions. As a global player in terms of clean technology and health technology and as a centre of expertise on sustainable land use, VITO helps you lead the way. That is because we believe that research, tailored solutions and government policy go hand in hand.

How does VITO achieve the transition to a sustainable world? With actual projects that make a difference: stationary batteries will soon be a lot safer, Flemish cities excel at smart energy projects and a new generation of biofuels is in the making. You will discover all this and more in this edition of VITO VISION. We hope that you find this edition interesting and informative!

*Dirk Fransaer*  
Managing Director VITO

## TOP-LEVEL TECHNOLOGY FOR BETTER POTATO CULTIVATION

This potato field has revealed its secrets thanks to the technology of the iPot project. Data on groundcover and biomass are gathered in the field via camera drones and satellites. All those measurements are collected on a digital geographic information platform. Thanks to the information on the platform, the processing industry and potato traders will be able to track the growth of their potatoes. They can improve their predictions of the harvest and, together with farmers, intervene straight away when something is about to go wrong. The result: a sustainable increase of potato crop yield. Camera drones and European satellites such as Sentinel-2 provide the aerial images for the platform. The iPot project is the result of cooperation between VITO, Le Centre Wallon de Recherches Agronomiques (CRA-W), l'Université de Liège (ULg) and experts from the potato industry. The platform should be ready by 2017.

More proof of VITO's focus on agricultural technology is the ozone flux model. This model shows farmers and policy-makers the so-called ozone flux, i.e. the amount of ozone that agricultural crops absorb through their stomates. The impact of ozone on the crop can be estimated far more accurately by calculating ozone flux than by measuring the ozone concentrations in the air. For example, researchers concluded that ozone caused the crop yield in Flanders to decrease by about 5 % on average in 2009.

*More information:*  
[isabelle.piccard@vito.be](mailto:isabelle.piccard@vito.be) (iPot)  
[felix.deutsch@vito.be](mailto:felix.deutsch@vito.be) (ozone flux model)





# HOW SAFE ARE STATIONARY BATTERIES?

EUROPEAN STALLION PROJECT DEVELOPS FIRST SET OF SAFETY STANDARDS WORLDWIDE



## BART MANTELS

[bart.mantels@vito.be](mailto:bart.mantels@vito.be)

- > Master of Engineering: Civil Engineer at KU Leuven
- > Postgraduate in 'usability design' at KU Leuven
- > Active as product manager for battery management systems in the Energy Division at VITO/EnergyVille
- > Project leader of several projects about battery management systems:
  - NAIADES: Testing and improving a new type of Na-ion battery
  - SPICY: Testing Li-ion batteries under higher tension levels
  - SAVE: Storing energy to use when needed; a project aimed at farmers and SMEs

*In the last few decades, the number of applications for batteries has increased exponentially. Batteries come in all shapes and sizes. The latest battery on the market is the stationary lithium-ion battery, which stores excess renewable energy. That is its main added value. VITO/EnergyVille and six other European partners have compiled a set of safety standards for this type of battery.*

In 2012 VITO/EnergyVille launched a European project called STALLION: Safety Testing Approaches for Large Lithium-ION Battery Systems. For this project, seven European partners joined forces: VITO, Umicore, CEA, DNV GL, VDE, LIACON Batteries and ABB, which are all experts in fields relevant to battery systems. This consortium developed a set of safety standards for large stationary lithium-ion battery systems, which is a global first.

### Storage for renewable energy

Such a set of safety standards is urgently needed because lithium-ion batteries are very popular with manufacturers. There are many reasons for this: lithium is light and has a high energy density. Laptops, electric drills and smartphones often include a lithium-ion battery. But lithium-ion batteries also exist in stationary form. These large, non-removable batteries can combine thousands of battery cells, providing an enormous storage capacity. That is what makes them so interesting. They are the perfect way to store excess renewable energy.

