



Welcome!

Dear Readers,

Over the last months the hands-on research and first implementation in the lighthouse and follower cities have led to good progress within Triangulum.

The set of data gathered through the on-site assessments including interviews and workshops with more than 250 smart city stakeholders and project partners, provides an essential component for the Triangulum Smart City Framework and its replication model. The “Multilevel Impact Assessment and Monitoring” described in the current Baseline Report (WP2) assesses the success and challenges of the smart city modules developed from the on-site assessments, enabling the replication to the follower cities of Prague, Sabadell, and Leipzig. The assessment is based on a solid set of impact indicators.

The first Triangulum General Assembly was successfully held in Berlin last November, hosting workshops with the Triangulum project partners and INEA. The success of Triangulum and the European SCC1 projects strongly depends on cross-cutting collaboration and the sharing of expertise which was the focus of the Fraunhofer Urban Futures Conference following the General Assembly in Berlin. The workshops with GrowSmarter, Remourban, representatives of the new SCC1 projects and the European Commission was the starting point to develop a joint initiative focusing on dissemination and replication.

We are looking forward to enhancing these collaborations with our SCC1 partners and to demonstrating the current progress made in “Europe’s smart cities proofing grounds” at the EIP’s Annual Assembly, which will take place in May at the Triangulum lighthouse city Eindhoven.

Damian Wagner



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Progress in our Cities

City of Manchester

Following the issue of the Energy Technical Implementation Report and a series of workshops, Siemens continues to work with the Manchester consortium to design and develop the Central Controller component of the Energy Workstream. A series of Building Benchmark Assessments have also been completed. These compare the typical energy consumption and consumption trends of a number of buildings across the Manchester Corridor against similar buildings and provide a series of recommendations based on best practice. The Assessments are currently under review and discussion with the respective building managers, with the aim of implementing a number of optimisations that provide energy and carbon reductions. Investigation continues into the availability of suitable renewable generation products notably Micro Biomass, Solid Oxide Fuel Cells and Micro CHP. On identification of suitable products, site surveys will be completed to identify appropriate locations so that the installation process can commence.





Progress in our Cities

City of Eindhoven

At the end of February, a delegation of the European Economic and Social Forum (EESC) visited our Lighthouse City of Eindhoven. The local coordinator, Henk Kok, presented Triangulum to them and specified several Eindhoven-specific tasks and what it means to realise integrated solutions - involving citizens - on the ground.

Henk Kok also gave a short speech, which was taped and broadcasted in Munich, about trying to visualise a successful replication by growing the Morgenstadt network through the creation of smart city satellites in strong smart city regions, like Brainport Eindhoven.

You can find his speech here:

<https://youtu.be/5pgjJOYIVHk>





Progress in our Cities

City of Stavanger

Design competition for new battery buses

Students at Vågen, Bergeland and Godalen high school will compete to decorate three new battery buses. On Friday, 12th February, more than 100 students gathered at an information and inspiration meeting at Vågen VGS Sandnes.

County Mayor Solveig Ege Tengesdal opened the meeting by explaining that the county wanted a fresh new look for the battery buses, and that they were looking forward to seeing what creative ideas the students would come up with.

Unique in Norway

Kolumbus currently has two battery buses as a trial. The county is working on a new test project with three battery buses. The battery buses that are currently operating in Northern Jæren are the only ones in Norway.

'The purpose of the pilot project is to raise awareness for battery buses. We will also look at how our collective system can adapt battery buses and vice versa', says Joachim Weisser, project coordinator at the county administration.





Progress in our Cities

City of Stavanger

Triangulum

Stavanger participates in the EU-funded project Triangulum, and is one of three lighthouse cities that will develop smart, environmentally friendly solutions in energy, ICT and mobility. Battery buses are one of several pioneering projects in Triangulum that other cities can later learn from.

'The follower cities Prague and Leipzig have been in contact with the Rogaland county and are interested in the battery bus project we have initiated. Triangulum is about to demonstrate, disseminate and replicate', says Weisser.

Local partners in Stavanger are Rogaland County, Stavanger, Lyse, University of Stavanger and Greater Stavanger.

Nuart

The design runs from 18th February until 18th April 18th. School classes are invited to deliver an unlimited number of proposals.

After the closing date, a jury will select a design from each school before a separate ballot decides the overall winning design. The voting system has not yet been clarified.

The County has been using Nuart to inspire students. The jury consists of the County Mayor, the County Transport Manager and three artists from the Street Art environment: Martyn Reed, Wan Ho and Hama Woods.

The class with the best design will win a prize of NOK 20 000.

