

RUGGEDISED

Designing smart,
resilient cities for all

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Executive summary

This report provides a glance of the replication trajectory sustained by the RUGGEDISED project with substantial focus on hands-on insights delivered by the Fellow Cities of Brno, Gdańsk and Parma. The report reflects the lessons learned and the experience gained by the Fellow Cities thanks to the replication activities in RUGGEDISED to the benefit of other interested replication cities.

Replication is based on the common understanding that cities benefit from the exchange of information, experiences, ideas and technical solutions. Replication is not intended as the exact copy of the same product/solution/etc. in other contexts but should rather be understood as its adaptation to a different environment. Replicability analysis may address both scale and context. Assessing the replication potential of Smart Solutions, or more in general of urban solutions, is complex and an exclusive focus on technical aspects is not sufficient to guarantee the effectiveness of replication. Beyond the technological dimension, many other aspects should be considered when we go to undertake a replication path: i.e. socio-cultural, environmental, legal, institutional, economic dimensions.

The three Fellow Cities of Brno, Gdańsk and Parma have been guided and supported by a replication process in their path of replicating smart solutions inspired by those that are already implemented in the three Lighthouse Cities: Rotterdam, Glasgow and Umeå. The Fellow Cities have also the ambition of becoming in turn Lighthouse Cities and start deploying the smart solutions identified in the Replication and Investment plans immediately after the closure of RUGGEDISED project. The activities of WP7 focussed on creating and enhancing the environment for replication before moving on to the implementation of Lighthouse Smart Solutions in the Fellow Cities. This was done taking into account many aspects that go beyond the effective implementation of Smart Solutions, namely: i) Establishment of a Smart City Governing Group; ii) Improving cooperation in the governance structure of the city; iii) Empower the cities through knowledge share and training; and iv) Definition of the strategic city vision and the roadmap. The acquisition of organizational and technical competence was tracked and closely monitored through the execution of several activities, in particular: replication workshops, study tours to the Lighthouse Cities and international cooperation with Japan.

The Fellow Cities of RUGGEDISED share their lessons learned on replication so that others can learn from them and find an easier path into the future. Study visits to the Lighthouse Cities are a definitely added value and a positive experience, in which teams of experts are able to explore chosen topics in detail and to discuss specific smart solutions in depth. The foresight process is another successful aspect that allows the involvement of various stakeholder groups with the help of workshops. On the other hand, not everything has been a success for the Fellow Cities in the RUGGEDISED project. Different reasons can be named in every case depending on the particular context.

Several associated benefits that RUGGEDISED has brought to the Fellow Cities can be mentioned: learning from other people's mistakes; overcoming silo mentality by creating a city government and changing inter-departmental dynamics; involvement of relevant figures and a wide range of stakeholders; improvement of the level of knowledge and capacity; incorporation of more innovative approaches, technologies, and financial models.

In RUGGEDISED, collaboration has taken place at all levels in different forms: study visits, workshops, international team-building. Despite travel restrictions caused by the Covid-19 pandemic, the Fellow Cities have had the opportunity to learn and replicate lessons and good practices working together with many stakeholders on the foresight process.

Every city that wishes to engage in a successful pathway of replication in order to become a Smart City must address specific needs by tailoring its replication process to the particular local requirements. Besides considering local context factors, several tips for smooth replication can be mentioned: commitment and support of politicians; a long-term vision of the city; early stage engagement; preservation of stakeholders' confidence; small pilot projects; and the importance of city governance.

The structure of the document is as follows:

- Chapter 1 provides a synopsis on the concept of replication;
- Chapter 2 gives a general overview of the Replication approach in RUGGEDISED, outlining the replication path followed during the project;
- Chapter 3 provides the lessons learned by the Fellow Cities;
- Finally, Chapter 4 concludes and sums up this activity.



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1. The concept of Replication

The notion of “Replicability” is widely used in the context of Smart Cities and Urban development projects and it refers to the possibility of applying the same solution implemented in a city to a **different city context** with the aim to achieve the same objective. Replication is based on the common understanding that cities benefit from a more or less formalized exchange of information, experiences, ideas and technical solutions. Policymakers such as the European Commission have incorporated the idea of replication into their smart city initiatives and funding schemes¹. More broadly, replication can be defined as the application of a successful model, approach, strategy, technology, product or policy in another location, even completely different. In this regard, it is important to specify that “application” is **not intended as the exact copy** of the same product/solution/etc. in other contexts but should rather be understood as its **adaptation to a different environment**.

An extensive study published by DG ENERGY², Directorate- General for Energy of the European Commission, connects the notion of replicability to the possibility of applying the same solution/technology implemented in a city to a different context with the aim to achieve the same objective. It states that the replicability analysis may address both:

- **scale:** the extent to which a solution can be increased in size without compromising its efficiency and effectiveness
- **context:** whether the solution can be replicated in a different environment

The same study points out that assessing the replication potential of Smart Solutions, or more in general of urban solutions, is complex and **an exclusive focus on technical aspects is not sufficient to guarantee the effectiveness of replication**. Based on these assumptions, the concept of Replication in RUGGEDISED took on a broader meaning. It is because of this reason that, **beyond the technological dimension, many other aspects should be considered when we go to undertake a replication path:** i.e. socio-cultural, environmental, legal, institutional, economic dimensions and all those local aspects that characterize a city.³

¹ P. Ruess, "Smart City Replication and Group Model Building: A Conceptual Comparison," 2021 IEEE European Technology and Engineering Management Summit (E-TEMS), 2021, pp. 27-32, doi: 10.1109/E-TEMS51171.2021.9524862.

² EC DG ENERGY, [Analysing the potential for widescale roll out of integrated Smart Cities and Communities solutions](#), June 2016

³ Paolucci L. “Estimating the Replication Potential of Urban Solutions for Socially Integrative Cities”, Chapter 14 from the book [“Towards Socially Integrative Cities”](#), Muller B. et al



2. Overview of the Replication approach in RUGGEDISED

In WP7, the three Fellow Cities of Brno, Gdańsk and Parma have been guided and supported by a replication process in their path of replicating smart solutions inspired by those that are already implemented in the three Lighthouse Cities: Rotterdam, Glasgow and Umeå. The Fellow Cities have also the ambition of becoming in turn Lighthouse Cities and start deploying the smart solutions identified in the Replication and Investment plans immediately after the closure of RUGGEDISED project.