"Generating wind or solar energy depends on the weather. Energy peaks on sunny or windy days can be hard to process. A stationary lithium-ion battery offers an excellent solution," says Bart Mantels, product manager of VITO/EnergyVille. "Now, with the STALLION consortium, we have designed a set of safety standards for very large stationary batteries for the first time."

### Maintaining the advantages of lithium-ion technology

The fact that those safety standards have now been bundled into a set does not mean that the current lithium-ion batteries are unsafe. It just means that they are a lot bigger and more complex than your average laptop battery and come with different risks. Each battery cell contains a positive and a negative pole. A separator keeps both poles apart. If that separator is damaged, both poles come into contact, short-circuit and ignite.

"The lithium-ion battery cell in a mobile phone doesn't contain a lot of energy. If it short-circuits, the fire is easy to put out. But large stationary batteries can cause problems: if they short-circuit, they release a lot of energy. It is nearly impossible to extinguish the resulting fire," says Mantels. "If you want to maintain the advantages of lithium-ion technology, you need a strict safety framework."

## A PARTNER SHARES HIS EXPERIENCE

**Festus Coetzee, ABB:** "The energy landscape is changing dramatically with the move to "fuel-free" sources in the form of renewables, with batteries becoming ever more important for storing the excess energy generated. Safety standards for both products and systems will form an essential part of implementing these technologies successfully. Together with several regional partners, VITO successfully coordinated this challenging project, STALLION. We at ABB are of the opinion that the first important steps have been taken towards setting the safety guidelines for the future."

### Limit risks

To design the safety framework, the project partners analysed all possible risks for different kinds of lithium-ion batteries, including portable ones, in the first project phase. They then validated the risk analysis. As project coordinator, VITO/EnergyVille was responsible for the analysis and its validation. "We proposed several safety tests as standards. All of them have been simulated thoroughly. For each simulation, we asked ourselves: Do our hypotheses hold up? Is this a good test? Does it limit the risk we had in mind? We only included a safety standard in the eventual set when we could give it a positive assessment," says Mantels.

### Guideline for manufacturers and consumers

After two-and-a-half years of discussions and research, the consortium proposed a set of safety standards. "The standards themselves still need to be determined. That will happen in specialised committees, through representatives of the corporate world. Then they will be offered for sale," says Mantels. "For manufacturers and consumers, we also provided an extensive overview of standards for batteries. There are many different kinds and applications for batteries as well as many safety standards. With this overview, we untangled the mess."

The STALLION project ended in March 2015, but the cooperation between the European partners will carry on. "We have pinpointed several possibilities already, along with aspects that deserve further research. Starting in spring 2016, we want to continue improving the safety of lithium-ion batteries, but no longer just from the perspective of tests. This autumn, we hope to gather the necessary funds," concludes Mantels.

You can find the set of safety standards on [batterystandards.vito.be](http://batterystandards.vito.be)





# NEW GENERATION OF BIOFUELS IN THE MAKING

## VITO INNOVATES PRODUCTION OF BIOBUTANOL

*VITO tested an innovative method to produce biobutanol more efficiently. After successful results on a laboratory scale, VITO worked on pilot tests in several cooperative projects. This research brings the large-scale production of advanced biofuels another step closer. Within VITO, Heleen De Wever and Wouter Van Hecke lead the way.*

"The production of biobutanol is nothing new," says VITO-researcher Wouter Van Hecke. "Ever since World War I, we've been producing acetone, butanol and ethanol on a large scale through fermentation of sugar aided by bacteria. It is one of the largest biotechnological processes ever developed. But, after World War II, we got competition from petrochemistry, which developed

strongly and could work far more efficiently and therefore less expensively. With each oil crisis, we saw a slight revival of the biobutanol industry, but it disappeared again the moment the crisis was over."

"Meanwhile, the worldwide search for alternatives to fossil fuels became more and more defined," adds his colleague Heleen De Wever. "Policy-makers, those in Europe included, feel the need for a more sustainable course. Moreover, they want to be more self-sufficient, less dependent on import from possibly unstable regions. That is why the interest in bio fuels – biobutanol included – is on the rise, both with researchers and with manufacturers."