You can find a short video with interviews [here](#).



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On-site Assessments

At the core of the impact assessment and replication of smart solutions is a joint data assessment in collaboration with the cities and local stakeholders focusing on the following levels:

1. The Solution Level
2. The City and District Level

During the first 12 months of the project, there have been on-site assessments in each city, both in our Lighthouse Cities and our Follower Cities, entailing expert interviews and workshops with local stakeholders to ensure that all relevant facts and ideas can be considered.

The procedure in the Follower Cities is different to the procedure in the Lighthouse Cities as they aim to investigate within the fields of ICT, energy, mobility, governance, planning and economy, how to evaluate weaknesses and potentials from which specific projects derive and measures are developed that are necessary for a sustainable urban development of the follower city. The results are then discussed in a workshop at the end of the on-site assessments with the relevant local actors and developed in order to infuse to the concept of the Smart City Implementation Plan. During the on-site assessments, interviews are conducted with leading experts, heads of major organisations, department heads and research institutes or companies.





On-site Assessments

On-site assessment in Manchester



The on-site assessment in the lighthouse city of Manchester took place from the 11th to the 22nd January. This assessment was led by researchers from the Institute of Human Factors and Technology Management (IAT) at the University of Stuttgart in coordination with the Institute for Industrial Engineering (IAO) and the Institute for Open Communication Systems (FOKUS) at the Fraunhofer Gesellschaft, and TÜV Süd. The corridor of Manchester is the focus area for the Triangulum project. The 243 hectare area was created in 2002 as a consequence of the Commonwealth games in 2002 and is characterised by strong partnerships. It is a unique business location that hosts two of UK's most important universities: The University of Manchester and the Manchester Metropolitan University as well as the Central Manchester University Hospitals NHS Foundation Trust. With the objective of understanding how local actors work together to implement smart technology solutions, 23 interview sessions with 31 interviewees from the mentioned institutions, the City Hall as well as private sector project partners such as Clicks&Links and Siemens were carried out. The follower cities of Prague and Sabadell partially joined the assessment. The collected information is being processed in the form of a report and will be used to design Investment schemes for future replication.



On-site Assessments

On-site assessment in Stavanger

From the 30th November until 9th December, the second Triangulum on-site assessment took place in the lighthouse city of Stavanger. Within the context of the EU-funded smart cities and communities project, Stavanger is striving to maximise the benefits of its Triangulum smart city implementation plan for citizens and local businesses, as well as to achieve a long-term resilience of the local economy.



16 expert interviews were conducted with 25 project partners as well as local politicians including Mayor Christine Sagen Helgø. The interdisciplinary assessment team led by the Fraunhofer Society and TÜV Süd focused on understanding the smart city solutions which are being implemented in Stavanger, such as the e-bus demonstration project, the central heating of public buildings, the data hub and smart home solutions. Furthermore, the local context, which enables such developments to be successful, was evaluated.



At the end of the assessment days, a workshop was held with important stakeholders where benefits and beneficiaries of the smart city solutions were identified and important issues for the future development were discussed.

Through the great support of the city management team and all local partners, the knowledge about Triangulum activities in Stavanger was greatly enhanced. Moreover, all three follower cities were present and had the opportunity to have first insights and discussions with some key actors of the city. The findings of this on-site assessment will be documented in a report and used in the development of a smart city replication framework, which will facilitate the replication of these smart city solutions in other cities and regions.

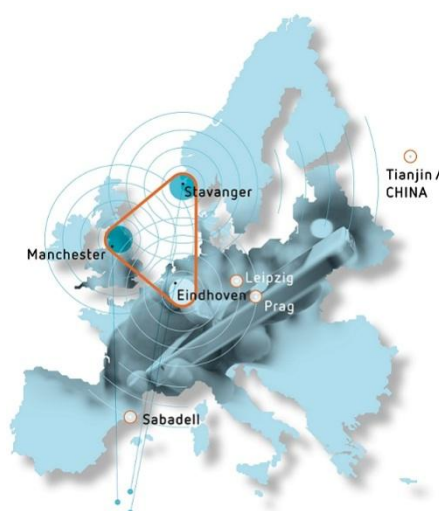


On-site Assessments

On-site assessments in our follower cities

The aim of the on-site assessment in the follower cities is to identify a set of interrelated measures and projects that can be transferred into a smart city implementation plan in order to trigger urban sustainable development.