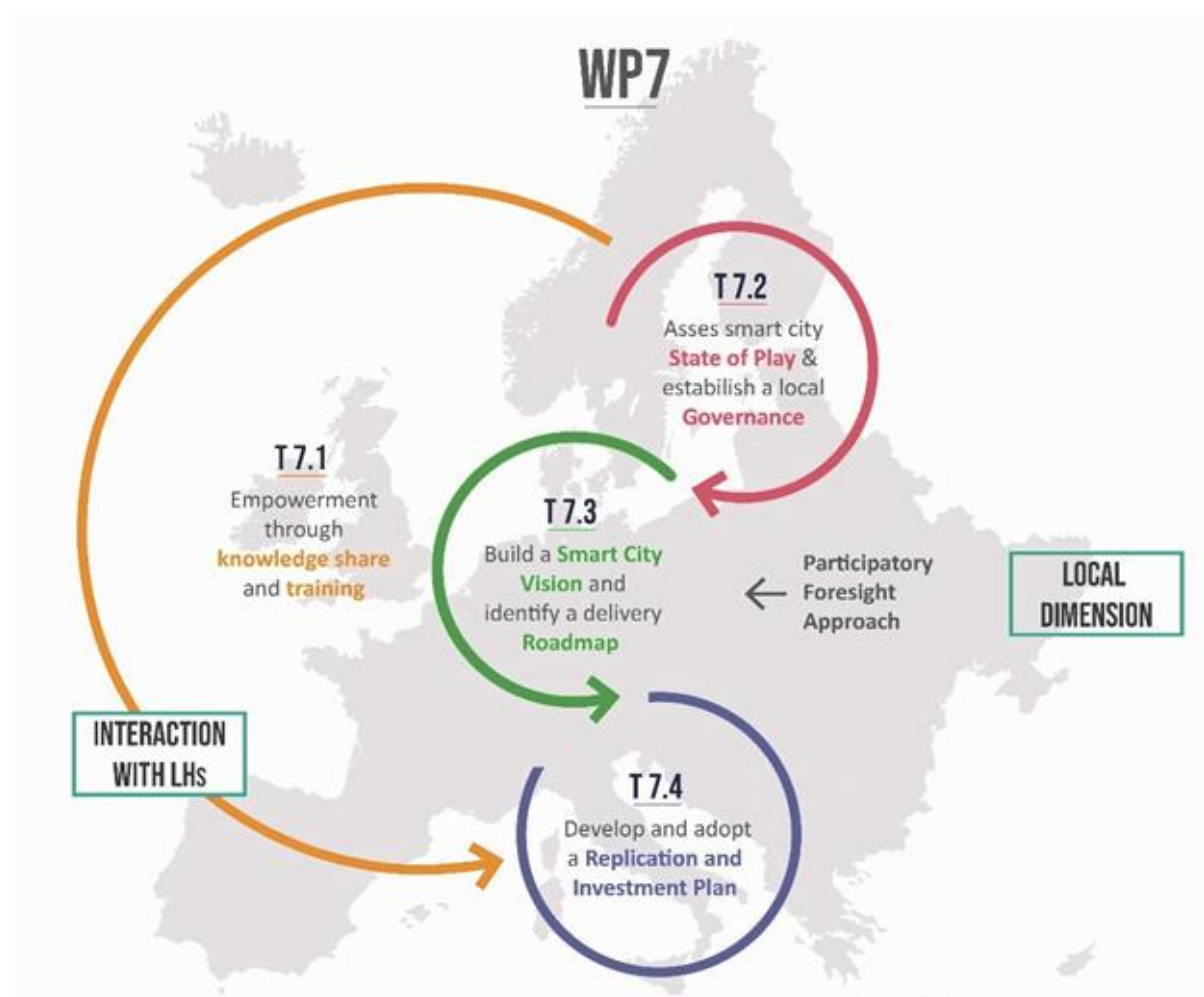


Figure 1: Replication approach in RUGGEDISED (WP7)

The activities of WP7 focussed on creating and enhancing the environment for replication before moving on to the implementation of Lighthouse Smart Solutions in the Fellow Cities. This was done taking into account many aspects that go beyond the effective implementation of Smart Solutions, namely:

- **Establishment of a Smart City Governing Group.** To ensure that the Fellow Cities start off on the right foot of the replication process and the long way towards becoming a Smart City, proper forms of Smart City Governance should be established in compliance with the local needs, requirements and traditions⁴. In this regard, attention must be put to creating a well-assorted, collaborative and tight-knit group.

⁴ An initial assessment was conducted at the beginning of the project and evidence of the different actions is reported in the “Initial Replication Assessment” (D7.1).



- **Improving cooperation** in the governance structure of the city is needed to ensure better management, communication and collaboration between the different city departments and relevant stakeholders, to guarantee improved services to citizens, to ensure that sustainability always comes first and to address all the relevant and essential aspects for the realization of the smart city. In this context, developing individual smart solutions is not enough and it becomes necessary to act at a higher level by setting up a **proper governance body** able to steer all these activities in a coordinated manner. This aspect can make a real difference in the extent and duration of impacts in the long term.

Thanks to RUGGEDISED, all three Fellow Cities established effective forms of governance, showing a strong commitment to carry on and steer smart city's initiatives. These entities have been carefully structured in such a way as to be able to survive the numerous political elections and succession of local governments that normally take place in a city. Each Governing Group was made up of a core team, a steering board and an advisory board. Activities of knowledge exchange of local practice and the adoption of co-creation approaches involving all the key stakeholders were pivotal for ensuring the success of this process.