### Halving energy use

Wouter Van Hecke: "The usual technique to produce biobutanol from the reaction mixture of fermented sugars is distillation. Distillation works very well but it devours energy. Moreover, the produced product slows down the fermentation process. Therefore, we have tested how we can remove that product, biobutanol, during fermentation in order to decrease the delay. We have used a specific method of in situ product recovery (ISPR): pervaporation. The results were positive: We got higher productivity with far less water consumption."

"What makes this research unique is that we are the first to test a biobutanol production process with two sequential fermentors (bioreactors), followed by a pervaporation step. Moreover, we chose to run a continuous operation, which is more interesting for the general process. In the lab, the tests ran for about forty days non-stop, without the dreaded membrane pollution. We used these results to investigate the technical and economic feasibility of a large-scale biobutanol production plant. We believe that, under certain circumstances, we can halve energy use and lower production costs by ten percent using our method. But there are some disadvantages. We are making the actual process more complex because we are adding an element. Moreover, most existing biobutanol processes still run in batches, not continuously. That means we have to do larger-scale testing."



Heleen De Wever and Wouter Van Hecke

### Further research within DemoProBio

Heleen De Wever: "We are currently performing those large-scale tests. In the meantime, we have concluded the DemoProBio project. That project was run with funding from Enterprise Flanders as part of the New Industrial Policy. We were able to scale up our approach to a pilot project along with Bio Base Europe Pilot Plant. The results generally confirm what we had already concluded in the lab environment. But we do see more challenges, for example in the area of membrane performance."

### European ambitions for renewable fuels

Heleen De Wever: "Early May, the European project ButaNexT started. It studies the entire value chain of biobutanol production. The project was coordinated by Green Biologics Ltd. VITO is a project partner and is continuing its earlier research on a pilot scale. But for the first time we are working with raw materials of the second generation, made from cellulose-containing biomass streams. Through this project we want to contribute to the European goal to make ten percent of all transport fuel renewable by 2020. Our project involves a mixture of biobutanol,

fossil fuels and conventional biofuels (ethanol and bio diesel) for use in petrol and diesel engines."

### Industrial relevance goes beyond biobutanol

Wouter Van Hecke: "Our knowledge isn't just relevant for the biofuel industry. We can find broader applications for the concept of continuous processing and in situ product recovery. It is also relevant for other fermentation processes, such as the production of organic acids or aroma components and even for chemical processes. And it doesn't have to be just about pervaporation. Our knowledge of both separation techniques and conversion processes is unique. We work inde-

## "POLICY-MAKERS FEEL THE NEED FOR A MORE SUSTAINABLE COURSE."

pendently and therefore aren't tied to specific manufacturers. Moreover, we help companies design the process and develop laboratory and pilot scale tests and we can advise them on the technological and economic feasibility of their plans and ways to scale them up."

More information:

[heleen.dewever@vito.be](mailto:heleen.dewever@vito.be)

[wouter.vanhecke@vito.be](mailto:wouter.vanhecke@vito.be)

## AWARD FOR VITO RESEARCH ON BIOBUTANOL

VITO was rewarded for its research on biobutanol production combined with pervaporation. Wouter Van Hecke, who has a PhD in bio-engineering and has been a researcher at VITO for the last five years, presented VITO's research results with a poster presentation at the latest edition of Knowledge for Growth, a bioscientific congress organised by FlandersBio.



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## WHAT ARE BIOFUELS?

A biofuel is a collective name for fuels made of biomass and not made of fossil fuels such as oil. Think of other oils like rapeseed oil or fuels generated from biological processes such as fermentation. You can use them as such or mix them with other bio- or fossil fuels.

Our knowledge on the production of biofuels is steadily increasing. More and more, our focus is on advanced biofuels, including biobutanol. These are created from materials that do not compete with food production, such as crop residue or waste streams.