A two week intensive on-site research constitutes the core of the system analysis in each follower city, where data is daily collected via interviews and site visits to best-practice projects and solutions. Based on the understanding gained in the assessment of the lighthouse cities together with the information gathered in a number of interviews with key stakeholders from the local administrations as well as the private sector, civil society and research institutions, the researcher team develops hypotheses for the implementation of smart solutions in the cities. This process started with the On-site Assessment in Prague (June 2015), followed by Leipzig (February 2016) and Sabadell (March 2016).





On-site Assessments

On-site assessments in our follower city of Leipzig (I)

Leipzig on-site assessment results presented at the *Leipzig West "Zukunftslabor"* (Future Lab)

The second Triangulum on-site assessment of the year 2016 was held in Leipzig, one of the three Triangulum Follower Cities, between 15th and 24th February.

Within the on-site assessment, a group of researchers from Fraunhofer and TÜV Süd interviewed 25 local experts on the fields of energy, mobility, city planning, economics, governance and ICT in order to analyse challenges and demands for Leipzig's smart city future. Additionally, some of the interviews were conducted with experts working specifically on the development of the district *Leipzig West* (Plagwitz/Lindenau). The district will function as the city's laboratory for intelligent and integrated urban transformation. It will also serve as a blue print for further smart district developments within the city. Leipzig West has undergone several significant phases of development, which include the transformation induced by industrialisation, a declining population with accompanying political changes and de-industrialisation and most recently, an ongoing urban renewal process since the reunification, giving the district a new vigour. The diversity of the district's use with a high livability factor, engaged inhabitants, and the ongoing dynamics with revitalisation efforts allow for its great potential to demonstrate future urban development. With the support of Triangulum, the City of Leipzig is developing the first Smart City Implementation Plan for *Leipzig West*.



Picture: Leipzig West, Karl-Heine canal



On-site Assessments

On-site assessments in our follower city of Leipzig (II)

Preliminary results of the on-site assessment were presented as a kick-off for the discussion of the future of *Leipzig West* in the second *Zukunftslabor*-meeting held on the 23rd February. A broad range of experts and citizens were invited to discuss and share their visions for the district on a variety of topics relevant for future development. Issues such as sharing concepts, smart mobility, big data, decentralised rainwater management, affordable housing and micro logistics were addressed.

The *Zukunftslabor* together with the *Zukunftsforum* form the shareholding structure of the City of Leipzig's first Smart City Implementation Plan. The *Zukunftsforum* is organised every 3-4 months and brings together the project advisory committee consisting of the mayor of the city, the city council, representatives of companies and universities. The *Zukunftslabor* meetings are organised parallel to the *Forums* and are dedicated to different subject matters (housing, energy, mobility, water, economy, and governance). Each theme has a responsible operative team comprised of 10 experts from different sectors. To ensure widespread participation and to maximise the amount of new ideas, citizens are also invited to take part on certain *Zukunftslabor* meetings. The City of Leipzig with its Office for Urban Regeneration and Residential Development, in cooperation with the 3rd party University of Leipzig is responsible for the overall management of the development.

To secure best possible results, the Triangulum team will continually support the City of Leipzig in its goal of becoming a Smart City.



Picture: Leipzig West, 2nd *Zukunftslabor* at Konsumzentrale



On-site Assessments

On-site assessments in our follower city of Sabadell (I)

In the last months, the city of Sabadell, together with its linked third parties VIMUSA, IAS and Promoció Econòmica de Sabadell, has worked intensively in the city analysis prior to Triangulum's on-site assessment held from 29th February to 9th March 2016. Not only has data with more than 100 indicators and action fields been collected, but also nearly 30 organisations have been involved - other public administrations, non-profit foundations, research centres and private companies - and 12 municipal departments. These entities and departments have participated during the on-site assessment conducted by Fraunhofer, most of them in the interviews as well as in the final innovation workshop held on 9th March in the "Fira Sabadell" exhibition centre. After this analytic process we have obtained a much clearer picture of the strengths, weaknesses and the potential of Sabadell, and an interesting local innovation ecosystem has been developed. As a result of the on-site assessment, around 20 potential new projects have been proposed, in the fields of urban mobility, ICT, energy, citizen participation or innovative economy, and 14 of them were discussed in the final workshop identifying goals, components, stakeholders and supportive factors for each of them.





