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Executive summary

In the RUGGEDISED project, the three Fellow Cities of Brno, Gdańsk and Parma are 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.

An intensive process of capacity building and knowledge transfer has been established to reach these formidable and arduous objectives. The process consists of four main blocks of activities which are developed at European and local level:

- Empower the cities through knowledge sharing and training;
- Assess the state of play, establish and run the smart city governance groups;
- Deliver a vision and an implementation roadmap with participatory foresight;
- Deliver the Replication and Investment Plans.

This report intends to give a description of the results obtained by the Fellow Cities in the task of defining a strategic city vision and implementing a roadmap of upcoming actions and investments in energy, mobility and ICT sectors. A participatory foresight approach – extensively explained in the third chapter – has been adopted in RUGGEDISED with the aim to facilitate the strategic planning and the effective establishment of a collaboration platform able to collect and catalyse all the interests of the community. This process has been implemented in each Fellow City and has been steered by Governance Groups ensuring the involvement of a wider group made up of all the local stakeholders relevant for the development of the Smart City.

All Fellow Cities have finalised their participatory foresight process and their medium-long term city visions and roadmaps – defined thanks to the local participatory process – which are both summed up in this report.



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1. Introduction

Successful foresight in support of replication processes in the smart city context relies on well-designed participatory mechanisms, and their success depends on the involvement of the “right” participants, the “right” moderators and a thorough coordination of all participatory steps for guidance. Participatory foresight allows strategic planning to break organisational silos, overcome institutional inertia, and avoid sporadic action. It effectively establishes a collaborative forecasting platform that is able to channel the often-fragmented energy and intelligence present in our communities to design a concrete way forward. The approach seeks to bring together institutional, technical, economic, ecological and societal stakeholders to perform a prospective analysis to create shared vision of the future smart city (the strategic vision), as well as a mid-term tactical decision-making to accomplish that vision (the roadmap). Each participatory foresight process in RUGGEDISED has been tailored to the specific local requirements in terms of objectives, available resources and expertise, existing planning techniques and documents.

With the structure of a short report, this document summarizes the application in RUGGEDISED of the replication process and the participatory foresight approach and subsequently the progress attained by the RUGGEDISED Fellow Cities during the project.

In essence, this report intends to show the results obtained by the Fellow Cities in the course of building a Smart City Vision and identifying a delivery Roadmap by means of using the methodological framework offered and adapted accordingly to every city.

The structure of the document is as follows:

- Chapter 2 provides a general overview of the RUGGEDISED Replication process;
- Chapter 3 introduces and illustrates the concept of the participatory foresight approach, its applications in RUGGEDISED and the role of the Community of Practice (CoP);
- Chapters 4, 5 and 6 give for every Fellow City thorough details about their strategies, the adopted foresight processes, the visions and the roadmaps.
- Finally, Chapter 7 outlines the main findings, conclusions and lessons learned from the participatory processes among several cities, projects and partners.



2. RUGGEDISED Replication process in a nutshell

The Replication process of RUGGEDISED has been designed with the aim to guide and support the Fellow Cities of Brno, Gdańsk and Parma in getting ready for the replication of smart solutions inspired by those implemented in the three Lighthouse Cities: Rotterdam, Glasgow and Umeå.

Concretely, the three Fellow Cities are assisted in the development of their Replication and Investment Plans for the deployment of local smart city projects. Each Fellow City will determine the formal binding level of these plans (e.g. should they be officially approved by the local authorities or not), with the ambition of becoming Lighthouse Cities, and start deploying the smart solutions identified in the plans immediately after the closure of RUGGEDISED project.

To reach this challenging objective, an intensive process of capacity building and knowledge transfer has been set up and structured in four main blocks of activities unfolding both at European and local levels (Figure 1).

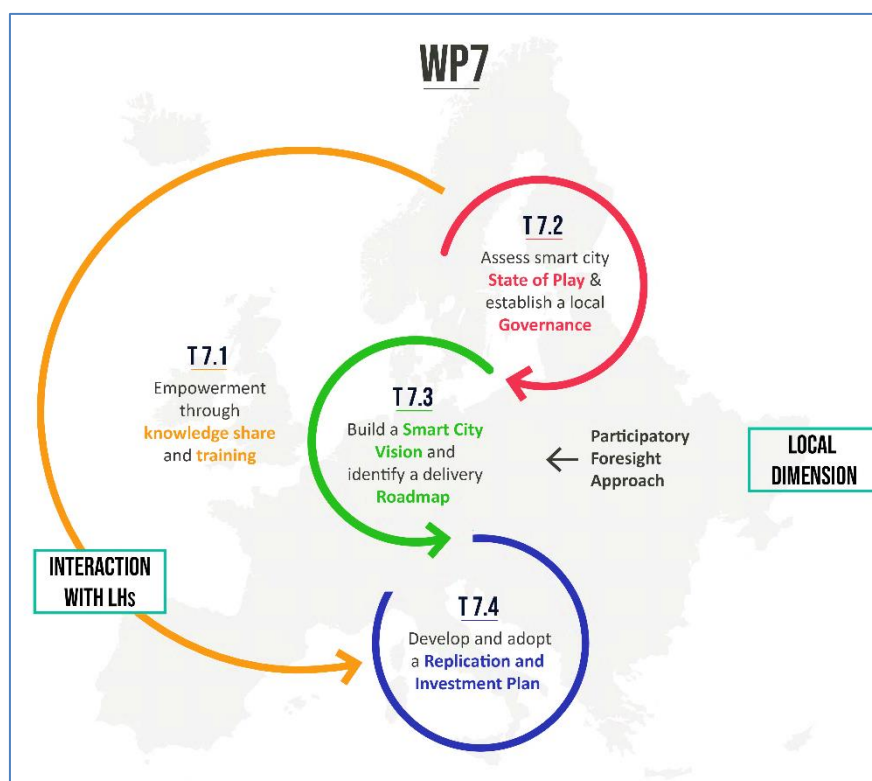


Figure 1: Replication process in RUGGEDISED (WP7)

❖ *Empower the cities through knowledge sharing and training (T7.1)*

Knowledge transfer is a term used to encompass a broad range of activities envisaged to support mutually beneficial collaborations between the societal players taking part in the smart city activities of the RUGGEDISED cities: authorities, universities, industries and businesses, and the civil society.

Within RUGGEDISED, knowledge transfer has been applied making use of different modalities and means of implementation. Fellow Cities, indeed, are involved in an intensive process of capacity building and knowledge transfer aimed at supplying the competencies for an informed and reliable replication of the smart solutions. 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.



To this purpose, several opportunities for knowledge transfer between Lighthouse and Fellow Cities are foreseen in the replication process in RUGGEDISED: Replication Workshops; Study Tours and ad hoc webinars, web meeting and conference calls¹.

The following three blocks of activities shall be understood as consecutive steps that are due to take place on a local scale in each of the Fellow Cities.

❖ ***Assess the state of play, establish and run the smart city governance groups*** (T7.2)

The Replication and Investment Plans are to be considered as the reference documents that the Fellow Cities are committed to and will not substantially modify. In order to reach this final milestone, an initial phase where actors review the state of play on their smart city context and prepare the work is required.

Moreover, to ensure that the Fellow Cities start off on the right foot the long way towards becoming a Smart City, proper forms of Smart City Governance have been established in compliance with the local needs, requirements and traditions².

This is an ongoing set of activities and significant results have been already achieved. Each Fellow City, indeed, established an effective local governance group with a strong commitment sustaining and steering smart city's activities and initiatives. In all cases, efforts were focused on ensuring solid group structures able to persist after the end of the project, being able also to "survive" the numerous political elections and successions of several local governments. This is fundamental to guarantee that Fellow Cities can continue steering and supporting the local Smart Cities activities over time.

❖ ***Deliver a vision and an implementation roadmap with participatory foresight*** (T7.3)

Another key step leading up to the development of the replication and investment plan is the definition of a strategic city vision and a roadmap of upcoming actions and investments in energy, mobility and ICT sectors. To this purpose, a participatory foresight approach has been adopted in RUGGEDISED with the aim to facilitate the strategic planning and the effective establishment of a collaborative platform able to collect and catalyse all the interests of the community. This process has been implemented in each Fellow City and steered by the respective Governance Groups that provided for the involvement of a wider group made up of all the local stakeholders relevant for the development of the Smart City.

All Fellow Cities have almost finalised their participatory foresight process³ and are up to define their medium-long term city visions and roadmaps.

The results of this work are described in this report.

❖ ***Deliver the Replication and Investment Plans*** (T7.4)

As mentioned, this is the final goal of the entire replication itinerary and, once their Replication and Investments Plans are developed, Brno, Gdańsk and Parma will become in turn Lighthouses and will concretely start on their path towards becoming Smart Cities.

¹ Details and outcomes of this activity are reported in D7.6 "Reports on technical workshops"

² 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).

³ Reports of the local workshops are reported in D7.5 "Reports from the Governance Groups meetings"



3. The participatory foresight approach

Foresight is a conceptual framework as well as a process of prospective analysis and informed decision-making that includes mid to long-term considerations of likely, possible, or even just thinkable futures (Miles, 2008)⁴. It is about anticipating transformation and change in different fields (e.g., technological, social, socio-economical, ecological, or political).

The concept of foresight

In a way, foresight is an answer to a lack of effective governance strategies dealing with wicked problems and uncertain future developments as it allows to take possibly hidden structural changes and weak signals into account. Thereby, the focus is on the increasing need for generating scenarios and anticipatory strategies for improving the basis of today's decision-making.

As we can observe, cities are confronted with a **variety of societal challenges**, such as climate change, ageing, poverty, environmental hazards, security, or ecologic sustainability. The following could support cities in tackling those issues,

- participatory foresight processes are expected to provide an adequate tool;
- answering to the demand for concerted orientation;
- visions by integrating diverse perspectives, disciplines and implementation of results;
- mobilizing stakeholders through participation.

Such forward looking and participatory processes are expected to provide transformative impulses to discourses held by the public and/or private sectors as well as to condense facts, to synthesise knowledge to take tacit knowledge from various disciplinary backgrounds into account. The goal is to give insights and recommendations for action regarding the aforementioned challenges, where conventional, top-down instructive attempts to accelerate change often slow the process down as they activate resistance of people concerned.

To overcome this caveat, social systems depend on the capability of collective sensemaking processes. Independently from people's objectives and interventions, reality becomes what gains an impact and that is why the intense communication within foresight processes can better influence transformation of social systems.

The need for a participatory approach

Particularly, telling success stories gives a baseline for discourses focusing on desirable futures, thereby opening options for exploiting given collective knowledge repertoires of experts and civil society as well as decision makers concerned. This process of communication sparks enthusiasm and intentness to realize challenging actions based on the knowledge that future changes only can be based on past successes. Nobody can drop out from his or her experiences, roles and contexts: Dialogue-based participatory foresight processes pick up and combine all these corpuses of knowledge and diverse perspectives based on reliance, curiosity and appreciation for reliable and jointly assessable future oriented solutions.