## RETINAL PICTURES HELP TRACK DISEASES AT EARLY STAGE

The retina can be found at the back of our eyes. It is a layer with photosensitive cells that allows us to see. Retinal cameras can make images of the different structures in the retina and the capillaries that guarantee circulation. This is done in a non-invasive and comfortable manner.

Our retina tells us a lot about our health. With a retinal picture, we can evaluate that information in the blink of an eye. The vascular pattern in our retina strongly resembles both the central vascular system and the vascular system of our brain. Changes in width and branching patterns of retinal capillaries provide us with information on the impact of our lifestyle and our health (such as playing sport or sitting a lot), and on the development of systemic diseases (such as hypertension, stroke or Alzheimer's disease) or their progression.

More information:  
[patrick.deboever@vito.be](mailto:patrick.deboever@vito.be)



## BIOCHEMICALS FROM GREENHOUSE GASES



VITO'S CARBON DIOXIDE FACTORY BELGIAN LAUREATE IN THE EUROPEAN INNOVATION COMPETITION

*Innovative cleantech ideas to address climate change were the goal of ClimateLaunchpad, the largest cleantech competition in Europe. Candidates first had to obtain a podium place in the Belgian part of this prestigious competition. VITO was one of the three Belgian laureates thanks to its process to turn carbon dioxide into biochemicals.*

What is the best cleantech business idea to face worldwide climate change? For the second year in a row, the European knowledge and innovation community Climate-KIC organised the ClimateLaunchpad competition to find the answer. The candidates for the European final came from 28 member states. To participate, they first had to convince a national jury in their home country.

### Ready for the market

For the 2015 edition, 29 Belgian students, researchers and entrepreneurs submitted their ideas. Of these, VITO selected ten. The chosen teams followed a two-day business boot camp and a series of coaching sessions. They prepared for the national final, where they presented their business idea to a professional jury.

The cleantech competition is not just a breeding ground for promising ideas, but also a launchpad for talent. "In this competition, we want to give innovative ideas the chances they need by developing them in a balanced way along with the participants," says Bart Dooms, Venture Creation Manager at VITO. "These new ideas or products generally have a strong technical foundation, but without business ideas, they won't be successful. By refining the ideas and developing a



professional pitch for them, we prepare them for the market."

### Carbon dioxide factory

One of the Belgian laureates is VITO's so-called carbon dioxide factory. This factory turns carbon dioxide – a by-product – into useful biochemicals such as methanol or formic acid. This is done with gas-porous electrodes which have been patented by VITO. "A perfect concept for large chemical clusters in the ports of Antwerp and Rotterdam or in the Ruhr area," says Metin Bulut of VITO, one of its inventors.

"It is remarkable how ClimateLaunchpad's guidance changed our vision," Bulut continues. "Originally, we wanted to develop the electrodes to sell them so that they would offer sustainable added value to companies that produce a lot of carbon dioxide emissions. Now we are considering the development of our own production platform to convert carbon dioxide based on those electrodes. We would like to run this carbon dioxide factory on renewable energy, whenever plenty of it is available."

GreenTech Recovery and VITO's SolFO-Gel were the other Belgian laureates.

GreenTech Recovery is a cooperation of VITO and Europem that deals with recovering emitted volatile organic substances in oil and gas refineries. SolFOGel is an application that turns any kind of water into potable water.

The submissions from the 28 participating European member states amounted to about seven hundred projects in all. On Friday September 4, 2015, the top three national finalists presented their innovative ideas to a European jury of the Climate-KIC Accelerator Programme, which translates cleantech ideas into strong business ideas. The Norwegian project Desertcontrol won first prize and received 10 000 euros. VITO's carbon dioxide factory earned a place in the top ten. Along with nine other projects, it will now be developed into a start-up in the prestigious European business accelerator programme of Climate-KIC.

