

Smart City Benchmarking visit to Copenhagen and Hamburg **27.-29.9.2017**

TRAVELOGUE

The Witty City Programme of Tekes organized a benchmarking visit to Copenhagen, Odense and Hamburg for Finnish companies, researchers and city delegates. The aim of the visit was to support networking and knowledge sharing in smart urban development.

This travelogue shortly summaries the meetings and main lessons learned.



Smart City Benchmarking visit to Copenhagen and Hamburg 27.-29.9.2017, PROGRAM

Wednesday 27.9.2017 Copenhagen	Thursday 28.9.2017 Copenhagen – Odense - Hamburg	Friday 29.9.2017 Hamburg
<p>Flight Helsinki –Copenhagen</p> <p>9.30 – 11.30 Smart city in a Danish context.</p> <p>Meeting with Ramboll & Loop City</p> <ul style="list-style-type: none"> • Welcome to Ramboll - Henrik Stener Pedersen • Denmark Smart City Strategy, Peter Norn • Smart Transport in Denmark, Søren Have • Smart Urban Design, Søren Hansen • Loop City, http://loopcity.dk/en/ Vibeke Linde-Strandby, Strategic programme manager 	<p>9.15 Meeting with Ambassador Vesa Vasara</p> <p>9.30 -10.30 City of Copenhagen - Copenhagen Solution Lab, direktør Torben Gleesborg i Teknik- og Miljøforvaltningen samt Copenhagen Solution Lab http://cphsolutionslab.dk/</p> <p>10.30 Bus to Odense Workshop in the bus:</p> <ul style="list-style-type: none"> • Organisational presentations by participants (in Finnish) • Lessons learned in Copenhagen 	<p>9.00-10.20 City of Hamburg “Digitale Stadt Hamburg” Digital Director Matthias Wieckmann</p> <p>11.00-12.00 mySMARTLife project, Management öffentlicher Raum, Christoph Lindemann</p> <ul style="list-style-type: none"> • Energy, Mobility and Digital communication
<p>13.00-14.30 House of Green, focus on energy solutions, Senior Projektleder Anette Kørschen Brænder https://houseofgreen.stateofgreen.com/</p> <p>15.00 – 16.30 Energy Lab Nordhavn http://www.energylabnordhavn.dk/ Project Manager Christoffer Greisen</p>	<p>13.00-15.00 Company visit Micro-Matic http://www.micro-matic.com/ Peter Vejlgaard, Søren Klitvang and Morten Laugesen, Micro-Matic</p> <p>Smart City presentation, City of Odense CEO of the Department of Culture, Sport and Urban Development Anne Velling, City of Odense</p> <p>15.00-19.00 Bus to Hamburg, Workshop in the bus:</p> <ul style="list-style-type: none"> • Economy, politics and making business in Germany • Energy 	<p>12.45–13.15 Presentation on electronic busses (mySMARTLife project), Nina Zeun</p> <p>13.15-14.45 Hafencity Smart Port Hamburger Hafen Marius Eschen and Dr. Phanthian Zuesongdham</p> <p>15.00-16.20 City Science Lab – Hafencity University</p> <p>16.30 Bus to the Hamburg airport Flight Hamburg – Helsinki</p>

Wednesday 27.9.2017

Smart city in a Danish context

Summary and lessons learned

The meeting at Ramboll provided the group with an overview on smart city in a Danish context. The trends are globally the same; in order to prevent climate change, e.g. new mobility solutions, autonomous vehicles and electric cars are needed. And the key to success is digitalization.

The concept of Smart City cuts across many sectors in society and therefore a need for a holistic strategic approach is vital. The interconnectivity across sectors, citizens, businesses and organizations will be secured through open data availability and ICT infrastructure. Smart City is not the goal as itself, but it is a tool to integrate and improve economic, political, social and cultural aspects and development in a city. Smart solutions should solve real problems. The challenge is to ensure open interconnectivity and collaboration which requires e.g. educational input.

The main principles for Danish urban development are sustainability and liveability. One example of this is the definition of 5 minute city: within five minutes walk, you should be able to reach basic shops, institutions, work places and cultural facilities OR you can walk to a public transport mode leading to the destination. An example is Nordhavnen, which is a 2 km² new district in Copenhagen. The area is providing Copenhagen with a new interface to the water. It is built as a carbon neutral city and a city of sustainable mobility.

Denmark is the most digitally advanced economy in EU – just followed by Finland. Since 2001, municipalities, regions and state have had joint, long-term strategies to drive the digital transition of the public sector. There is a strong dedication to smart city development within both the public and private sphere. There is political attention to the potentials of smart city and many research institutions have made smart city development a priority (e.g. DTU and Aalborg University). Despite of the lack of national strategy on smart city development, Denmark is a hub for human-centered urban design and clean technology which tap into the smart city agenda. Municipalities drive smart city development, and there are many pilot projects and smart city initiatives in Denmark. Central focus areas in those include parking, street lighting, climate adaption, mobility, as well as citizen engagement tools. For example in the field of mobility there are several pilots which aim to tackle the geographic challenges faced in the country. Cost effective, intelligent and environmental-friendly solutions will be provided by bike/car sharing system, possible autonomous ferries, information tables for cyclists, etc. The strong history of living labs will support piloting and testing in Denmark also in the future.



