

INSPIRATION FOR TOMORROW'S CITIES

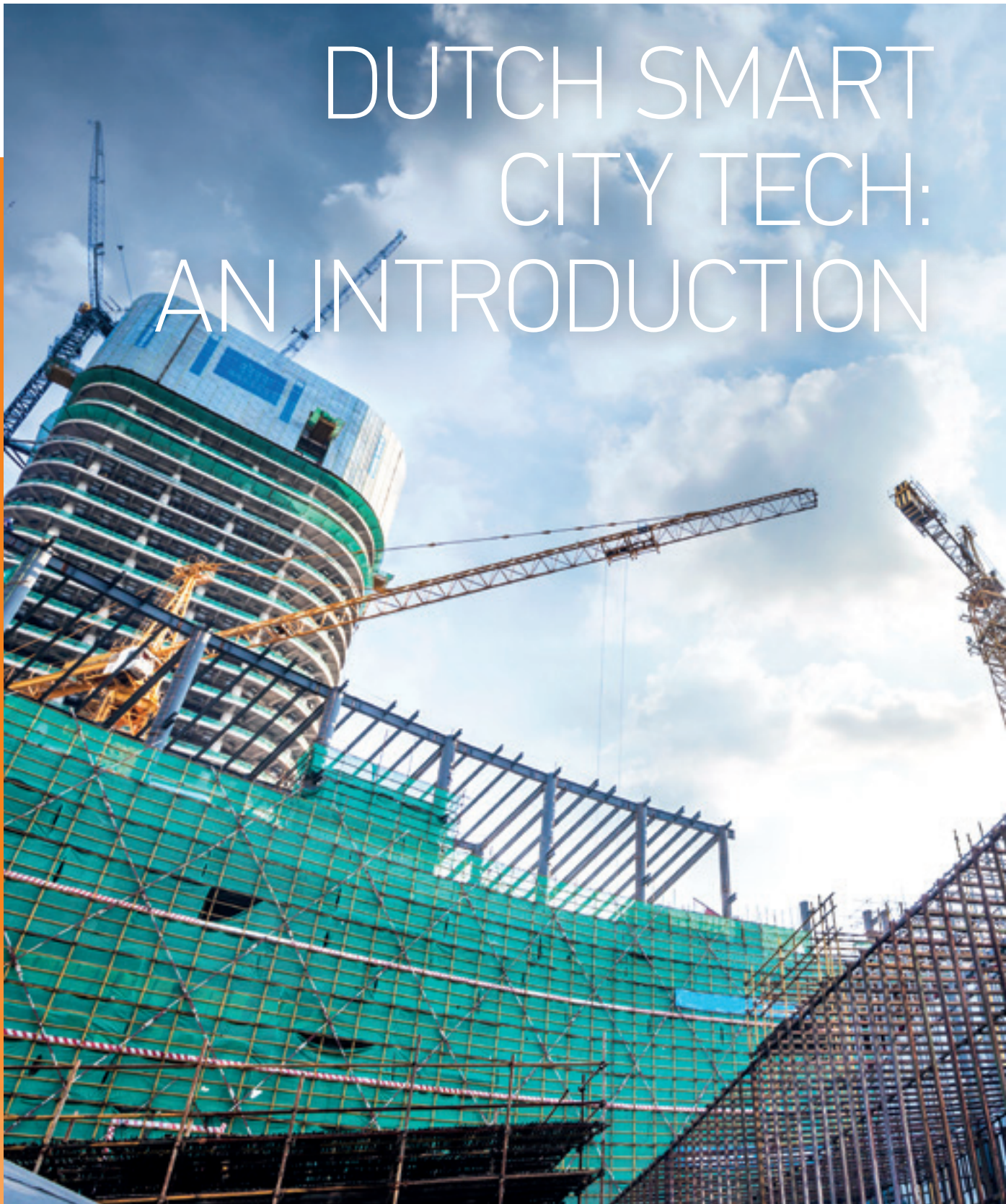


# SMART CITY





# DUTCH SMART CITY TECH: AN INTRODUCTION







The 'Smart City' is no longer a dream for the future. Local governments worldwide increasingly use different solutions to improve the quality of life, progress, and competitiveness in cities. In any smart city, people are at the heart of every solution. The main purpose of technology in smart cities is to improve the living conditions of, and the possibilities for, the residents. How can Dutch companies help improve life for citizens worldwide?

## WHY THE DUTCH?

There are various ways in which Dutch companies distinguish themselves from their neighbours. Most importantly, this is in the way they innovate and do business, regardless of the product or service they provide. Smart City and the city of the future are pre-eminently themes in which 'pigeonholing' adds little. The innovative and solution-oriented approach of companies in the Netherlands fits perfectly within this. Dutch companies do not approach the development of their product or service from the angle of the technology, but from the angle of the challenge: what is the issue at hand, and which parties are needed to solve this issue? Dutch entrepreneurs take the perspective of the entire system and involve the entire chain, while naturally considering the possibilities for their own business.

Dutch companies have a good international image for a variety of reasons. Firstly, this is due to the fact that Dutch companies must, by definition, be compliant with EU regulations. This means that all Dutch companies comply with a relatively strict regulatory framework. In addition, through centuries of experience with foreign trade, the Netherlands is known as a reliable partner. Our products might not be the cheapest you can find, but they are of very good quality: if you buy a Dutch product you get value for money. Additionally, we live up to our agreements, we pay our bills, and we are always looking for the win-win within cooperation.

The Netherlands is the ideal testing ground. Dutch companies experiment with new technologies in the form of field labs, demonstration and icon projects, and within those, work together with governments, knowledge institutions and citizens. This means that we can guarantee a good testing environment for new technology in the Netherlands, which can therefore be validated relatively easily. These small-scale projects also offer the ideal way to test new technologies on a small scale before they are applied on a larger scale.

## LET'S WORK TOGETHER!

Most importantly, Dutch companies that are busy developing the city of the future like to do this with other parties: cooperation is key. They are very collaborative, between different companies, but also in the triple helix or even quadruple helix (business - government - knowledge institutions - citizens).

All in all, Dutch companies are excited about tackling your urban challenges with you. In this Guide, we aim to show you what the Dutch can do to help you with your urban challenges. We present you with cases - to give you an idea of what is possible -, company profiles - so that you can get to know the individual companies better -, and a quick and easy matrix, so that you can see who can support you and exactly how. Should you have any questions, please feel free to contact FME ([international@fme.nl](mailto:international@fme.nl)) or NLinBusiness ([info@nlinbusiness.com](mailto:info@nlinbusiness.com)).



# BUILDINGS & ENERGY

As a municipality, you want your citizens to feel comfortable in and around public buildings. Municipal offices, hospitals, schools and other public buildings should therefore contribute to a healthy and productive living and working environment. Connecting installations and systems digitally can ensure that a building adapts and meets users' requirements. Think of access, light, indoor environment, connectivity and control via smartphone. At the same time, in order to achieve sustainability goals, it is essential that energy is used as efficiently as possible to achieve this. Smart technology can help, as seen in the following practical cases.



## ENERGY OPTIMISATION AT POSTNORD: 50% MORE LIGHT EFFICIENCY

### The challenge

With more than 33,000 employees in Denmark and Sweden, PostNord is the largest communications and logistics company in the Nordic region. Every year, 5 billion letters and 142 million packages are sorted, packed, and distributed to 25 million citizens and 2 million companies across the Nordics. Back in 2017, PostNord aimed to reduce its CO<sub>2</sub> emissions by 40% by the year 2020. This ambitious goal has led to a close partnership with LEDVANCE for many different projects. Optimising lighting by changing from conventional lighting to the much more energy efficient LEDVANCE LED lighting is one of these projects.

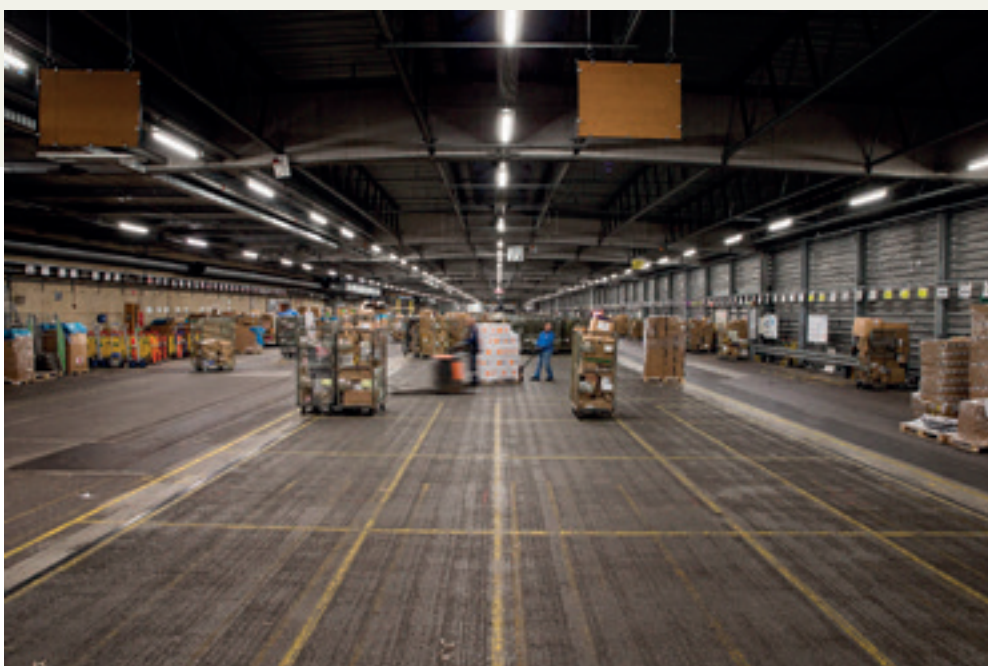
### The solution

PostNord moved over completely to LEDVANCE's LED luminaires. The fact that these products have a lifespan of 15 years on average (50,000h, B70/L50), a product warranty of 5 years, and a very short delivery time, are just a few of the reasons why PostNord chose LEDVANCE. But also, because LEDVANCE LED luminaires, used in the PostNord centre in Broendby, only have a 2-cm installation height. This height means they are easy to install, and therefore the installation price is the lowest ever experienced by PostNord. Also, PostNord doesn't have to worry that PostNord's sensitive production

machinery will be damaged during the installation process. In Broendby, PostNord has changed more than 1,200 luminaires in the warehouses, packing centre, offices, cafeteria and kitchen, plus some of the outdoor lighting.

The new LED luminaires emit twice as much light as the old system. This is good news for the employees who work nightshifts, as they benefit from the strong and natural light they now have. The new luminaires use 50% less power and also discharge much less heat. The company therefore no longer has to use coolers to cool down the rooms. All in all, it has been possible to reduce the total energy consumption by 25%.

With a lifespan of 15 years on average and a product warranty of 5 years, PostNord benefits significantly from using LEDVANCE's LED luminaires and it anticipates using the same solution for future projects.







## ENSURING SAFETY WHILST THE WORLD FAMILIARISES ITSELF WITH NEW WAYS OF USING GAS

### The challenge

The reduction in Dutch gas brings new energy challenges for the Netherlands. Hydrogen might be the solution, either mixed with methane or as a complete replacement for methane. Is our gas infrastructure suitable for smaller hydrogen molecules? Are more gas leaks expected? What impact does this have on safety in our homes?

### The solution

New Cosmos - BIE is a manufacturer of gas sensors and detectors. With 60 years of experience, we have been able to manufacture a unique hydrogen sensor that is selective to hydrogen and does not respond to household chemicals which might interfere with a safe detection system.

New Cosmos developed the world's first residential gas alarm in 1964. Since then, the company has developed many products, such as three-in-one alarms to detect gas leakage, incomplete combustion and fire, as well as battery-operated gas alarms for bulk supply systems. We engage in ongoing development and improvement to meet today's evolving needs with advances in, for example, voice synthesis alarms, power saving and design enhancements. In addition, we have developed functions such as expiration notification, malfunction alarms, and post-activation confirmation of which alarm was triggered, to ensure that this essential

safety equipment will perform reliably, protecting life and property in the event of an emergency.

