Learning from each other

in the

EU H2020 SMART CITIES AND COMMUNITIES Program

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Four major cities in northern, southern, eastern and western Germany have gained an extensive experience lead as Smart City lighthouse cities within the framework of the EU H2020 SCC1 program. Since 2015, they have been working on complex interdisciplinary Smart City projects to meet the global challenges of our growing cities.

Below they share first insights from the Smart City projects GrowSmarter (Cologne), Smarter Together (Munich), mySMARTLife (Hamburg) and MAtchUP (Dresden).

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40 Lighthouse Cities and 52 Follower Cities

The 40 European lighthouse cities and 53 follower cities, which are supported under the EU H2020 SCC1 program since 2015, are sharing their mutual experiences in technological and social innovation, comparing approaches and solutions and checking their transferability. Themes concerning the integrated management, governance and legislation, but also tendering, financing and municipal cost-benefit models in the areas of energy, mobility and integrated infrastructures are increasingly gaining importance in their smart city transformation. This results in jointly developed tools for smart city transformation such as the "Smart City Guidance Package"[1].

In Focus: Energy, Mobility, Integrated Infrastructure

Smart City Guidance Package

Successful Smart City approaches

Dialogue at federal level

At national level, the four German lighthouse cities are in close contact with each other. With the intention of scaling up successful Smart City approaches in the long term, there is a common aspiration to transfer learnings to other German cities and municipalities. It is equally important to engage in constructive dialogue at the federal level and, considering the range of combined project experience, to point out challenges and potential improvements for German municipalities to policy makers at the state and federal levels.

Challenges for German municipalities

Transfer of practical and future-oriented skills

Future-oriented competencies

In the planning and implementation of the Smart City projects, the four cities have acquired future-oriented skills and competencies for the Smart Municipality:

Overarching project groups

- Working in decentralised and cross-departmental project groups to develop integrated solutions

Integrated Urban Development Planning

- Integrating Smart City solutions in the urban and spatial development planning, e.g. masterplans for urban mobility, settlement management software, integrated project planning and implementation in urban renewal areas, including urban development funding, etc.

Digital Technologies

- Implementing digital technologies and understanding the impacts of their use

Legal Bases

- Understanding the necessary legal conditions and standards on the use of data and the protection of personal data for municipal administrations, municipal enterprises and municipal subsidiaries

Urban data platforms

- Developing urban data platforms with user-oriented access regulations and correspondingly designed evaluation procedures

Digital Twin

- Designing realistic digital images of the city ("digital twin").

[1] https://eu-smartcities.eu/events/smart-city-guidance-package-way-forward

Digitisation is an essential public service provided by the local authority

Secure digital infrastructure

The current municipal mandate is to create a secure public digital infrastructure in addition to the planning and management of physical infrastructures and municipal citizen care. In the future, cities will have to assume responsibility for digital urban spaces and workspaces too. A variety of questions need to be addressed: What is included in the mandate and who assumes which responsibility in the digital world? Do we need our own data center in order to meet the requirements of a digital infrastructure? Urban politics and administration face the challenge of creating a content orientation framework for the digital environment, as well as clear process structures for the use of data by urban actors.

Own data center?

Potentials in Germany can only be jointly realised between municipalities, the federal government and the federal states

Optimising the basics

Cooperation with the Federal Government and the States

Mandatory framework

To secure the foundations upon which to build smart communities in the long term, we specifically seek cooperation with the federal and state governments. It is of crucial importance for the cooperation between cities that binding framework conditions, such as legal bases for the use of new technologies, are discussed and implemented at the federal level. This helps to counteract negative developments in a digitised urban society. The numerous experiences demonstrate that many framework conditions for smart cities cannot be prepared and influenced only at municipal level. Therefore, to support and expand the exchange of applied learnings between cities, we suggest invest in long-term, targeted cooperation with the established German lighthouse cities.

Long-term collaboration

New cooperations between cities, state, federal government and EU can complement existing forms of collaboration in a relevant and pragmatic way

Targeted Exchange

The aim is to achieve a targeted exchange between local, state and federal politics. This can take place e.g. through:

Smart City Dialogue platform

- Active participation of the German lighthouse cities in the ongoing Smart City dialogue platform of the federal government

Visits

- On-site visits to the cities

Best Practices

- Sharing best practice and providing open source solutions.