Ramboll <http://www.ramboll.com/>



Ramboll is a leading engineering, design and consultancy company founded in Denmark in 1945. The company employs 13,000 experts and has a strong presence in the Nordics, North America, the UK, Continental Europe, Middle East and India, supplemented by a significant representation in Asia, Australia, South America and Sub-Saharan Africa.

With almost 300 offices in 35 countries, Ramboll emphasises local experience combined with a global knowledge-base. Ramboll works across the markets: Buildings, Transport, Planning & Urban Design, Water, Environment & Health, Energy, Oil & Gas and Management Consulting.

Ramboll's approach to enabling smart choices comprises three interrelated dimensions:

1. Smart governance – cities should establish the appropriate governance and organisation that enables collaboration across city departments to ensure that city planning is strategic and holistic whilst also being realistic and thereby implementable.
2. Smart technical concepts – cities should explore and identify the smart concepts available to solve an issue. This could include district heating/cooling, energy and water synergy parks, or blue-green infrastructure, which are all areas where Ramboll has world leading expertise.
3. Smart technologies – ICT can be used to support improved sustainability. This could include technologies such as water metering that minimize the use of resources, free parking space detection systems, or 'green waves' that prioritise traffic flows for bicycles.

Loop City <http://loopcity.dk/en/>

Loop City is a collaboration between 10 municipalities, the Capital Region and the Danish State on urban and business development along the Ring 3 light rail. The collaboration partners are the Capital Region, Ministry of Transport, Danish Business Authority, and the following municipalities: Lyngby-Taarbæk, Gladsaxe, Herlev, Rødovre, Albertslund, Glostrup, Vallensbæk, Ishøj, Brøndby, Hvidovre,

The shared objectives of Loop City are to:

- create sustainable and dynamic urban and business development along the new light rail
- improve the quality of urban life and the conditions for residential and business development throughout the corridor
- become an internationally recognised example of best practice in collaborative, strategic urban management
- attract investment
- attract passengers to make use of public transport through focusing on the physical environment and station proximity

Summary and lessons learned

Loop City, a strategic collaboration between 10 municipalities, The Capital Region of Denmark and The Danish State, aims to become an internationally recognized example of best practice in collaborative, strategic urban management. Loop City focuses on the quality of urban life and the conditions for residential and business development throughout the corridor. It combines digital infrastructure with holistic approach to planning & urban development.

The collaboration is organized e.g. within largescale living labs



- DOLL Lighting Lab is the worlds' largest living lab on intelligent lighting. Both national and international actors can test their products and solutions in the lab.
<http://www.lightinglab.dk/UK/>
- Mobility Living Lab, which has two ongoing projects: 1) Real-time transport data innovations project with IBM 2) Autonomous cars in LOOP CITY testbeds

House of Green

<https://houseofgreen.stateofgreen.com/>



House of Green is an interactive showroom and visitors' center funded by the Danish Industry Foundation. House of Green uses a combination of guided storytelling and self-exploration to showcase Danish integrated solutions and scenarios across the landscape of energy, water, climate, resources and the environment.

House of Green is designed as one single space with three main areas:

1. **The visitors' center and interactive showroom** is primarily aimed at foreign delegations visiting Denmark. Danish representatives act as hosts that both inspire and inform delegations before they move on to on-site visits. The showroom guides the visitor through the landscape of green Danish solutions through a combination of storytelling and self-exploration. The showroom also houses a permanent, interactive installation that highlights the potential and possibilities nested in the green Danish business sector.
2. **The virtual universe** tells coherent and dynamic stories about Denmark and the Danish industry's green capabilities on many levels – from the Danish vision of becoming fossil free by 2050 over cross-sector stories to branch specific solutions. Furthermore, visitors are able to explore solutions based on their own interests through a combination of stories, facts, photos and videos.

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- 3. **The lounge area** and flexible meeting facilities invite collaboration, negotiation and knowledge-sharing among Danish as well as international stakeholders, organizations and companies.

Summary and lessons learned

State of Green is a public-private partnership founded by The Danish Government, The Confederation of Danish Industry, The Danish Energy Association, The Danish Agriculture & Food Council and The Danish Wind Industry Association. House of Green, in turn, is marketing and communication agency for State of Green and its' focus is to share Denmark's green know-how via tours, events, website etc. The stateofgreen.com website provides further information on 1400 Danish green solutions.

The history of green Denmark lies in the oil crisis 1973-1974; Denmark was dependent on imported energy, and the pollution caused by fossil fuels was largely recognized. The need for more environmental policy raised and ever since renewable energy and energy efficiency have been the cornerstones of the Danish energy framework.