More information:  
[bart.dooms@vito.be](mailto:bart.dooms@vito.be)



# MORE FLEMISH CITIES BECOME ENERGY SAVVY



CITIES INVEST IN SUSTAINABLE ENERGY USE



Stijn Vranckx and Dieter Cuypers

## VITO THINKS ABOUT SMART MANAGEMENT OF GREEN AREAS

*To develop sustainable cities, sufficient green space is a necessity. For instance, this space helps to prevent heat islands in the city during very warm summers. Along with consultant agency Antea, VITO studied the existing green areas in Flanders.*

Six types of green area are the starting point of the study: green areas near the house, green areas in the neighbourhood, green areas in the city quarter, green areas in the city and the city's forest. "With a score of 3.65, the average inhabitant of Flanders has three to four different types of green area in his immediate environment," says researcher Stijn Vranckx of VITO. But there are large regional differences. For example, in Limburg all types of green area may

be part of the direct environment. But in West-Flanders, the many farmlands are not considered a type of green area and so the score is very different.

This data is part of measurements of the quality of the environment and will be translated to the policy level. For example, the city of Antwerp commissioned a web tool that indicates which types of green area should be added in which places to improve people's quality of living.

*The study on types of green area is part of the study Measuring Instrument Environmental Quality commissioned by the Flemish Government's Environment, Nature and Energy Department.*

*Ghent has emerged as a city with smart energy management. This is thanks to the European STEP UP project. VITO helps ensure that the knowledge that was collected can also be used in other Flemish cities.*

Climate change is not just an issue for world leaders but also requires measures at the local level. Via the European Covenant of Mayors, 4,000 local and regional governments in Europe declared their willingness to work on energy efficiency and the development of renewable energy. Flanders saw local climate initiatives as well, such as 'Ghent Climate City', 'Leuven Climate Neutral 2030' and 'Climate Municipality Bierbeek'.

In the last few years, VITO showed itself to be an excellent partner to realise initiatives for sustainable cities. It helped local governments and boards create an actual climate or energy action plan as a part of the Covenant of Mayors.

### European alliance

In Ghent, such an energy action plan or SEAP (Strategic Energy Action Plan) resulted in its participation in the European STEP UP project. STEP UP is short for Strategies Towards Energy Performance and Urban Planning. For this project, the cities of Ghent, Glasgow, Riga and Gothenburg joined forces and received support from the European Commission. In each city, collaborative initiatives were developed between the city council, the academic world and the industrial world. Their goal was to make optimal use of local opportunities for the sustainable use of energy.



Many Flemish municipalities took part in the STEP UP project

Researcher Dieter Cuypers of VITO/EnergyVille: "We didn't just support Ghent in developing itself as city with smart energy management, but also with its communication and ways to spread expertise. Afterwards, we created flagship projects in Ghent and other Flemish cities. These successful initiatives make a difference because they are technically, socially and financially feasible and can also be applied elsewhere."

### Ghent sets a good example

Along with inhabitants and consumers of the Ghent neighbourhoods Sint-Amandsberg and Dampoort, STEP UP explored feasible initiatives for sustainable neighbourhood and home renovation, low-energy transport, carbon dioxide reduction and the fight against energy poverty.

The results of the project were integrated in the climate policy of the entire city. This approach found considerable resonance outside Ghent. "In Ghent, everyone got involved: from the city council to progressive companies, from stakeholders in the social sector to inhabitants and their children. The participatory approach in Ghent has also inspired our European partners and other Flemish cities and municipalities," says Cuypers.

### Learning from others

Apart from Ghent, nine other Flemish centre cities participated in the Flemish part of STEP UP. For each city, VITO identified a central theme for its own climate plan and launched innovative

## STEP UP PARTNERS SHARE THEIR EXPERIENCE

**Alex Verhoeven**, a member of staff working in the area of sustainable management with the Association of Flemish Cities and Municipalities (VVSG): "VVSG coordinates the Covenant of Mayors Network, so it made sense to join the STEP UP project. Through the network, we introduced centre cities to STEP UP so that they could benefit immediately from the result-oriented trajectory assistance. Now we want to continue our successful cooperation with VITO under the same banner."