Topics for future-oriented cooperation are primarily in the area of data governance and the promotion of innovation

- Due to the rapid technological development and the general networking through digitalization, the development of urban data platforms and other technical solutions in the digital environment cannot happen in an isolated way as stand-alone solutions in individual cities. It will be of central importance to strengthen the further cooperation between German cities. Hamburg and Munich, for example, have developed and implemented joint approaches for geo-information systems. Hamburg, Munich and Cologne are involved in the standardisation of traffic systems and are coordinating their preparations for the introduction of cooperative systems.

Urban Data Platforms

- An important concern of the Smart City lighthouse cities is to treat digitization as a new field of municipal public services. In many areas, however, this still requires the creation of common organisational and technical foundations, as well as demand-oriented allocation of roles and responsibilities (in financing, organisation and implementation) within both the municipalities and their subsidiaries and vis-à-vis the federal and state governments.

Digitisation as a field of services of general interest

- In the area of municipal data platforms and their networking common prerequisites must be defined and developed. These include the consistent standards for "urban platforms" as well as for jointly used interfaces and data formats, the use of city-wide highest security standards for the handling of sensitive Smart City data and, last but not least, the jointly designed and thus smooth exchange of data within cities and across city boundaries.

Standardisation

- The conditions under which urban data can be used are to be defined. The principle of transparency in the sense of Open Data for administrative data should also be taken into account. This can give impetus to the promotion of the IT community and value-added processes of innovative start-ups. The public thus becomes aware of the fundamentally responsible handling of data through the municipality.

Terms of use

- In order to promote innovation, it is highly recommended that real laboratories/experimental areas with simplified rules for action are allowed in and around the city. Here, in close cooperation and coordination between citizens, city administration, industry and start-ups, prototypes can be developed on site and jointly tested under real conditions.

Experimental spaces

Conclusion

The dialogue with experienced lighthouse cities offers an outstanding opportunity to disseminate solid knowledge on how to achieve climate protection goals and shape digital change locally. Intermunicipal cooperation at the national level is an important key to establishing tried and tested solutions more quickly in other locations and to effectively collaborating with business and science on future-oriented solutions to the pressing challenges of our times.

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GrowSmarter

Lighthouse Cities:	*Cologne, Stockholm, Barcelona*
Follower Cities:	*Graz (Austria), Porto (Portugal), Suceava (Romania), Cork (Ireland), Valletta (Malta)*
Project period:	*January 2015 to December 2019*
EU funding:	*25 Mio. Euros (of which for Cologne: 7,3 Mio. Euros)*
Website:	*http://www.grow-smarter.eu/home/*

The aim of the "GrowSmarter" project is to reduce energy consumption, improve air quality, especially in urban areas, and contribute to sustainable mobility. In total, the consortium of 32 industrial partners is working on intelligent solutions for the future of our cities. In the course of the project, the City of Cologne is testing measures in the areas of mobility, energy and information and communication technologies and has selected the district of Mülheim, in particular the Stegerwaldsiedlung, for the pilot project of sustainable urban development. The neighborhood was built in the 1950s. Today it covers an area of approx. 31.3 hectares with 1,395 apartments. Within the framework of "GrowSmarter", 16 buildings (689 residential units) were energetically modernized and serve as a blueprint for future sustainable urban and neighbourhood developments in the existing stock. Citizens were involved in the project through various measures.

Concrete actions in the field of energy and infrastructure

- Implementation of holistic energetic renovations in existing buildings with innovative measures such as energy recovery in lifts and conversion to LED lighting.
- Increase of the regenerative share of the power supply via PV
- Storage of excess electricity in batteries
- Use of air-conditioned heat pumps in combination with district heating from the district heating network to cover peak loads
- Optimization and control of the overall system by the so-called “Siedlungsmanagement” = neighborhood management system (energy management software, virtual power plant)

Concrete actions in the field of Mobility

- Installation of mobility stations at neuralgic points of public transport with station-based car sharing with conventional e-vehicles, e-charging points, car park reservation, rental bikes and pedelecs
- Development of an app as an integrated platform to connect Car-Sharing and public transport (developed from GrowSmarter)
- Further development of the public transport subscription chip ticket (VRS-eticket) into a "Multiticket": Integration of station-based Car-Sharing and Bike-Sharing into the "Multiticket". This makes it possible to open Car-Sharing vehicles, use rental bikes, buses and trains, all on one ticket. Development of a standardized 10% environmental discount on all Car-Sharing tariffs.
- Roll-out: city-wide expansion of the mobility stations as part of a comprehensive mobility concept

Concrete actions in the field of ICT

- Intelligent linking of different project activities through the exchange of data, in particular in the areas of mobility and energy.
- Configuration of an open urban Big Data platform capable of storing and processing urban data in real time.
- Establishment of an "urban cockpit", which should enable users to access traffic data, for example (goal: to optimally control energy and traffic flows and, for example, to control user behaviour in an environmentally friendly way via information on traffic disruptions, transport connections and means of transport).