In 2015, 49% of Denmark's energy production came from crude oil and 23% from renewable energy. E.g. 67% of total production of electricity came from renewable energy sources. Over the next 10 years, the share of electricity production from renewables is expected to increase to around 82%.

The main components in Denmark's renewable energy production are wind and woody biomass (33% vs. 30% of the national production). In addition the country imports renewable energy, of which 64.5% is wood pellets.

When considering the energy consumption, 39% of the consumption was oil related in 2015 when the portion of renewable energy was 29%. With a significant increase in solid biomass, biogas as well as biofuels, bioenergy will continue to make up the majority of total Danish renewable energy consumption in 2020. What it comes to wind energy, 50% of Danish electricity consumption will be supplied by wind energy by 2020. There are many offshore projects in wind energy pipeline before the end of 2021, and the power exchange NordPool ensures flexibility in grid connections. Danish security of supply is very high. Despite few windless day per year, electricity is available more than 99.99% of the time.

The significance of Green Business is remarkable in Denmark. It has been estimated that it has a turnover of 23,3 billion euros as well as the volume of 9,6 billion euros in 2014. With 2.8 % of the total employment in Danish companies, the Green business really is good business.

But the ambitious journey will continue. Denmark wants to be fossil fuel independent society by 2050. In addition the target is to have 100% renewable energy in the energy and transport sector. Currently Denmark is identifying further ways to meet international climate obligations in cost effective way as well as developing national markets with the actions based on Danish Energy Agreement 2012: e.g. energy saving obligations, national strategy for retrofitting and investment subsidy schemes (for promoting energy efficient use of renewable energy in industrial production processes).



EnergyLab Nordhavn

<http://www.energylabnordhavn.dk/>

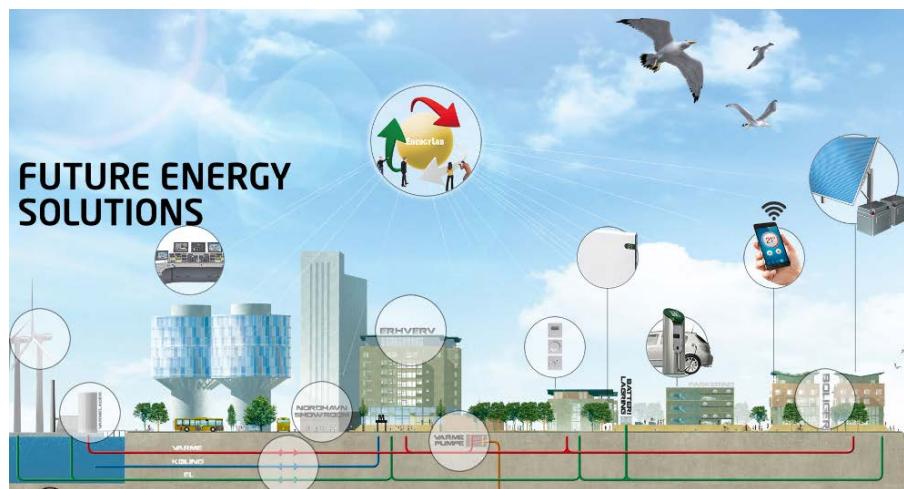
The project EnergyLab Nordhavn – New Urban Energy Infrastructures develops and demonstrates future energy solutions. The project utilizes Copenhagen's Nordhavn as a full-scale smart city energy lab and demonstrates how electricity and heating, energy-efficient buildings and electric transport can be integrated into an intelligent, flexible and optimized energy system.

The project integrates research, development and demonstration and is a large-scale project that contributes to the grand challenge of transforming the energy system to efficiently integrate a large share of renewable energy, a means to support international and national climate goals.

The project focuses on the cost-effective future smart energy system that integrates multiple energy infrastructures (electricity, thermal, transportation) and provides an intelligent control of subsystems and components – providing necessary energy flexibility for efficient utilization of renewable energy.

The project has a total budget of DKK 143 mio. (€ 19 mio.), of this DKK84 mio. (€ 11 mio.) funded in two rounds by the Danish Energy Technology Development and Demonstration Programme (EUDP).

The project participants are: DTU, City of Copenhagen, CPH City & Port Development, HOFOR, Radius, ABB, Danfoss, Balslev, CleanCharge, Glen Dimplex, METRO THERM and the PowerLabDK facilities. The project is supported by EUDP (Energy Technology Development and Demonstration Programme).



Summary and lessons learned

Over the next 50 years, Nordhavn will develop into a new district with 40 000 residents and 40 000 jobs. The general target is to become an example of a future sustainable city, supporting Copenhagen's 2025 carbon-neutrality goal. This requires integrated energy infrastructures and other smart components.

The district development will be done within six themes: identity and history, islets and canals, Co2 friendly city, five-minute city, blue and green city, and intelligent grid.