- **Empower the cities through knowledge share and training.** Another crucial aspect is the **level of knowledge and capacity** that the members of the smart city governance must acquire in order to be able to create, steer and manage the Smart City. Learning from other experiences is a key step for strengthening know-how and boosting expertise on both technical and non-technical themes and, thereby, allowing Fellow Cities to consciously deal with eventual barriers that might be encountered, to anticipate potential failures and to be able to identify the best way to avoid them. Within RUGGEDISED, the concept of knowledge transfer has been applied making use of different modalities and means of implementation.

As mentioned, WP7 started off from the assumption that **replicating does not simply mean copying and implementing what has been done elsewhere, but it looks more at understanding and adapting solutions according to the context**. Therefore, it was fundamental, on the one hand, to ensure a process of knowledge transfer between RUGGEDISED cities and, on the other hand, accompanying this process by enabling and supporting the governing groups of the three Fellow Cities in the planning process. This was achieved through the definition of a shared long-term city vision, the establishment of a roadmap outlining the main milestones and steps towards the Smart City and, finally, the development of a fully-fledged Replication and Investment Plan. In this regard, the acquisition of organizational and technical competence necessary for the actual smart solutions deployment was tracked and closely monitored through the execution of several activities, in particular: replication workshops, study tours to the Lighthouse Cities and international cooperation with Japan.

Table 1: Knowledge share events in WP7

KNOWLEDGE SHARE EVENTS	
Type	Description
Replication Workshops	The topics addressed during the Replication Workshops ranged from how to structure effective governance in the city to more technical and managerial aspects, often offering the Fellow Cities implementation and monitoring updates from the Lighthouse Cities, providing the opportunity for peer-to-peer discussions on progress, problems, solutions and results. Six Replication Workshops were held during Ruggedised General Assemblies, with the involvement of experts responsible for the different smart solutions in the Lighthouse Cities and members of the governance of the Fellow Cities. These events have been the venue for fruitful discussions and the perfect occasion for transferring knowledge and establishing a dialogue and an exchange among cities.
Study visits from the Fellow Cities to the Lighthouse Cities	Study tours are considered the most effective means of face-to-face, peer-to-peer knowledge exchange. In RUGGEDISED these visits have been organised to allow Fellow Cities to foster deeper engagement with the stakeholders and experts of the Lighthouse Cities, to benefit from an operational, hands-on observation of the smart solutions and to further knowledge of implementation and technical aspects.



	Although travel restrictions due to the Covid-19 emergency have hampered the realization of study tours, 7 visits could be arranged (reports in <i>D7.6 – “Reports from the technical workshops”</i>). Additional exposure to the social and technological innovations involved by the smart solutions of the Lighthouse cities was obtained by the Fellow cities during the regular General Assemblies organised by RUGGEDISED, which offered not only an occasion to touch first-hand the solutions, but also to speak with the those directly involved in their development and realisation.
International cooperation with Japan	It is an activity proposed by ISINNOVA after the interest shown by the Mission of Japan to the EU in the Smart Cities and Communities initiative of the European Union, and it seeks to foster facilitated knowledge share between international smart city programs employing budget made available by unused resources in the project. The activity aims to structure, facilitate, and foster a mutual flow of knowledge between the 6 RUGGEDISED cities and key smart city players in Japan, which are the Government’s Cabinet Office, responsible for the overall coordination of Japan’s smart city program, and the selected cities of Hamamatsu, Kamakura and Tamana City. The expectation is for both sides to establish an environment in which inspiration, growth and long-term synergies can be unlocked. Several concrete cooperation events are organised, in which local policy makers, practitioners, and experts discuss viable solutions, technical and process issues, and future opportunities in relevant smart city domains such as governance approaches, civil society and citizens engagement, public-private funding schemes, working business models, and tips for replication: - Online workshops/webinars to facilitate the acquisition of new knowledge and to receive inspiration from smart solutions developed elsewhere. - Onsite/virtual missions, which are deemed most valuable. - Other online bilateral/multilateral meetings if requested. All the details and results of this cooperation will be published in deliverable <i>D7.9- “Enhancing smart cities in Europe and Japan through collaboration”</i>.

- **Definition of the strategic city vision and the roadmap.** Another key step leading up to the development of the replication and investment plan is the definition of the strategic city vision and the roadmap of upcoming actions and investments in energy, mobility and ICT sectors. The **participatory foresight** has been one of the focal points of the replication process and has been developed at local level in each Fellow City. The application of this method **facilitated the strategic planning and the effective establishment of a collaborative platform able to collect and catalyse all the interests of the community, thus strengthening it and creating new networks of society.**

This combination of foresight methodology with principles and techniques stemming from organizational development has been steered and adapted in each Fellow City by the respective Governing Groups. At least four stakeholder forums have been held in every Fellow City: kick-off governing forum, scenario forum, vision forum and roadmap forum. These forums were jointly designed and evaluated by the Community of Practice (CoP), which supervised the Smart City leaders and core team members in the local foresight processes. The **foresight process also contributed to the improvement of the cooperation internally perceived by all the parties involved in the stakeholders ‘group.**



3. Lesson learned on Replication

The journey to becoming a Smart City is a hard one. The Fellow Cities of RUGGEDISED share below their positive and negative experiences so that others can learn from them and find an easier path into the future.

3.1 What worked

Study visits

All three Fellow Cities agree that a very important and definitely positive experience for them was the opportunity for their representatives to participate in study visits to the Lighthouse Cities. During these visits the Fellow Cities were able to pick out topics which they wanted to explore in more detail. This approach translated into **teams of experts from the Fellow Cities visiting other teams of experts from the Lighthouse Cities to discuss specific smart solutions in depth.**

In **Brno's** opinion, these Peer-to-Peer activities were one of the **biggest added values of the project.** They recommend to plan enough time to exchange experiences and to focus on concrete solutions. Ideally, a whole day or even several days should be devoted to a specific topic.