We recently started a project with gas infrastructure supplier Con Edison, based in New York. The project involves detecting gas leaks in households close to the smart meter. If even a very small gas leak is detected, a signal is passed on through the gas supplier's wireless network and, in turn, this will be passed on to the local fire brigade, which will take action long before the potential occurrence of a fatal explosion. The first pilot in New York proved to be effective, giving the Fire Brigade accurate information about genuine gas leaks and preventing false alarms. We are now starting the next phase and soon more than 330,000 New York households will be safer due to the gas detectors of New Cosmos. In parallel, we are running the first pilots in Europe to achieve the same level of safety as that proven in New York city.



**NEW COSMOS - BIE**  
Gas Detection Solutions



## KOOMEN INSTALLATION – FROM ENERGY LABEL G TO A

### The challenge

Public and semi-public buildings are increasingly expected to be energy efficient, or even energy neutral. At the same time, it is also essential to create a pleasant and healthy environment for users of the building. How can both of these goals be achieved?

### The solution

By applying heat storage in phase transition, incorporated into ceiling systems, OC Verhulst can balance heating and cooling loads in a building in line with a day/night rhythm. This heat can be used for both cooling and heating. To this end, ventilation air is required and the quantity of this must be tailored to a healthy and comfortable indoor climate. This whole system is, of course, controlled by the presence of people. After all, this presence determines (among other things) whether or not our systems are active. The use of Phase Change Materials (PCM) makes this goal more than relevant in 2020. The use of PCM turns any building into a “heavy” building, which behaves like a slow thermal battery, with a consistent indoor temperature (think, for example, of old churches, or caves where the temperature is always consistent).

Koomen in Diemen is cooled and heated centrally, by means of an air-treatment cabinet with high efficiency heat recovery. The heat pump linked to the air-treatment cabinet provides primary heating or cooling for the entire building, if the air heating is insufficient. To compensate for cold radiation from the façade, there is a gas wall-mounted boiler with radiators: a so-called hybrid installation. In the future, this boiler can be replaced with an air/water heat pump. The roof already has modern insulation material. Because the entire building is equipped with variable volume controls and PCM climate ceilings, the amount of energy used for ventilation, cooling and heating is based on the presence of users. The goal is to create a healthy and comfortable environment through ventilation, but only when necessary. The use of heat storage in PCM climate ceilings ensures a consistent temperature throughout the building. Smart control technology ensures that the climate installation is optimally energy efficient. The solar power installation on the roof contributes significantly to the building’s energy consumption.





## PLASTIC LEGNO SPA AND OXYCOM: COOL, FRESH AIR IN HOT ITALIAN SUMMERS

### The challenge

In factory buildings, indoor environmental conditions are not only affected by outside temperatures, but also by the heat generated during the manufacturing process. Therefore, most manufacturing companies will have a cooling system in place to control the indoor air conditions. But as the summer heat is rising globally, it is becoming increasingly difficult for manufacturers to provide a healthy, comfortable and cool work environment for their workers. As a consequence, workers struggle to concentrate and become less productive in their work. Not to mention the unfavourable effect high indoor temperatures may have on raw materials or semi-finished products that are processed. As a result, manufacturers are looking for an effective solution to improve their workplace conditions and provide a healthy and fresh workplace for their workers.

### The solution

Adiabatic cooling provides an affordable solution to comfortably cool and ventilate large spaces in industrial buildings. Even in warmer climates, adiabatic technology never fails to deliver tangible cooling efficiently. While relying on the natural principle of water evaporation, this cooling system turns the workplace into an energy-efficient and healthy space that encourages productivity.

Plastic Legno Spa is a manufacturing company in Castellamonte, Italy that specialises in making plastic containers and trays for food products. Because of the hot Italian summers, the company was looking for a cooling solution to make working conditions more comfortable. At first, Plastic Legno Spa considered using standard air-conditioning technology, which involves the use of compressors and refrigerants. However, once the company was introduced to Oxycom's adiabatic cooling technology and its significant (economic) benefits, the company chose the latter option. One of the main reasons Plastic Legno Spa chose Oxycom's technology is because of its energy-saving rates. Enzo Carra, the company's Purchasing Manager, says: "we have been able to verify that Oxycom's cooling installations consume between eight to ten times less electricity than traditional cooling systems". Carra continues: "I am very pleased with the quality of the air too. Because Oxycom uses fresh outside air, which is filtered and cooled, the quality of the indoor environment has improved significantly since the installation of the system. Moreover, the installation of the adiabatic system happened rapidly, so our production process was able to continue shortly afterwards". He adds: "the cooling machines are quality built and maintenance is standardised, so the system simply looks after itself". Plastic Legno Spa was able to test the range of Oxycom's adiabatic technology immediately after its installation as the outdoor temperatures rose to extreme levels in July and August 2019. "All in all, we are very satisfied with Oxycom's adiabatic cooling solution. While reducing electricity costs, we were able to bring the indoor temperature down significantly compared to previous summers. Besides, the cool, fresh air provides a comfortable and healthy ambience for our factory workers".



#adiabaticcoolingsystem #Oxycomcoolair  
#naturalcoolair #smartcity

**OXYCOM**  
natural air conditioning



## IMPROVED COMFORT USING LESS ENERGY FOR GOLDBECK

### The challenge

More and more people are becoming aware that we have to rethink the way we generate, distribute and use energy. As there are so many of them, buildings, in particular, are major energy consumers. Dealing with this issue has proven to be quite a challenge. In many cases, saving energy in buildings is a manual job, requiring highly skilled people.

### The solution

Priva ECO is an innovative solution which can be used to complement an existing Building Management System. The solution lowers energy, whilst guaranteeing comfort. Unlike many existing solutions, where a user is provided with a dashboard, Priva ECO works fully automatically. It could be likened to transforming a car into a self-driving car.

Both GOLDBECK and PRIVA aspire to position themselves as hi-tech industry leaders, which is why they endeavour to develop, test and produce innovative building automation technologies that are easy to use and thereby improve customer satisfaction.

At the time at which Goldbeck decided to move forward with Priva ECO, the proposed building had a history of overshooting its conditions within the building, so it became the first project site. The Building Manager elaborates: “Priva ECO fits in particularly well with our product philosophy for office buildings, because we promise high levels of comfort and sustainability, low maintenance costs and energy efficiency to our customers and employees.”

As part of the implementation process, relevant information about the mechanical installation and properties of the office building were collated and entered into a “digital twin” (i.e. a replica of the actual building), which was refined with Artificial Intelligence over a two-week period. Priva ECO then took control of the building, making autonomous decisions about the use and deployment of the mechanical installation.



The Goldbeck building was fitted with the Priva ECO pilot less than a year ago. A final performance assessment can therefore not be made until more consumption data has been collated, but the building manager has already seen convincing results. “On the one hand, the people who work in the offices experience better levels of comfort and, on the other hand, benchmarking this building against our other building clearly shows that a huge amount of energy has been saved over a relatively short period of time.”

#PrivaECO





## EASY VISUAL INSIGHTS INTO URBAN AIR QUALITY

### The challenge

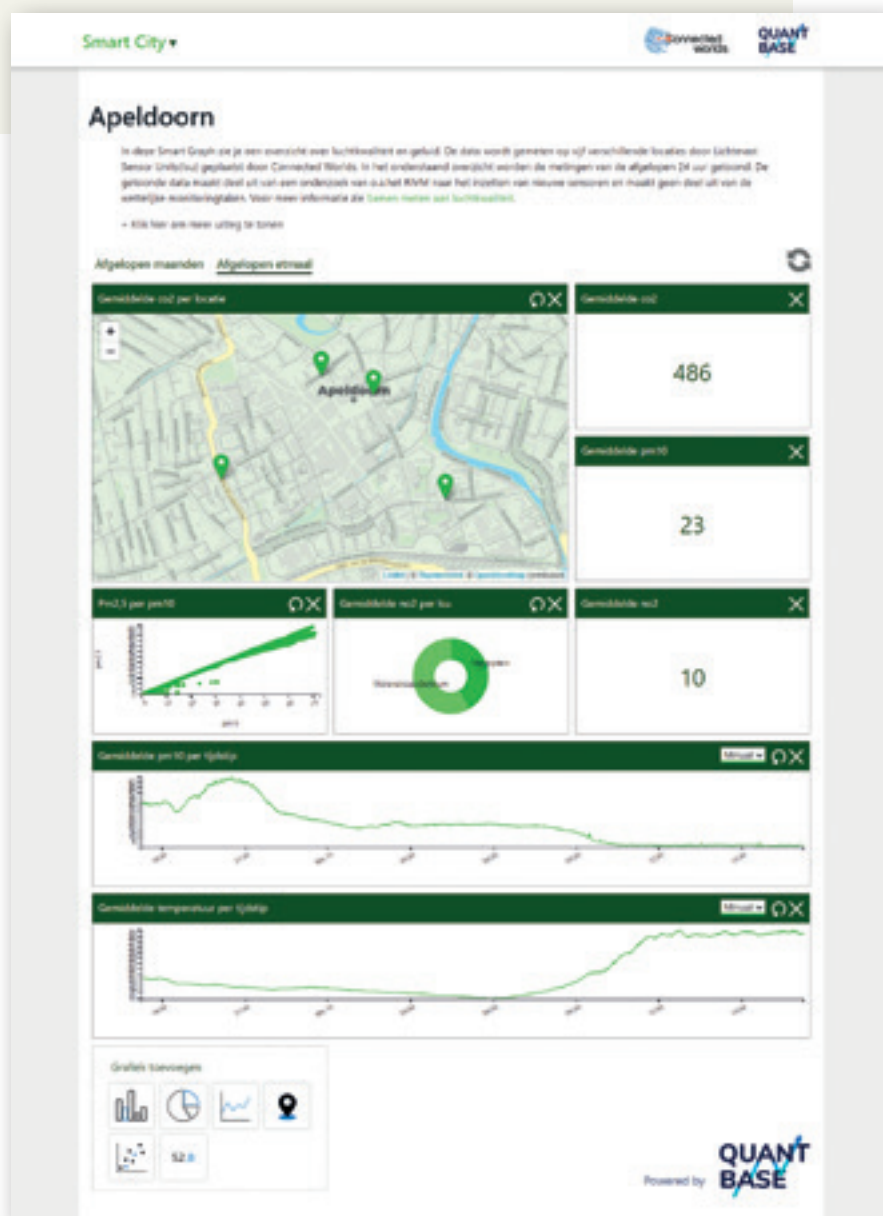
People are concerned about the quality of their environment, especially the air that they breathe. If figures are available to provide an insight into this, they want to understand this and monitor any positive or negative developments. This information is not easily accessible or understandable. To familiarise themselves with this information, people want figures, more details, and want to be able to obtain these easily.

### The solution

It is important there is a direct, transparent link between measuring air-borne elements and the publication of relevant data. A real-time link that can be accessed,

understood and used to form your own impressions of the data when needed.

We have created a direct link between sensors measuring several air-borne elements and our interactive dashboard. Using an API, we translate the results into graphs and maps. The results are available at <https://lucht.smartgraph.bi/?lang=en>, where data is shown for four cities in the Netherlands, with real-time data for Apeldoorn and Dordrecht. Click on one of the cities on the map to view the dashboard. On the dashboard scroll down by simply clicking the elements and additional modules can be added at the bottom left.





## OPTIMAL PATIENT CARE THROUGH INTELLIGENT INFRASTRUCTURE IN MEDICAL LABORATORY

### The challenge

Pressing challenges, such as urbanisation and climate change, require adaptive and smart infrastructures, both for now and in the future. It is important to connect energy systems and buildings. This starts with a building which works optimally, an example of which are laboratories in hospitals, where the average energy consumption is relatively high. Important focal points for labs are environmental conditions, such as temperature and humidity, business continuity and safety, with minimum energy consumption as the goal.

### The solution

Siemens' laboratory solution is unique because it intelligently links the entire infrastructure of installation: from acid cabinets to area control and primary installations. With modular system architecture, the laboratory can be easily adapted to changes in layout or use of space. The continuous exchange of information between all modules, plus easy accessibility of data through a single interface, fully exploit the possibilities in terms of safety, economic feasibility and comfort. This ensures that working conditions are optimal, and the strictest requirements for human and environmental protection are met.