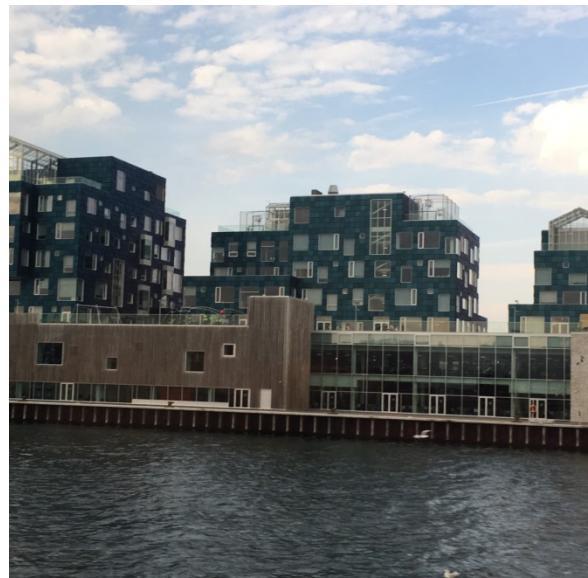
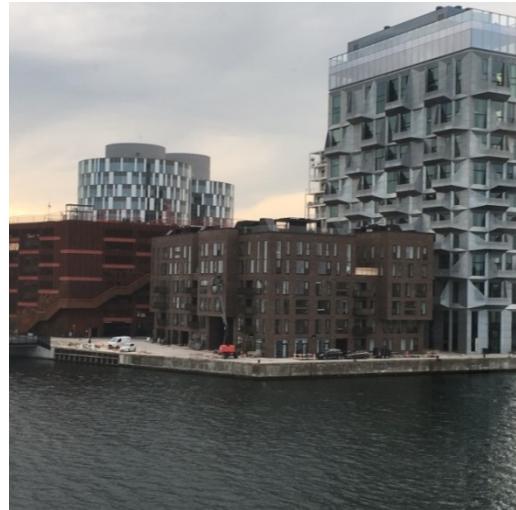
EnergyLab Nordhavn brings together stakeholders from various sectors such as energy infrastructure, authorities, industries and knowledge institutions. The project interlinks development and research activities related to key challenges of future smart energy systems:

1. DEVELOPMENT OF A COHERENT FLEXIBLE ENERGY SYSTEM with novel technical solutions like energy storage by variable district heating temperatures, buildings providing flexibility and more integrated markets where infrastructures are closely interconnected and operationally co-optimized.
2. RE-THINKING ENERGY INFRASTRUCTURE DESIGN AND DIMENSIONING METHODS to accommodate e.g. new low heat demanding buildings, new dynamic patterns from responsive prosumers and technologies to shift between use of electricity and district heating.
3. DEVELOPMENT OF ENERGY TECHNOLOGIES providing grid services by smart cost-effective controllers and associated new business models and user interactions.

The EnergyLab Nordhavn project includes e.g. following experimental activities

- Technology for adaptive use of low temperature district heating and electricity
- Grid services by electric water heaters in private homes
- Controller for optimal operation of large heat pump
- Smart charging EV infrastructure
- Electric battery storage in the power grid
- Low-temperature district heating supply solutions
- Islanding heating system supply
- Ultralow temperature substations installed in multifamily or commercial buildings
- Flats equipped with remote controlled thermostats
- Supermarket heat recovery system

Copenhagen International School (the picture on the right) is one of the buildings included in experimental activities in Nordhavn. The outdoor walls are mainly solar panels, and real-time data about electricity, lightning, energy and indoor climate is collected and analyzed to be further utilized in modeling & forecasting.



Thursday 28.9.2017

City of Copenhagen - Copenhagen Solution Lab

<http://cphsolutionslab.dk/>

Copenhagen Solutions Lab is the City of Copenhagen's incubator for smart city initiatives. Lab is working cross-departmental with the City's administration and in partnership with local and international companies and knowledge institutions to create and test new ideas, technologies and solutions to real urban challenges, and create new ways to relate to urban planning and the built environment.

The Copenhagen Solutions Lab is having focus on creating triple helix partnerships. Copenhagen Solutions Lab will lead the implementation of innovation and smart city development in close collaboration with knowledge institutions and companies as well as citizens.

New ITS solutions, reduced carbon emissions, implementation of sensors that create real time data and information on current situations in the city and the build up and architecture of a new 'Big Data Digital Infrastructure Platform' that shares data across public and private sectors will all be working focus points within the Lab.



Summary and lessons learned

City of Copenhagen has three types of goals. The city wants to be responsible (=Co2 neutral in 2015, climate proof, no waste of resources), liveable (= the worlds' best city for cyclists, better everyday life, more nature in the city) as well as the city with an edge (= flexibility and creativity, and unique and cohesive neighborhoods). Copenhagen wants to be suitable and green city and it is a model example of co-creation and participation of citizens to collaborate.