Figure 2: Brno's Study Visit to Rotterdam in September 2019

For **Gdańsk**, **most valuable thing** was the observation of how Rotterdam – the largest seaport in Europe – is preparing for the technological and organized challenges related to the energy transformation and zero-emission economy. Gdańsk watched Rotterdam prepare to transform itself into a smart city by working with the Erasmus University, as well as other research units and the private sector. Gdańsk's representatives also visited Umeå – a university city with a young population – where they could observe how the implementation of smart city activities is proceeding with the strong participation of residents in the decision-making process. It was the aspect of social participation that was particularly interesting to the Polish visitors.

Foresight process

Another successful aspect of the RUGGEDISED project in the Fellow Cities was the foresight process – including a **series of workshops (WS) involving various stakeholder groups.**

In **Gdańsk**, the workshops gathered representatives of public and private sectors, researchers and experts who discussed ideas for building three different scenarios for each sector: mobility, energy efficiency, innovative building



in the city. The debates, moderated by an expert the University of Gdansk, were dedicated to drawing scenarios for Gdańsk until 2050: a development scenario, a regression scenario, a status quo. The foresight workshops were also useful at the stage of formulating key development challenges for the city, which are reflected in the revised 2030 Plus Strategy, which was adopted by the City Council on September 29, 2022. The revised Strategy gained a spatial dimension, and among the biggest changes in the document, one should mention **a new strategic goal – Green City**. The document also indicates the expectations of the planned activities and the indicators of their achievement.



Figure 3: Second Foresight Forum in Gdańsk – Scenario in May 2018

The foresight process in **Parma** with local stakeholders worked well thanks to a lot of work and focus put into it. **All partners were committed to cooperate** on the projects and a strong relationship for future opportunities with the stakeholders was built. However, Parma advises to be careful: the process needs to be not so long, otherwise there is the risk to lose the stakeholders' interest. It is essential to find the right people inside the Municipality and among stakeholders to produce a real change and that can be difficult. Parma suggests to fully exploit the potential of new technologies allowing participation.

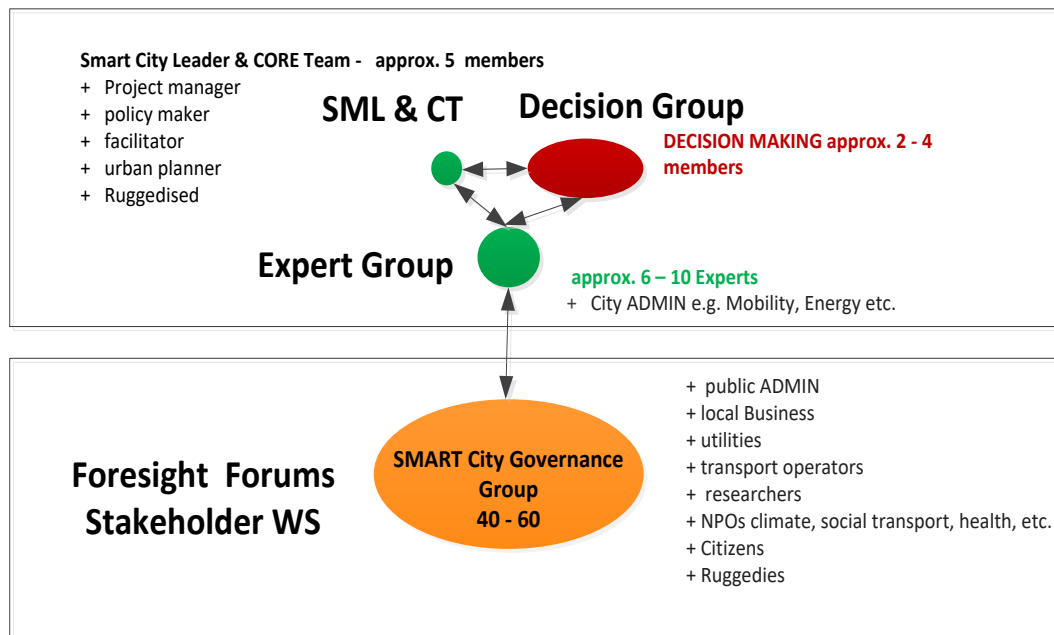


Figure 4: Social Foresight Architecture (Source: Doris Wilhelmer 2017)

Project length

A big benefit, according to **Brno**, is the length of Horizon 2020 SCC01 projects – 5+ years, as this type of project cannot be solved in 2 years, allowing for longer term work on site preparation and preparation for replication.



3.2 What did not work

Every Fellow City has faced different challenges and obstacles depending on their particular context. That could be one of the reasons as there is no common aspect to point out when talking about the things that were not so successful in the RUGGEDISED replication path.

Brno

Brno regrets not having had the **outputs from the monitoring** at the time when they were creating the replication plan. This is practically the most important data – whether specific smart solutions make sense at all, and it limits the city in its replication efforts. The City of Brno suggests to address this issue in terms of the format of SCC01 projects.

The other matter tackled by Brno concerns the **replication workshops during the General Assemblies (GAs)**: they would have appreciated receiving more background information beforehand, and more time to discuss during the events, to fully address the many topics of each individual smart solution. The limited time made available by the General Assemblies resulted in these aspects being discussed sketchily, thus only partially reaping the replication potential and benefit of these workshops.

Parma

The first point raised by Parma is that the **internal process** was more difficult than expected. It was a huge project, maybe not completely understood from decision makers. The second point is somehow related as they express the existence of some difficulties in moving from abstract interest on general topics to actual projects.

3.3 Bridging the gap

In this section the Fellow Cities share some examples of the what they have been doing to “bridge the gap” and the activities they have carried out and the associated benefits that the project has brought to them.

Gdańsk

Thanks to RUGGEDISED, Gdańsk can learn from other people's mistakes. The **partners loyally shared their failures, successes and weaknesses of the tested solutions**, thus saving the Fellow Cities troubles in the future. By taking part in the project, Gdańsk as shown to be a city open to modern solutions.

