TECHNOLOGICAL SOLUTIONS FOR A SUSTAINABLE FUTURE

Building Smart Cities

FME

POWERED
BY **DUTCH**
TECHNOLOGY

FME in figures

21 BILLION EUROS OF ADDED VALUE

2,200 MEMBER COMPANIES

45 AFFILIATED TRADE ASSOCIATIONS

220,000 EMPLOYEES

EXPORTS OF **49** BILLION EUROS

TURNOVER OF **91** BILLION EUROS

FME is the Dutch employer's organization for the technology industry. The 2,200 member companies are active in production, trade, automation and maintenance in the metal, electronics, electrical engineering and plastics sectors. FME members employ a total of 220,000 employees, generating a combined turnover of € 91 billion, an added value of more than € 21 billion and exports of € 49 billion. The FME members thus account for one sixth of the Netherlands' total revenue from exports. FME has 45 affiliated trade associations.

Smart City

In discussions on urban development, the term 'Smart City' is never far away. Due to rapid urbanization and associated issues such as congestion, pollution, lack of safety and unreliable utilities, cities worldwide need to become smarter in order to tackle the challenges they face.

FME, the association for the Dutch technological industry, defines a smart city as "a city equipped with technology that uses data, combined with operational technology, to tackle urban challenges more effectively and efficiently". In a smart city, people are at the heart of any solution. Improving their living conditions and opportunities is the primary goal of any smart city technology.

As the development of smart cities gathers pace, the first examples of real-life solutions are appearing all over the world.

FME connects today's smart city tech with tomorrow's challenges, acting as a catalyst for innovation. In this document FME identifies crucial (sub)sectors in which the Dutch technological industry can contribute towards smart city solutions with real added value.
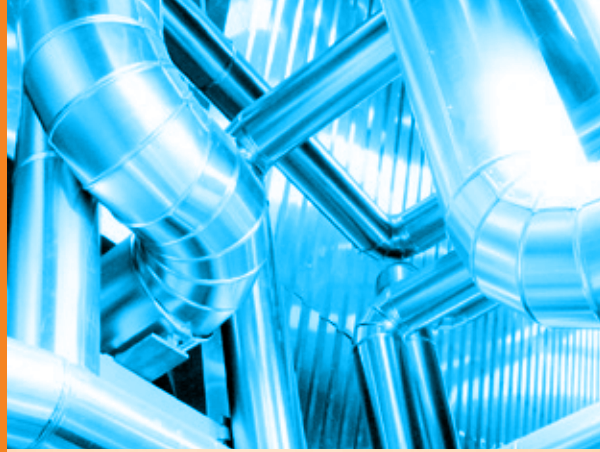
Smart Buildings and Homes

Key challenge: creating healthy and sustainable buildings for living and working

As people move into cities, more and smarter spaces are needed to accommodate them, and to make sure that citizens can live healthy and comfortable lives in their preferred surroundings for as long as possible. In a smart building, whether this is an office or a home, everything is connected and communicates with the user.

All prerequisites for comfortable living (such as CO_2 levels, temperature, lighting, air quality, etc.) are continuously monitored through sensoring, and can be adjusted by residents and users throughout the day: from the home itself, or from a distance. On cold days, inhabitants can turn on the heating when they are on their way home. During parties with many guests, CO_2 levels and temperature are monitored and ventilation and heating are automatically adjusted to keep everybody comfortable. Smart, self-regulating systems will still have to leave room for individual users to influence and adjust settings.

Energy sharing, smart care and smart doors

Smart buildings are not only energy-neutral, they even generate surplus energy which can be shared with the community. They also enable people to continue living at home as they grow older, by using technology to ensure certain health standards that can at this moment only be delivered through direct care. Other examples of smart home technology include intelligent lighting that saves energy by automatically adjusting lighting levels to the preferences and daily routines of users. Smart doors, meanwhile, will allow residents to see visitors on any device from any location, and will even enable 24/7 delivery of packages, regardsless of whether the addressee is at home.

Safety & Security

Key challenge: heighten safety and security levels of civilians throughout the city

Society is rapidly changing, which creates many opportunities but also a variety of new threats and risks, on top of several issues that cities have already been dealing with for years. In a smart city, both new and established threats can be managed using smart technology.

The key to improved safety in the smart city is the principle that 'to detect is to know'. Sensors of various kinds, cameras and microphones play an integral role in smart solutions.

Smart crowd control
Increasing both actual safety and the safety perception of the public can be achieved by using technology in a variety of ways. For example, good crowd control – in emergencies as well as day-to-day situations – can ensure that any situation in which people group together is managed in a way that benefits the public. Whether this is through programmes that predict human behaviour in certain circumstances, or smart floors that can adapt their pattern to the appropriate situation, smart crowd control solutions can significantly raise safety levels in the city of the future.