In order to reach the goals settled, the city needs actors and projects for further development. The city needs to be more open to do projects and to provide citizens with possibilities to participate. The national borders are not the limit, City of Copenhagen warmly welcomes also Finnish actors to present their solutions and to test their solutions in the city. For example in city level, Copenhagen is collaboration within Select for Cities project (<http://www.select4cities.eu/>) with Forum Virium Helsinki.





The main themes and ongoing projects relate to e.g. intelligent transport systems and lightning. 60% of citizens go to work by bike, and the amount of bikes has recently exceeded the amount of cars in Copenhagen. Intelligent Transport System integrates busses, cyclist, pedestrians and cars. It shortens travel time for busses and cyclists as well as maintains travel times with better regularity and fewer stops for cars. Variable Message Signs guides cyclists to avoid traffic jams and informs the estimate time from point A to B. Environmental issues are in focus in replacing street lights with LED solutions and tiny boxes around the city are measuring the level of air pollution. Sensors are also helping car drivers to find free parking

slots and free wi-fi is in pilot phase. In September 2018, Copenhagen will host 25th ITS Congress, where the focus is on how ITS can contribute to livability, greener environment and lower congestion and thereby contribute to a higher quality of life to citizens. <http://itsworldcongress.com/>

Micro-Matic

<http://www.micro-matic.com/>

The Micro Matic Group comprises a global network of companies all focusing on supplying high quality draft dispense equipment and services.

Worldwide the company is a market leader in the supply of spears and dispense heads to the brewing industry. The company has changed the rules on the liquid transfer of commodity chemicals with the introduction of the EPV system, a closed system disposable plastic valve.

Over the years Micro Matic has been awarded several times for its commitment in thinking, designing and acting environmentally correctly, being in production or product innovation.

Micro Matic Industrial has benefited from its success in the brewing industry by using its know-how and expertise to develop valve systems for environmental protection in the chemical industry.

- Privately owned Danish group
- Headquarter in Odense
- Company founded in 1953
- Represented worldwide
- Turnover more than € 182 Million
- 745 employees



City of Odense

<https://english.odense.dk/>

With a history dating back more than 1,000 years of history, Odense is one of the oldest cities in Denmark. legacy dating from the Vikings, all the way into today's transformation to a modern Danish city with a hub for robot technology and innovation, connects Odense with the outside world.

With 200,000 inhabitants, Odense is Denmark's third largest city. The open, modern city of Odense is home to more than 180 higher education programmes, a university hospital and several strong clusters in the fields of robotics, drones, welfare technology and IT.

Odense has a strong strategic focus on development and growth in a wide range of policies and strategies focusing on business development, urban development and experience development.

The aims of City's Smart City strategy are e.g.

- Strengthen collaboration with research and industry on developing new services through a community partnership
- Set existing and new data available for business and product development in private companies and start-ups
- Make the city a laboratory for testing applications for improved mobility, energy and environment
- Promote Odense as a city that focuses on digital benefits for citizens and businesses.



Two examples of digital solutions in Odense

○ SMART WAYFINDING AND PARKING

It should be easy to find the way and parking slot in the city. By utilizing available data, motorists and cyclists can go through the website and provide their assistance to route planning (what is the easiest way to get to a destination). When you arrive at your destination, you meet in the city center 65 intelligent parking signs that inform the drivers about available parking slots. The website and the application helps with parking, price information and payment period. With Smart Wayfinding solution strengthens the city's cultural and commercial life.

○ BIKE CHECKPOINT

The good habits are shaped in the young years. Therefore, Cycle checkpoints are conducted at schools in Odense, where schoolchildren are fitted with electronic chips on their bicycles, which automatically detects the school's activity level. School students and their parents can continuously follow the efforts on the Internet and through competitions they are motivated towards more physical activity.



Summary and lessons learned

In the spring 2015 the Smart City Strategy was adopted by the City Council of Odense. The systematic approach was then concretized by four Living Labs which has started to take shape after establishment in 2016.

In Odense, Smart City is a tool. In addition, it is all about data. Smart City is about new technologies that provide new data for boosting co-operation and communication with citizens. In addition it is about new ways to utilize better existing data.

City of Odense has taken a problem solving approach to smart city. The key players are the university and other knowledge institutions (e.g. the University of Southern Denmark). The city has been given to researchers and students as their laboratory in order to meet the challenges and explore the opportunities from new technologies in smart city management and development. The goal is to develop a more digital mindset within the municipality.

Concrete steps are taking within the living labs:

1. Living Lab Citizen's House: Optimizing building maintenance and enhancing flexible use of the building as well as extending learning to other municipal buildings afterwards - schools, sports arenas etc.
2. Living Lab Climate: Coordinating data across technical fields, integrating climate data better in planning phase, test of new technologies and utilizing modelling e.g. in flood risk management plans
3. Living Lab People: Getting to know the patterns of movement in the city center, testing different types of technology – cameras, Raspberry Pis, wearable sensors etc. Making data visual, accessible, transparent and "useful", as well as making data a tool for dialogue and co-creation
4. Living Lab Traffic: Aggregating data sources and real time data for communication with the citizens, internal planning, optimizing routes etc.