Surely, participation needs more a higher amount of time and money compared to expert driven approaches. This disadvantage is accompanied by specific benefits: on the one hand, results gain much more acceptance and commitment to action, and on the other hand, cross-sectoral, cross-discipline and cross-silos networks emerge enhancing sustainability in all realms affected. Thereby, shared images of the future facilitate coordinated actions of different public and private actors and organisations in the present.

One of the main benefits of participatory foresight processes is that, with only little efforts, radical changes of mental models and patterns of behaviour of organizations and people can come to reality. At the end of a foresight process participants build on the shared insights, and

⁴ Miles, I. (2008), "From futures to foresight", in Georghiou, L., Cassingena, J., Keenan, M., Miles, I. and Popper, R. (Eds), The Handbook of Technology Foresight, Edward Elgar, Aldershot.



the chances that they adapt their strategic or tactical decision making are high.

Related to municipal coordination, foresight may be used as strategic intelligence tool aiming at **more rational decision-making** across policy fields and time by highlighting the longer term and extended perspectives. It also aims at advocacy coalition building by establishing a broad commitment to the realisation of a **shared vision** by highlighting a given challenge and gathering support around it. Last but not least, it is implemented as an instrument of **managing the social context of the participatory process** by realising a hybrid set-up for strategic reflection, debate and action offering new frames and thus changing old debates by means of a wide participation.

*Supporting
Decision-
Making
process*

Foresight is an innovative, multi-method framework: In short, Foresight can be understood as a conceptual framework for combining and integrating future oriented methods in order to support informative decision-making processes within a highly complex environment (Miles, 2008)⁵. Foresight processes are **tailored to the specific needs** of the involved stakeholders as well as to the allocation of resources (e.g., people, expertise, technology, or time). A wide range of foresight methods are established and often they are combined in a tailored way that fits the purpose.

*Foresight
methods*

In order to support decision-makers in setting-up foresight processes, Wilhelmer and Nagel (2013)⁶ correlate **foresight methods** according to these three phases:

1. The **Pre-Foresight** – goals, orientation, the scope of time-horizon, stakeholders;
2. The **Main-Foresight** – environmental analysis of drivers and megatrends, emerging issues, scenarios and visions;
3. The **Post-Foresight** – strategies and policy recommendations, networks for decision, evaluation (Miles, 2008; Popper, 2008)⁷.

Popper (2008) provides a good overview of Foresight methods, grouping them into **four categories**: Expertise, interaction, evidence and creativity (see Figure 2).

⁵ Miles, I. (2008), "From futures to foresight", in Georghiou, L., Cassingena, J., Keenan, M., Miles, I. and Popper, R. (Eds), The Handbook of Technology Foresight, Edward Elgar, Aldershot.

⁶ Wilhelmer, Doris, und Reinhart Nagel. Foresight-Managementhandbuch: das Gestalten von Open Innovation. 1. Aufl. Management / Organisationsberatung. Heidelberg: Carl-Auer Verl, 2013.

⁷ Popper, Rafael. „How Are Foresight Methods Selected?“ Herausgegeben von Maurits Butter. Foresight 10, Nr. 6 (15. Oktober 2008): 62–89

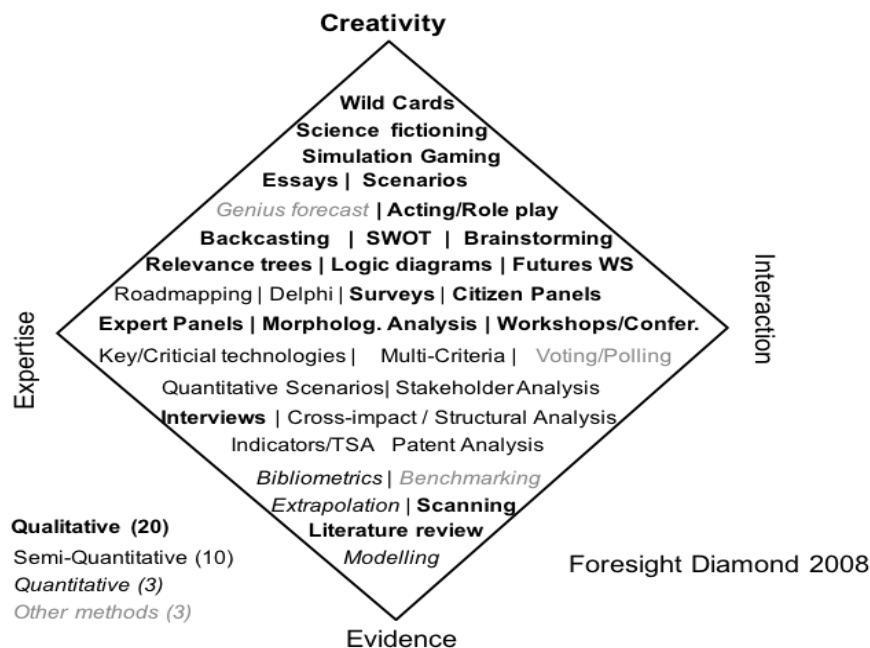


Figure 2: Popper's Foresight Diamond (Popper et al., 2008)

Foresight methods aim at:

1. **Collection and interpretation** of available expertise by means of expert-panels, interviews, scenario-building, road-mapping, etc.
2. **Extrapolation** of evidence-based knowledge from publications, patents, market/trend analysis, modelling, bibliometric searches, etc.
3. **Interaction** by means of Future Conferences, Open-Space, World-Café, citizen-panels, etc.
4. **Co-creation and creativity** by means of wild cards, improvisation, play-back theatre, role-play, science-fictioning, graphic facilitation, etc.

Participatory-Foresight, demands an adequate combination of these methods aiming at pacing people in their mental models as individuals and stakeholders as well as leading them into new dimensions of observing and interpreting their environment.

Foresight architecture combines project management tools as well as set-ups for social change processes: Participatory Foresight processes combine both logic and structural elements of project management as well as of (trans-)organizational development. **A core team**, a **steering board**, an **advisory board** and a **stakeholder forum** are essential for governing Participatory Foresights. This architecture was adopted in RUGGEDISED and thoroughly tailored to the different Fellow Cities (See also D7.1 "Initial Replication Assessment") included between 60 and 250 people.

Foresight Architecture

The **core team** is coordinated by a foresight process-owner, conceptualizing and facilitating the overall set of procedures and activities. Both the process-owner and the core team serve as the heart and engine for conducting co-creation processes.

Members of the large **stakeholder forum** assume responsibility for shaping processes and results by contributing with their personal experiences and expertise. Another key-mission is to reflect intermediate results with confidantes of "home organizations" thus spreading and adapting foresight results to their organisation's requirements.

A strategic **steering board** is an optional element: it flanks the overall process, thereby involving



clients to an unusually high extent. This allows for controversial discussions and mutual learning processes of clients as well as foresight core teams.

A supplementary **advisory board** is also optional and can bring together civil servants with researchers from universities and applied research in regular evaluation meetings.

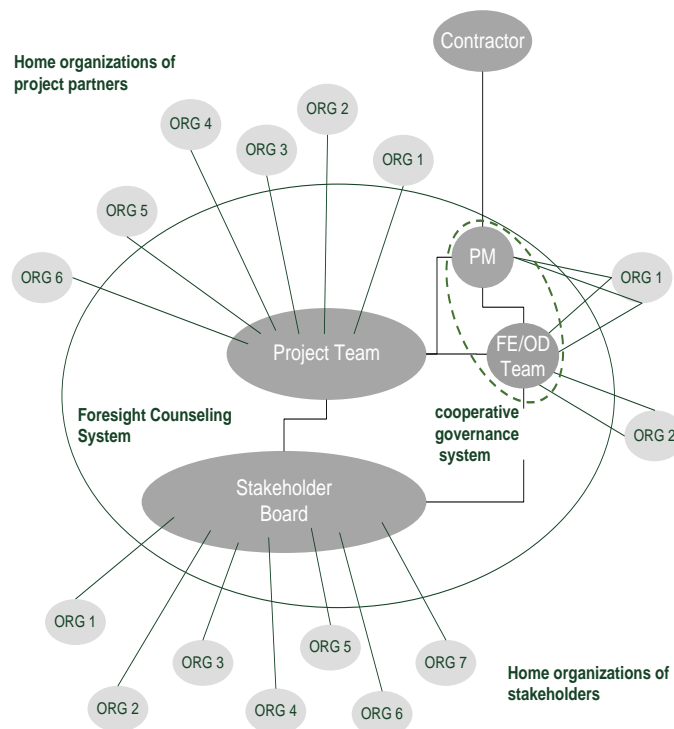


Figure 3: Social Foresight Architecture (Source: Wilhelmer/Nagel 2013)

These elements of foresight architecture which aim at managing the context of the participatory foresight process (**context-management**) offer a suitable **communication framework** for enhancing the unfolding of trust, reliability and self-responsibility as well as the emergence of novel knowledge. Three set-ups of context-management are bundling the structural elements of project management and (trans-)organizational development. They are aiming at a) process-management, b) generating new information and c) transformation of collective and individual mental landscapes and patterns at stakeholder-forums.

Foresight architecture therefore provides the adequate set-ups:

- **governance set-up:** in charge of conceptualizing the process design and conducting/adapting the foresight-process (project-manager, core-team; steering-board, advisory-board).
- **development set-up:** responsible for generating new knowledge by searches, patent analysis, modelling, etc. (project-members)
- **transformation set-up:** responsible for contributing experiences, elaborating plausibility checks, assessments and allowing transformative change of all actors involved (large stakeholder forums)



Every foresight process is tailored with respect to its realm and appropriate goals. Regarding co-creation, foresight processes consist of **off-stage elements** (preparatory steps such as desk research, surveys, modelling) and **on-stage elements** encompassing several stakeholders' workshops (forums).

Foresight processes can be structured around four to six "on-stage" stakeholder forums bringing together stakeholders from industry, research, civil servants, non-governmental organisations etc. Stakeholders are participating all along the process, serving as hosts within dialogue rounds, discussing with strategic targets and optional measures on eye level and co-creating a creative visioning and scenario building process. In order to allow a glimpse of how a foresight process could look like, an hypothetical "**on-stage foresight process**" is outlined in the draft concept:

1. Kick-Off of stakeholder forum: "What for Foresight? - A joint departure"

Tasks: framing the scope, clarifying roles, discussing and agreeing objectives and steps; providing basic information about both participatory foresight approach and foresight concept, outlook to dates and venues.