A laboratory solution of this kind has been achieved at Medlon medical laboratory in Enschede. A new laboratory has been created from two operating

theatres. At Medlon, the patient's interests always come first – i.e. blood analysis results should be delivered as soon as possible.

Good hygiene, temperature, pressure and humidity within laboratory environments play a crucial role. Medlon in Enschede learns how technology contributes to optimal patient care

Working more efficiently Smart Infrastructure links all devices, reducing the need for laboratory technicians to walk around and making it easy to analyse information.

**Business continuity and security** All critical devices are redundantly structured, so that failures do not lead to a loss of data or material. The lab has several 'acid cabinets' with a sliding window, so that employees are not exposed to harmful substances. These acid cabinets are automated and linked to the air supply in the lab. A good pressure hierarchy is important to prevent contamination of material.

**Minimum energy consumption** The solution that has been developed is sustainable and reduces energy costs. Air is sucked into the acid cabinets at all times, the control is precise so that a low flow is sufficient to work safely, plus it is more energy efficient.

#smartlabs #smartcity #smartinfrastructure





## CREATING A GREENER WORLD WITH SUSTAINABLE ENERGY

### The challenge

The deteriorating effects of fossil fuels are becoming increasingly apparent at a rapid tempo. However, much of the well-being within our societies is based on the consumption and use of large amounts of energy, which currently largely still comes from fossil fuels. What can be done to increase the use of sustainable energy?

### The solution

One of the most sustainable forms of energy is solar. By installing solar PV systems with solar panels on any type of roof or surface, solar energy can be widely used. Van der Valk Solar offers this solution.

Our materials are made at our factory in the Netherlands and assembled in sheltered workshops. For the following project, we have worked out the ballast calculations in detail and our drawing department has processed these in several revisions. Along with the installer, IZEN, the constructor and the insurer, we have agreed how this system can be installed with a minimum roof load, but safely. With the ValkPVplanner, the complete bill of materials was printed out, allowing coordination of the materials and ten full trucks left our warehouse without a hitch. Forty-eight thousand and forty solar panels have been installed with our ValkPro+ L10 East-West system. These were installed with a shorter pitch of 2,150 mm, enabling more panels to be placed. This roof can now provide power to 4,500 families.



## MATRIX

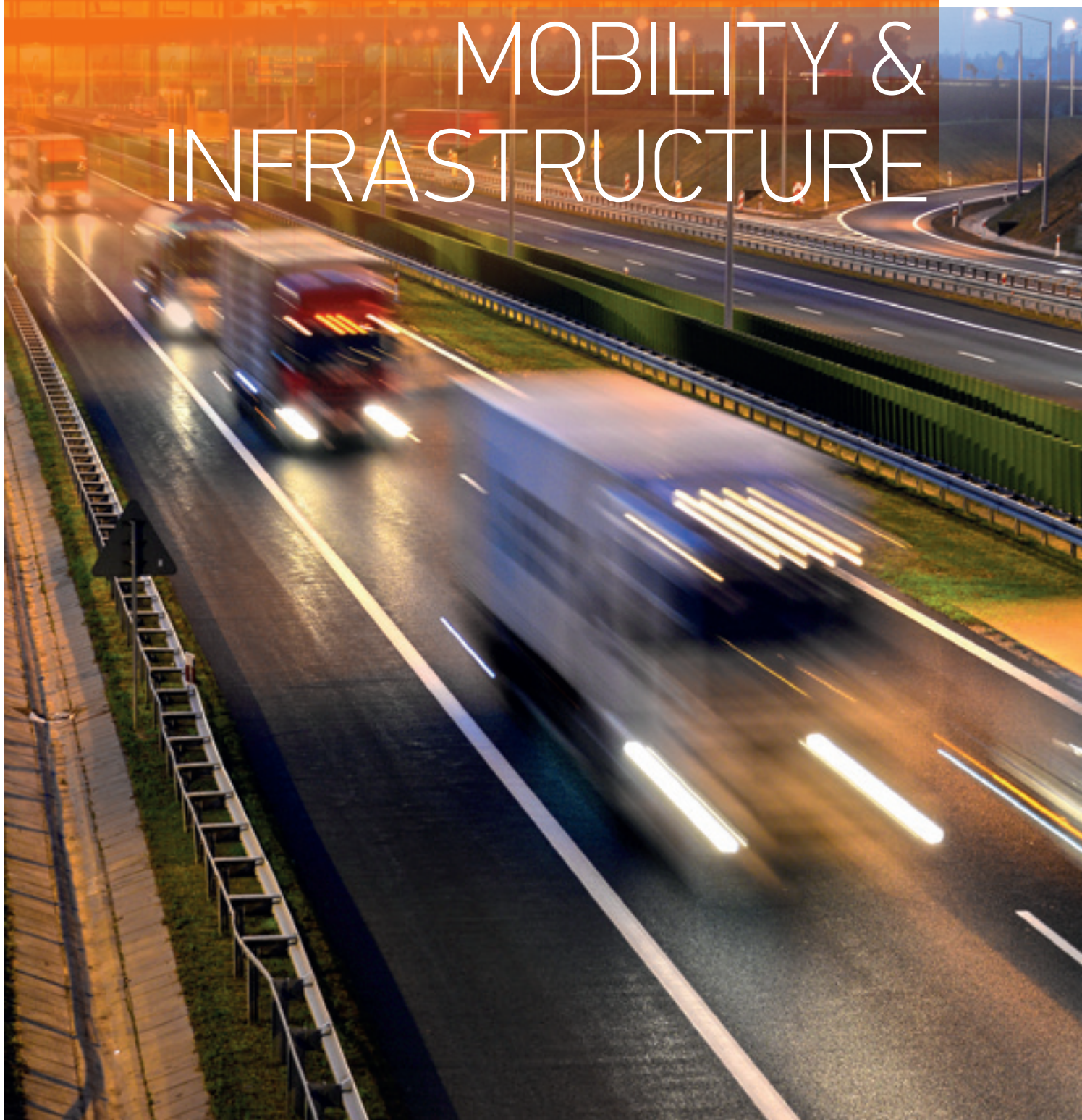
## BUILDINGS &amp; ENERGY

Energy systems			Construction & facades			Installation technology								
Energy storage	Smart grids	Renewable energy	Circular materials & systems	Smart facades	Industrial building	Smart lighting	Sensing & monitoring	Entry systems	Water recycling	Energy management	Fire safety systems	Energy efficient HVAC	Building automation	
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One of the most important elements that contributes to the quality of life in the city is mobility: citizens must be able to travel easily from A to B. Many people within cities worldwide continue to travel by car, out of necessity or convenience. Unfortunately, this causes both congestion and air pollution, which is exacerbated by the increasing amount of online purchases that are made and must be delivered to the city by a variety of companies. Additionally, large quantities of cars and freight traffic regularly entail traffic risks, which can even result in casualties. On the one hand, alternative means of transport, such as step-through e-bikes and electric bicycles, can ensure better mobility, as there are fewer cars on the roads. On the other hand, however, they unfortunately also cause a more confusing traffic situation, as there are more different types of road users.

# MOBILITY & INFRASTRUCTURE





## NIJMEGEN RESIDENTS FREED FROM NOISE: MEASURES EXCEEDING EXPECTATIONS

### The challenge

The world is becoming ever more crowded. Our population is expanding year on year, and so is our need for mobility. This has already led to many problems, such as noise disturbance. Traffic noise has become Europe's second largest environmental problem. It leads to hazardous levels of stress and lack of sleep. Cardiovascular disease, slowed cognitive development in children and tinnitus are also direct consequences of noise disturbance, according to research by the World Health Organisation.

### The solution

We have taken a scientific principle called 'diffraction' and used it to develop noise-reducing products that are cheaper, (socially) safer, more durable and more aesthetic than current options. Sound moves like water: it always seeks the path of least resistance. Therefore, when you create resonance beneath sound waves, the noise deflects upwards. This is called diffraction. Our diffractors make sound waves resonate in a grooved element, which 'push' other sound waves upwards. As a result, the area behind that sound wave is much quieter.

Residents of the Dutch city of Nijmegen have fought for it for years: noise-reducing measures along the Neerboscheweg highway. In December 2019, a solution

was finally put into place: the WHIS® wall, made by 4Silence. This 1-metre-high structure affords greater noise reduction than a sound barrier that is three times higher. Residents in the vicinity therefore maintain their view, but are able to live in a much quieter environment. It is eight times quieter than it was before. Mieke Welschen, one of the residents: "When the barriers were placed alongside the road, we thought 'Well, the proof is in the pudding'. But it's amazing what you can achieve with such a low structure." Alderwoman Harriët Tiemens placed the last diffractor: "The people get to live behind a nice little green wall, instead of the huge barriers they have on the other side of the road. That's really special."

### First UK pilot with WHS® wall alongside railways

When performing projects abroad, you find that governments justifiably like to do their own sound testing. That is why a pilot project was performed in close collaboration with Transport for London. The results of the post WHIS® wall installation noise measurements showed a significant reduction of at least 8 dB, comparable with a 3-metre-high noise barrier. Detailed and independent measurement reports are available on request. This project was part of the Innovate UK programme and was funded by the Department of Transport.

[#noisereduction](#) [#healthycityliving](#) [#smartechnology](#)



reducing  
traffic  
noise





## ADVANCING THE CITY OF UTRECHT IN ITS AMBITIOUS EV GOALS

### The challenge

Poor air quality is a major problem in Dutch cities, and cars are one of the main causes of this problem. The everyday traffic and the space required by cars for parking is an additional problem in many cities.

### The solution

WeDriveSolar ([www.wedrivesolar.nl](http://www.wedrivesolar.nl)) with GoodMoovs inside is a solution for Inner City air quality and other climate problems in connection with inner city traffic and parking problems. The solution to resolve both problems is a combination of shared electric vehicles and dedicated charging infrastructure, combined with solar panels connected directly to the grid. The dedicated charging infrastructure is also ready for bidirectional charging.

WeDriveSolar is part of the Smart Solar Charging project, which will help Utrecht to become the world's first city to balance its energy needs with bidirectional charging techniques. The system was developed and installed

by WeDriveSolar in cooperation with Renault in the City of Utrecht and is growing steadily in the province of Utrecht and other Dutch cities.

The broadly applicable technology enables smart charging of the electric shared cars with solar power, storing solar energy peaks in the car batteries and using the energy when demand is high. Electric cars therefore become part of smart power grids, thus increasing their returns in terms of energy and payback. The shared electric vehicles of WeDriveSolar are combined with GoodMoovs sharing platform, which enables members to easily reserve and drive cars through an app and back-office services. The GoodMoovs platform is a sharing platform for EVs and (e)bikes. GoodMoovs currently manages a fleet of more than 250 electric shared vehicles, including the WeDriveSolar shared electric vehicles. It is the second largest fleet of electric shared vehicles in the Netherlands. GoodMoovs offers services and systems to facilitate the sharing of these electric vehicles.

# NO MORE CONTINENTAL FLIGHTS: THE FUTURE OF SUSTAINABLE MOBILITY

## The challenge

While the transport sector fulfils a pivotal socio-economic role, the sector is simultaneously one of the largest energy consumers, responsible for about 25% of global CO<sub>2</sub> emissions. Unless immediate measures are taken, global transport emissions will increase by another 60% by 2050. At the same time, transportation is also heavily challenged by population growth, which leads to contrasting needs of providing more frequent and faster connections whilst reducing emissions.

## The solution

Excellent transport infrastructure grants access to goods, services, employment, recreation, and allows freedom of movement, making compelling transport infrastructure a magnet for inward investment and human talent. Transport infrastructure in cities greatly boosts regional and national economic development. This is the key factor in a region's competitive advantage. A high capacity, sustainable method of transportation could realise these benefits, while offering a solution to the problems of congestion and air pollution faced by the transport sector.

The most promising new solution that has received extensive attention as a sustainable alternative for high-speed transportation is the hyperloop. With the speed of an aircraft and lower energy consumption than a train, hyperloop may very well be the only solution we have to sustainably improve our global mobility. But it is not only the distances on which aviation dominates the market

where hyperloop thrives. Its exceedingly high transport capacity, shorter than ever travel times, tiny infrastructure footprint, exceptional low use of energy, and the unique prospect of connecting cities along a line without disrupting long-distance travellers, makes it an alternative for any congested intercity connection.