For Gdańsk, the balanced energy management that Rotterdam is currently testing in the Ahoy exhibition and entertainment complex is a **good inspiration for a model place**, which may be Amber Expo or selected office buildings in the future. In Gdańsk, they are also thinking what to do to **achieve the maximum effect with a minimum of financial and energy expenditure**. The point is not to add to the carbon dioxide emissions generated by thermal power plants.

“The passing summer has shown us best that we need not only heat for heating rooms in winter, but also energy for cooling in summer, which is important especially for the health of the elderly and young children. We need to learn how to use the waste heat of municipal wastewater to provide air conditioning on hot days. The same atypical source of energy can be used, for example, to heat pavements in winter. You do not need to sprinkle them with sand, let alone salt. There is no need to convince anyone about the bad influence of salt on the environment, but the sand ground by thousands of feet is also harmful to us - adds Joanna Tobolewicz. - Turns into fine PM10 dust, as harmful as furnace fumes.”

Parma

One of the limits Parma immediately identified in its internal organisation is the difficulty of **working across different departments**. During RUGGEDISED they tried to overcome this problem through the close involvement of key staff of different departments in the foresight process and in two pilot projects that were being carried out with two local start-ups (involving, beside the energy and climate office, also Mobility, digital transition and civil protection offices).



One of the main lessons learned by Parma is that **cities need to create an internal team in the city government**, with strong relationships at a strategic level and at an operational level across key departments. This can be challenging, as their experience shows, but it is necessary to get a stronger internal commitment, shared responsibility for achieving smart city and climate goals.



Figure 5: Third Foresight Forum in Parma – From Scenarios to Roadmap in November 2018

Brno

Brno finds that in order to bring the different departmental approaches together, **disciplinary silos must be overcome on a daily basis**- This task might even require changes to inter-departmental dynamics and working processes. In the end, a more collaborative approach will come out through understanding these diverse approaches as part of a shared, iterative planning cycle. Planning and implementation must not be undertaken independently, efforts need to be made to actively align them.

3.4 Broader involvement

In this section the Fellow Cities showcase how they managed to involve other departments, projects, partners, companies, citizens.

Brno

The involvement of two relevant figures of the Brno Municipality - the deputy mayor and the councillor for territorial development - was crucial for **“political leadership”** which also ensured **added finances** for Urban study, Masterplan and other expenditures which were not covered by the project.

A **wide range of stakeholders inside and outside the Municipality of Brno**, including owners of surrounding land and buildings were included from the early stages, step-by-step as the project evolved – everybody had a chance to get used to the innovative ideas and approach.

In Brno, the main focusing is on the development of the Špitálka smart district. The preparation and planning of such a project is very complex, comprehensive and integrates all areas and topics of urban development. The preparation requires **consultation and involvement of a large number of relevant partners**. Whether they are other departments, municipal companies, external experts, consultancies, citizens, etc. At the same time, by being firmly anchored and linked to a specific territory, the project is now, also among other projects, seen as a fixed part of the wider territory. So, in this respect, RUGGEDISED has undoubtedly been beneficial and has helped significantly to expand cooperation within the city.

The project of revitalisation of the Špitálka district – which is called RE:Špitálka – is a pioneering project in Czech republic in the terms of an extent of the area, the width of the involved smart solutions and the emerging form of the public-private partnership. The knowledge potential accumulated in preparation of this project is a great opportunity to be shared between other cities involved in the Horizon 2020 projects. The conferences and events on the topic of the smart cities has already brought valuable connection between the representatives of Czech cities,



e.g. Kladno, Litoměřice and Písek, or the research teams from the universities, e. g. Czech Technical University in Prague.

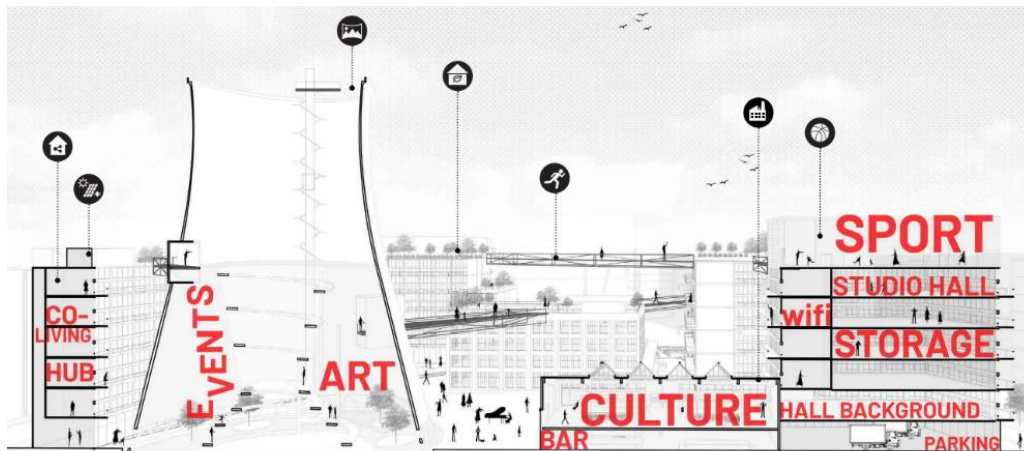


Figure 6: Functional concept of the Špitálka district

Occasional opening of the site to the public and preparation of temporary use, involvement of students within MUNISS competition ([web link](#)) help to introduce RUGGEDISED to the general public. Emphasis on promotion of the project and related topics that are also attractive to the media helped to increase the interest. Thanks to the **broad involvement of other entities**, including students, Brno has an easier situation in continuing activities in the future, finding new collaborators etc.