Friday 29.9.2017

Smart City Hamburg

<http://hamburgsmartcity.com/>

Hamburg, one of Europe's most livable and economically cities, is growing like most metropolitan areas around the world. This growth is challenging, because political, ecological and geographical task are bundled into the assignment to using existing space in a new way alongside ensuring sustainability, quality of life and economic growth.

This is way Hamburg turns its Smart City approach into reality by establishing smart technologies and implementing numerous interdisciplinary pilot projects. These tangible steps in the fields of energy, mobility, logistics, governance, society and science positively impact not just the city's innovative and sustainable development but social process as well.

The city of Hamburg is determined to approach digitalization as an opportunity and to tap its potentials for providing greater economic power and quality of life for Hamburg's citizens.



Summary and lessons learned

Digital City Strategy of Hamburg was approved by the Senate in January 2015. The key actors in the strategy and its implementation are State Secretary Council, Digital City Co-Ordination Office, HafenCity University/MIT: CityScience Lab and CDO. The strategy brings together all relevant stakeholders: administration, public companies, authorities, companies, universities and citizens.

In order to improve quality of life and economic attractiveness of the city, the strategy will support digitalization and innovations in the domains of mobility, energy, culture, living, education, economy and administration. The actions taken are built on networking and citizen participation. No silos between the domains will be needed.

In the strategy on Intelligent Transport Systems of Hamburg the focus is e.g. on traffic control, intelligent infrastructure, intelligent parking, services & payment, intelligent vehicles and mobility as a service. There are several ongoing projects where online parking detection, information on real-time traffic data, public ride-sharing services and traffic light forecast are tested. There is the mobile application which collects the data which public transportation systems you have used and for how long, and the app will charge you accordingly at the end of the day. Compared to Copenhagen, the amount of bicycles is modest, 12 % of the traffic is bike traffic, but its role is getting stronger. E.g. sharing system for bikes is adopted very well and the city will improve the infrastructure for this eco-friendly type of transport in the near future.

One of the key principles in the city of Hamburg is open data. In 2017, Hamburg was ranked No. 1 as Germany's most transparent state. Already in 2012, Hamburg committed the Transparency Act - the act that work for public information to be available for all. The city proactively enhances the use of old data for new purposes as well as integrates entirely new solutions to existing systems. One of the data source available is the geodata of Hamburg, which is further utilized in providing official maps and the 3D city model. Naturally all data is not yet available to use, due to e.g. data protection, but still it is time to change the mindset towards the situation where public administration is acting proactively to post information.

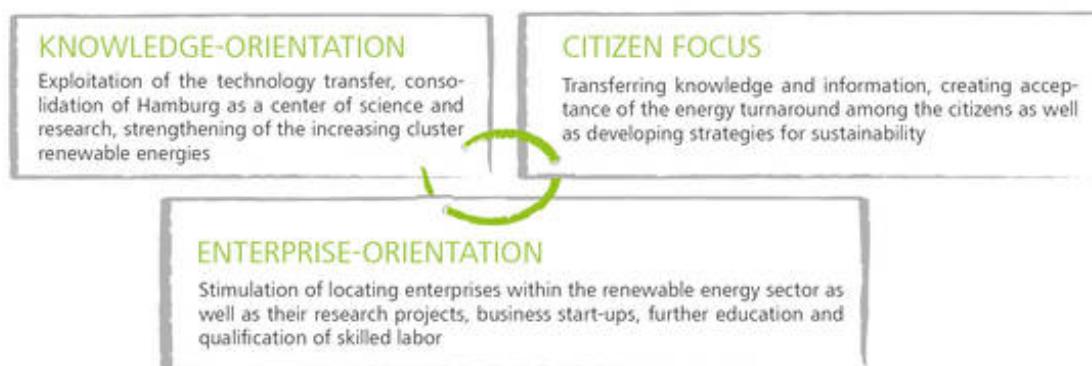


One further example of open approach in the city is Hamburg Open Online University. This co-operation between all state universities in Hamburg and university hospital has been started in 2014 and currently the project offers open educational resources and platform for everyone interested to learn more. (www.houu.de)

Energie Campus Bergedorf

<https://www.haw-hamburg.de/english/research/energy-sustainability/cc4e/energy-campus.html>

The objective of the Energy-Campus is to network between companies, universities and institutions in order to develop application-orientated solutions and innovations for renewable energy that will cause high benefit for people in general. The Energy-Campus concentrates three core areas:



The activity in the laboratories is aimed at acquiring research findings and expanding knowledge. In addition, understanding of specific matters related to wind energy generation, wind farm operation and grid integration as well as storage is to be enhanced. SMEs in particular benefit from the research and development capacities of the Energy-Campus. This raises their ability to react to the challenges of the energy transition and to assert themselves in the more intense international competition.

mySMARTLife

<https://www.mysmartlife.eu/mysmartlife/>

mySMARTLife is a project funded under the European Union's Horizon 2020 research and innovation programme. Under the coordination of CARTIF Technology Centre, 28 partners from 7 countries are collaborating to make sustainable cities with smart people and a smart economy a reality. Activities will take place in the three demonstration cities Nantes, Hamburg and Helsinki. The four follower cities Bydgoszcz, Varna, Rijeka and Palencia will learn from these experiences.