Hyperloop will allow large numbers of passengers to conveniently travel between larger cities, at high speeds, ultimately offering the shortest total trip time without intermediate stops. For example, a trip from Amsterdam to Berlin or Paris will take less than an hour. The passenger-scale hyperloop has lower implementation and operation costs than, for example, high-speed rail, resulting in an affordable form of mass transportation. Furthermore, the hyperloop technology has been engineered as one of the most environmentally friendly means of transport.

Besides travel, hyperloop also offers a more efficient way to transport goods across cities, countries, and eventually even continents, which would benefit everyone. The Cargoloop is envisioned to be the small-scale, cargo-only version of the hyperloop. Cargoloop has relatively low costs both in terms of implementation and operation and maintenance, uses less energy than any other modality and has a very high capacity. This implies a substantial potential for a modal shift in logistics, relieving road congestion and making the supply chain more sustainable.





## THE NETHERLANDS VERY PROGRESSIVE IN EMISSION-FREE PUBLIC BUS TRANSPORT

### The challenge

Cities around the world are faced with the sizeable challenge of reducing CO<sub>2</sub> emissions and improving air quality. From this point of view, bus transport is, of course, a lot more efficient than individual passenger transport. Nevertheless, a bus with an internal combustion engine generates CO<sub>2</sub>, particulate matter and nitrogen oxide, among other things. Reducing these emissions is beneficial to the environment and public health.

### The solution

Electric bus transport is increasingly becoming the norm in Dutch public transport. These buses do not emit harmful substances and, when using green power, this is a very sustainable solution. In this way, the benefits of bus transport can be optimally exploited without the environment-related disadvantages. In addition to electric buses, a smart and reliable charging infrastructure is an absolute prerequisite to achieving this goal.

In Eindhoven, large numbers of electric buses were included in the timetable for the first time, and this was a breakthrough. This is different from a pilot construction in which small-scale and penalty-free testing is first carried out. If an electric bus does not work properly today, a new attempt will take place the next day. Substantial fines are immediately linked to failing or slow electric buses in the system that disrupt the timetable. After its success in Eindhoven, Amstelland-Meerlanden, a regional joint

venture, came up with the largest electric bus fleet within one operation in Europe. With a hundred electric buses, Connexxion provides public transport around Amsterdam Schiphol Airport seven days a week, and in some cases 24 hours a day. This is unique in terms of the number of electric buses and the power of the charging infrastructure.

For this project, along with their customers, VDL Bus & Coach, Heliox and Croonwolder&dros came up with a 'portal construction'. This is a support structure similar to the system that hangs the matrix signs above the highways. Opportunities were seen for a similar construction for the loading infrastructure of buses, as this reduces the number of obstacles surrounding the charging infrastructure. This also avoids costly damage to and the downtime of buses.

Due to the growth in volume, design costs are reduced. The risks of the construction of charging installations are also known, which allows Croonwolder&dros to control this during the design phase. This leads to faster implementation and less inconvenience. The development and application of standards also contributes to this. In addition, innovations are taking place. Batteries become lighter, smaller, cheaper and have greater power. The loading installations are adapted accordingly. Also, a considerable amount of consumption data are available. This enables more precise and smaller installations to be designed.

heliox



croonwolder&dros | TBI



## EXPERIENCE YOUR NEW BIKE ROUTE IN VIRTUAL REALITY BEFORE IT'S BUILT

### The challenge

As a municipality, you constantly try to improve the infrastructure in your city: residents, commuters and tourists want to travel from A to B as quickly, enjoyably, and safely as possible. Of course, as a municipality, you are also committed to things like reducing air pollution and the CO<sub>2</sub> imprint of your city, and you are responsible for the health of your inhabitants. In the Netherlands, people travel in cities by car, bicycle, on foot and different methods of public transport. Alternative modes of transport such as the electric scooter are increasingly found on the streets. Unfortunately, with improvements and/or changes to your city's infrastructure, this creates some complexity: how do you know if the change you want to make actually has the desired effect?

### The Solution

Virtual reality. Through the use of virtual reality, users can experience developments and changes digitally before they are applied. As a municipality, this gives you the opportunity to see whether the adjustment in infrastructure does indeed have the desired effect. This also makes it easier to involve citizens in the project: they can already experience the benefits of improved infrastructure before the physical work starts!

Between Tilburg – Loon op Zand – Waalwijk, an enjoyable, fast bicycle connection has been developed - a so-called 'fast bike route'. This express bike route (F261) is wider than a standard bike path, with red asphalt and priority over other traffic. Fast bike routes are comfortable and make cycling to work a lot more attractive. Employees who cycle are fitter, help to decrease daily traffic congestion and they contribute to a better environment.

The missing element was a specific design for express bike routes, with recognisable marking on the asphalt and signage. With CycleSPEX, the design has been tested and assessed by potential road users.

CycleSPEX enables cyclists to experience a planned bike path with 3D glasses, as if the new route were already there. The chosen design will also be applied to the other routes. As far as we are concerned, all new projects in the Netherlands can first be tested quickly, cheaply and effectively to ensure acceptance, logic and safety.

#VR #cycling  
#userexperience  
#TheUrbanFuture





## MATRIX

# MOBILITY & INFRASTRUCTURE

Mobility systems					Infrastructure					Data collection and usage					
Parking management	Zero emission mobility	Traffic management systems	Charge infrastructure	(e-)Mobility as a Service	Noise mitigation and monitoring	Connected lighting	Hyperloop	Safety systems	Traffic monitoring	Vehicle to infra communication	Smart and predictive maintenance	Last mile delivery	Monitoring air quality	Simulation, VR/AR	
			•												<b>Alfen</b> alfen.com/en
			•												<b>ABB</b> global.abb/group/en
			•												<b>Heliox</b> www.heliox.nl
	•														<b>DAF</b> www.daf.com/en/sites-landing
	•														<b>VDL</b> vdlbuscoach.com
					•										<b>Sorama</b> www.sorama.eu
							•								<b>Hardt Global</b> www.hardt.global
	•		•	•								•			<b>FIER Automotive</b> www.fier.net
					•										<b>4Silence</b> www.4silence.com
						•									<b>Signify</b> www.signify.com/global
						•									<b>Sustainer</b> sustainer.com/en/
										•					<b>NXP</b> www.nxp.com
•		•													<b>Dynniq</b> dynniq.com
					•										<b>Merford</b> www.merford.com/en
•	•	•	•			•		•	•		•			•	<b>SPiE</b> www.spie-nl.com
												•			<b>Bosch</b> www.bosch-mobility-solutions.com/en/
														•	<b>The Urban Future</b> www.theurbanfuture.com
										•					<b>KPN</b> www.kpn.com/zakelijk.htm#/
						•		•	•		•				<b>TBI</b> www.tbi.nl
•			•		•	•		•	•	•	•	•			<b>Siemens</b> www.siemens.com/smart-infrastructure





# SAFETY & SECURITY

People want to feel safe in their own neighbourhoods, in areas where they go to socialise and when using stations and car parks. Measures are therefore needed to ensure that people do not feel that they have to avoid certain places because, for example, these places are too dark, or because there is a greater likelihood of robberies or fights. It is also important that safety is guaranteed during major events, for instance, by ensuring that there are clearly signed exits that people can use in the event of an emergency. At transport hubs, such as stations, some travellers may attempt to use the facilities without a valid ticket. How can this be prevented? In addition to the use of security guards, plus social control by the general public, technology can also help to promote safety and the sense of security. Below are a few compelling examples.



## TWO TECHNOLOGIES. ONE SOLUTION.

### The challenge

In a post-COVID-19 society, building owners and tenants would like to return safely to their place of work and offices, and it should be safe and secure for them to meet business associates in office buildings. In addition to various concerns regarding the post-COVID-19 era, people would like to move seamlessly through large buildings and skyscrapers. In an age of ever-expanding cities and urbanisation, it is becoming ever more complicated and time-consuming to navigate through cities and buildings.

### The solution

As a global leader in elevator destination control systems, Schindler's PORT Technology has rapidly expanded its footprint into mobility solutions in buildings. The PORT Technology offers its users secure access and seamless journeys through entire buildings. It therefore made perfect sense to combine PORT with Boon Edam's leading and unique welcome and secure entrances, creating one smart, attractive and cutting-edge solution that resolves both issues: the secure and seamlessly efficient movement of people.

### Seamless and Secure Elevator Destination Control

By integrating PORT into the Boon Edam Lifeline speed gate, a visitor or resident can be quickly authorised via RFID card or the myPORT smartphone app, and visitors can be granted access via a web-based colour code.



## THE POWER OF TWO



Once authenticated, the PORT's elevator dispatch algorithm instantaneously allocates the best possible elevator to the passenger. While the PORT device authenticates and guides the visitor or resident, Boon Edam's Lifeline Speedlane Swing takes care of the entrance management. The Lifeline Speedlane Swing has been revolutionising the security industry since 2014 and is well-known as the smartest, fully operational speed gate on the market. The speed gate was developed with aesthetics in mind, and its smooth, premium glass casing houses intuitive-coloured LED lights which effortlessly glide along the tapered cabinet top to ease visitors seamlessly through the checkpoint. This solution efficiently manages visitors to the building and people traffic through the building using the elevators can be regulated in order to be safe and secure in the post-COVID-19 era.

## SMART AND SAFE LIVING IN A FORMER BUSINESS PARK

### The challenge

The Rivium business park in the municipality of Capelle aan den IJssel has many empty units. There is also a sharp increase in demand for housing in Rotterdam. The new Rivium will be a lively and future-proof working and living area for students, starters and professionals. A trendy neighbourhood with a focus on safety.

### The solution

Four project developers have purchased former business units that are located at the business park and old office buildings are being transformed into homes, or being replaced by residential apartment blocks. In order to create a trendy and future-proof neighbourhood, the use of smart technologies is essential. A Comelit Multi-User Gateway will be added to an old office building, licences will be issued, and future residents will be able to enter the building through a video door entry system activated via a smartphone app. Video surveillance systems, home automation and anti-intrusion can be added to the app.

There is also a shortage of student housing in Rotterdam. The former office building, Rive Republic, has been transformed into 111 studios. These turnkey homes, with affordable rents, are ideal for students. There is a self-driving bus to Kralingse Zoom metro station and it takes

just 20 minutes to cycle to the centre of Rotterdam. The first 111 studios were rented out within a few hours.

At Rive Studios & Apartments, residents feel at home as soon as they get to the entrance. The entrances are lively places with a launderette, flexible workspaces, small-scale catering and a supermarket. Visitors can easily ring the doorbell using the Comelit 3one6 Touch entry panel. This door entry panel, with 8" HD touchscreen, is pure design and is a perfect touch for the Rive Republic Studios. Through the use of a Multi-User Gateway, remote name management is possible. Multi-User Gateway is an Internet connection to connect the Comelit IP network (ViP) to a private network connected to a standard device, such as a computer or router. The location no longer has to be visited to change the name on the touchscreen, this is simply done online.

A modern, intuitive and smart solution. The door entry system is also easily managed through the Comelit app, which is very convenient for busy students in a metropolis. Through the same app, the system can be expanded at a later date with a video surveillance system, anti-intrusion or home automation.

**#security #door entry #IP #Rotterdam #students**



**Comelit®**  
Passion. Technology. Design.





## BRONCKHORST ENERGY NEUTRAL

### The challenge

As a municipality, you want to be as sustainable as possible, especially taking into account the Paris Climate Agreement. You can do this by setting up energy-saving measures in many different areas. Lighting, for example, was originally a considerable energy consumer. However, you want to offer your residents the most pleasant and safe living environment possible, so turning off most streetlights (in itself a sustainable solution) is not an option. How can you unite both goals?

### The solution

An initial important step as a municipality is to replace conventional luminaires with LED luminaires. This replacement alone means a 50% saving in energy costs. But there's more to it than that. By opting for a smart solution (Connected Lighting) each fixture can be dimmed individually at any time. This saves more money in energy costs. It also saves on maintenance, because the luminaires themselves indicate when maintenance is needed and automatically send a signal to the maintenance company.