2. Scenario 2050 Forum: "Thinking alternative futures"

Tasks: Identification of main societal, technological, economic, environmental and political drivers in specific contexts (trend-analysis, environmental-analysis). Mental future journey by a guided imagination enabling stakeholders to change their view from present time to a future perspective of 2050. Building future trajectories and story lines providing a paradigmatic base for developing guiding scenario-frameworks for storyboards. Embedding "personas" in concrete scenes of (un-)desirable life scenarios of 2050.

3. Vision Forum 2050: "Dreaming a desirable future and breaking down future orientation"

Tasks: Performance (e.g. improvisation theatre) and assessment of approximately five life scenario sketches addressing key messages of about four alternative best case scenarios and one dystopia scenario to the stakeholders, allowing both, a humorous working atmosphere in the large group as well as the deduction of qualitative objectives. Visioning process of a desirable (normative) future and deduction of qualitative and quantitative objectives 2050 as well as guiding long-term issues for subsequent road mapping process.

4. Roadmap Forum 2050: "Strategic planning for uncertain and unforeseeable futures"

Tasks: joint identification of transformation goals and drivers as well as change agents in the field; road mapping of bundles of measures (functional perspectives, information types) and strategic planning. Robustness check of bundles of measures.

5. Action Plan Forum 2020: "The end of conceptualization as starting point for action!"

Such a forum aims at achieving overall foresight objective by putting in place measures from various policy fields. Existing policy measures are analysed and gaps in the policy landscape are classified and identified. Demand stemming from policy analysis carried out before "on stage stakeholder forums" is defined and policy recommendations and implementation plans are defined.

**Contents and
Timeline**



3.1 Application in RUGGEDISED

In RUGGEDISED Project we aimed at implementing two major success factors for the forward-looking activities to be carried out in the RUGGEDISED Fellow cities:

- a suitable communication framework for carrying out a participatory foresight process on local level and
- a comparable, content and timeline driven foresight architecture.

The whole process was accompanied and supported by joint, overarching meetings between the Fellows cities, the accompanying research institutes and Foresight experts. This Community of Fellow cities was set up by the AIT team as a tool for jointly designing and evaluating the joint project kick-off event as well as the three local Foresight Forums within each of the Fellow cities (See next paragraph “Summary on the role of the Community of”).

Within our first **Community of Fellow Cities** session, Brno, Gdańsk and Parma were invited to implement a **Smart City Leader** (local project manager), a **Core Team** supporting the Smart City Leader during the foresight process by facilitating the stakeholder workshops and contributing to organisational tasks and an **Advisory Expert Board**, including previous and current local project managers of sustainability projects in the cities.

This communication framework aimed at allowing a **joint development of a comparable content and timeline-driven RUGGEDISED foresight architecture** as well as a **specific RUGGEDISED method-mix** by including Smart City leaders and their Core Team members into the regular CoP planning workshops.

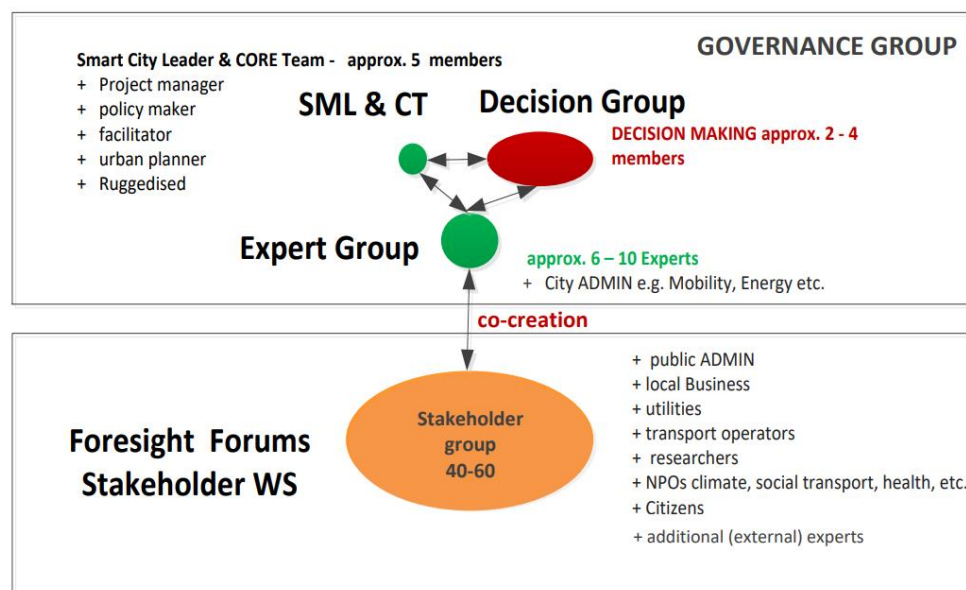


Figure 4: RUGGEDISED Foresight Architecture (Source: Wilhelmer 2017)

The local Core Teams and Smart City Leaders were responsible for designing and facilitating the local foresight processes. Both the Smart City Leaders (process owner) and the Core Team served as the heart and engine for conducting **co-creation processes**. The Community of Fellow cities organized frequent workshops on specific topics and activities to support this task of local implementation of the foresight process (see figure 5 and 6 on the foresight architecture and timeline). Citizens and other stakeholders were invited to the local large **SMART City Governance Group** within the regular workshops for each city and of course changed depending on the political situations e.g. in Gdańsk and Brno. Within RUGGEDISED, reception by and influences from the important local decision-makers (decision making group) rather remained a “black box” and had only been partly discussed within the community of Fellow cities workshops. It only became visible in the case of Brno, where, after an election and the change of mayor, despite the exemplary anchoring of the vision, goals and indicators, the implementation steps of the strategic roadmap were slowed down. However, the back-up by the supportive steering group and RUGGEDISED as quite large important European project reduced the tendencies of the new city government to question existing results of the previous governmental period and contributed to a ongoing implementation of the Brno smart city vision.



Governance Roles	Tasks
Core Team & Smart City Leader	Design & organise & facilitate the process
Expert Group	Desk research, analytical work, Formulation of narrative scenarios, Documentation / Visualisation Vision; Documentation & Visualisation Roadmap
Decision Group	Approval of Design/ Programs of GOV-Forums (WS); Decision making regarding Scenarios, Vision, Roadmap, Replication and Investment Plan
Smart City Governance Group	Learning from Lighthouse cities (mainly in workshops). Co-Creation of Foresight Process, Plausibility check of Replicability & Investment Plan

As indicated above, the local **foresight process** was planned in close connection to the **community of Fellow cities workshops**, which were foreseen to support the preparation and the follow up of the local foresight forums. Thereby, the timeline of the **overall process** is reported in Figure 5 below:

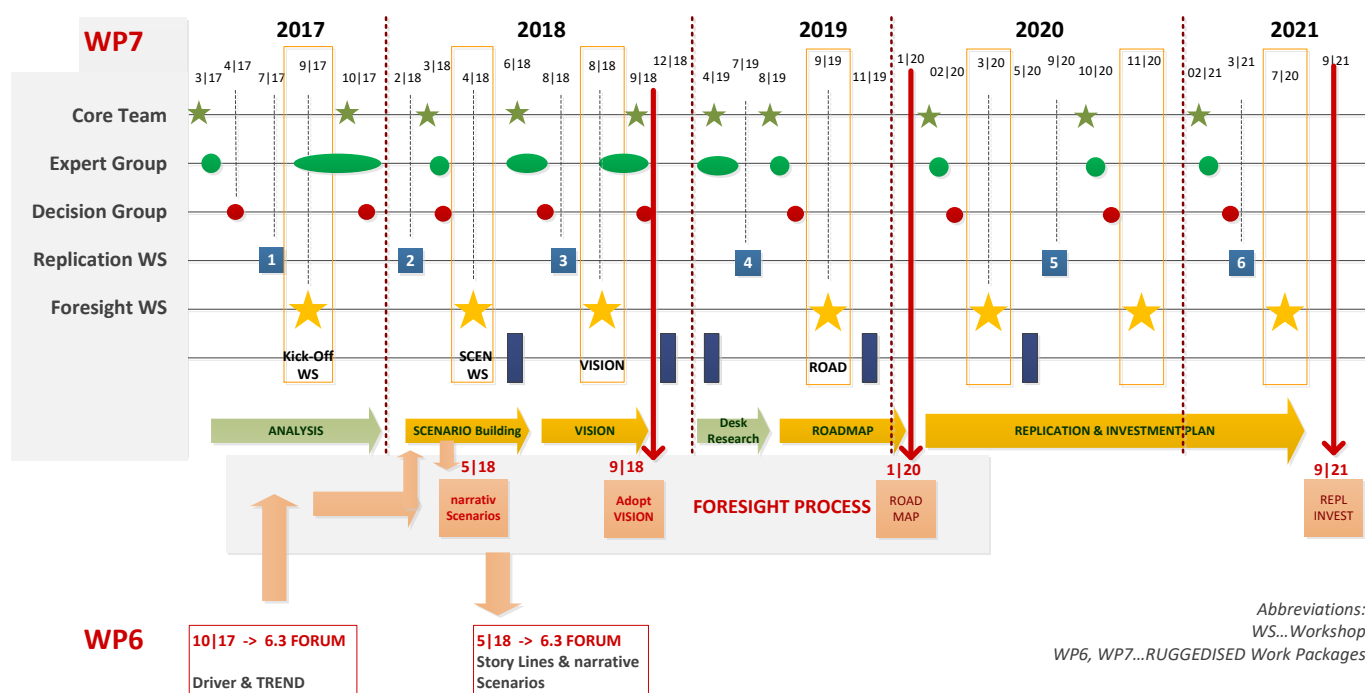


Figure 5: Timeline of foresight architecture (Source: Wilhelmer 2017)

The starting situation in the cities was different: Gdańsk had recently carried out a citizen participation process and was sceptical about whether the foresight process would bring about an unnecessary repetition and thereby cause resentment in the city and among the key stakeholders. Brno was already in the middle of a foresight process and therefore could not integrate itself into the schedule planned by RUGGEDISED. Parma was more used to technology-driven processes and was accordingly uncertain about what the involvement of a large stakeholder group could bring in.



The RUGGEDISED Team's answer to this initial situation was that "visioning" would be a **periodic task for cities**, which should take place approximately **every 5 years** in order to take new developments into account in adapted strategic goals. In order to reduce the uncertainty regarding participatory stakeholder processes, all cities were asked to choose **local process consultants** to support them in the stakeholder dialogues. Parma chose an external consultant who had already proven itself in other processes and was supported also by ISINNOVA in the process set-up, while Gdańsk was very well served with the consortium partner PICTEC. Brno, in turn, was invited to a "good practice role" due to the advanced starting situation: Brno's task was to present the goals, methods and results of its own Foresight Forum to the other two Fellow Cities during the CoP meetings.

These inputs complemented the methodological framework, which the AIT team made available to all three cities, as a **basis for planning**. The advantage for Brno was, in turn, that they were able to supplement the SCENARIO forum, which was not part of their schedule, and thus complete their own approach.