Parma

Parma managed to involve more than **50 local stakeholders** within their foresight process called **Parma Futuro Smart**. Within the municipality, Parma set up the Smart City Governance by grouping the key persons to be involved in the process of becoming a Smart City. The governance structure includes:

- i. *Project Manager*: partner of the RUGGEDISED project, creating and maintaining linkages between project and local activities;
- ii. *Smart City Leaders*: one being more institutional and the other being more operative, working both at the project at local level;
- iii. *Decision Group*: made up by the Mayor, three Deputies, the General Director and the University (a part of the replication area identified is the University campus)
- iv. *Core Team*: Operative steering group made up of project partners (Municipality of Parma, Infomobility and ISINNOVA) as well as all other departments of the municipality and the University: Energy and Seismic Division; Sustainability policies Sector; IT Sector; Management Division (EU Office); UNIPR;
- v. *Expert Group*: a series of expert have been involved both in the local workshops and in the development of the Replication and Investment Plan. This group includes: Parma Energy Agency; Mobility Manager, Logistic Expert; Smart Waste Experts; ITCity; Communication Division; Urban Planning; Civil Protection; Local Police.



Figure 7: Kick-off meeting of Parma Futuro Smart



Gdańsk

Gdańsk's partners on the way to smart city solutions were the Gdańsk Water and Sewerage Infrastructure and PICTEC - a foundation with the status of an independent entity, supporting activities in the field of the latest IT solutions and from the scientific side. Other collaborations included the IT Office, the Department of Investment Projects, and the Public Transport Authority. One of the results of the project is the raising of the importance of issues related to **energy efficiency and the creation of the Energy Office**.

3.5 Organisational and mindset change

All three Fellow Cities have improved their level of knowledge and capacity through knowledge share and training, and they hope that, after the end of RUGGEDISED, internal cooperation, collaborative platforms and societal networks, and synergies with stakeholders can be sustained in the long term. But more specifically, what remains in the Fellow Cities after the end of the project? Has a new mindset been achieved that goes beyond the specific results and particular solutions?

Gdańsk

A significant change in the way of thinking about Gdańsk's development was reflected in the 2030 PLUS Development Strategy in the document adopted by the City Council on September 29, 2022, **containing strategic goals and related spatial development goals - a functional and spatial model**. An extremely important change reflecting the new mindset is the forging of a new strategic goal, which is the **Green City**.

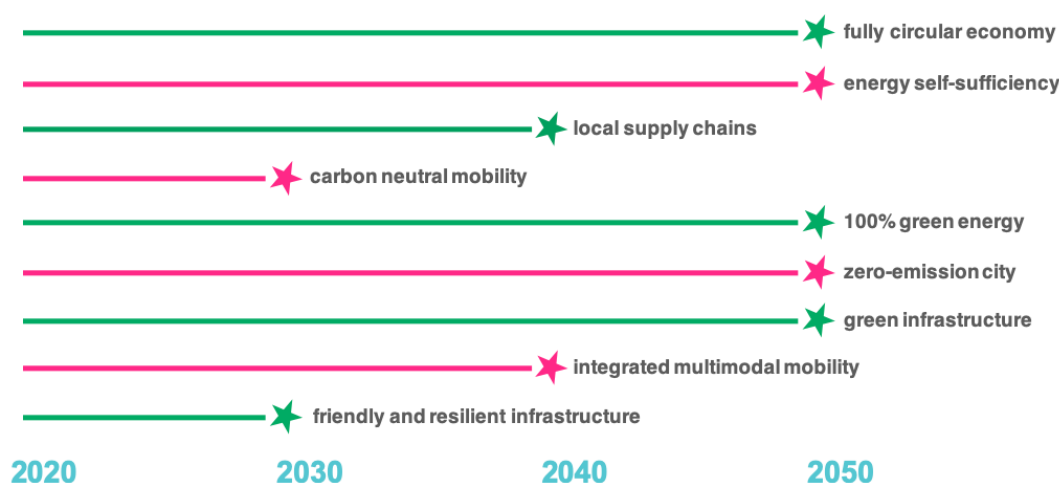


Figure 8: Time-horizon to achieve priorities included in the vision of Gdańsk 2050

Important lessons for Gdańsk come from the Lighthouse Cities in the field of electrification of the bus fleet. There are already many electric buses in Umeå, but it is a small and compact city. In addition, electric vehicles run there for short and "flat" distances. In Gdańsk, short bus routes usually lead through terrains of varying height. On the other hand, our "flat" routes are too long to provide vehicles with a sufficient supply of energy. Rotterdam has set itself a 100% target, a zero-emission fleet in 2030. The barriers are still significantly higher purchase costs compared to internal combustion vehicles and the problem with providing charging infrastructure. As all ideas are methodically tested, and thanks to their actions today, Gdańsk will have the answers at hand in the future. This means being able to achieve a lot by knowing in advance where to go and why. The project partners provide answers to the "how": a city that does not harm its inhabitants and uses resources in an efficient way.

Brno

H2020 SCC01 projects are of a research nature. This mindset - and the perception of this mindset also by city officials and people in the city leadership - has allowed Brno to **explore and incorporate more innovative approaches, technologies, and financial models**. Thus, the perception of the project as an opportunity to pilot and test new



approaches and then to be able to upscale them to other areas/projects of the city was crucial. For instance, the Housing Department of the Municipality of Brno, based on information from RUGGEDISED, is now considering similar innovative forms of financing the development of their own projects.

The long-term systematic step-by-step preparation of the site and the prevention of brownfields, where a redevelopment plan is prepared long before the land and buildings are actually abandoned, is also a significant contribution of the project to the paradigm and mindset shift of the City of Brno.

Parma

In the case of Parma, the RUGGEDISED project has been its **first attempt to start working in an intersectoral way**. Thanks to RUGGEDISED, the City of Parma has gained awareness on how to properly respond to the challenges related to the ecological transition. This was very helpful and gave the city the right attitude to apply to the 100 climate-neutral and smart cities EU mission of the European Commission.

3.6 Collaboration at all levels

In the RUGGEDISED project, collaboration has taken place at all levels in different forms: study visits, workshops, international team-building. Below there are some examples of collaboration - or lack of it – in the Fellow Cities.

Parma

Parma's experience in the context of the RUGGEDISED project has brought the opportunity to learn and replicate lessons, good practices, especially in the management of communication activities, research and involvement of stakeholders and the organization of workshops and working tables. All this was used to **create a model to be applied in every project that involves specific targets**. Also highlighting the difficulties is important, in the case of Parma, they did not find many difficulties in creating a synergistic working group, perhaps it was more difficult to keep the interest alive. For this reason, the Parma Futuro Smart web container was used, where news, updates, travel reports and meetings of the Consortium always converged.