The municipality of Bronckhorst sets the bar high. By 2030, the municipality wants to be completely energy neutral. An ambitious plan entrusted to Bronckhorst. By opting for connected street lighting by Interact City in all residential and outdoor areas, the municipality is taking another step towards its sustainability ambition. In this way, the innovative municipality addresses valuable themes, such as comfort and safety, while making savings in energy costs.

"The 'LEDing' of our public lighting resulted in an energy saving of 50%. By making our lighting smart, we now have the right amount of light everywhere. And we save more money in terms of maintenance." – Paul Hofman, Alderman Sustainability and Energy, Municipality of Bronckhorst.

Many municipalities have already made the switch from conventional lighting to LED, which allows for substantial savings in energy bills. There are more and more municipalities, like Bronckhorst, that want to save even more energy through their sustainability ambitions. Interact City for public lighting proved to be the perfect solution in this respect. New LED luminaires were automatically traced directly through the municipal network via a GPS module. After this, the municipal public transport administrators were able to set the lighting needs per residential area through dimming profiles on the Interact City dashboard. The luminaires now dim and light up at different times. This also applies to the outdoor areas, with their special flora and fauna. By additional dimming in these places, nature is disturbed as little as possible. With this smart lighting system, the municipality sets a good example to the inhabitants, every single day and night. Bronckhorst ensures a good balance between energy savings and safety, with respect for the beautiful nature that characterises the municipality.



## EINDHOVEN AS LIVING-LAB

### The challenge

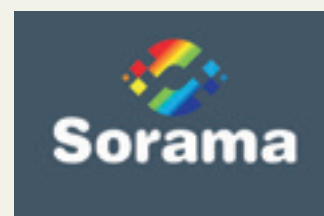
As a municipality, you want to guarantee the safety of residents and visitors to your city or village as much as possible. Police and other forms of law enforcement are responsible for this through surveillance, the aim being to attend the scene as soon as possible if an incident is reported. However, these law enforcement parties are regularly overburdened during, for example, events or nights when people are out on the streets. As a solution to improve law enforcement efforts, traditional cameras are often installed. These cameras are, of course, effective, but also have disadvantages, for example, they intrude on privacy and they are not always directed towards the location of an incident.

### The solution

By adding sound as a means of detection, (PTZ) cameras can be sent to the right area based on sound triggers. This enables optimal assessment of a situation. Sound cameras, which can be hung from existing infrastructure, analyse sounds without recording them. Based on sound, it can be determined what is happening in a particular area, and an automatic signal can be issued to law enforcement parties if an incident occurs, and/or cameras can be directed to the correct location. With the addition of GPS data location, the location of the incident can also be immediately communicated. This ensures a targeted and efficient response.

The new Sorama Smart City Listener platform is active 24/7 in Strijp-S's living lab. The living lab occupies an area with pavements, a street and a restaurant terrace. Four Sorama Listener64 microphone arrays are installed in light poles around this area and linked via Ethernet connections to a fibreoptic backbone. Strijp-S's 'community watch' group has a newly developed smartphone app that receives push messages for aggressive behaviour at a specific (GPS) location, to monitor and view the situation.

But sound cameras are also used for general safety on the streets, in traffic and in places popular for their nightlife. This year, for example, sound cameras will be installed at Stratumseind and at the Kennedylaan junction at the Technical University in Eindhoven. The microphones work together with smart software so that accidents or near misses can be detected, and the police get an automatic quick notification for an accident at an intersection or on the road.





## BRIGHTER LIGHT IN UNSAFE SITUATIONS IN THE ROTTERDAM DISTRICT OF LOMBARDIJEN

### The challenge

In poorly lit places, problems such as burglary and theft are unfortunately more common. Permanent lighting is often not the solution, because it often consumes unnecessary power.

### The solution

FME member Sustainer has come up with a solution: a fixture with a built-in microphone that picks up and analyses sounds. As soon as the system recognises dangerous situations, a camera is turned on. Because the camera is connected to the streetlights, they will glow brighter.

Burglaries in homes and robberies are a problem in Rotterdam. On the Dantestraat in the Rotterdam district of Lombardijen, a Fieldlab has been set up in the fight against these burglaries. This is an initiative of the Ministry of Justice and Security. In the Fieldlab, Sustainer's 'Anne' luminaires, equipped with a microphone and a video camera, will be used as the 'ears and eyes of the city'.

When Sustainer's Anne luminaires are equipped with a microphone, sounds in the environment can be detected and recognised. Conversations are not

recorded, but ordinary situations and situations of threat or danger can be distinguished from one another. As soon as a sound is recognised indicating an unsafe situation, such as glass shattering or arguing, the various cameras close to the microphone will switch on to monitor what is happening. As the cameras are connected to the lighting, the lighting switches on and the lamps light up brighter at the relevant location. The sensors sound an alarm. Suspicious movements and behaviours are spotted at an early stage and local residents and passers-by are alerted to the unsafe situation.

This application can help to prevent burglaries and can help the municipality to be more successful in catching suspects. In turn, this contributes to an improved sense of security in the district. The initial trial results are expected in the autumn of 2020. If successful, the Sustainer application will continue to be used on those streets.

#smartlighting #safety #Sustainer

**Sustainer** 



## MATRIX

SAFETY &  
SECURITY

Safety & security systems						
Entry systems	Lighting	Fire safety systems	Crowd management	Cyber safety	Camera surveillance	
•						<b>Comelit</b> <a href="http://www.comelitgroup.com/nl-nl/">www.comelitgroup.com/nl-nl/</a>
•						<b>Boon Edam</b> <a href="http://www.boonedam.com">www.boonedam.com</a>
	•					<b>Sustainder</b> <a href="http://sustainder.com/en/">sustainder.com/en/</a>
	•					<b>Signify</b> <a href="http://www.signify.com/global">www.signify.com/global</a>
		•				<b>New Cosmos - BIE</b> <a href="http://www.newcosmos-europe.com">www.newcosmos-europe.com</a>
				•		<b>Compumatica</b> <a href="http://www.compumatica.com">www.compumatica.com</a>
					•	<b>Bosch</b> <a href="http://www.securityandsafetythings.com">www.securityandsafetythings.com</a>
•		•	•	•	•	<b>Siemens</b> <a href="http://www.siemens.com/smart-infrastructure">www.siemens.com/smart-infrastructure</a>
				•		<b>KPN</b> <a href="http://www.kpn.com/zakelijk.htm#/">www.kpn.com/zakelijk.htm#/</a>
				•		<b>IBM</b> <a href="http://www.ibm.com/nl-en?lnk=m">www.ibm.com/nl-en?lnk=m</a>
					•	<b>Sorama</b> <a href="http://www.sorama.eu">www.sorama.eu</a>
	•	•			•	<b>SPiE</b> <a href="http://www.spie-nl.com">www.spie-nl.com</a>
			•			<b>Argaleo</b> <a href="http://www.argaleo.com">www.argaleo.com</a>
•				•		<b>Thales</b> <a href="http://www.thalesgroup.com/en">www.thalesgroup.com/en</a>



A number of conditions are essential in order to connect and make smart technologies work. For example, there must be a stable and secure data infrastructure, ensuring that the data used in a smart city does not compromise the privacy of inhabitants. The various solutions in the city also need to be integrated in order to work optimally. Think of the interplay between lighting and traffic control systems, or connected waste containers and the logistics system of the waste processor. System integrators ensure that the optimal result is achieved by building the systems, and connecting, managing and maintaining them and/or facilitating a data and visualisation platform. System integrators bring the physical and digital worlds together. You will find specific examples of this in the cases below.

# SYSTEM INTEGRATORS

An aerial night view of a city with a network overlay. The city is illuminated with lights, and a network of white lines connects several glowing white location pin icons scattered across the urban landscape. The background is a dark blue and orange gradient, with the city lights providing a textured, high-contrast backdrop for the network diagram.





## SOCIAL ISSUES IN NORTH BRABANT PICTURED THROUGH DIGITAL TWIN

### The Challenge

Cities are getting smarter, relying more on data to determine their policies. In cities, more and more data are being generated in many different ways, which means data must be as up-to-date as possible. This is a huge challenge for specialists: good information requires up-to-date and reliable data. To date, this data is collected in various ways from a variety of sources. That collection and processing of data takes an enormous amount of time. Time you'd rather spend usefully.

### The Solution

Argaleo offers the 3D Digital Twin of the Netherlands: the Environmental Server. With the Environment Server you have virtually all national data sources at your disposal online: Data As A Service. This data is linked correctly and can be used directly in conjunction within all common systems. The map images and datasets are available in all file formats you may need. Up-to-date, reliable, and complete. In addition, this urban data is visualised through a web viewer in a 3D Digital Twin of your own city or region. This gives you the right insight into social themes directly and online.

In the province of North Brabant, Argaleo has developed a custom 3D Digital Twin. In this Digital Twin, more than

a hundred datasets are visualised. For example: the year of construction of buildings, boundaries of water boards, ecozones, the classification of buildings based on logistics function, etc. In this Digital Twin, real-time (sensor) data is also visualised, i.e. the live positions of trains. A user-friendly menu allows the user to visualise and filter different layers of data to answer policy questions quickly and accurately. Examples of these questions include:

- What are the energy labels of my listed buildings?
- How many care locations are located close to high-risk buildings?
- Which 'Natura 2000' sites are close to licensed building sites?

The advantages of a 3D Digital Twin is that you get a quick insight into social themes. Because it is a web-based solution, it is accessible and scalable. You can easily share the web link with your colleagues. In addition, the 3D Digital Twin has a platform function in which a company's own data or that of third parties (e.g. sensor suppliers) can be visualised in one web portal. The further development of the 3D Digital Twin of Brabant focuses on various themes, for example circularity of buildings.

**#3D #DigitalTwin #DataDriven #Smart Cities**







## HOW A SOC CAN BECOME THE HIGHEST RISK IN AN ORGANISATION

### The challenge

Technological innovation has created many opportunities to work faster, more efficiently and better. The Internet, in which systems and networks are connected to one other, plays a central role in this. However, if one point becomes infected, it can spread to the entire network and continuity may be compromised.

### The solution

With the numerous connections, it's hard to rule out the possibility that systems and networks might be affected by malware. After all, one click is enough to bring in a Trojan horse. However, the consequences can be limited by placing digital fire doors in the network. This compartmentalises the network into different subparts and ensures that the most critical parts have additional protection. If an attack is successful, the fire door system prevents the entire process from grinding to a halt.

A government organisation in critical infrastructure has taken numerous mitigating measures to minimise the risk of a digital attack. All endpoints send data to the Security Operating Center (SOC) where all systems are monitored 24/7. As soon as something suspicious occurs, the SOC receives an automatic notification and staff can take action.

Linking all endpoints to the SOC also creates a new vulnerability. If the SOC is infected, and of course that chance is low, ransomware can also infect all endpoints through the SOC, meaning they can no longer be controlled. As this organisation is active in the critical infrastructure, this has huge consequences on Dutch society and can affect all of us.

In this case, Compumatica has developed technology to apply one-way traffic in the form of a data diode (MagiCtwin). It is physically impossible to send data in the other direction. The SOC can still receive all data from the endpoints, but can no longer communicate back. This is also necessary anyway, because the SOC does not control these endpoints. This is done in a different location.

This enables the organisation to take advantage of the technological capabilities that are available, taking into account the challenges it presents in the field of digital security. Together we are building the safe digital Netherlands of tomorrow.

#Soc #Security #critical infrastructure #network security



## EXCAVATING DATA POWERS THE ROAD TO KNOWLEDGE

### The challenge

The challenge we face today is the maze of data we have to find our way out of to reach the destination of information. Innovations in the field of geodata bring along new ways of measuring the world around us. An expert level of insight is needed to collect all important information and to combine this to create valuable knowledge. Measuring and connecting data which leads to knowledge doesn't only save huge amounts of time for state officials, the government and businesses, but more importantly it creates a safer environment and workplace for those workers who excavate and make measurements in contaminated and potentially dangerous soil.