The mySMARTLife Objectives:

- Transforming current cities into more sustainable places where smart people and smart economy become reality.
- Making cities more environmentally friendly by reducing CO2 emissions and increasing the use of renewable energy sources.
- Making cities more inclusive and allowing a high quality of life.
- Involving citizens in the development of an integrated urban transformation strategy, which is easily transferable to other cities.
- Increasing the digitalization of the cities thanks to the urban platforms.
- Implementing more than 150 actions in the three lighthouse cities of Nantes, Hamburg and Helsinki.
- Passing on experiences to the four follower cities (Bydgoszcz, Varna, Rijeka and Palencia) as well as inviting other European cities to join the mySMARTLife cities network to share their experience.



NANTES | HAMBURG | HELSINKI

mySMARTLife Interventions News Events Network Publications



Further information on
mySMARTLife in Helsinki will
be found in Finnish at:

<https://www.tekes.fi/nyt/uutiset-2017/mysmartlife-hankeella-kohti-energiatehokasta-tulevaisuutta/>

HafenCity

<http://www.hafencity.com/en/home.html>

Hamburg's newest city quarter is already Europe's biggest urban development project and still growing. Pilot projects aim to reduce and optimize traffic and create intelligent solutions for real estate management. Visitors and inhabitants will soon enjoy an integrated solution for mobility, including almost seamless transitions between car/e-cars and bike/e-bikes.

On an area of 157 ha a lively city with a maritime air is taking shape, bringing together workplace and residential uses, culture and leisure, tourism and retail facilities in a fine-grained "new downtown" on the waterfront.

HafenCity is being developed from west to east and from north to south – 64 projects are completed and another 69 under construction or in the planning stage; deals through sale of land or exclusive options have been closed on around 1.7 million sqm GFA. In the meantime, HafenCity has established its popularity as a place to live and work. Nowadays more than 1,800 residential units are completed approx. 12,000 people work in HafenCity as a whole, employed by more than 730 companies.



Port of Hamburg

<https://www.hafen-hamburg.de/>

Around 9,000 ship calls per year, almost 300 berths and a total of 43 kilometers of quay for seagoing vessels, more than 2,300 freight trains per week, four state-of-the-art container terminals, three cruise terminals and around 50 facilities specialized in handling roro and breakbulk and all kinds of bulk cargoes, along with about 7,300 logistics companies within the city limits – these are just a few of the factors making the Port of Hamburg to one of the world's most flexible, high-performance universal ports. 138.2 million tons of cargo crossed the quay walls of Germany's largest seaport in 2016. That included around 8.9 million standard containers (TEU). Hamburg is accordingly the third largest container port in Europe and in the 17th place on the list of the world's largest container ports.

SmartPORT Hamburg

The smartPORT Hamburg will facilitate the increasingly efficient use of the port area. It will produce advantages for the port operations and the environment.

One constant task is to optimize traffic management, safety, infrastructure and environmental conditions in the port. The Smart Infrastructure for Ports (SI4P) projects aim to improve traffic management, reduce traffic related delays and loss of revenue.



Summary and lessons learned

Smart Port Hamburg by Hamburg Port Authority (HPA) is an initiative aiming to tackle the challenge of how to use harbor infrastructure more optimally. Port of Hamburg is located in the city center and the city and its functions need to be noticed e.g. in the aspects of possible pollution. Smart Port Hamburg is utilizing and implementing digital solutions, e.g. virtual reality, in the harbor environment in order to strengthen communication, logistics and energy efficiency in the area.

One of the first solutions created was Port Monitor service. Due to the increasing cargo volumes and growing levels of traffic, the efficiency of the port is crucial. HPA is developing intelligent solutions to increase the flows of traffic and goods. Optimizing flows of information for efficient handling of goods, will also have a long term effect on reduction of emissions and air pollutants. Since 2014, the Port Monitor software has retrieved information from various measuring and communication systems used in the port. Monitor software gathers data on vessel positions, water levels, mooring, bridge heights and widths etc., and provides an overview of the current traffic situation. Traffic information systems, fully automatic container terminal, route management and flood protection gates are just a few examples on the solutions in the port.

In addition HPA has introduced a cloud-based information and communication system (SPL), which has several applications, e.g. on calculating the estimated time of arrival, route planning and navigation and finding free parking slot.