When implementing the foresight process, the AIT Team chose the following **content and timeline driven foresight approach**, which had already proven itself in several Austrian cities^{8,9,10} like Villach, Vienna, Linz, Amstetten, Kremsmünster, etc.

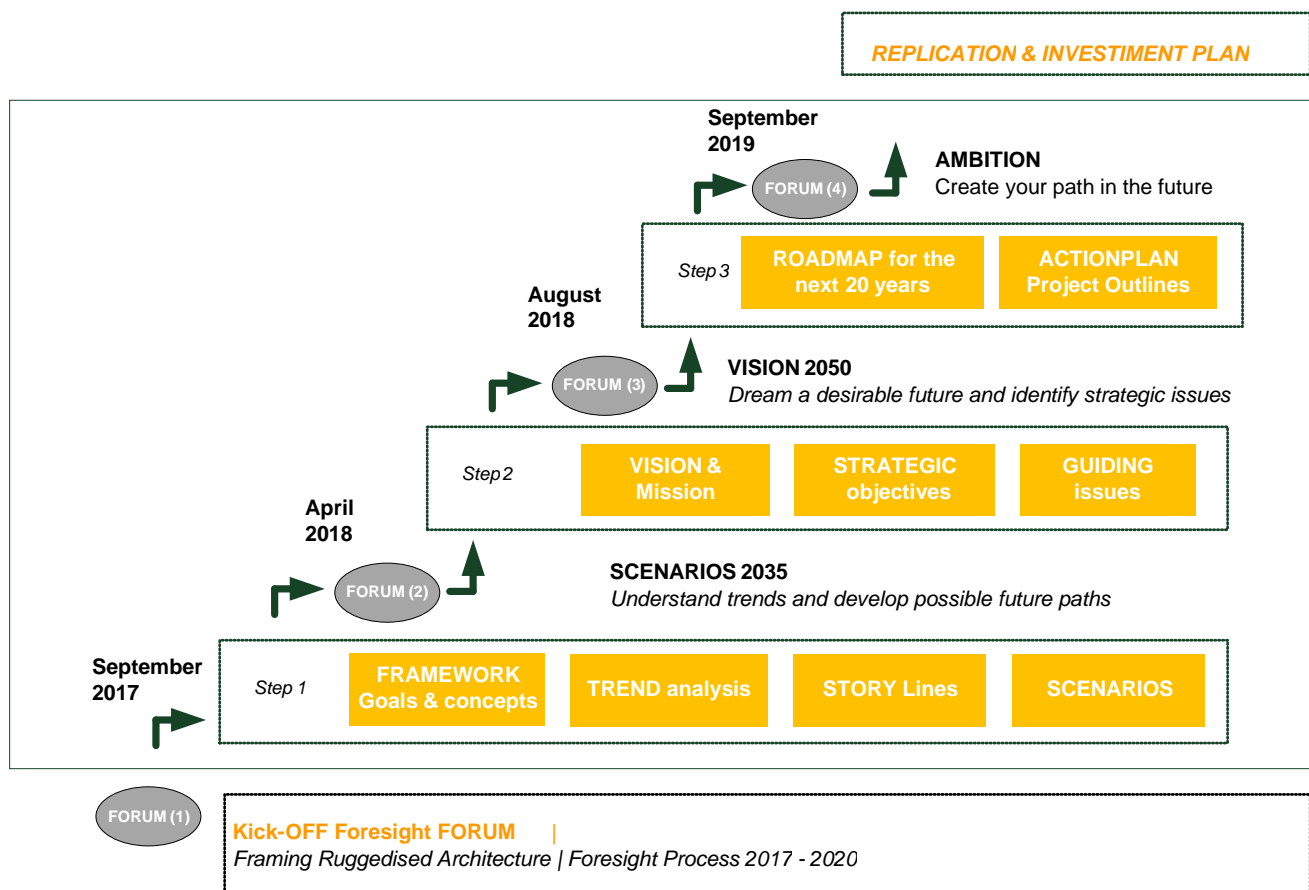


Figure 6: Content of foresight architecture (Source: Wilhelmer 2017)

The main elements/steps of the foresight process had been assigned specific goals and content as outlined below. This process was discussed and **coordinated with the representatives of the cities** and supported by the respective experts and scientists (project partners and local facilitators).

⁸ www.smartcities.at/stadt-projekte/smart-cities/

⁹ www.amsl2030.at

¹⁰ <https://www.schaltwerk2030.at/>



1. **Kick-Off: “Setting the Scene”:** Introduction of RUGGEDISED project and clarification of the European “smart city” concept; Contextualisation of RUGGEDISED by interlinking it with ongoing research projects. Case for action for transformative change: Upcoming Grand Challenges for cities and Citizens’ dreams of an attractive future; Introduction of “participatory foresight approach” and decision making on application fields for transformative change towards quality of life 2050; Stakeholder Invitation: Communication of time frame and dates and a heartily welcome to join the process.
2. **Local Scenario 2050 Forum: “Thinking alternative futures”:** Identification of main societal, technological, economic, environmental and political drivers in specific contexts. Building future trajectories and story lines providing a paradigmatic base for developing guiding scenario-frameworks for storyboards. Embedding “personas” in concrete scenes of (un-)desirable life scenarios of 2050.
3. **Local Vision Forum 2050: “Dreaming a desirable future and breaking down future orientation”:** Performance and assessment of life scenario sketches addressing key messages of about four best case and one dystopia scenario to the stakeholders, allowing both, a humorous working atmosphere in the large group as well as the deduction of qualitative objectives. Visioning process of a desirable (normative) future and deduction of qualitative and quantitative objectives 2050 as well as guiding long-term issues for subsequent road mapping process.
4. **Local Roadmap Forum 2050: “Paradox planning of uncertain and unforeseeable futures”:** Jointly identification of transformation goals and drivers as well as change agents in the field; road mapping of bundles of measures (functional perspectives, information types) and strategic planning. Robustness check of bundles of measures.

3.2 Summary on the role of the Community of Fellow Cities

To sum it up, the process of joint planning of the local implementation of the Foresight process has played an important role in legitimising the urban development strategies on the local level. The efforts and the back-up by a European project supported and stabilised the political and planning tensions to a certain extent. As RUGGEDISED has shown, this needs specific roles, architectures, formats and methods which allow for developing an effective, context-sensitive approach.

Within Ruggedised, the Communities of Fellow Cities were set up by the AIT team as a means for **jointly designing and evaluating the three local Foresight Forums**. This body thus acted as supervision for the Smart City leaders and core team members in their task of implementing and evaluating local foresight processes. The **implementation steps** included:

- 1) defining the CoP participants (Smart City Lead, core team members);
- 2) establishing a shared understanding of the participatory foresight process;
- 3) planning the CoP workshops in a way that was preparatory and Follow-up work on the local foresight forums enabled;
- 4) the implementation of the role of Brno as a good practice example from which the other cities can learn;
- 5) the consistent implementation of the planned steps.



Foresight Community of Practice

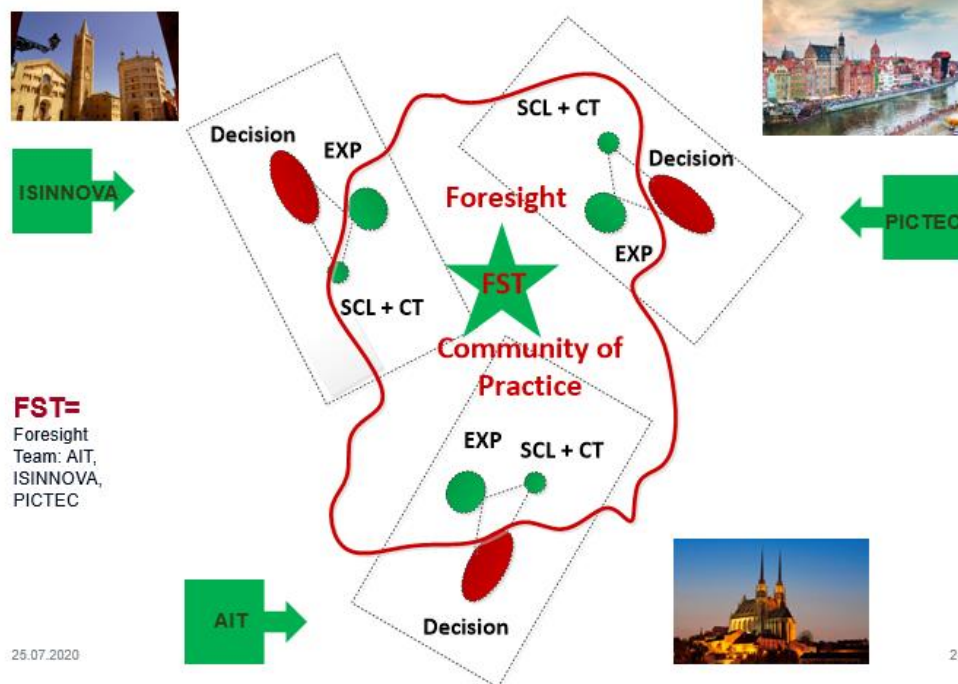


Figure 7: Community of Practice (CoP) Architecture (Source: Wilhelmer 2017)

ISINNOVA took over the special role of supporting Parma, PICTEC supported and provided its advice to Gdańsk and AIT guided and followed closely the process in Brno. AIT led the process, setting up the conceptual framework and provided its expertise along with useful recommendations on the steps to follow and the expected results. This division of tasks proved to be helpful in designing a tailor-made and place-based process, but still following a joint understanding of the foresight process and allowing for comparison as well a mutual learning. The Fellow Cities always adapted and implemented the recommended methods in their own way with regard to their own abilities and preferences and keeping into account their local context. However, the process of joint planning and assignment of local responsibility for the implementation within the Community of Fellow cities workshops has clearly supported the building of trust as well as coalitions within and between the cities over time. This has been recognized by the RUGGEDISED project partners and been positively evaluated by the cities themselves (see chapter on conclusions).



4. Brno

4.1 Brno Smart City Strategy

Strategy #BRNO2050 represents the **main strategic development document** of the City of Brno. Its main contribution is to **set key goals and priorities of the city development**. The strategy will establish a **framework for the direction of partial sectoral policies** and will be the **foundation of active decision-making** in the medium- and long-term.

Strategy #BRNO2050 (Figure 8) is divided into three parts:

- *Strategic part* – on the level of vision, strategic values and city development goals, designed for a longer time period (2050);
- *Programming part* – set for shorter time period (2028) and includes specific priorities and measures;
- *Action plan* – set for the shortest time horizon (2020) and will specify exact activities and projects to be implemented.



Figure 8: Strategy #BRNO2050

This “modular system” allows a continuous updating of the different parts of the strategy while maintaining a long-term vision of city development.