### The solution

We provide our customers with knowledge and information. 'Work smarter not harder' is our company's motto. We do this by providing them with software with which they can easily access or request the information they require. They can view this in real-time, using our desktop application. Also, information can be requested by means of documents, that will display the



current state of the soil. This document can also be requested in the form of 'safety class'; this lists all precautions that should be taken before excavation can commence. Considering the various forms and services that we provide, the difference between these two options is that one only provides the person requesting the information with data about the state of the soil and the contamination. If there is contamination, the 'safe class' states what steps have to be taken by law. A combination is also possible.

In order to enable excavation to take place "wisely and safely", Nazca collects and combines several sources of data that are relevant for parties who wish to excavate a particular area. Information about non-exploded explosives and pollution. This creates the foundation for security guidelines and safety measures. Soil data provides knowledge, that enables informed strategy decisions to be made. Relocating a cable can save both time and money if the original location that was chosen is too 'crowded'.

**Nazca Solutions: data becomes knowledge.**

**nazca  
solutions**



# SMART SOLUTIONS FOR ASSET MANAGEMENT: EEFDE SLUICE COMPLEX AS A LEARNING ENVIRONMENT

## The challenge

In every city there are numerous systems requiring maintenance. For example, bridges, locks, energy systems, sewerage and the waste system. For authorities such as the municipality, the State Water Authority, water boards and grid operators, this causes a significant amount of work. Maintenance at fixed times (periodic maintenance) means systems will end up unusable when they could have possibly lasted for longer. Finally, there is a significant shortage in service and maintenance personnel, and efficient deployment of this workforce is therefore crucial.

## The solution

The way to deal with this is the transition from periodic to predictable maintenance. In other words, to perform maintenance exactly at the time it is needed and only to the parts that require this, instead of shutting down periodically and maintaining the entire system. Sensors and algorithms can be used to predict how systems run and whether maintenance will be required (soon). This can be traced, for example, by calculations to sound, vibration, temperature or other variables.

As from 2017, Eefde Sluice Complex will be one of the learning environments at the Dutch Directorate-General for Public Works and Water Management. Multiple parties will work in an Open Innovation Structure; each party will have its own knowledge, and through this learning environment, there will be an opportunity to expand knowledge through actual practice.

## Preventing faulty gear casing by combining data

On the levelling slide (a slide that allows water to pass through the lock) tests are carried out and energy monitoring (quantity and quality) is used with detection of deviations to gain an insight into all movements and actions recorded on and around the levelling slides of the lock. The usual way of working is that, after a notification, the fault handler forwards this to the plant and sends it back to the contractor. To understand what is happening, the contractor has to visit the site, after which he can deploy the correct people or resources. This process takes a lot of time.



At the Eefde Sluice Complex, measuring equipment is in place on various parts of the lock. Recently, energy measurements on the main distribution of the slides have been detected very occasionally in the power outputs between the three phases. The contractor, SPIE, went to look and saw and heard nothing at first. A few weeks later, when the frequency of the alarms increased, another mechanic went to look and heard a strange sound. When he looked closely, he noticed an imbalance in the engine. This imbalance is normally only noticed when the gear boxes break down. As this was discovered in a timely manner, the imbalance could be corrected and preventing damage amounting to around 20,000 Euros and possibly further obstruction.



MATRIX

# SYSTEM INTEGRATORS

Data infrastructure and distribution				Operational technology	
Telecommunication systems	Data analysis and AI	Data management	Data visualisation & digital twins	Implementation	Predictive maintenance
				•	•
				•	•
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	<b>SPIE</b> <a href="http://www.spie-nl.com">www.spie-nl.com</a>
	<b>ENGIE</b> <a href="http://www.engie.com/en">www.engie.com/en</a>
	<b>TBI</b> <a href="https://www.tbi.nl/">https://www.tbi.nl/</a>
	<b>Compumatica</b> <a href="http://www.compumatica.com">www.compumatica.com</a>
	<b>KPN</b> <a href="http://www.kpn.com/zakelijk.htm#/">www.kpn.com/zakelijk.htm#/</a>
	<b>Nazca IT</b> <a href="http://www.nazcasolutions.nl">www.nazcasolutions.nl</a>
	<b>Quant Base</b> <a href="http://www.quantbase.eu">www.quantbase.eu</a>
	<b>Argaleo</b> <a href="http://www.argaleo.com/en/">www.argaleo.com/en/</a>
	<b>LeGrand</b> <a href="http://legrand.com/en/landing">legrand.com/en/landing</a>
	<b>IBM</b> <a href="http://www.ibm.com/nl-en?lnk=m">www.ibm.com/nl-en?lnk=m</a>
	<b>Siemens</b> <a href="http://www.siemens.com/smart-infrastructure">www.siemens.com/smart-infrastructure</a>



Are you curious about one or more of the companies that you have read about in the case studies, which may be able to help you to develop into the city of the future? Would you like to know more about these companies, and perhaps even contact them? Please find a list of company profiles below. Companies are organised by sub-sector, and then in alphabetical order. For a more integrated approach towards urban challenges, contact FME at [international@FME.nl](mailto:international@FME.nl) or NLinBusiness at [info@nlinbusiness.com](mailto:info@nlinbusiness.com).

# COMPANY PROFILES



**4Silence**

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**Vision and mission**

At 4Silence, we believe that nobody should suffer from the growing demand for mobility and the (increasing) traffic noise that comes with it. That's why we take pleasure in inventing, researching, and developing scientifically proven – and easy to install – noise-reducing solutions for infrastructure. Such as the WHIS®stone, WHIS®wall, and WHIS®top.

These three products reduce traffic noise in an entirely innovative way: by deflecting it. This is called diffraction. It makes noise reduction more elegant, durable, effective and cost-effective, helping more people enjoy peace and quiet in their environment.

**The team**

The 4Silence team consists of different specialists, with one shared mission: to make noise reduction through diffraction a reality. This means that:

- governments can do their job better and easier;
- contractors can install noise-reducing products faster and more sustainably;
- residents and travellers experience less noise and visual pollution.

Our people have (scientific) backgrounds in acoustic engineering, infrastructure construction and technical engineering.

We're located in Enschede, close to where we once started: the University of Twente. We're down-to-earth, pragmatic, and hands-on. We are here for our customers both day and night, and we never hesitate to pick up the pace when needed.



reducing  
traffic  
noise

**Argaleo**

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**Value from data**

Argaleo develops and sells ICT services, applications and support for companies and the government. It is our mission to create value from data for our customers and users. Economic value and social value. We do this by offering online "Digital Twin" solutions that provide the insights into the challenges of the future.

Argaleo offers a platform for your own 3D Digital Twin City. With this Digital Twin you are able to create insights, analyses and predictions of important topics like mobility, energy, liveability, health and so on. In a web-based 3D application you can use our datasets and connect your own data to obtain and share information. It is an online solution that is fast, easy to use and scalable.





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### The premium choice

Boon Edam leads the field when it comes to supplying top-quality revolving doors, high-security doors and speed gates to customers across the world. We are a third generation, Dutch family business and we pride ourselves on our knowledge and dedication to this specialised market. From the moment you talk to us about your entry vision, through to the decision-making process and not forgetting during the after-sales and service process – you are in safe hands with us.

Our promise is our commitment to making you feel welcome and secure, and our mission is to help you make a decision that adds value to you and your business. Boon Edam works with architects, contractors, system integrators, facility managers, security experts and building managers, and over time it has amassed a loyal network of happy customers, who consider us to be their top choice. This is based on the fact that we consistently and continually offer real added value to the project partners who place their trust in us.

**BOON EDAM**

**Security & Safety Things GmbH**  
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### Collaborative innovation

Security and Safety Things re-imagines innovation in the IoT with a new platform for security cameras:

- An open ecosystem connects camera manufacturers, application developers, system integrators and end-users for collaborative innovation
- AI-enabled apps automatically analyse video footage for operational data, ranging from occupancy levels, weapons and smoke detection, to retail-specific applications
- The IoT platform provides a camera-operating system, a development environment, comprehensive device

management tools and an Application Store

- The Application Store features more than 55 AI-enabled apps from more than 35 specialised developers

Security and Safety Things GmbH is set to reshape innovation in video analytics and computer vision with its open and secure IoT platform. The Security and Safety Things platform harnesses the power of security cameras to provide valuable enterprise-wide operational intelligence for facilities and organisations in a variety of industries. On the platform, developers can rapidly create new applications for a variety of cameras from

different manufacturers and market them through the open Application Store of Security and Safety Things. Security and Safety Things, plus some of its camera partners, are also already running pilot projects in a live setting, supporting cases such as heat mapping and queue analysis in retail stores, automated payment processing or licence plate recognition for barrier-free traffic.

 **BOSCH**  
Invented for life

**Comelit Nederland B.V.**

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**Improving the quality of everyday life**

Founded in 1956, Comelit Group SpA is an industrial company operating on a worldwide scale and specialising in the design and manufacture of video entry, video surveillance, anti-intrusion, home automation, access control and fire-protection systems. The company has a strong international vocation thanks to its close ties with the area in which it was created and in which its headquarters are still located today (Italy, Val Seriana).

Comelit has always placed mankind at the centre of its vision. This humanist approach is evident in the company's focus on its employees, in the organisation of its working

environment, in the ethics governing its relationships with suppliers and distributors, and in the partnership it fosters with installers. Every Comelit product expresses this vision, constructed on the basis of enduring values.

Comelit exports to over 70 countries worldwide and, in addition to its Italian headquarters, has 15 branches located in strategic areas in which the company operates: from Europe to the Far East, the United States and the Middle East. This articulated sales structure integrates shared know-how with the awareness of specific requirements in each market.

Comelit's mission is to constantly look towards the future. Innovation through continuous investment in manpower and technology finds an outlet in the design of new solutions dedicated to improving the quality of everyday life by maximising simplicity and functionality.

**Compumatica secure networks B.V.**

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**Cybersecurity with a personal touch**

Compumatica, which was founded in 1991, is a Dutch cyber security manufacturer which specialises in crypto (network encryption, e-mail encryption) and network segmentation (firewall, Diode). The products have different security certifications from the Netherlands, the European Union and NATO. All products (software & hardware) are built and developed in Europe.

Compumatica has more than 25 years of experience in the cybersecurity market. We develop, produce and implement solutions with a high security grade without backdoors.

During the development process of the solutions, security is the main focus besides simple implementation and integration, easy management and usability for the end user.

Our slogan "Cybersecurity with a personal touch" indicates that our customers are our top priority. If you have any questions, require support, wish to upgrade products to the latest solutions, or have special requirements, we would be happy to assist you.





#### FIER BV

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#### Accelerating sustainable mobility & logistics

FIER Automotive & Mobility (since 1995) is a specialised consulting and business development company, active in the dynamic market of mobility & logistics, focusing on sustainability and innovation. FIER initiates, develops and manages projects which have a strong impact on making mobility more sustainable, that contribute to the fight against climate change. For customers and stakeholders in our network, FIER is seen as an ambitious team of experts who do their work based on (scientific) knowledge and experience. "Accelerating sustainable mobility & logistics, FIER gets the job done".

FIER consists of a team of 7 dedicated employees and a pool of external experts. FIER supports national and local public authorities in defining and implementing their policies in e-Mobility and charging infrastructure. It provides policy support, which is based on many years of research and in-depth insight into the effectiveness of stimulation measures and incentive systems. The knowledge of FIER in terms of economics, logistics and vehicle technology, is also used for coaching fleet managers in electrifying their fleets. Combined with an understanding of market development and technology foresight, FIER assists companies in their strategic transition to

e-Mobility, including their vehicle portfolio strategy, their charging equipment and/or their services. The scope of FIER's work ranges from light electric vehicles, passenger and commercial vehicles and fleets, to heavy duty for public transport and freight. It includes the relevant smart charging infrastructure, integration of renewables and storage.



#### Hardt Global Mobility

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#### Sustainable and affordable high-speed transportation

Hardt Hyperloop is a technology company, with headquarters in the Netherlands, which specialises in hyperloop. Hyperloop is a promising innovation that is faster and more energy-efficient than both aeroplanes and high-speed trains and meets the growing demand for sustainable and affordable high-speed transportation of freight and people. The founders of Hardt Hyperloop won the first international hyperloop competition by Elon Musk's SpaceX in 2017.