**Dominiek Vandewiele**, an expert in the areas of energy and climate at the inter-communal cooperative Leiedal: "Thanks to the professional assistance of VITO, we created a large file on energy atlases. We want to continue our work on the Flemish level. And vice versa, we could use the knowledge that other cities acquired during the project. For example, the city of Kortrijk is currently looking at whether it can develop heat grids."

coaching trajectories. "For the city of Kortrijk and twelve surrounding municipalities we developed an overview of existing energy atlases. These show energy use in certain areas and cities and show possibilities for sustainable energy use. Together with the city council of Kortrijk and the inter-communal cooperative Leiedal we studied how they can use them."

Dieter Cuypers: We were able to use our experience with the Flemish cities that signed the Covenant of Mayors to develop a learning network during STEP UP. A major advantage: We can quickly pass on insights and best practices that have been acquired and generate enthusiasm in new cities and municipalities. That way, the learning network keeps growing."

*More information:*  
[dieter.cuypers@vito.be](mailto:dieter.cuypers@vito.be)  
[stijn.vranckx@vito.be](mailto:stijn.vranckx@vito.be)

*On the website*  
[www.stepupsmartcities.eu](http://www.stepupsmartcities.eu) under 'Tools and Inspiration' you will find other inspiring trajectories and practical examples from the STEP UP project.



# VITO AND SOUDAL KEEP OUT HARMFUL SUBSTANCES

## SOUDAL HAS CONSTRUCTION MATERIALS TESTED BY VITO

*Construction and decoration products used in-house can contain harmful substances that end up in the air. Europe therefore imposes strict norms for the emission of those products. Measuring these emissions is thus becoming more important. Silicone and glue producer SOUDAL relies on VITO to run its emission tests.*

If you think of air quality, you think of carbon dioxide emissions, greenhouse gases or smog alarms. But the quality of the air in buildings may also sometimes be quite poor. Some construction and decoration products release substances, such as volatile organic substances, that have an impact on the air quality and on our health. This is a major concern for companies such as SOUDAL, a global player in the production of glues, silicones and foams.

**Peter Geboes**, Manager of Research & Development at SOUDAL: "To ensure that they won't affect the health of our customers, we want to test all of our products thoroughly. That is why we signed a framework agreement with VITO this spring." **Marc Lor**, project coordinator at VITO for Product Emission, Migration and Leaching, adds: "As such, we have formalised our long-running cooperation with our important partner and neighbour."

### What exactly are product emission tests?

**Marc Lor**: "First off, we check the emission of volatile organic substances (VOS) and particulates. We do this with the emission tests in the special-



Marc Lor (VITO) and Peter Geboes (SOUDAL)

ised test chambers at VITO's disposal. We have large test chambers, but also small ones, which we can use to work faster and at less expense. First we apply construction materials in the room. The amount of material used is representative for a European living room. Next we use our devices to identify and measure the substances the material emits and monitor them online.

"We also offer a wide range of tests for product analysis. These include chemical consistency tests, odour tests, leaching tests, risk analyses, life cycle analyses and exposure models. We use them to track specific pollutants."

"In our specialised test chambers we can also determine the capacity for air filtration of construction materials. We

expose test objects to test atmospheres with different pollutants in diverse concentrations. VITO has a gas generation system at its disposal that can only be found in very few places in Europe. Using this system, products that generate a secondary reaction can also be studied, like terpenes for example. Those are natural substances contained in construction and consumer products and can become harmful after contact with ozone."

**Peter Geboes**: "We employ VITO for the analysis of our products. All those results are brought together in reports, which we use to emphasise the quality of our products."

### In the past, SOUDAL had its emission tests conducted abroad. So why the choice of VITO, a Flemish knowledge centre?

**Peter Geboes**: "We have been testing part of our product range with VITO since 2014, in particular glue for tiles, parquet or other flooring. We've always appreciated the smooth exchange of information about the tests or procedures. In previous years, SOUDAL grew into a large international player, but that local connection is still something we value a lot. Because VITO owns the same infrastructure to conduct the same tests as our foreign partner, we didn't hesitate for a moment. Moreover, VITO offers more than just standard tests alone."