On-site Assessments

On-site assessments in our follower city of Sabadell (II)

The projects analysed during the innovation workshop were:

- Application of a video conference for social and health care
- Application of a video conference at the municipal citizen's helpdesk
- Full energy refurbishment of an urban block with a variety of types of buildings: residential, office, industrial and public facilities
- Quadruple helix with a territorial approach in the field of health, sport, design and ICT
- Innovative ICT tools for citizen participation: information screens in frequented and leisure spaces with customised messages
- Broadcasting in streaming citizen participation sessions, with the possibility of voting "online" and "offline"
- Integration of municipal mobile applications currently scattered in a single app "SBD 4.0"
- Energy efficiency in municipal buildings with screens of public information on energy efficiency connected automatically to the building's energy monitoring
- GIS environmental tool for calculating the potential of solar energy production buildings in Sabadell according to their energy consumption
- Digital application to book available spaces in public buildings
- Other measures for a more green and sustainable implementation of garden panels on bus stops, collecting rainwater in buildings, implementation of vegetated ceilings (urban agriculture) to industrial building roofs
- Implementation of a system of distribution of goods with electric bikes (with a minihub)
- Increased use of the bicycle: Install new parking systems that are safer for bicycles
- Delivery of bicycles to students at secondary schools in Sabadell to promote modal shift, as part of a competition among schools to promote environmentally responsible behaviours.



On-site Assessments

On-site assessments in our follower city of Sabadell (III)

The challenge for the months ahead is to maintain the innovation ecosystem that has been created and to start the technical elaboration of the projects to be included in the Triangulum implementation plan in Sabadell.

The on-site assessment concludes the analytic work initiated by the municipality with internal discussions under three sectoral roundtables - mobility, energy, ICT - to identify the priorities and action lines, and evaluate the transferability of the Triangulum projects developed in Manchester, Eindhoven and Stavanger. In order to facilitate the assessment of the transferability, technical officers from the municipality of Sabadell and VIMUSA have participated in the on-site assessments of Eindhoven, Stavanger and Manchester which have taken place between October 2015 and January 2016.





Other activities

First General Assembly Meeting in Berlin, 24th – 25th November 2015



From 24th – 25th November 2015, Triangulum's partners met in the Spy museum in Berlin for the first General Assembly Meeting after the kick off meeting in February 2015.

All seven work package leaders presented their progress, challenges and upcoming activities. The other partners were able to scrutinise all operations and to find common solutions and similarities.

Furthermore, the Follower Cities presented their progress and possible future challenges. The three Lighthouse Cities acted in a supporting role and offered advice during bilateral discussions.

Besides these presentations, central Triangulum topics such as the development of the "smart city replication framework" and the "ICT reference architecture" were discussed in several workshops.

Valuable support was provided to our General Assembly Meeting by the attendance of our project officer, Damian Bornas-Cayuela, who was available to answer questions.





Other activities

Finalisation of the baseline report

Triangulum proposes a novel form of smart district development that integrates energy, ICT, and transportation to improve the efficiency of commerce and governance as well as reduce greenhouse gas emissions. The goals of the project's Work Package 2 "Multilevel impact assessment and monitoring" are to monitor and assess the impacts of the demonstration projects in the lead cities of Manchester, Eindhoven, and Stavanger in order to support learning within and between them, and to underpin the Triangulum replication model being developed in Work Package 6. The framework for monitoring and evaluation provided the basis to assess the successes and challenges of the smart city modules developed within Triangulum, enabling the construction of a cohesive reference architecture through which smart city districts can be replicated in the follower cities of Prague, Sabadell, and Leipzig. The baseline report is based on the expected impacts and impacts indicators that modules foresee.

Special thanks to Dujuan Yang, Trond Linjordet and Chris Martin for their hard work pulling together the reports for Eindhoven, Stavanger and Manchester and of course to our Triangulum partners for their time and effort in working with us to identify impacts and indicators for each module. Overall we have sets of impacts and indicators for 30 modules across the three cities, which we will continue to refine and enhance with our partners over the next 12 months.



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Past Events

Urban Futures Conference

Urban Futures Conference on 25th & 26th November 2015 in Berlin
- Innovations, strategies and processes for the city of tomorrow -



Fraunhofer's "Urban Futures" Conference aimed to bring together relevant stakeholders from Germany and abroad specialising in sustainable urban development and the smart cities. Visionaries from municipalities, politics, business and research have presented and discussed their solutions for the cities of the future. Exceptional programme formats such as the "Call for ideas" innovation competition, "Morgenstadt marketplace", "Speed dating" for mayors and the "Ideas lounge" offered additional opportunities to gather information and exchange ideas.

This was the first opportunity for the Triangulum consortium to get in contact with other Smart City Initiatives, such as REMOURBAN and GrowSmarter.

The conference was divided into three streams, whereat one stream focused on "Smart Cities and Communities (SCC) - Europe's flagship projects". Within this stream the Triangulum partners were able to meet their counterparts of the other SCC1 projects Remourban and GrowSmarter.