In December 2017, the Brno City Council approved the first part of the strategy, entitled “**#BRNO2050 – Strategic part**”, which presents a **long-term vision for the city development by 2050**, based on 23 strategic values. The vision thus presented the first comprehensive directions and goals of the future development of the city of Brno.

Following the endorsement of the long-term vision, the processing of the **#BRNO2050** strategy has moved on to the next phase. Defined strategic values of Brno by 2050 have become a steppingstone for the preparation of more specific **plans for the medium-term outlook** within five thematic groups – **ENVIRONMENT, PROSPERITY, SERVICES, RESOURCES, GOVERNANCE**, forming the vision of the city’s long-term development.

At the same time, during the development of specific plans for fulfilling the vision, there have been partial adjustments to selected goals and merging of some closely related and interrelated values, which will require some



consequent revision in the document “#BRNO2050 – strategic part” already approved by the City Council. **Error! Reference source not found.** below shows the Programming part of the Strategy #BRNO2050.

Table 1: Brno. Overview of five thematic areas for processing the Programming part of the #BRNO 2050 Strategy and associated resulting strategic values

PILLAR QUALITY OF LIFE			PILLAR RESOURCES	PILLAR GOVERNANCE
ENVIRONMENT	PROSPERITY	SERVICES	RESOURCES	GOVERNANCE
City with affordable/available housing	Prosperous city	Healthy people	City efficiently managing the water resources	Shared vision and the good name of the city
Compact and balanced city	Central European Centre VVI	Cohesive respecting city	Energy-saving, independent and resilient city	Functioning Brno Metropolitan Area
Architectural face of the city	Educated University city	Cultural city	Clean and circular city	Effective electronic administration and open data
Nature in the city	International city	Sports city	Healthy environment	Participative administration
City with effective and sustainable mobility	Globally available city	Safe city		

The guarantors of individual values and other members of the working groups have produced a proposition of the main priorities and measures to be targeted by the city of Brno over the next 10 years.

During the processing of **road-mapping part of the strategy**, the following were identified:

- clear medium-term priorities of city development within individual values,
- specific measures by 2028, through which the priorities are to be met,
- responsible institutions in charge of implementing specific measures,
- determination of the timetable for selected individual measures (where relevant).

The proposition of priorities and measures was officially published from 4 June to 9 July 2018 at www.bрно2050.cz, to allow professionals and public to comment. There have been around 150 comments, which were duly settled by the guarantors and published on that site.

Preparation process of the Strategy #BRNO2050

The new city strategy has been developed innovatively both in terms of content and process, with an **exceptional emphasis on participation by both the broad public and experts on specific fields**. Since the start of the process, the strategy has been discussed within the "city ecosystem", which is a platform made up of expert representatives from the most important sectors in Brno metropolitan area, where more than 1,000 different institutions have been approached to work together. From these institutions, the ambassadors of all six main interest groups, the guarantors for all strategic values and their aides and, as appropriate, the members of the working groups were progressively elected in a transparent manner.

The progressive processing of the strategy document has led to the establishment of the **long-term visions and objectives** for city development and to the identification of the **medium-term priorities** that will be included in new **concrete action plans**.



Table 2: Brno. Timeline of the development of the Strategy #BRNO2050

WHEN?	WHICH PART OF STRATEGY BRNO 2050 IS BEING PROCESSED?	HOW?
March – September 2017	Preparation of the Strategic Parts by 2050 (visions, values, objectives)	Workshops with representatives of the urban ecosystem, guarantors of individual values
October – December 2017		Discussion of the Strategic part within commissions, City Council and City Assembly
November 2017 – July 2018	Preparation of the Programming part by 2028 (priorities and measures)	Work in thematic working groups, activities for public involvement
August – September 2018		Discussion of Programming part in commissions, City Council and City Assembly

Since the spring of 2017, when #BRNO2050 strategy began, a large number of different events have taken place with the involvement of experts and public:

Meetings with expert public

- 3 meetings of Urban ecosystem – approx. 400 people,
- 5 working group meetings – approx. 300 people,
- 1 meeting of Brno City Council executives – approx. 50 people,
- discussions in 11 Brno City Council commissions,
- meetings in all 8 political clubs (all political parties presented in the city assembly),
- presentations in selected Brno Metropolitan Area municipalities,
- recurrent presentations of strategy within the ITI Management Committee of the Brno Metropolitan Area,
- numerous bilateral negotiations with different entities of the urban ecosystem.

Meetings with public

- several sociological surveys,
- meetings with citizens in 18 city districts – approx. 400 people,
- several multi-day events “on the streets” of the City or on the Brno Exhibition Centre as part of the RE:PUBLIKA fest,
- 3,000 responses collected within so-called Feeling map of the city and its districts,
- 3 big debates on selected city-wide topics – approx. 250 people,
- 2 exhibitions held in Urban Centre Brno, etc.

All events and meetings held were always accompanied by an on-line campaign, which took care also of creating various apps for children and adults, which enable them to be involved in the creation of #BRNO2050 strategy (on the website www.brno2050.cz). These events helped to build the above-mentioned proposal priorities and measures, alongside the visibility of what the City of Brno is up to now.

4.2 The Foresight process adopted by Brno in RUGGEDISED

RUGGEDISED project contributed to the development of #BRNO2050 strategy with the conceptualization and organization of a series of structured events. The participatory foresight method proposed in RUGGEDISED proved to be the most beneficial aspect for the success of the workshops. This approach has never been applied before in the City of Brno and raised the interest of all participants, who appreciated the opportunity to jointly work on different scenarios and to specifically discuss on city's trends and megatrends during the forums. A short description of each event is reported below.



City Strategy Kick-off meeting

Date: 22/03/2017; **Location:** BVV Trade Fairs Brno, Brno, Czech Republic

The aim of the meeting was to introduce to participants the basic scheme of the Brno City Ecosystem concept and invite them to be part of building this unique approach of collaboration. The Brno City Ecosystem is perceived as an ongoing collaboration of all stakeholders in Brno (on local, regional and national level). The objective of this collaboration is the long-term development of the city. First shorter-term goal is to start discussing the new Vision and City Strategy #brno2050.



Scenario Forum

Date: 07/09/2017; **Location:** VIDA! science centrum, Brno, Czech Republic

The objective of the workshop "Scenarios for #brno2050" was to look at the future of Brno with different eyes, meaning with a "top-down" look, with a look of the trends and megatrends that are and will be affecting Brno. The aim was to identify the most important trends for Brno, seeking to determine how they could influence the city. At the same time, it was also verified how the current draft of the vision, values and goals was consistent with these external influences. The outcomes of the workshop helped the guarantors of individual values to define the future desirable status correctly. During the workshop, nine scenario options and everyday life stories were developed.



Third Governance Forum in Brno

Date: 20/09/2017; **Location:** BVV Trade Fairs Brno, Brno, Czech Republic

The third Governance Forum was organized as an event for members of the City Ecosystem to inform them and draw up the next steps to become a smarter and more sustainable city. Apart from the summary and discussion of progress of compiling #BRNO2050 strategy, the event was also a great opportunity to honour the ambassadors of City Ecosystem for their hard work and award them with a ceremonial certificate.





Road-mapping forums (two events)

Road Mapping no.1 - Date: 23/04/2018; Location: Brno City Hall, Brno, Czech Republic

This meeting of City Ecosystem members took part one year after its inaugural meeting in March 2017. During this meeting, the first year of City Ecosystem activities was evaluated primarily by the elected ambassadors. In addition, the planned activities in cooperation with the City Ecosystem were presented to the participants.

The second part of the meeting was aimed at creating a new medium-term strategy #brno2050. During this part recent activities regarding creation of new city vision and efforts in creation of road mapping part of the strategy was presented.



Road Mapping no.2 - Date: 12/06/2018; Location: Brno Urban Centre, Brno, Czech Republic

The fifth Governance Forum was a follow-up to the Road Mapping Forum no. 1. The aim was to create a new medium-term plan for #brno2050 strategy. During this workshop, participants proposed specific priorities to be potentially included in the strategic roadmap and, then, voted to establish those more important.

The main purpose of the Road mapping no.2 forum was:

1. To establish roles and responsibilities for coordination and implementation of individual priorities and measures;
2. To define the roadmap for the implementation of individual measures;
3. To collect suggestions for projects and activities for the 2020 Action plan.





4.3 Brno Smart City Vision

What Brno will be like one day, is outlined in following sentences and described in more detail in the full version of the #BRNO2050 vision.

Quality of life

What will life be like in Brno when I grow up?

Advise



Governance

How will Brno function when I'm 38?

Decide



Resources

Will Brno use its potential to the maximum in the future?

Vote



"In 2050, Brno is synonymous for an attractive and sustainable city in the international comparisons.

Brnoers appreciate the high quality of life in the city, which offers them the opportunity to work as well as to do business, entertain and relax. It combines the fruits of research and innovation with the economic prosperity of individuals and companies. Urban landscape blend in the surrounding countryside. Brno is a city without barriers and provides a good public space for the Brnoers. Openness and cohesion on the one hand and healthy and resilient environments on the other hand create a home and safe background for a half million people.

Brnoers are aware of the scarcity and limitations of natural resources, encouraging their efficient use so that the city still has enough water, energy and resources for its development. They want the city to leave the future generations in the same or in a better state.

Brnoers perceive that the city is being managed vigorously, in a modern way and efficiently. Its management and development are based on a cultivated public debate and long-term cooperation of all partners. The city breathes for its inhabitants and they can be proud of their city."

The vision includes 23 proposed strategic values. These values contain specific and partial goals and concrete indicators. Full version of the #BRNO2050 vision with specific strategic values, development goals and indicators is available [here](#).





4.4 Roadmap towards Brno Smart City

The Roadmap plan for Brno 2019-2028 has five key areas:

Environment

Imagine that all those unsightly vacant places will disappear, public spaces will be cultivated, rivers will create a green backbone of the city, there will be new apartments not only for the rich – and when you take a breath in Brno, it will be mainly clean air.

- NATURE IN THE CITY - A system of green spaces and water features instead of waste yards and concrete.
- COMPACT CITY - So that it does not sprawl into the open landscape without reason.
- ARCHITECTURAL FACE - We will bring attractive and modern architecture to Brno.
- AFFORDABLE HOUSING - For everyone, also for the elderly or young families.
- EFFICIENT TRANSPORT - How does it work best? By public transport, by bike, or on foot.
- HEALTHY ENVIRONMENT - More green spaces, clean rivers for bathing and better air.

Prosperity

Brno is a Mecca of innovative companies that create rich economic opportunities, which bring benefits to all residents – while they have the will to work, create and return the energy back to the city.