Parma has worked together with many local stakeholders on the foresight process. Thanks to this, the Territorial Alliance for Carbon Neutrality was born. This is a public-private partnership aiming at stimulating and guiding the process of economic, social and environmental transformation necessary to achieve the ambitious goal of Carbon Neutrality in the territory of the Province of Parma within 2030.

"Starting from April 2018 at WoPa - WorkOut Pasubio and in Officine ON / OFF (innovation spaces) in Parma, a series of workshops were held within the PARMA FUTURO SMART project, dedicated to intersectoral comparisons to define the scenarios of the Smart City. The first workshop "Scenarios for Parma Smart Future in 2030 - Through the multi-stakeholder discussion for the co-definition of Scenarios for Parma Smart City-" was organized by the Municipality of Parma and by Infomobility, with the support of the companies ISINNOVA and Focus Lab. The meetings were attended by important local actors from different realities: representatives of the Administration, University of Parma, companies, public and private bodies and high schools. The goal of the workshops was to establish an activity path for Parma Smart City in 2030, through a participatory path at a local level, starting from global trends. The meetings were organized in four thematic tables: Energy-Environment & Smart Grid-Infrastructure, Transport & Mobility, Society & People, Economy & Innovation. At the end of these sessions there was a concluding plenary session and the spokespersons of each group illustrated the scenarios that emerged in the various sectors to all participants, also through a graphic representation developed by four students of the Toschi Art School. The involvement of the students was another important step for the realization of the PFS activities and other moments of co-working were also organized, to increase the participatory process and involve more actors from different fields in the RUGGEDISED replication activities."

Unfortunately, at the present stage, the City of Parma has **not involved its citizens yet**, but the goal is to work directly with them in the next steps of the Smart City process (e.g. within the 100 climate-neutral and smart cities EU mission).



Gdańsk

The City of Gdańsk regrets the **discontinuation of the promising international cooperation due to travel restrictions caused by the Covid-19 pandemic**. It was the biggest obstacle in the implementation of international exchange under RUGGEDISED, which was especially valuable, because it gave the possibility of direct contacts of specialists with their counterparts in the Lighthouse Cities, and even more importantly, watching smart city solutions on the spot.

“One of the most valuable elements of activities under the RUGGEDISED project in Gdańsk was a series of foresight workshops devoted to working on development scenarios in the field of mobility, construction and energy. Participants of these workshops focused on identifying trends determining the development of the city. Representatives of the municipal office, municipal units, experts from the world of science, and representatives of the commercial sector met at three thematic tables. Participants took up the challenge of referring to the trends that will most likely shape our future. Already today, for example from OECD reports, we know that cities will face issues such as aging societies, a sudden change in the reality of functioning of given areas due to technological innovations, an increase in energy demand or the growing role of actors from the private sector in decision-making. The discussions at individual tables were heated. People with different professional paths, working in different sectors, had to jointly sketch initial scenarios assuming strengthening, weakening and no changes in the areas of mobility, energy construction. The effect of these discussions has been summarized in the form of development scenarios for the city. Thanks to this, a vision of actions necessary for Gdańsk has been created, which in turn are being translated into development investments for the city.”

Brno

In Brno's view, it would be a good idea to **directly allocate and define the time (a time bank) of the Lighthouse City experts for the Fellow Cities and direct exchange of experiences**. Brno also suggests to focus the GAs more on updating project deliverables and milestones and as an important team building event. That would translate into reducing the number of GAs and instead add more time for peer-to-peer sessions.

“The cooperation with the people from AIT during the preparation and conceptualization of the Scenarios for Brno workshop, which used the participatory foresight method, was absolutely excellent. Brno involved experts on that topic also from the Technology Centre of the CAS ([homepage](#)) in the preparation and it was a pleasure to see these two institutions working together in the preparation of this successful workshop. I might have been at that time one of the first events in the Czech Republic that used the participatory foresight method at all.”

Another recommendation by Brno regarding collaboration is the importance to **involve politicians and representatives of other departments / partners in the study tours** – in order to get them “on-board”.

3.7 Tips for a smooth replication

Every city that wishes to engage in a successful pathway of replication in order to become a Smart City must address specific needs by tailoring its replication process to the particular local requirements in terms of objectives, available resources and expertise, existing planning techniques and documents. Besides local context factors, several general trends and common considerations for ensuring capacity building, knowledge sharing, engagement from local stakeholders, and high impact can be mentioned:

- ✚ Cities must have commitment and support of motivated politicians to get accountability, leadership, direction and control of the smart city process.
- ✚ In order to get full political support in a long-term vision of the city, clarity of purpose is needed from the very beginning.
- ✚ A paved way to success implies early stage engagement, which is highly important.



- ✚ Regular meetings must be held in order to get support from all levels of an organization and preserve and strengthen stakeholders' confidence. This is for both external and internal level, and it could help a city to overcome the habit of working in silos.
- ✚ Small pilot projects involving different departments within the municipality can help and can show the effectiveness of a smart solution.
- ✚ City governance is crucial in horizontal processes, as well as the management team.

3.8 Online resources

The reader can find below several links to relevant websites containing information, articles, publications and videos by the three Fellow Cities.