Detecting and assessing risks
Sensors can also help to detect risky behaviour in its earliest stages, so that law enforcement can react swiftly and appropriately. For example, through a combination of self-learning cameras and sound sensors, it can easily be determined whether a group of loud people in a party area are simply having fun or are in fact displaying aggressive behaviour. When behaviour is tagged as aggression, police or other guards are notified and respond while risks are still manageable. This also means fewer people are needed for patrolling events and busy locations, which in turn means more people can be deployed in areas where the need for physical patrols is greater, for example in residential areas.

Access control and identification
Recent technological developments have also resulted in smart access systems and identification methods that make cities significantly safer. Whether it is automatic ticket-control systems for large events, cameras that not only track a person's movements along the entrance area but also pick up irregularities, or facial identification systems that can be used on airports and stations – there is a large variety of smart access systems that can make us feel safe without feeling caged in.

Mobility & Infrastructure

Key challenge: getting citizens and goods from A to B within a reasonable timeframe, while reducing CO_2 emissions

As cities fill up and current mobility and transport options are strained to their limits, moving from one urban address to another becomes significantly more difficult. In order to ensure smooth transport of both people and goods, it is necessary to develop alternative modes of transportation or substantially upgrade the current systems.

Part of the solution is to reduce the pressure on the system created by non-citizen mobility (such as delivering packages, food, etc.). By using smart technology, delivery and pickup systems can be aligned with each other more easily. Other solutions focus on ways to centralise these services in smart pick-up locations where every citizen can pick up or drop off items as they please.

Data sharing

The system can additionally be relieved of some of its pressure by making sure information regarding parking, traffic jams, and other important obstructions is monitored and shared with citizens. This allows them to make more informed choices, resulting in smoother mobility flows. Apps and other platforms will complement smart technology, making solutions like car sharing and smart parking (based on real-time communication of free spaces) easier to achieve. Motorways will also be used more effectively by making them smart, ensuring a more flexible use of the transport system.

Clean mobility

In a smart city, autonomous vehicles will add to the ease and convenience of movement. The environmental pressure of mobility will be decreased by phasing out cars that use fossil fuels, and increasing the number of vehicles that run on alternative fuels such as biogas, electricity or hydrogen. This development also entails a growing need for smart energy storage and charging infrastructure.

Energy

Key challenge: finding sustainable ways of ensuring a continuous high-quality energy supply for all

In a smart city, conventional energy is no longer used and renewable energy is used more efficiently through of the use of data.

A smart energy grid combines and makes the most of various forms of energy, for example thermal and electrical. On a city level, data helps to match supply and demand of energy through continuous monitoring and prediction models.

Smart meters

Smart energy meters are installed in every building and home, and are easy to use thanks to integration with other meters. These meters do not only communicate energy usage throughout the building, but also enable the building to feed any surplus energy into the (local) grid.

Local solutions

In a smart city, energy is generated, stored and used locally as much as possible for maximum efficiency. Citizens increasingly have the opportunity to generate their own energy through a variety of sustainable methods.

Energy sharing

Additionally, peer-to-peer energy exchange, in which surplus energy is not directed back towards the grid but passed on to your neighbour, becomes increasingly common. Blockchain systems ensure the safety of these grids, giving all participants insight in the relevant data. On sunny days, energy that is generated by solar panels on rooftops and that exceeds the demand of the building itself, can safely and efficiently be used by surrounding buildings.
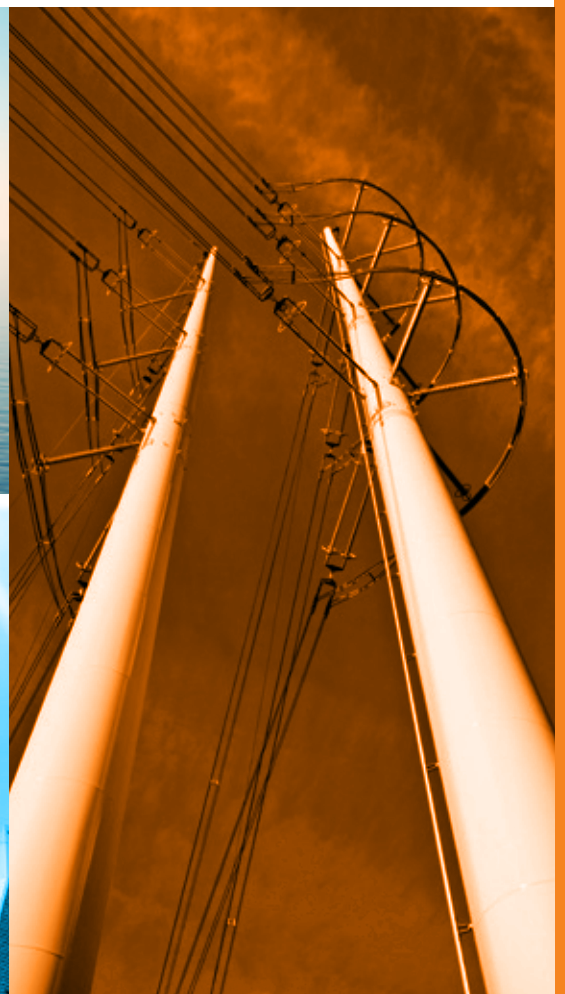
Water & Waste

Key challenge: preventing floods and water shortage, and achieving more efficient waste management in cities

In smart cities, water and waste of all kinds are managed successfully through the use of a variety of sensoring and monitoring systems.