**Marc Lor**: "In practice, the annual agreement with SOUDAL means that we test their products (R&D) and make sure they conform to the current regulations (compliance). The expertise of our Product Emission Competence Centre is renowned in both Flanders and abroad. Through framework agreements with large players such as SOUDAL, we confirm that front-running position. VITO is available for every kind of company that wants answers to questions about cleantech or sustainable material use. We are an independent expertise centre that thinks alongside the company. Taking into account their questions and needs, we conclude a cooperation agreement to support companies in a structured manner."

### How will emission standards for construction products evolve?

**Marc Lor**: "A uniform set of European legislation doesn't exist yet. The member states have their own rules but those can differ significantly. Moreover, we constantly need to account for new substances. On the one hand, these come from new additives, and on the other, new substances or lower concentrations can now be detected more easily through better analyses. We consult with knowledge centres and governments in other member

states to align our ideas and goals. As a technical expert, we want to ensure together with the government and industry that emission values don't become too strict. Pollutants are only harmful to our health when they exceed a critical threshold. We want to determine that threshold as accurately as possible so that no health risks are created and that manufacturers can still work on process and product innovation."

**Peter Geboes**: "We will continue to ensure that our products comply with

the highest quality standards. SOUDAL has been a pioneer in this area for years and has helped shape Belgian legislation on the composition of floor glues. Now we need a uniform set of European legislation. Then all companies can aim for the same strict standards, in the interest of the well-being of our customers."

More information:  
[marc.lor@vito.be](mailto:marc.lor@vito.be)



VITO has specialised testing equipment at its disposal

**Nathalie, what does the 3xG project mean to you?**

The 3xG-project means Gezondheid (Health) - Gemeenten (Municipalities) - Geboorten (Births). The study is taking place in three Flemish municipalities: Dessel, Mol and Retie. In the 3xG-project, I study the impact of the environment and life style on our health. Because babies are the most sensitive to dangerous substances, they are at the centre of our research. The health of the baby and its mother are being studied from before birth to many years after. Researchers analyse allergies, birth parameters, pollutants and vitamin and hormone levels in urine and blood samples.

The research shows that there are still high levels of heavy metals present in newborn babies - born from 2011 to 2014 - probably due to the former industrial activities in the area.

**Do you attach a lot of importance to scientific communication?**

It is very important to popularise science in order to raise awareness of products and substances people come into contact with on a daily basis and the effects that those products might have. To inform the participants of the 3xG-project of the progress of the research, we recently organised a family day on the Zilvermeer domain in Mol.

The participants were given further explanations about the results of the study and could share their experiences with other participants. To communicate about science, you need thorough knowledge of the study and a talent for communication. You do not talk about 'exposure to phthalates' but about the receipt you get after paying for your groceries (which may contain phthalates). Moreover, we do not just involve the participants with the results of the study, but we also suggest policies for local governments to improve children's quality of life. What makes it even more fascinating is that the study

**NATHALIE LAMBRECHTS STUDIES EXPOSURE EFFECTS**

"WE DON'T THINK ABOUT ALL THE THINGS WE COME INTO CONTACT WITH ON A DAILY BASIS AND WHAT EFFECTS THEY MIGHT HAVE ON OUR HEALTH."

is performed in cooperation with scientists from other areas, such as sociologists from the University of Antwerp, doctors and nurses from the Provincial Institute for Hygiene, and also local partners.

**You are a very driven researcher and you have a family with two young children. How do you balance this combination of work and family?**

VITO is an attractive employer because the biomonitoring research brings creativity and multidisciplinary into my work, but VITO also offers flexibility. I have two young children: a four-year-old and a one-year-old. The combination of work and young children is undoubtedly complicated for

everyone. Having flexible hours helps me to fully optimise my efforts at work and at home.