- PROSPEROUS CITY - Smart business support will result in rich job opportunities
- EPICENTRE OF INNOVATION - Local pride: Central European centre of science, research and innovation.
- EDUCATED CITY - Accessible and open education opportunities for everyone and at all levels.
- INTERNATIONAL CITY - Brno as a tolerant city that accepts talented foreigners.
- GLOBAL ACCESSIBILITY - From Brno to Prague in an hour, to Bratislava in 40 minutes. Why not?

Services

Only a few things will improve relationships between people more than great and affordable services for everyone. Meet others at a concert, play sports together, have a place to go to see the doctor, feel safe in your own city. Simply, live a quality life.

- HEALTHY PEOPLE - A responsible lifestyle will be in the best interest of all people in the city.
- COHERENT CITY - When mutual help is not a luxury, but an everyday essence of relationships.
- CULTURAL CITY - An incredibly creative atmosphere will attract numbers of personalities to Brno.
- SPORTING CITY - There is no life without motion: sports accessible for everyone without any difference.
- SAFE CITY - Brno as a synonym of “a good address”, where people live without fear.

Resources

It is not a good idea to merely utilise nature – it is much better to live along with it. The city will ensure smart water management; the banks of the rivers will be safely open to people. Smart Brno will be an energy-sustainable place without excessive waste.

- WATER MANAGEMENT - Brno will ensure drinkable water for people and protect the city from floods.
- ENERGY SUSTAINABILITY - The art of producing energy from clean sources, which are around us.
- CLEAN CITY - Repeated use, smart sorting and recycling will result in a reduction of waste.

Governance

Brno is a pioneer of development in cooperating with surrounding towns and municipalities. It involves residents in deciding on a part of its budget. And in 2050, it will be an exemplary place that listens accommodatingly to all its residents.

- SHARED VISION - Everyone pulls the same rope and supports the development of the city.
- BRNO METROPOLITAN AREA - Cooperation with adjacent municipalities is fruitful for everyone.
- E-GOVERNMENT AND OPEN DATA - Information is easily accessible and city data is public.
- JOINT GOVERNANCE - Brno gives space to people for making joint decisions about the city development.



These items might just seem too general. But there are specific projects hidden in their background that are already running or are under preparation in Brno. **Full version of the Roadmap for Brno 2019-2028 with specific goals, projects, activities and responsibilities is available [here](#)** (in Czech; the English version will be available by January 2021).



5. Gdańsk

5.1 Gdańsk Smart City Strategy

Gdańsk has been implementing projects and initiatives for many years, and, above all, is designing and implementing a consistent policy that falls within what is nowadays understood by “smart” or “wise city”. In recent years, the assumptions of Gdańsk policy have been clearly formulated in **Gdańsk 2030+ Strategy**, which was prepared as a result of the inclusive and participatory process of consultations and workshops held with the active involvement of a wide spectrum of stakeholders.

Gdańsk 2030+ Strategy was created and adopted by the City Council in resolution no. LVII/1327/14 from 25th September 2014. It was the first document in Poland to be developed in cooperation with citizens (research community, NGOs, residents and other stakeholders). The adoption of Gdańsk Operational Programmes 2023 (resolution no. XVII/514/15) by the City Council, which took place on 17th December 2015, served as the first step of the execution of strategic objectives of Gdańsk 2030+.

Gdańsk 2030+ Strategy is built upon five main pillars:

- The first one – **Education and Social Capital** – adheres to building interdisciplinary educational partnerships and promoting inclusion so all citizens could thrive in formal and informal education systems. The system of multistage education, including vocational education and offering of several higher-education institutions in the city, is supposed to respond to technological development trends as well as to nurture entrepreneurial attitudes and competencies.
- The second pillar – **Economy and Transport** – addresses the strong need for both innovative business as well as an innovative economy. Apart from facilitation of the growth of the local business sector, especially innovative companies and start-ups, and new jobs creation, the investments in this domain are supposed to strengthen the position of Gdańsk as a recognized and efficient logistics hub in the South Baltic area. The effort will be put to the development of a local IT ecosystem which should stimulate the economy through commercialisation of knowledge and innovative technologies. In the field of transportation, the Strategy 2030+ calls for modern transport infrastructure, active forms of urban mobility, and for sustainable, energy-efficient, and zero-emission mobility based on public transportation means.
- The third pillar – **Public Space** – points to the role of sustainable development of public services and urban spaces. To that end, social inclusion and protection of the natural environment should constitute important goals. Moreover, public places have to become a functional, accessible and aesthetic space.
- **Culture**, being the fourth pillar, focuses on the spiritual heritage of Gdańsk. In order to strengthen the cultural identity of the citizens, their passions and interest should be stimulated through the development of local culture. This, in turn, could contribute to building the position of Gdańsk as the cultural capital of Northern Poland.
- Finally, the fifth pillar – **Health** – concerns cross-sector cooperation (amateurs, professionals, technology start-ups, etc.) for the development of innovative solutions within public health. Increasing awareness in terms of health-positive habits is strongly embedded in the City’s role.

5.2 The foresight process adopted by Gdańsk in RUGGEDISED

The foresight process in Gdańsk was coordinated by PICTEC with support from AIT. In Gdańsk the foresight process was adopted and used as a prognostic method and strategic planning tool to develop possible futures and prepare urban actors and stakeholders for joint activities responding to the envisioned scenarios.



1st Foresight Forum: Identification of STEER Factors (Social, Technological, Economic, Environmental, Regulatory)

Gdańsk (November 11th, 2017)

The aim of the first meeting was to inform local stakeholders in Gdańsk about the RUGGEDISED project and to introduce them to the foresight process. The benefits of the RUGGEDISED project as well as stakeholders' role in the process were put forward and explained. The main and the central goal, however, was to create a tangible output, which was to result in the update of "Gdańsk 2030+" strategy. To that end, the Foresight Forum was dedicated to the identification of STEER factors which will determine Gdańsk development in the future. Groups consisting of representatives from business, academic and local government sectors discussed the preliminary vision of Gdańsk in 2050. The outcomes of this discussion were then analysed in a horizon scanning activity based on the STEER methodology.

2nd Foresight Forum: Scenario Development

Gdańsk (May 9th, 2018)

The aim of the second meeting was to inform the participants about the outcome of the 1st Foresight Forum and to sustain and show the crucial role of the stakeholders. To that end, the 2nd Foresight Forum was dedicated to the creation of scenarios which will influence Gdańsk development in the future. The participants were divided into groups (consisting of representatives from business, academic and local government sectors) and chose the most important trends (STEER factors plus OECD trends) and their concretizations. Then, on this very comprehensive basis, they formed three scenarios for the city development: best-case scenario, worst-case scenario and business as usual scenario. The scenarios were developed by creating a scenario trajectory (connecting the concretization of individual trends and STEER factors).



Figure 9: Gdańsk 2050 scenarios presented in graphical form. From left to right: scenarios for the development of energy, built environment, and e-mobility sectors (in Polish)

3rd Foresight Forum: Visioning

Gdańsk (December 18th, 2018)

Building on the outcomes of the two previous Foresight Fora, the main goal of the third forum was to create a shared vision of Gdańsk, that will influence Gdańsk development in the future. Divided into diverse groups the participants had to answer guiding questions concerning: the state of the city, actions that must be taken, experiences in implementing such actions and megatrends addressed by implementing the Vision. While creating the Vision, the participants used positive scenarios from the 2nd Foresight Forum and the preliminary vision of Gdańsk from the 1st Foresight Forum. In result, the vision defined by stakeholders took into account the following pillars: (1) zero-emission city, (2) circular economy, (3) zero-emission transport, (4) transition to renewable energy sources (5) priority for public transportation, and (6) strict requirements and standards in construction sector to facilitate energy-transition.



4th Foresight Forum: Innovation Missions and Roadmap

Gdańsk (May 8th, 2019)

The general objective of the 4th Foresight Forum in Gdańsk was to deliver a roadmap indicating and organizing innovation priorities to be achieved by the city in a long-term perspective of 2040-2050.

Innovation priorities were defined in terms of missions such as executed at DARPA¹¹ and NASA or as recently advocated by Mariana Mazzucato and adopted by the European Commission with regard to the planning and implementation of the 9th Framework Programme called “Horizon Europe”¹². Therefore, the mission design and roadmap workshop were supposed to:

- (a) clearly define missions to be achieved within the assumed timeframe (2040-2050);
- (b) translate general mission-statements into detailed milestones;
- (c) organize milestones within the timeframe with regard to feasibility and other factors.

The outcome of the workshop covers nine preliminary innovation missions and their respective roadmaps as discussed below in chapter 5.3.

5.3 Gdańsk Smart City Vision

Both Gdańsk 2030+ Strategy adopted officially in 2014 and the outcomes of RUGGEDISED participatory foresight process are considered here as a framework to outline the Gdańsk smart city vision for 2050.

Firstly, the **Gdańsk 2030+ Strategy** ([link](#)) sets out priorities for Gdańsk development by 2030. In order to meet the needs of residents, both current and future, the document outlines directions that will strengthen Gdańsk’s social, economic and cultural potential and lays the foundation for future innovation actions fostering the cooperation of actors in Gdańsk metropolis, Tricity agglomeration, and in the whole Pomerania region.

Secondly, a **preliminary vision of Gdańsk in 2050** was delivered during the 1st Foresight Forum already in November 2017. It was discussed and defined by representatives from business, academy and local government sectors. As such, the preliminary vision guided the entire foresight process.

Thirdly, the third foresight forum held in December 2018 delivered further components of Gdańsk 2050 vision. This time foresight forum participants were supposed, in the course of various joint activities during the workshop, to answer three questions:

- What is the desired state of the city within the designated time horizon?
- What actions are required to materialize the vision?
- What is our experience in implementing these types of activities?

The workshop resulted in several insights that threw light on general statements of the First Foresight Forum. In section 5.2.4. below, the main technological or knowledge-related priorities and challenges identified by stakeholders are presented in a detailed form.

RUGGEDISED: Preliminary Gdańsk 2050 Vision

The preliminary vision of Gdańsk in 2050 is based on four main cornerstones.

Firstly, Gdańsk in 2050, as an inclusive city, created for and by the people, nourishes diversity of its citizens. Public spaces foster socialization and reinforce social relations. Secondly, Gdańsk in 2050 functions within a circular economy. Being a self-sufficient and green city, it strongly builds upon cradle-to-cradle design. Thirdly, the city is developed according to the assumption that interdisciplinary cooperation constitutes a basis for the innovation process, that is why in Gdańsk in 2050 different sectors collaborate ensuring the City’s economic security. Finally, being a smart city and a fully integrated metropolis, Gdańsk of the future uses real-time metropolitan data processing and embraces the role of its citizens in city management processes.

All four pillars of the 2050 vision, support the overarching objective of high quality of life of Gdańsk citizens, see Figure 10.