Smarter Together

Lighthouse Cities:	*Munich, Viena, Lyon*
Follower Cities:	*Santiago de Compostela (Spain), Sofia (Bulgaria), Venice (Italy)*
Observer Cities:	*Kiev, Yokohama*
Project period:	*February 2016 to January 2021*
EU funding:	*25 Mio. Euro (of which for Munich: 6,85 Mio. Euro)*
Website:	*www.smarter-together.eu*

"Smarter Together - smarter together" focuses on people's quality of life and tests new technologies and sustainable solutions for sustainable urban development, mobility and climate protection. Particular attention is paid to smart forms of active citizen participation and the development of innovative, creative offerings in the city districts. The Munich project area is the district Neuaubing-Westkreuz/Freiham. The smart city solutions are to be implemented here and then transferred to other districts. As part of the project, the City of Munich is cooperating with eleven partners from science and industry. EU funding is aimed at innovation: testing is expressly desired. That's why an entire quarter is becoming a laboratory for the city of tomorrow. The proposed packages of measures are based on an economy of sharing, the joint use of services and goods, the recycling of resources and energy savings, innovative business models, the user-friendliness of services and the targeted, socially compatible use of modern technology.

Concrete actions in the field of energy and infrastructure

Energy-efficient refurbishment:

- Intensive technical, legal and financial advice and accompanying moderation of renovation processes for condominium owners' associations
- Development of new support mechanisms and tools for the refurbishment of COA; development of tools for the sensitisation and presentation of personal energy-relevant behaviour.
- Implementation of energetic refurbishment in the MFH - residential building stock on KfW EH 100 Standard
- Integration of regenerative energy supply systems (PV)
- Connection to geothermal-based district heating network
- Integration of EMS (Energy Management System in Buildings)
- Development of a user-oriented guideline for condominium owners' associations (owners, administrators) for the implementation of individual energetic measures up to extensive renovations.

Energy-efficient districts:

- Integration of a further geothermal-based heating plant into the municipal district heating network
- Installation of a battery storage of 1MW capacity and integration into SWM's Virtual Power Plant
- Integration of municipal PV systems into SWM's virtual power plant

Concrete actions in the field of Mobility

- Eight e-mobility stations link different offers for individual mobility:
  - MVG Rad rental bike system supplemented by motor-assisted MVG eWheels
  - MVG e-Trikes with high load capacity
  - E-Carsharing Vehicles from STATTAUTO
  - Charging stations for electric cars
- Quarter boxes at mobility stations as a central logistics point for supplying goods ordered online and for depositing items or exchanging them with neighbours (sharing)
- Information steles with details on mobility offers and other services
- Tool for joint registration route for MVG bike offers and STATTAUTO

Concrete actions in the field of ICT

- Creation of a Smart Data Platform for the recording, administration, analysis and presentation of all data generated in the project in Munich.
- Conception of a data guard concept/data gatekeeper for a holistic view and treatment of data in the Smart City area from the point of view of the municipal administration
- Creation and continuation of a "Munich Smart City App" to display various results and measurement data from the Smart City areas
- Construction of a Real Lab (60 intelligent light poles) for testing sensor solutions (see Open Call 1 and 2) in combination with the Smart Data Platform and the "Munich Smart City App".
- Innovation call "Open Call" 1 and 2 with the topics sensor solutions for the collection of the topics air quality, weather data, traffic measurement, parking lot detection as well as the evaluation and representation of the measurement results.

mySMARTLife

Lighthouse Cities:	*Hamburg, Helsinki, Nantes*
Follower Cities:	*Bydgoszcz (Poland), Rijeka (Croatia), Palencia (Spain)*
Project period:	*December 2016 to November 2021*
EU funding:	*19 Mio. Euro (of which for Hamburg: 5,16 Mio. Euro)*
Website:	*https://www.mysmartlife.eu/mysmartlife/*