More information:  
[www.studie3xg.be](http://www.studie3xg.be)  
[nathalie.lambrechts@vito.be](mailto:nathalie.lambrechts@vito.be)

**3XG-STUDY**

Many of the substances and products we come into contact with are absorbed or excreted by our bodies. Assuming that this won't have long-term consequences is risky. Not all health effects of products and substances or of our environment are known, especially not long-term or when they occur simultaneously.

**KALEIDOSCOPE****70 PARTICIPANTS ATTEND CLOSING EVENT OF INNOVATION NETWORK**

The expertise network Resource innovation Network for European Waste (ReNEW), a cooperation of 19 European research partners, is stimulating the valorisation of waste streams through innovation and technological developments. For the closing event of the project on May 28, 2015 organised by VITO, 70 participants travelled to the Office of the Northern Ireland Executive in Brussels. Guest speakers Karl Vrancken (VITO) and Ken Webster (Ellen MacArthur Foundation), global authorities in their field of expertise, gave their views on sustainable material management and the circular economy of the future. This was followed by lively debates.

[ria.jacobs@vito.be](mailto:ria.jacobs@vito.be)

**INDOOR AIR QATAR EXAMINED**

In May, the Qatar National Research Foundation approved VITO's first research project in Qatar. In this project, Marianne Stranger of VITO is studying the quality of indoor air in Qatar. According to the World Health Organisation, Qatar is second on the global list of regions that are most polluted by particulate matter. The climate is very warm. The majority of the population stays inside and relies on air-conditioning. But even inside, the inhabitants are exposed to several pollutants from, for example, house perfumes. Through this study, the Qatar government wants to find out what influence inside air has on public health. In order to do so, VITO is organising measurements at schools and at students' homes.

[marianne.stranger@vito.be](mailto:marianne.stranger@vito.be)

**NEW PLATFORM FOR ENERGY ADVICE**

Energy takes a large bite out of our finances and yet it is essential for our modern comfort. But we do not pay enough attention to ways to adjust our energy use. That is why VITO/EnergyVille and Ordina Belgium developed the Energy2Consumer platform, which aims to improve communication between energy providers and consumers. Through the new platform, the energy use of private individuals is analysed via simple questions. This results in personalised energy advice, including energy-saving measures, made to fit the consumer. Ordina is developing the E2C platform and is using the research, data and algorithms of EnergyVille. The platform will be online around early 2016. Afterwards, Ordina will provide full support.

[kristel.boonen@vito.be](mailto:kristel.boonen@vito.be)

**REMOTE SENSING FOR AGRICULTURE IN THE SPOTLIGHT IN MILAN**

BELSPO, the federal science policy, has put the spotlight on Belgian scientific knowledge relating to remote sensing for agriculture. This took place at the 'Space4Food' workshop on June 11 during the World Expo Milano. Researcher Sven Gilliams gave a presentation on agricultural monitoring for VITO. He focussed on Africa and the Belgian microsatellite PROBA-V. This satellite can produce images with a resolution of 100 metres and allows the evolution of agricultural crops to be monitored in far more detail. VITO processes and distributes the data collected by PROBA-V.

[sven.gilliams@vito.be](mailto:sven.gilliams@vito.be)

**VITO RESEARCHER AT MASSACHUSETTS INSTITUTE FOR TECHNOLOGY**

From February to May 2015, Dennis Cardoen of VITO stayed at the Massachusetts Institute for Technology (MIT) in the United States. For his doctoral research, he studied the means to desalinate water with electrochemical techniques. These techniques should remove salt from brackish water and process streams in a sustainable manner. Cardoen received guidance from Professor Martin Bazant, an expert in the field. "MIT is an inspiring environment where you can follow seminars on every possible subject," says Cardoen. "Exchanges between various research groups within MIT are strongly encouraged."

[dennis.cardoen@vito.be](mailto:dennis.cardoen@vito.be)

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