¹¹ Carleton, T. (2015). “Point of View: Changing Culture Through Visionary Thinking: Applying the DARPA Hard Test for Innovation”, *Research Technology Management* 58(3), pp. 12–15.

¹² Mazzucato, M. (2018). *Mission-Oriented Research & Innovation in the European Union. A problem-solving approach to fuel innovation-led growth*. Luxembourg: Publications Office of the European Union.



Figure 10: Preliminary Gdańsk 2050 vision delivered during the 1st Foresight Forum held in November 2017

Gdańsk 2050 Vision

Once the scene was already set by the second foresight workshop that drafted plausible scenarios of future Gdańsk development, the Third Foresight Forum on visioning identified major priorities that have to be addressed in order to (a) fulfil the vision of citizens' high quality of life and (b) efficiently respond to threats and opportunities resulting from scenarios developed during the Second Foresight Forum. The key findings of the visioning workshop have been integrated in the preliminary vision and include:

- multifunctionality of districts to reduce travelling and commuting time;
- zero-emission public transportation services based on mixed modalities of transportation (synergies with functional metropolitan transportation covering Gdańsk, Gdynia, and Sopot agglomeration);
- active prevention of climate change and resistance to climate change through water retention system (including micro retention) or energy recovery facilities and installations;
- zero-emission economy and services through management of ecosystem services and compensation mechanisms (energy transition to renewable energy sources and energy generated from waste, including bio-waste);
- focus on health, air quality and green infrastructure (ecological principles for construction and transportation sector);
- self-sufficient city (circular economy) in terms of energy and improved efficiency of local supply chains (economy based on local resources);
- the low share of private cars and increased share of personal mobility measures (like bikes or scooters);
- universal access to city data (continued Gdańsk open data policy) and facilitation of local innovation hubs;
- integrated and open management based on real-time data processing on a metropolitan scale (deployment of IoT-based sensing infrastructure, edge computing, and big data analytics solutions).



5.4 Roadmap towards Gdańsk Smart City

This section introduces organizational and administrative actions implemented by the City of Gdańsk to streamline creation of the required policy measures supposed to facilitate the adoption of widely understood smart city standards.

The adopted foresight methodology accounts for **participatory inclusion** and networking of all stakeholders who were invited to participate in the collaborative development of scenarios, visions and roadmaps. To that end in all four foresight meetings, Gdańsk hosted academia, businesses, industry, NGOs, and public administration representatives. The **expert group** appointed at Gdańsk City Hall was responsible for feasibility verification, continuous feedback, and further operationalization and decomposition of the vision and roadmap into projects and funding streams. Finally, the **decision group** consisting of highest-ranking officials from Gdańsk City Hall and municipal companies, is responsible for acceptance of foresight-work outcomes, legitimization and official adoption, required policy design and development to support investment, and executive decisions.

*Stakeholders
and
Governance*

One of the objectives put forward for Gdańsk foresight process was to focus on innovative actions required to face future challenges, which should be supported by **knowledge production and progress in technological R&D**. Both components are supposed to guarantee a better understanding of the current situation and challenges ahead but at the same time, they also need to provide measures to act, which includes both policies and technological competence.

In order to achieve this objective, an idea of “Urban Innovation Agenda” was conceived. The idea assumes that contemporary cities are indeed knowledge-generating actors and the agenda should become a tool to define research and innovation (R&I) priorities, goals and initiatives such as detailed projects addressing particular composite goals. As such, in the context of horizon scanning and participatory foresight process, the “Urban Innovation Agenda” answers the following question: **what R&D&I activities are required to ensure the optimal and long-term functioning of the urban system?**

*Urban
Innovation
Agenda*

Development of the agenda has a deeply participatory character. Through bottom-up collaborative visioning and a technology road-mapping process, the agenda outlines strategic priorities resulting from the demand of the local ecosystem but also from its **knowledge and technology supply side**. Therefore, the agenda fulfils a four-fold function: it coordinates activities, informs stakeholders, evaluates innovation opportunities and possible projects as to their compliance with priorities set out, and finally promotes endeavours for the wider public to win social acceptance and attract further stakeholders and contributors.

Currently, the execution of strategic projects in Gdańsk is planned and managed through the so-called Gdańsk Operational Programmes.

While the Gdańsk 2030+ Strategy sets goals for long-term development, the currently being implemented Operational Programmes (adopted in December 2015) focus on a closer time horizon of 2023, which is a consequence of the programming period adopted by the European Union (2014-2020) to provide funding to member states. Gdańsk Operational Programmes cover nine areas as follows:

- education,
- public health and sport,
- social integration and civic activity,
- culture and free time,
- innovation and entrepreneurship,
- investment attractiveness,
- infrastructure,
- mobility and transport,
- public space.

*Gdańsk
Operational
Programmes*



Once officially adopted by the City Council, the “**Urban Innovation Agenda**” is supposed to become one of the strategic documents that will constitute a **framework for the design and implementation of the operational programmes beyond 2023**. Thus, RUGGEDISED project will contribute to the identification of future innovative measures with which the vision of Gdańsk smart city would be implemented.

PICTEC as a partner responsible for design, implementation, and facilitation of the foresight process introduced a novel concept to consider contemporary cities as actors capable of defining and executing **innovation missions** to be codified in the “Urban Innovation Agenda”.

The concept of “innovation missions” was adopted from the approach recently recommended by Mariana Mazzucato to the European Commission with regard to the planning and implementation of the 9th Framework Programme called “Horizon Europe”.¹³ On the one hand, missions are more detailed than usually very general societal, technological, or environmental challenges but on the other hand are broader than individual projects, thus leaving space for **bottom-up initiatives and entrepreneurial or academic discovery**. In that regard, Gdańsk is expecting even stronger involvement of the local and regional innovation ecosystem composed of public administration, research organizations, industry and business, NGOs, and civil society representatives.

The vision of smart city development is structured into innovation missions which are also similar to those pursued by DARPA, i.e. Defence Advanced Research Project Agency.¹⁴ In general, missions are supposed to be far-reaching, technically challenging, multidisciplinary (as are the problems they try to solve), and actionable.

Table 3: Gdańsk. Overview of preliminary innovation missions designed during the 4th Foresight Forum

Horizon	Mission	Scope
2050	Zero-Waste City	sustainable waste management; energy generated from waste, including bio-waste
2050	Energy Self-Sufficiency	self-sufficient city (circular economy) in terms of energy recovery (e.g. rollout of energy recovery facilities and installations)
2040	Local Food Supply Chain	improved efficiency of local supply chains (economy based on local resources)
2030	Modal Split in Favour of Carbon-Neutral Mobility	low share of private cars and increased share of personal mobility measures
2050	Green Energy Generation and Management	energy transition to renewable energy sources and active prevention of climate change and resistance to climate change through water retention system (including micro retention)
2050	Zero-Emission Gdańsk	zero-emission economy and services through management of ecosystem services and compensation mechanisms; zero-emission public transportation services
2050	Green Infrastructure	focus on health, air quality and green infrastructure (ecological principles for construction and transportation sector)
2040	Sustainable and Accessible Multimodal	mixed modalities of transportation; multifunctionality of districts to reduce travelling and commuting time

*Innovation
Missions
and
Technology
Roadmap*

¹³ Mazzucato, M. (2018). *Mission-Oriented Research & Innovation in the European Union. A problem-solving approach to fuel innovation-led growth*. Luxembourg: Publications Office of the European Union.

¹⁴ Carleton, T. (2015). “Point of View: Changing Culture Through Visionary Thinking: Applying the DARPA Hard Test for Innovation”, *Research Technology Management* 58(3), pp. 12–15.



	Mobility	
2030	Friendly and Resilient Infrastructure	integrated and open management based on real-time data processing on a metropolitan scale (deployment of IoT-based sensing infrastructure, edge computing, and big data analytics solutions); universal access to city data (continued Gdańsk open-data policy) and facilitation of local innovation hubs

A detailed overview of missions is available in D7.3 “Intermediate Replication Assessment”. All proposed missions are supposed to implement all vision components that were outlined during the 3rd Foresight Forum (see section 5.2.4. above). For clarity, Figure 11 presents the grand objectives underlying the proposed missions. Of course, each of the missions covers achievement of intermediary goals which are not depicted in the figure.

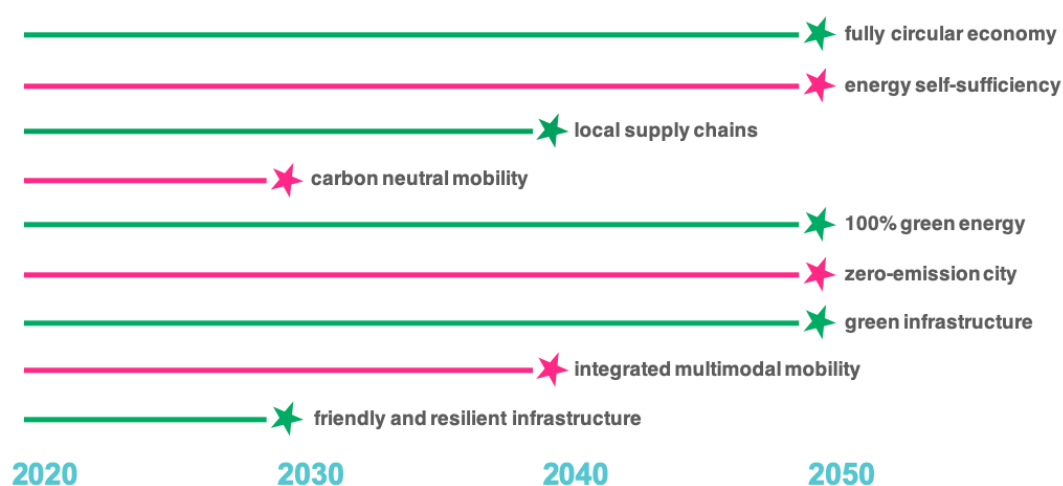


Figure 11: Time-horizon to achieve priorities included in the vision of Gdańsk 2050

Initial outcomes of the foresight process were also disseminated at GovTech Club Meeting held on August 29th, 2019 in Warsaw.¹⁵ GovTech Poland is a programme created to support public sector in development and adoption of innovations and modern technologies. Its main objective is to facilitate the communication between the public sector and innovators, including SMEs, start-ups, research community, and citizens. The programme is coordinated by central government units such as Ministry of Digitalization, Ministry of Entrepreneurship and Technology, or Ministry of Finances. GovTech Club Meetings are usually attended by high-ranking officials from the central government and local authorities.

The list of missions and their integrated objectives which resulted from the 4th Foresight Forum is not final. It requires further consultations, feasibility assessment and official approval before it can be put into action. To that end, Gdańsk City Hall accompanied by PICTEC as the party responsible for design and implementation of foresight activities have to accomplish the following steps:

1. consultation of the initial mission statements and roadmaps with all stakeholders involved in the foresight process;
2. integration of received feedback to produce pre-final version of the documentation;

Further steps

¹⁵ Bonecki, M., Tobolewicz, J. (2019). “Smart solutions as a tool to develop cities and create long-term development visions”, GovTech Club Workshop, Warsaw, August 29th.



