

Not just a Dream of the Future: Dresden on its Way to Becoming a Smart City

As part of the increasing worldwide urbanization more and more people are living in cities. In order to maintain their quality of life, cities need to be able to provide intelligent answers to important questions like how urban living can be energy efficient and sustainable. Dresden is already on track to becoming a “Smart City” where local researchers and enterprises are developing new technologies for the city of the future.

Dresden is a unique place; more than half a million people reside in the Elbe metropolis, and the city's population continues to grow with a stable upward trend. Dresden maintains its status as the city with the highest birth rates in Germany. Ten million tourists visit Dresden every year and as an important science and convention location it attracts national and international researchers and entrepreneurs year-round.

Smart Mobility: Traffic as One of the Major Challenges of the Modern City

One thing is sure, in a big city like Dresden masses of people need to be moved intelligently no matter how they travel. The Dresden Transport Authority (DVB) operates 184 trams and 163 buses that transport more than 400.000 commuters along a total of 320 miles (516 kilometers) system length. Since 2012, the city has been home to the longest bus in the world: a 98.5 foot-long (30-meters) 'auto-tram'. The technology for this hybrid drive originated in Dresden. It was designed by the Fraunhofer-Institute for Traffic and Infrastructure Systems of the Technical University Dresden.

Another prototype, the low-floor city rail vehicle, is 147.5 feet (45 meters) and also one of the world's longest trams, and significantly contributes to relieving one of Germany's largest road networks and preserving the environment. In order for cars and public transportation to operate smoothly in traffic and function efficiently especially during rush hours, the City of Dresden, the Technical University Dresden and the industry association Silicon Saxony have joined together to encourage the development of trend-setting projects. The initiative is called "Smart City Dresden – This is how we will live tomorrow." In the first part of the project, 'Smart Mobility', project leaders are researching ways to meet the challenges of the city's large traffic flow.

Traffic Management System is the Heart of Dresden's Traffic Management

In cooperation with the Technical University Dresden, the Road and Civil Construction Authority of Dresden developed the Traffic Analysis Management and Optimization System called VAMOS. VAMOS is the heart of Dresden's traffic management and delivers a comprehensive analysis of Dresden's traffic conditions. The system interconnects more than 1,000 regionally available traffic detectors as well as various traffic control and signaling systems of the city's road and motorway network. Dresden taxis function as mobile traffic congestion reporters while 'live' video cameras across the city visually inform about traffic flow. The key component of VAMOS is the Dresden Traffic Data Center located at the Technical University Dresden. The various detector points provide the information for the system to

determine current traffic conditions, calculate alternatives to optimize traffic flow and control the traffic completely and automatically.

In addition, VAMOS provides a dynamic parking information and guidance system. The main advantage of VAMOS' smart-mobility-solution is two-fold: not only does the management system ensure optimum traffic flow, but it also guarantees the energy efficient use of Dresden infrastructure. The prototype VAMOS, which has successfully been in use in the Dresden urban agglomeration area has a modular structure that makes it easy for other cities to transfer the model either partially or in its entirety into their community.

The developers of traffic technology of the future are keeping an eye on Dresden. The project "Energy Efficient Driving 2014/2" initiated by the Federal Ministry for Education and Research (BMBF), for instance, pilots in Dresden with "eMobility" as part of the program. Electro mobility (or e-Mobility) represents the concept of using electric powertrain technologies, in-vehicle information, and communication technologies and connected infrastructures to enable the electric propulsion of vehicles and fleets. Powertrain technologies include full electric vehicles and plug-in hybrids, as well as hydrogen fuel cell vehicles that convert hydrogen into electricity. e-Mobility efforts are motivated by the need to address corporate fuel efficiency and emission requirements, as well as market demands for lower operational costs. In the Dresden project, scientists are searching for ways to significantly increase the reach of electric vehicles.

Not just a Dream of the Future: 'Smart' Concepts for all Aspects of Life

At VAMOS, project partners are also addressing how the modern city can resolve the competition between individual and public transportation. In a pilot project, scientists developed a digital, web-based driving-assistant that intelligently favors public transportation at traffic lights. A permanently installed Smartphone sends information from the guidance system to the bus or tram driver and recommends the speed that will least influence individual car and bike traffic. In this way the system is able to considerably reduce overall energy consumption.

Developed in Dresden, Building Material C3 is the Future of Construction

The Technical University Dresden laid the foundation for the future of construction and 'Smart Living' with the development of the future construction material C3 (Carbon Concrete Composite). Eighty industry and research partners collaborated on the C3 project, which was sponsored by the Federal Ministry for Education and Research (BMBF). All partners agreed that without substantial innovation in the construction industry it will not be possible to lower the sector's current level of energy and resource consumption. A new material compound made from carbon and high performance concrete, C3 is an important milestone in the pursuit of this goal. The building material has a longer life span, preserves resources, saves energy and lowers the emission of carbon dioxide, and therefore provides optimum conditions for sustainable urban construction.

Heating with Computers: Computer-generated Power Plants Provide Energy and Heat

Growing cities increasingly depend on energy. How we produce, store and provide energy will massively transform the 'Smart City'. The metropolis of the future does not only feature new technologies and

products developed specifically for the needs of urban dwellers, but from time to time it is the unconventional ideas that make the difference.

Using computers for heating purposes is an idea that has successfully been realized by the Dresden enterprise Cloud & Heat Technologies GmbH. This start-up company, initially founded as AoTerra, successfully integrates hardware servers in homes. While the servers provide computing power for cloud applications and services to other companies, the heat that these active servers produce contributes to heating the home and water. The advantage of this technology is clear: the computing power and generated energy are available at a reasonable cost.

Dresden has made significant steps forward to becoming a Smart City. This development is due to the city's innovative technological landscape, its strong network structures and highly qualified specialists.