Within the framework of the EU project mySMARTLife, various model projects for an energy- and resource-efficient city will be developed and implemented together with the partner cities until 2019. The project area in the city of Hamburg is located in the centre of the Bergedorf district, where one of Hamburg's most important inner-city growth areas is located with the development of the new attractive residential areas along the Schleusengraben. The mySMARTLife partner network, in which various institutions from administration, science and research as well as locally and internationally operating companies have joined forces, is already active in many places here. The measures of the mySMARTLife project are divided into four thematic areas: energy and infrastructure, mobility, digital communication and interaction with citizens. On the basis of these sub-areas it will be shown how a transformation to a "Smart City" can succeed. Sustainable concepts and strategies will be developed in the districts of Schleusengraben and Bergedorf-Süd in the Bergedorf district, which will offer citizens innovative solutions for everyday life.

Concrete actions in the field of energy and infrastructure

- Proportionate use of hydrogen in combined heat and power plants to supply heat to a new housing estate
- Building according to the latest energy efficiency standards using renewable energy sources
- Intensification of the energetic renovation of buildings also taking into account the protection of historical monuments and the participation of local property owners
- Establishment of local "heat islands" (block-type thermal power stations that can also be used for the surrounding buildings)
- Installation of new modern control technologies ("Smart Home Solutions") in senior citizens' apartments
- Installation of modern LED street lights with adaptive brightness control, W-LAN and other sensor technology such as bicycle counters
- Coupling of a wind farm with a battery storage for testing grid-compatible operating models

Concrete actions in the field of Mobility

- Developing electric mobility and reducing emissions in the public fleet (cars and bicycles)
- Development of an intelligent fleet loading management system
- Procurement of trolleybuses, associated charging infrastructure and maintenance facilities#
- Development of new car sharing offers, also in neighbourhoods
- Construction of charging stations for electric cars in the project area
- Construction of a parcel pick-up station, a micro-hub, in a shopping centre with associated environmentally friendly parcel distribution over the last mile for local companies and private individuals.

Concrete actions in the field of ICT

- Further development of the IT platform for the management of urban geodata into the so-called "Urban Platform
- Real-time data acquisition in the project area from the fields of energy, mobility and digital infrastructure
- Integration of existing data into the "Urban Platform”

MAtchUP

Lighthouse Cities:	*Dresden, Valencia, Antalya*
Follower Cities:	*Herzliya (Israel), Kerava (Finland), Ostende (Belgium), Skopje (Northern Macedonia)*
Project period:	*November 2017 to October 2022*
EU funding:	*17 Mio. Euro (of which for Dresden: 4,5 Mio. Euro)*
Website:	*www.dresden.de/matchup*

The Smart City process in Dresden will be moderated by the European MatchUP project. The main topics are energy efficiency, digitalisation, electromobility and renewable energies. With its technological competence from the regional microelectronics cluster, Dresden is in a position to develop practicable solutions that can serve as models for other cities. Together with Valencia and Antalya, Dresden is a pioneer and European "Lighthouse City" in the MatchUP project. Follower cities are Herzliya (Israel), Kerava (Finland), Ostend (Belgium) and Skopje (Macedonia). A total of 28 partners from eight different countries are working on solutions for the cities of the future. The Johannstadt district of Dresden will be developed into an intelligent and energy-efficient urban district by combining it with other urban development measures.

Concrete actions in the field of energy and infrastructure

- Storage of renewable energies for the district heating network in heat storage tanks and intelligent control systems
- Development of user flow models for tenants in cooperation with Germany's largest housing company Vonovia (integration of intelligent measurement technology: smart meters and submetering)
- Establishment of a building control centre which in future will record the energy consumption of all municipal buildings (schools, day-care centres, etc.) and intervene to optimise them

Concrete actions in the field of Mobility

- Establishment of charging infrastructure for e-vehicles at mobility points combined with development of business models based on infrastructure and vehicle data
- Intermodal mobility points with networked memory
- Mobility platform that integrates various service providers with services based on the dynamic traffic management system.
- Car sharing model in combination of commercial and private vehicle use

Concrete actions in the field of ICT

- "City Platform" as central node for data availability of partners as Open Data or via authorization systems
- Interfaces to the city databases and integration into the "City Platform" as well as integration of real-time data