Past Events

Huge interest for My Smart City

On 23rd February 2016, Triangulum and Nordic Edge Expo hosted an event titled "My Smart City" during the "Impact Week" innovation week. More than 150 enrolled.



The high number of enrollments has made clear the huge level of interest in the topic of "Smart City". The Mayor of Stavanger, Christine Sagen Helgø, opened the event by emphasising that Stavanger will be a smart city. 'This commitment should be one of the main directions for the future', she said.

EVP for smart utility and business development at Lyse thought that a smart city is about using data and technology development in a good way.

Jan Erik Søndeland, member of the City Council in Stavanger Venstre, defined a smart city in one sentence: 'A smart city is composed of a wide range of technical solutions that interact to minimise the resources used to improve services for citizens. Local authorities need to consider how much we should take action, and how much we should invest in this. Then we must involve all the good forces in the region. It may be the university, entrepreneurs, and it may be about opening up a living laboratory where private companies can connect and develop products that can be good for the local inhabitants'.

Councilman Knut Underbakke of Gjesdal, emphasised that Gjesdal has what it takes to become a smart city. He continued that Gjesdal will show the world that they can be smart and will install smart technology for eight care homes for the disabled.

Chief Technology Officer of Microsoft Norway, Shahzad Rana, suggested that municipalities open up and share information from its countless databases so that they can develop better services for citizens. He urged Stavanger and Gjesdal to publish their business data.

Through the Triangulum project, Stavanger will develop even more intelligent solutions in the fields of mobility, ICT and energy over a five year period. Participants in the project are from Stavanger are the University of Stavanger, Rogaland County, Lyse and Greater Stavanger.

'Now that we have finished the planning phase in Triangulum, people will begin to see that something new is about to happen. Then it is important to get input from the inhabitants', said Gerd Seehuus, coordinator of the Triangulum project in Stavanger to [Aftenbladet](#).



Upcoming Events

Smart Cities Summit 2016, Frankfurt am Main, Germany

6th – 7th April 2016

The Future of the Smart Society

With ever-growing populations and an increased drive for sustainable, efficient and cost-effective living, the demand for Smart City innovations is at an all-time high.

Germany is at the forefront of Smart City technology and developments. The Smart Cities Summit Frankfurt will explore German Smart City projects and test beds, together with international case studies.

Presentations and discussions will detail where investment should be channeled into innovative technology; winning business models, and will provide critical insight into what will work for Germany and the wider region.

Triangulum will be represented by the local coordinator of our Lighthouse City of Eindhoven: Henk Kok. He will talk about the project in general and its meaning for the City of Eindhoven on the rocky road to becoming a smart society.

Find out more about the event here:

<http://www.smartsommit.net/frankfurt/smart-cities-summit.html>





Upcoming Events

EIP-SCC General Assembly 2016

Tuesday 24th May 2016, Eindhoven, Netherlands

The 2016 General Assembly of the European Innovation Partnership (EIP) on Smart Cities and Communities will take place on 24 May 2016 in Eindhoven, the Netherlands.

The General Assembly is jointly organised by the European Commission Directorates-General for Mobility and Transport, Energy and Communications Networks, Content & Technology. It is an official associated event of the Dutch Presidency of the European Council of the European Union.

In its third edition, this event is the place to be for learning about key policy and market trends for smart cities and communities and creating new contacts and networks. Over 400 participants are expected.

Find out more about the event here:

<https://eu-smartcities.eu/content/eip-scc-general-assembly-eindhoven>





Upcoming Events

Sustainable Energy Week 2016

13th - 17th June 2016

Every year EASME, on behalf of European Commission's Directorate General for Energy, organises the EU Sustainable Energy Week (EUSEW) - the biggest event dedicated to energy efficiency and renewable energy in Europe. It is designed to spread best practices, inspire new ideas and build alliances to help meet the EU's energy and climate goals. Its final aim is to allow stakeholders to help shape European policy on energy and work towards an Energy Union.

The major highlight of EUSEW is the **3-day conference in Brussels (14th -16th June)**. The programme of the conference generally puts together around 50 policy sessions with high-level speakers from public authorities, energy agencies, industry associations, businesses, civil society organisations and hosts on average 3,000 participants.

Moreover, EUSEW brings about a series of networking events as well as an **Awards** ceremony for the most innovative projects on energy efficiency and renewables. This year, the main theme will focus on the pivotal role of consumers in the EU's energy system.

Find out more about the event here:

<http://eusew.eu/>





Partners

Project Management



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Replication



Ajuntament de Sabadell



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