What it comes to energy, HPA has e.g. installed an underground energy storage system (ice banks) with the heat pump in the Vessel Traffic Service Center. The heat pump can be used to store the waste heat in the form of ice, which, in turn, can be used for cooling in summer. This energy storage system causes a clear reduction of CO2 usage.

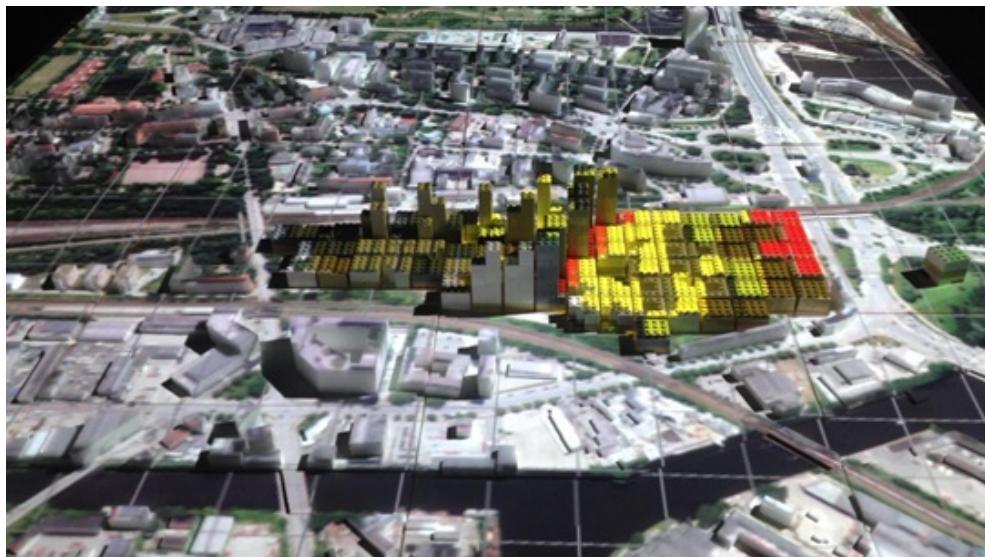
City Science Lab, HafenCity University

<https://www.hcu-hamburg.de/research/citysciencelab/>

CityScienceLab was established in the summer of 2015 at the HafenCity University. The lab is in collaboration with MIT as a research unit for the study of cities in the digital era. The CityScienceLab works with stakeholders from business, politics, civil society and the academy, in order not only to explore changes of cities, but also to constructively assist in their development. Specifically, the lab studies and scientifically analyzes urban processes in Hamburg. The city models are developed in order to discuss complex issues with professionals and non-professional alike, with the goal of clear representation of significant urban question.

The CityScienceLab ...

1. explores the interaction of the urban and digitalization; examining digital innovations and their impact on society
2. models and visualizes urban future scenarios; developing participatory processes and providing data competence
3. considers data as a public good; asking about the societal added value of digital technologies, and working in a user-oriented manner
4. works in a trans- and interdisciplinary way; taking up different scientific perspectives and pursuing a transformative claim
5. initiates dialogues between science, politics, civil society and business; discussing current urban challenges with experts and citizens



Summary and lessons learned

The CityScienceLab conducts projects on the level of fundamental as well as applied research. Projects range from third party-funded studies up to large-scale research and innovation initiatives. The CityScienceLab has following key competencies:

- Diagnostic of urban development processes with interactive city models (CityScopes)
- Design of Urban cyberphysical systems and data platforms
- Visualisation of complex urban information to support decision making in planning and design
- Quantitative and qualitative surveys, relational data banking and data analysis
- Design, facilitation and validation of participatory processes in urban development

The main tool for urban development is CityScope Technology originally developed by MIT Media Lab. City Scopes are digital city models which enable the interactive visualization of urban pattern and development scenarios. They consist of model tables and data blocs onto which information is projected in order to represent complex city data in a simple manner. Moreover, the technology enables the real-time 'what-if' scenarios. The tool is especially effective in group discussions and workshops with professional experts and non-professional citizens. The technology allows visualization of complex urban processes and interdependences where the impact of specific interventions can be assessed immediately.

The CityScope Workstation has six component 1) interactive data blocs, 2) modelling table, 3) table scanner, 4) control screen, 5) table projector and 6) data screen.

One of the projects in which CityScopes technology has been implemented is FindingPlaces. In the workshops organized in 2015-2016, citizens of Hamburg search on this interactive city model tool for public areas suitable for the erection of refugee accommodation. The mission was to find areas enabling the accommodation of 20 000 refugees in total.

In addition to concrete suggestions, the project FindingPlaces also facilitated the dialog between the citizens and the representatives of the city concerning the accommodation need. Of the areas proposed, the city evaluated 44 to be suitable. In the workshops, almost 400 citizens proposed 161 areas. The use of this interactive city model conveyed an impression of how the participation of the public in the city plans can be improved by digitalization.