Gdańsk

- [Gdansk get-together: 2 days of smart city exchanges at the RUGGEDISED project assembly.](#)
- [Projekt Ruggedised: w drodze do energooszczędnego i czystego Gdańska](#) (The Ruggedised project: on the way to an energy-saving and clean Gdańsk)
- [Gdańsk – pierwsze inteligentne miasto w Polsce](#) (Gdańsk - the first smart city in Poland)
- [O Gdańsku przyszłości w Brnie](#) (About Gdańsk of the future in Brno)
- [Projekt Ruggedised. Zmiany dla lepszej przyszłości planety rozpoczynają się w miastach ROZMOWA](#) (Project Ruggedised. Change for a better future for the planet starts in cities. CONVERSATION)
- [Smart city? Technologia to nie problem, najpierw potrzebna jest współpraca między ludźmi. ROZMOWA](#) (Smart City? Technology is not a problem, cooperation between people is needed first. CONVERSATION)
- [Ruggedised. Energia dla przyszłości Gdańska](#) (Ruggedised. Energy for the future of Gdańsk)

Brno

- [MUNISS Inter-university student competition. Téma 41 \(Špitálka\)](#) - Analysis of smart solutions in Špitálka. The aim of the second additional study was to analyze and evaluate plans for forthcoming smart solutions within the Ruggedised project for the Špitálka site.
- [Špitálka Media site](#)

Parma

- [Parma Futuro Smart](#), together with the other actors of the territory, seeks to trigger tangible results towards the Parma of the future: a territory that is more "connected" with the people responsible for its management / planning, more "readable" by those who live or live in the area wants to discover and more resilient during critical events.
- [Interview with the former councilor for mobility and environment Tiziana Benassi who supported the project](#) *"Parma aims to develop its own smart city strategy capable of putting the various skills and initiatives into a system, developing a vision of the city, a roadmap and a plan of initiatives and investments to achieve the objectives of sustainability, innovation and inclusion identified in the path of participation. Parma Smart City is a city that has deep roots in tradition and that knows how to look at the world of innovations together with the most modern European cities."*



4. Conclusions

This report summarises the lessons learned by the Fellow Cities during the life of the RUGGEDISED project regarding replication activities. The topics addressed in those activities might be of interest, mainly to the Fellow and Lighthouse Cities in their particular replication processes as one of the pathways of becoming a Smart City. But this information can also be useful to all the project partners who want to dig deeper into concrete aspects related to the replication of smart solutions.

Each Fellow City has greatly benefited from the sharing of knowledge that is essentially at the core of the replication approach in RUGGEDISED. In order to gather and systematize the knowledge that Lighthouse and Fellow Cities already have, the Fellow Cities should keep fluid communication channels with the Lighthouse Cities, even able to live beyond the end of the project. This is fundamental to guarantee that cities can continue steering and supporting the local Smart Cities activities over time.

Joanna Zbierska, project RUGGEDISED Gdańsk city manager

“The RUGGEDISED project lasted a very long time, six years. As a Follower and then Fellow city, we were to observe the activities of Lighthouse Cities, and then prepare a replication plan. Initially, the innovative solutions of our partners seemed to be very technically advanced, expensive and even unattainable, but over time it turned out that we implement similar projects often as in the case of Open Data of the Public Transport Authority or the revitalization of the Lastadia quarter without the contribution of European funds or only with a small EU co-financing. Significant changes also took place at the level of strategic planning of the city's development. GREEN City has become the main strategic goal of the city's development. In the organizational dimension, an important change was the creation of the Energy Office responsible for all issues related to energy in the city, including RES.”

As it is known, replication must take into account the local factors of success that can hardly be generalized in any context, especially very different ones (e.g. settled urban patterns VS new urbanization, geographical context, climate, institutional and historical specificity, etc.). It is about learning best practices and lessons against failures but paying attention to avoid “copy-paste strategies”. A two-fold approach is needed for the replication analysis: On the one hand, the local factors must be considered: socio-cultural barriers, Public/Private sector involvement, legal constraints, local infrastructure and so on. On the other hand, solution specific factor must also be considered: Interoperability/standards, TRL or SRL, costs and revenues, CO2 savings, user-friendliness...



Figure 9: Ingredients for successful Replication



Another relevant aspect to be considered by the Fellow Cities is that the necessity to involve in the aforementioned activities the relevant partners and stakeholders for the development of the Smart City (i.e., industry, research, civil servants, non-governmental organisations etc.). It can be said with a high degree of satisfaction that external stakeholders have been very involved throughout the project. On the other hand, one important challenge that the Fellow cities faced was to overcome not expertise issues but a kind of silo mentality in their own administrations, like the traditional ways of working.

Enzo Bertolotti, project RUGGEDISED Parma city manager

“After joining the project, the city of Parma has taken a step forward in terms of the permanent involvement of stakeholders and local companies. Before there was perhaps a mainly institutional dialogue with industrial partners, now instead, thanks to the project activities, through workshops and round tables and other related events and a dedicated website (Parma Futuro Smart), a local governance has been created to support all activities for the development of the Action Plan”

Travel restrictions due to the Covid-19 emergency, have hampered the study tours, which are considered in principle the most effective means of face-to-face, peer-to-peer knowledge exchange. Online alternatives do not allow to reach the same level of operational, hands-on observation of the smart solutions; let alone the personal ingredient that sparks engagement with stakeholders and partners. In sum, the continuous discussion and exchange of expertise and know-how in specific topics with the Smart Solutions’ responsables of the Lighthouse Cities has helped all Fellow Cities. Indeed, thanks to this process Brno, Gdańsk and Parma have enriched their knowledge on both technical and non-technical themes related to specific smart solutions. This set of activities is crucial for acquiring knowledge resulting from good practices and, at the same time, for consciously dealing with the potential barriers that could be encountered and learning from the failures, identifying the best way to avoid them.

Lukáš Grůza, project RUGGEDISED Brno city manager

“Peer to peer collaboration is essential for these kinds of projects. I would like to emphasize and underline the need of it. In this respect, I am very happy about the recent activities of the Scalable Cities initiative, which go beyond individual projects and promote these forms of direct connections and collaboration, e.g. expert reviews, expert missions, study tours etc.”

As a final point, it is worth mentioning that all SCC01 projects are conducting similar programmes using similar technologies in similar environments. They have learnt from each other and built on that learning – moving forward and building capacity to enable replication in similar urban environments. In this regard, dissemination and workshops have proved to be very useful instruments to share knowledge. It is no coincidence that knowledge sharing and capacity building are the focal points of this collaboration.



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