Hardt is the initiator of the European Hyperloop Center, a test center envisioned to open in the Dutch province of Groningen in 2022. Also, the company has built the first European full-scale hyperloop test facility and is the only company worldwide that has developed hyperloop lane switching technology, enabling it to implement a hyperloop network. Hardt is supported by (among others): Schiphol, NS, Deutsche Bahn, Koolen Industries, EIT InnoEnergy, Freigeist, Royal BAM Group, Tata Steel and Royal IHC.



**Hydraloop Systems**

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**Water recycle systems**

Hydraloop's mission is crystal clear: we want to enable people and organisations to save water without losing any comfort. That's why we developed the Hydraloop, a first of its kind, compact, smart, self-cleaning, low maintenance range of water recycle products.

Hydraloop water recycle systems can be installed in new or existing buildings. The Hydraloop collects water from showers, baths and washing machines and treats it without the use of chemicals, filters or membranes. The treatment system combines five

technologies: Sedimentation, Flotation, Dissolved Air Flotation, Foam Fractionation and an Aerobic Bioreactor. The sixth technology, which is the final treatment, is disinfection using UV light. The result is clean, clear, safe and disinfected water that can immediately and safely be re-used for the flushing of toilets, for the washing machine, for irrigating the garden or topping up the swimming pool.

With a Hydraloop system, people can recycle 85% of the mains water in their household or business, which results in much lower water

consumption. Hydraloop clients recycle so much water that they save 45% on their water bill and send 45% less water to the sewer. In cooler climates, they also save 400 Euros annually on their energy bill, because they need less indoor heating. And they reduce their carbon footprint by more than 6%.

**HYDRALOOP®**  
SMART WATER SAVING

**LEDVANCE**

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**Advancing light**

LEDVANCE is one of the world's leaders in general lighting for lighting professionals as well as end users, offering a broad variety of LED luminaires, advanced LED lamps, intelligent Smart Home & Smart Building solutions as well as traditional light sources. With offices in more than 50 countries and business activities in more than 140 countries, LEDVANCE possesses an outstanding global market access built on trusted, long-standing customer relationships and a powerful distribution network. Based on our in-depth

understanding of the general lighting market, trending technologies and changing needs, we support the specific and individual demands of both direct and indirect customers.

As a leading provider in the global lighting industry, LEDVANCE values environmental stewardship as a fundamental part of their business ethic.

Why do lighting professionals opt for LEDVANCE? Because we are one of the world's leading providers of general lighting – with

more than 100 years of experience. Because we can offer our customers a comprehensive portfolio of LED luminaires, LED lamps, LED strips with suitable drivers and traditional lamps under one roof. And because our product range allows us to create tailored lighting solutions – from shops to industrial lighting.

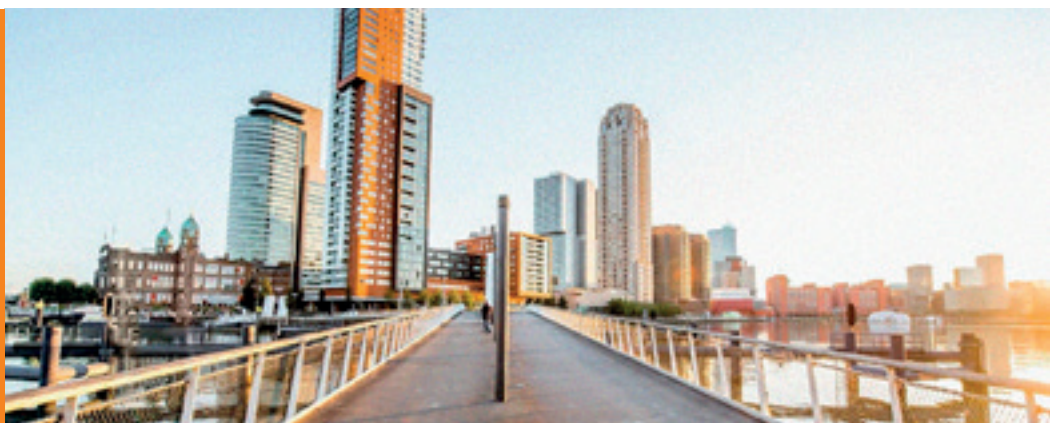




### Nazca IT Solutions BV

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### Work smarter not harder

The world and its infrastructure continue to change. It is getting busier, both above and below ground. Nazca provides answers and solutions to questions using data. The combination of creating and providing users with software, as well as the service to support this, is at the core of Nazca's activities. One of our products collects and discloses data for the subsoil and topsoil. We are leaders in the age of digital developments with our innovative solutions for relevant parties that work with environmental data. Geodata, sensor data as well as other data is instantaneously visible and applicable. This data, which provides users with the necessary knowledge, is accessible 24/7 with the intelligent solutions created by

Nazca: innovative initiatives to further the digitalisation processes, with many companies that, to this day, are plagued by stagnant documents. Nazca, is always looking for new ways to provide data to its customers. This had resulted in where we are now, i.e. having built an augmented reality app for the those needing information about the state of the subsoil.

Creating a SMART network using the IoT (internet of things) is another facet of Nazca's portfolio. A city or company can be provided with a digital twin made SMART. At the least, certain processes (for example the status of doors and windows being open or closed) can be controlled and observed remotely. There

is a possibility of operating your systems remotely and cutting losses in a timely manner in the event of an incident, made possible through alerts and a constant feed displaying status of operating systems.

Nazca looks to provides data to different branches ranging from geodata to health & sports. 'Work smarter not harder' is the motto we live by.

**nazca**  
**solutions**

### New Cosmos – BIE

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### Smart gas detection and sensor technology

New Cosmos - BIE is a manufacturer of stationary, portable and personal gas detection equipment and sensors, mixing high qualified gas detectors with smart forms of (wireless) communications suitable for applications in many industries and applications. These applications include hydrogen and methane detection near smart meters in residential areas, hydrogen detection in Fuel Cell vehicles but also in filling stations or at hydrogen production plants. With more than 60 years of experience in gas detection and sensor technology, besides

Europe, New Cosmos – BIE also serves customers in the Middle East and North Africa.

Our mission is to create a safer global environment with a reduced number of accidents. Our strengths:

- Sensor technology in-house
- Over 60 years of experience
- Reliability
- Unique sensor selectivity
- Long life-time
- Extended range of sensors for different gases

We offer solutions for the following markets:

- New Energy Markets
- Oil & Gas Exploration
- Chemical & Petrochemical
- Automotive Industry
- Laboratories
- Micro Electronics
- PV Industry



**NEW COSMOS - BIE**  
Gas Detection Solutions

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#### Air-handling

Orange Climate is one of Europe's most respected producers of air-handling units, air terminal devices and ducting. In almost a century we've built ourselves an excellent reputation when it comes to innovation, product quality and customer service. Our history, in combination with our direct involvement in countless projects both in our native country and across the world, has led to a solid base on which we can conduct our leading role in the air terminal devices industry.

#### Our mission: people, planet, profit

**People:** Research indicates that characteristics of buildings and building plant such as heating and cooling systems, natural light ingress and ventilation, have a significant effect on sickness absenteeism. Furthermore, a healthy interior climate also raises productivity. **Planet:** 16% of the CO<sub>2</sub> emissions in the Netherlands originate from functional architecture. The potential saving is estimated at 80%. These statistics justify continued focus of occupants of functional architecture on reducing the CO<sub>2</sub> emissions resulting from how they use their buildings.

**Profit:** A healthy interior climate has all kinds of (financial and sustainable) benefits for organisations.

#### Our commitment

We conduct our business in a socially responsible and ethical manner. We respect the law, support universal human rights, protect the environment and benefit the communities where we work. Our company's foundation is built on our values, which distinguish us and guide our actions.



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#### Unique adiabatic cooling technology

Oxycom was founded in 2002 by Hans Reinders who wanted to provide the world with a sustainable and eco-friendly cooling technology. Today Oxycom develops and produces the world's most energy-efficient air-handling components and climate solutions. Based on adiabatic cooling and energy recovery, Oxycom's cooling technology works on creating a carbon-neutral climate. Oxycom believes that the faster the world stops relying on traditional AC systems which harm the environment, and moves toward zero-emission climate control, the better.

#### Sustainable cooling solutions

Inspired by nature, Oxycom uses water to cool air in an environmentally friendly manner. Evaporating 1 m<sup>3</sup> of water delivers almost 700 kWh of cooling. In the adiabatic system, this amount of cooling needs just 10% of the electricity that is required for the same level of cooling in a traditional AC. With water as the refrigerant, Oxycom helps to create an HFC-free future and achieve ultimate cooling efficiency.

Oxycom understands the need for fresh and cool air in the workplace. Without a properly ventilated and too hot workspace,

workers struggle to concentrate, become less productive, and accidents are prone to happen. With outdoor temperatures on the rise globally, it is becoming increasingly difficult for employers to provide a healthy, comfortable and cool indoor environment for their employees. In this age of growing environmental concern, it is Oxycom's goal to deliver an environmentally friendly solution for a healthy indoor climate that makes people feel comfortable and productive, every day of the year.

**OXYCOM**  
 natural air conditioning



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### Creating a climate for growth

Priva is a company based in the Netherlands which develops and produces innovative solutions for sustainable climate control and process management for the built environment Horticulture and indoor growing facilities. In recent times, Priva has focused on development and is today offering cloud-based solutions adding value during buildings' operational lifecycles. One example is Priva ECO, an AI solution that improves comfort and energy performance in commercial, public and industrial buildings.

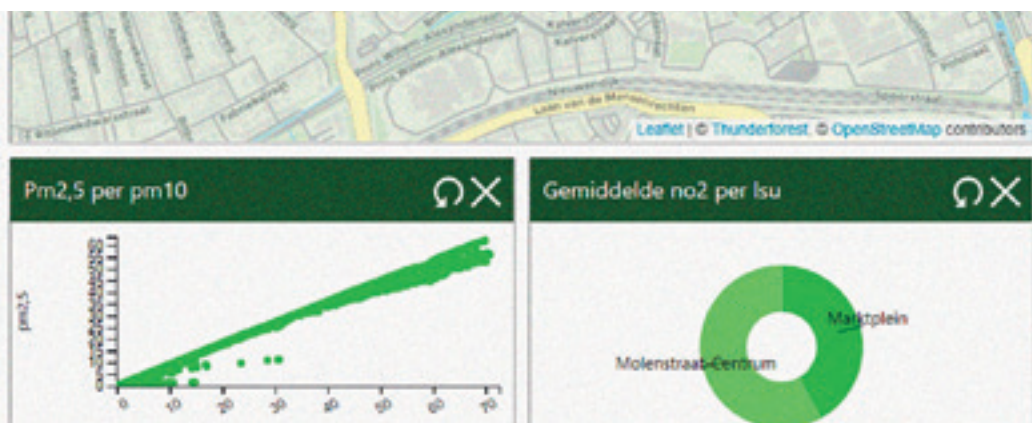
In today's world we see an enormous number of dashboards, providing users and managers of modern buildings with an overload of information. With so much information it can be challenging for the facilities manager to decide on priorities when also striving to improve a building's operations. However, much of his work has a strategic component. Decisions taken now will affect performance of the building hours later. Priva ECO is a solution that acts like a machine. It gathers data, makes decisions based on that data and then executes those decisions autonomously. It turns any building into a smart building.

Priva ECO is a cutting-edge cloud-based solution that uses a digital twin of the building, artificial intelligence to learn from its decisions and live data from the building. With those technologies it can predict both the comfort levels and the energy consumption 24 hours in advance. Priva ECO can be used as an add-on to any existing Building Management System.



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### Picturing data

Quant Base develops software tools to manage data and Big Data. The Smart Graph is the data platform we have developed to visualise, analyse, and communicate data. It is unique due to its accuracy, ease of use and speed of implementation. It can be installed in our Dutch cloud, in your own cloud environment and on-premise. So, you can decide where your data is stored and who can access it.