During (heavy) rainfall, the amount of water is monitored, and excess rainwater is buffered and/or stored, so that the city's water systems will not be overloaded. When water is needed, for example for the upkeep of the city's parks and leisure areas, the stored rainwater is reused, reducing the need for fresh water.

Smart wastewater management
Wastewater flows are sensored through the city's sewage system, which means peaks can be predicted and necessary changes and maintenance can be tailored to the actual need. Additionally, valuable components in wastewater are detected, filtered, and prepared for re-use.

Efficient waste collection
Household and company waste is no longer picked up at fixed times, but only when waste containers are full, which is measured through sensoring. This makes recycling easier: waste flows are separated in valuable categories and collected efficiently, without flooding the city with trucks to pick up the contents of each individual container.

Conditions for success

A smart city can only become smart if certain basic conditions are met, both technical and societal. According to FME, the following conditions are crucial to ensure a smooth transition from a traditional to a smart city.

People first!

First of all, as the smart city primarily serves the interests of its inhabitants, it is crucial that they accept the changes involved, and that their influence and ideas are put to good use.

Cooperative solutions

Smart city solutions should be answers to societal challenges that affect the city and its citizens. In order to achieve this, companies should work together with local governments and municipalities. Even though these new forms of cooperation might result in some challenges, this is the only way a smart city can truly benefit its citizens. In order to achieve this goal, it is now time to step out of the experimentation phase, and start applying smart city tech to real-life situations.

Funding: a shared responsibility

Additionally, since significant investments are required for this transition, it is of paramount importance that the right kind of funding is available in order to execute new ideas, projects and innovations. Part of this investment is to be made by the companies involved, as they will reap the benefits of a successful project in the long run. However, cities should also be prepared to invest in their transition to a smart city. They can do this by both creating the right frameworks and context for these developments, as well as by allocating budgets to this theme. In general regulations should promote development regarding smart cities, instead of hindering it.

A smart data infrastructure

Since smart cities depend on data, that needs to be transmitted, an adequate data infrastructure is essential (fiberglass, 5G, other technologies). Additionally, rules and regulations that pertain to cybercrime and privacy should be in place, ensuring that data does not end up in the wrong hands.

FME Smart City programme for its members

When it comes to smart cities, there are already many excellent smart technologies available on the market, which can be combined intelligently to create true smart city solutions. However, in order to keep up with population growth and urbanization, it is essential to keep developing new technologies.

FME connects members, both large and small, in order to stimulate technological innovation. We serve as a platform for our members to showcase and combine existing techniques, creating the specific solutions that cities need in order to transform into smart cities. At the same time, we create collectives of and join forces with innovative companies to create tomorrow's technology in field labs and other innovation projects. We combine today's smart city tech with tomorrow's possibilities, both in the Netherlands and abroad.

Inspiration and innovation

In the Netherlands, we organize seminars and workshops on specific smart city topics and regions to help keep our members up-to-date with the latest information. Furthermore, we organize inspiration and innovation sessions and trade missions to and from smart cities and regions abroad, and we are present at the most important trade fairs and events related to this topic.

Long-term partnerships

In order to ensure long-term relationships between the Dutch technological industry and innovative smart cities, FME mobilizes relevant parties to develop multi-year collective programmes which focus on smart city themes in certain regions. FME continuously monitors the smart city playing field, and defines projects that are relevant for our members. Additionally, we aim to find successful new business models that can be applied to aid the transition from cities to smart cities.

In short, FME serves as the catalyst that brings together the technological industry to promote innovation and business in order to tackle urban challenges, both home and abroad.

FME Smart City programme for stakeholders

In order to be successful in the creation of smart cities, FME believes that cooperation between private and (semi-)public parties is essential. Therefore, we work together as much as possible with municipalities, regional and national governments, and other stakeholders that aim to turn cities into smart cities.

We believe that in this area collaboration between all involved parties is essential to achieve change and success. FME aims to be a valuable addition to the current Smart City playing field, as it combines strong roots in the private sector with the objectivity of a not-for-profit organization. We therefore actively call upon all stakeholders to work with us to achieve our common goals.

Knowledge partner
Because FME continuously fosters ties with companies in the technological industry, we have an excellent idea of the possibilities that the sector can offer. We aspire to be a knowledge partner for cities, regions and other stakeholders, in discussions and brainstorms regarding smart city developments, and we aim to connect private and public parties in innovation projects.

Connecting supply and demand
FME strives to be a reliable and independent party connecting supply and demand in the area of smart city projects, in the Netherlands as well as abroad, and aims to bring private and (semi-)public parties closer together. Additionally, we aim to work together with all parties needed to present the Netherlands as an exceptional Smart City nation abroad.

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