This Smart Graph is used for reporting purposes by the Dutch emergency number 112 on a regional and national scale. Using APIs, we visualise sensor data in real-time on city air quality in interactive dashboards. For the Ministry of Infrastructure we make reporting manageable on infrastructure projects by International Financial Institutions. On behalf of a machine factory, we visualised sensor data from their machines.



**Siemens Smart Infrastructure**

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**Creating environments that care**

Siemens Smart Infrastructure (SI) is shaping the market for intelligent, adaptive infrastructure for today and the future. It addresses the pressing challenges of urbanisation and climate change by connecting energy systems, buildings and industries. SI provides customers with a comprehensive end-to-end portfolio from a single source – with products, systems,

solutions and services from the point of power generation all the way to consumption. With an increasingly digitalised ecosystem, it helps customers thrive and communities progress while contributing toward protecting the planet. SI creates environments that care. Siemens Smart Infrastructure has its global headquarters in Zug, Switzerland, and has around 72,000 employees worldwide.

**SIEMENS**  
*Ingenuity for life*

**Signify**

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**World leader in lighting**

Since 2018, Signify has been the new company name of Philips Lighting, a former division of Royal Philips. Signify is the world leader in lighting for professionals and consumers and lighting for the Internet of Things. The Philips products, the Interact connected lighting systems and data-enabled services, the numerous innovations like for Philips Hue, LiFi, NatureConnect, etc. deliver business value and transform life in homes, buildings and public spaces.

With our connected light and streetlight systems - that can be offered as a Light as a Service proposition - we enable cities and municipalities to reduce their energy costs significantly, to leave the investment cost and to focus on their core business.

With 2019 sales of EUR 6.2 billion, Signify has approximately 38,000 employees in the world and has a presence in more than 70 countries. Signify walks the talk: to unlock the extraordinary potential of light for brighter

lives and a better world. For this reason, it has been named Industry Leader in the Dow Jones Sustainability Index for three years in a row.

**signify**



### Sorama

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#### Make sound insightful

Based in Eindhoven, the Netherlands, Sorama has a team of highly skilled software and hardware engineers who have knowledge about sound and audio signal processing. Since 2014, Sorama has adopted technology, originally developed for R&D applications, to make sound insightful in product development, and has found applications to use this technology in the public domain.

#### Optimal Situational Awareness

Sorama offers audio-based signaling, localisation and classification that optimises situational awareness and creates the correct insights to improve the city you live in. Did you

know that noise pollution is the second most unhealthy environmental impact for humans? Is it a challenge for your city to distribute its police force efficiently? Or manage traffic incidents clogging up your city?

#### Hear the City when seeing is not enough

The Sorama Listener platform, along with the Listener64 microphone arrays or sound cameras, enables noise source localisation, quantification and classification in order to identify noise polluting pubs, (industrial) plants or vehicles with the greatest accuracy. In addition, events like people fighting, breaking glass, gunshots, alarms, traffic (near)accidents and anomalies are directed to the police

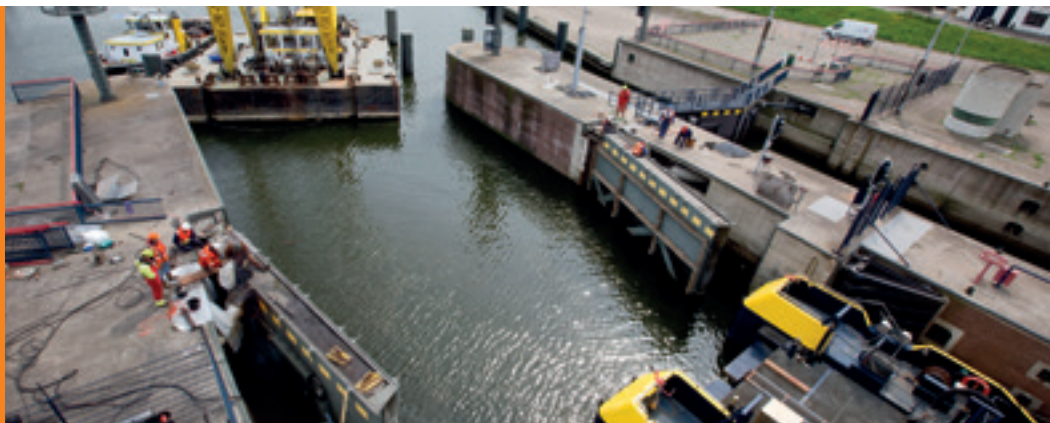
or municipality allowing them to act faster with appropriate measures. Combined with other sensors, such as security cameras, the Listener64 can optimise their use by directing PTZ cameras to a point of interest based on sound. This adds more value to your city surveillance by using both 'eyes and ears' when a situation of interest is being assessed.



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#### Improving quality of life

SPIE is a specialist in the installation sector. Because of the role we fulfil, we are an essential part of our economy and our way of life.

We advise and guide clients in the design, the implementation, the operation and maintenance of energy, infrastructure and industrial building installations. In this way we contribute to a better, more pleasant life - for people now and for future generations.

SPIE Nederland is a subsidiary of the SPIE group, the independent European leader in multi-technical services in the areas of energy and communications.



**Sustainer**

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**It starts with light**

Sustainer is a young and innovative Dutch company that develops, produces and delivers smart lighting and smart city solutions to municipalities and business clients in the Netherlands and abroad.

We see the public lighting network as the central hub for the smart city. An open system to which new applications can be added. New technologies provide the eyes and ears – the senses – for the public space. In a fast-changing world, it's vital to offer future-proof

solutions. Our high-quality, intelligent LED luminaires enable you to take advantage of the latest technologies at low financial risk. All our luminaires are therefore based on a modular design concept and can include a variety of sensor technologies. These sensors can be used for a large range of services and solutions, such as traffic/parking monitoring, digital surveillance and air quality monitoring. Our future-proof solutions are designed with the forthcoming transformation in mind. This means we can help to build a sustainable, safe, and healthy society.

**The Urban Future**

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**Improving cities with virtual experience and analytics**

Our solution CyclePRINT offers improved understanding of your cycling-network performance, as well as cycling potential in your city, all of which is crucial to improve the accessibility, sustainability, and health within your city. Building Happy Cities!

With data from apps, loops and traffic lights, we turn counts and tracks into information on cycling network performance. CyclePRINT drives decisions on cycling infrastructure,

calculating Societal Cost Benefit Analysis, cycling Potential and Propensity. It provides insights that traditional traffic models have not been able to provide on 'slow mode' transportation!

CycleSPEX allows people to experience future environments in Virtual Reality Simulation. The purpose is ex-ante design evaluation, and citizen participation, so they truly understand through VR what your plans are: making the best choice before money has been spent! Our solution gives you answers

to peoples' behaviour in (not yet existing) IoT-based infrastructure, or smart buildings. It's a modern method of engagement and communication!





### Van der Valk Solar Systems BV

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#### Solar mounting systems

Since 2019, Van der Valk Solar Systems has been one of the fastest growing companies in the solar industry and focuses entirely on the development and production of solar mounting systems for pitched roofs, flat roofs and open fields. Van der Valk Solar Systems also has an office and warehouse in the UK and is currently active in 13 countries. Our mounting systems are developed and produced at our own factory in the Netherlands and are popular because of their broad range of application, the short installation time, and their high quality. They are developed in accordance with the latest Eurocodes and therefore comply with the requirements defined for solar systems by

banks and insurance companies. Van der Valk Solar Systems is part of family-owned company Van der Valk Systemen, which has been a household name in the field of moving systems and mounting components since 1963. Our shared industrial complex consists of 20,000 m<sup>2</sup> of offices and factory spaces. Here we use modern machinery and the latest technologies to quickly and accurately develop, manufacture, and test products and systems.

#### Why Van der Valk Solar Systems?

- Innovative systems developed according to global standards
- Fast and reliable deliveries thanks to modern machinery and extensive stocks

- System supplier since 1963
- Free software for project design and calculation
- All of our systems can be used on every type of roof or subsurface
- Fast installation time because essential components have been pre-mounted
- All systems available in both portrait and landscape configuration
- Various systems also available as ready-to-use kits



### VDL Bus & Coach

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#### Driven by what moves you. Move. Together.

The challenge of working together to create a healthy living environment and a clean city has never been greater. In the pursuit of future-proof, sustainable mobility for people, society and the environment, zero emissions is the new standard. We devise public transport solutions for today and tomorrow. Collaboration is in our DNA. Innovation too. Experience the impact of our electric buses when you are on your way to school, work or to visit friends. We get millions of people moving, day after day.

Beyond being just a supplier of buses, VDL Bus & Coach is a complete system supplier. In addition to supplying buses, we also take care of the charging infrastructure, manage the project and implementation, and install, monitor, repair and maintain the entire system. We give advice during the purchase process, the operational period and also in the resale phase. We regard professional training courses, advice from experts and attractive financial solutions as the norm. The same applies to the rapid, guaranteed delivery of parts.

Experience the difference at [vdlbuscoach.com](http://vdlbuscoach.com)



# WHAT CAN YOU DO?

The previous practical examples show that abundant technologies are available to meet urban challenges. In addition, the examples are intended to inspire and show that technology offers the possibility of redesigning energy use, mobility and safety in the city. But technology alone does not offer a complete solution. A thorough response to societal challenges should be supported by a clear vision, appropriate forms of cooperation and consistent follow-up of successful pilot projects. Only then can municipalities and developers build on what has emerged, together with their networks, and can actually turn their cities into smart cities.

## **A vision regarding smart cities**

A clear vision regarding the societal challenges you aim to tackle, and the resources that you have available for that, is paramount to guide future decision making. Only by developing a clear vision for the long term do cities prevent themselves from being seduced for smart products for short-term success.

The concept of smart city is interpreted differently by different people and organisations. That is why it is important for the municipality and developer to determine to what extent its city is already smart. It can then be determined what improvements are needed to develop them. This includes profiling in focus areas such as mobility, energy, safety, etc. Smart solutions are

available for all these areas, but what is the most pressing bottleneck in the city at this point in time? In short: what should your main investment goal be at this moment in time?

Another essential part of such a vision is the view of collaboration with partners in the development process towards a smart city. Ideally, cities or counties take the lead in uniting knowledge and managing specific market opportunities, but often there is a lack of specific knowledge to properly assess the possibilities of technological solutions. Pre-commercial collaboration between private and public parties is therefore essential.

## **Innovative tendering & scaling up of pilots**

When tendering projects, the introduction of new innovative technology should be appreciated instead of shunned. Instead of continuing to purchase the same solutions, it is desirable that municipalities coordinate structurally and check whether there are better, more innovative solutions out there. Pilots should only be started once agreements have been reached about upscaling application in the event of success. The knowledge gained in pilot projects and in digital innovation teams within municipalities must be made available as effectively as possible. Current practices are unfortunately not always structured, and opportunities are therefore missed.







#### **FME: Committed to a future-proof world**

FME is the Dutch employers' organisation in the technology industry. The 2,200 affiliated companies include technology start-ups, trading companies, small and medium-sized industrial enterprises as well as large industrial conglomerates.

We are convinced that technology provides answers to some of society's most pressing questions and challenges. Our mission is to help shape those answers by mobilising and connecting technology companies with one another and with society as a whole. We are committed to a future-proof world: prosperous, healthy and inclusive.

FME members employ a total of 226,000 people, have a combined turnover of € 103 billion and their exports total € 51 billion. FME members therefore account for one-sixth of all Dutch exports. FME has 30 affiliated trade associations.

More information about the commitment of FME towards improving the built environment and creating smart cities can be found at [www.fme.nl](http://www.fme.nl). You can also get in touch with us through [international@fme.nl](mailto:international@fme.nl)

#### **NLinBusiness**

'NLinBusiness supports entrepreneurs who want to grow internationally. Our vision is that by connecting Dutch entrepreneurs to strong networks, relevant information and opportunities, we increase the success rate for Dutch entrepreneurs that want to expand their business internationally. We provide this connection online, through a digital platform, as well as offline through a network of NL Business Hubs.

NLinBusiness is a joint initiative of the Confederation of Dutch Business, in collaboration with the Dutch Ministries of Foreign Affairs and Economic Affairs and works closely with several employers' organisations. It also works with industry clusters, advocacy groups, bilateral chambers of commerce, knowledge institutions and Dutch business.

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