3. consultations with expert personnel from the Gdańsk City Hall and other stakeholders responsible for execution of the missions;
4. integration of received inputs to produce final document;
5. adoption of the “Urban Innovation Agenda” by the City Council in accordance with relevant legislative and executive procedures

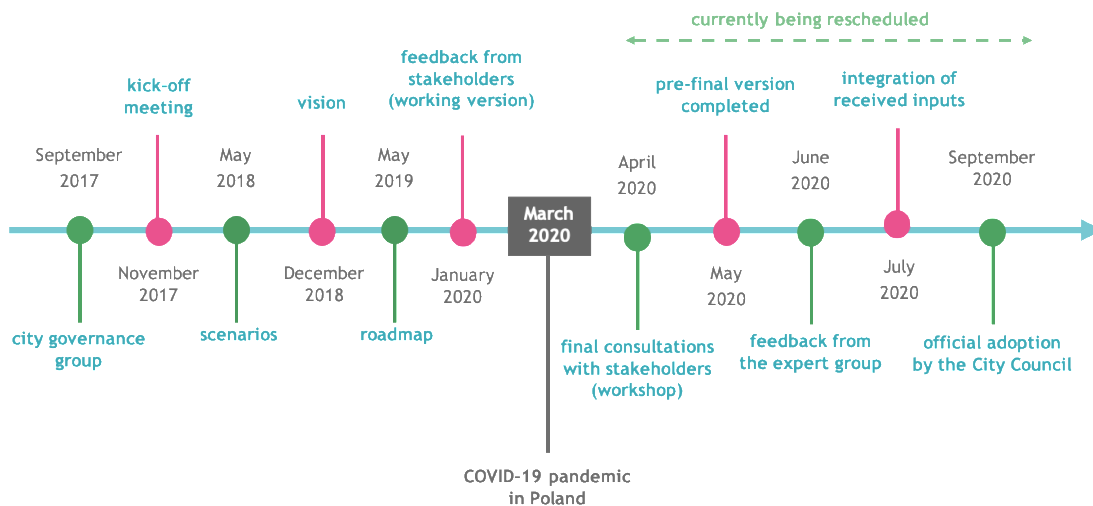


Figure 12: The original timeline for the completion of “Urban Innovation Agenda” and its required update due to COVID-19 pandemic outbreak in Poland

As of March 2020, the document containing the draft of 9 missions together with their milestones and timing constraints has been sent to stakeholders, including all participants of all the foresight fora held in Gdańsk as a part of the RUGGEDISED project. According to the original plan, the consultation process should have been completed by April 2020 when received inputs would have been integrated into the pre-final version of the document in May 2020. However, due to the outbreak of COVID-19 pandemic in Poland the initial timeline had to be updated (Figure 12).

As of November 2020, Poland is hit by the second wave of the pandemic which turns out to be much more severe. Therefore, the process of the roadmap adoption by the City Council is experiencing further delays. A provisional update of the timeframe assumes the completion of the process in January 2021.

Despite the pandemic-caused postponement of the final delivery of the Urban Innovation Agenda, the process covers presentation of the document to representatives of municipal departments and companies. In that stage, proposed innovation missions will be assessed as to their feasibility, available funding and other factors that determine execution of innovation actions in Gdańsk. Feedback received so far will be translated into updates of the agenda and is expected to bring in additional details.

The final version of the document will be eventually presented to the City Council and proceeded in order to be adopted as an **official strategic document**. Due to the legal status of the document, the agenda will (a) provide additional inputs for future extensions of Gdańsk 2030+ Strategy and (b) outline context and priorities for the preparation of Gdańsk operational and investment plans beyond 2023.



6. Parma

6.1 Parma Smart City Strategy

Over the last decade, Parma has been strongly committed to reduce energy consumption in different sectors. The joining of the Covenant of Mayors in 2013 and the implementation of SEAP were key turning points for Parma in applying the green principles to the entire governance action. Parma decided to start a series of wide-ranging measures and actions, actively involving citizens and enterprises. Within the SEAP, developed in 2014, Parma has outlined a comprehensive strategy to reduce its emissions and initiated measures and actions for achieving this goal. The SEAP identified some priority strategies, serving as framework for several projects that have been completed or initiated over the past years.

Moreover, Parma has launched several initiatives designed to reduce emissions in the transport sector. Through the drafting and implementation of the SEAP and SUMP (Sustainable Urban Mobility Plan), the Municipal authority has introduced effective incentives in favour of cycling, public transport, reorganization of logistics, environmentally friendly vehicles and the extension of pedestrian and 30 km/h zones. Fifteen SEAP actions having a direct and indirect impact on the reduction of emissions in the transport sector are still ongoing.

In 2015, through the European project SIMPLA¹⁶, the City initiated a SEAP-SUMP harmonization process and setting up a unified Energy and Mobility Sector, which was an important step towards the integration of policies and planning tools affecting energy consumption.

**Energy &
Mobility**

The development of a smart city can be described both in terms of process and of outputs. **All key stakeholders of a city need to be on-board if any successful transition is to be realised.** The recent examples of the smart specialisation strategies or the digital transformation blueprint give proof of this. In both cases, **no single stakeholder is identified as more important than the others but all of them are identified as necessary ingredients for success.**

"The [City of Parma](#) has always considered culture as a lever of well-being for the community, a vehicle for social and economic development, a place for freedom and democracy, space and time for inclusion and individual and community growth" ¹⁷.

**Community
and
Stakeholders
Engagement**

In this context, an important task of the City of Parma is to support and guide the innovation towards digital technologies. The Municipality of Parma embraces the objectives identified by the national and regional strategies towards the decarbonisation in the industrial sector, including Industry 4.0, green and circular economy, the regional strategy on Research and Innovation for Intelligent Specialization (S3) and the high-tech regional strategy.

Within RUGGEDISED, Parma created a local Smart City Governance group acting as a promoter within the city and with the stakeholders in order to develop a Vision, a Roadmap and an Investment and Action Plan to 2030: in November 2017 the initiative [PARMA FUTURO SMART](#) was officially launched to co-design and co-manage the smart city process.

**PARMA
FUTURO
SMART**

¹⁶ <http://www.simpla-project.eu/en/>

¹⁷ This pillar is included in the Italian Capital of Culture 2020 strategy. Investment in culture, requires solid design lines, real monitoring practices and a concrete return that leaves structures, methodologies and a solid cultural system. This is also a key element of Parma UNESCO Creative City for the Gastronomy, a project willing to activate an inclusive process aimed at the aggregation and recognition of skills for the development of culture and creativeness identified in the word "gastronomy". In this way, heritage and cultural life of the city are elements on which to build the basis of future planning. Parma has always invested in social inclusion: The City ranked the first place in this category in the ICity Rate 2018. The goal is to continue working to encourage inclusion, promote the right to work and provide educational and training opportunities to citizens.



Figure 13: Parma Futuro Smart informative poster

Parma Futuro Smart is a political strategy tool that supports the City's decisions for the definition of a Smart City Action and Investment Plan by 2030. With its specific connection and promotion role, more than 50 local, regional and national stakeholders from the quadruple helix have been involved in this initiative (public authorities, research institutes, private enterprises and associations/NGOs/citizens' representatives). The concept of *smart* promoted by Parma Futuro Smart does not mean merely innovation, resilience and technology but also **dialogue, social inclusion, sustainability, creativity and identity**. Therefore, the ultimate goal is to **create a humanized and structured city based on a strong local network made up of people, places, and policies**.

In February 2019, Parma signed the "Covenant of Mayors for Climate and Energy". Through the Sustainable Energy and Climate Action Plan (SECAP), currently under draft and to be completed by the end of 2020, Parma is committed to reducing CO₂ emissions (and possibly other greenhouse gases) by at least 45% by 2030 and become **carbon neutral in 2050**. **This plan will be taken into account for the preparation of the Smart City Action and Investment Plan.**

The local stakeholders involved in the foresight process were divided into 4 thematic working tables, as follows:



**4 Thematic
working
tables**

These four themes were deeply discussed during the workshops and, as a result, the different perspectives and ideas were collected, elaborated and consolidated in the definition of a comprehensive and shared Smart City Vision (see paragraph 6.3).



Smart Transport – Mobility

Parma's local stakeholders imagine a sustainable mobility with a strong technology innovation towards e-mobility, with a new generation of public and private vehicles. Intermodal path, urban infrastructure, dedicated lanes for LPT (Local Public Transport) and widespread e-charging points are necessary to achieve these goals. Smart mobility needs also new management and organizational practices around public and private demand and supply and more sharing mobility services. LPT must be a quality and more attractive service, with intermodal connection to other ways of local transport, with interchange zones and with on-line platforms to facilitate the process. Local authorities have an important commitment: to carry out an urban governance enabling a sustainable mobility system, and to create technical and social partnerships.

Smart Grid – Infrastructure / Smart Energy – Environment

From the stakeholders' point of view, the improvement of urban aspects related to energy and environment in a Smart perspective has two priorities: efficiency and knowledge. Regarding the first aspect, participants underline the potential of the energy efficiency refurbishment of public, private and industrial buildings, as well as the opportunities of a smart grid development. Efficiency is related not only to energy aspects, but also to waste and materials flows, which must be redesigned in a Circular Economy approach. Knowledge, considered in terms of ability to measure, data processing and decision-making process, is enhanced multiplying the "detection points" with sensors and other technologies.

Smart Society | People

Any change toward "Smart City" requires citizen's active involvement. Local stakeholders recalled the importance of improving the Municipality's communication in order to make citizens not only informed but also main actors of the city smart transformation. In this regard, the following three points were discussed. Firstly, every initiative should consider aspects related to equality and ensure the access to smart services also to the most fragile segments of the population. Secondly, initiatives aiming at promoting the virtual net should be accompanied by measures supporting the social network, such as urban gardens, green areas, neighbourhood shops and initiatives, etc. Finally, it was recognized the importance of cultural and training services as a basis for building an "ethic of capabilities" that sees the new technologies as an opportunity, not as a challenge. The process should be included in the Urban Agenda 2030 and should aim at the achievement of the Sustainable Development Goals and at creating a smart culture that combines innovation and tradition.

Smart Economy Innovation

Parma Smart Economy is imagined as an attractive pole of talents for new creative business ideas (e.g. food, culture). It is necessary to attract external investments from other sectors (e.g. ICT), to develop a City Branding through innovative networking among companies, LAs, Universities, not only local but also international ones. It is needed to rethink the productive system, putting at the same level the various nodes, from known brands to innovative SMEs, new professionals, FabLabs, new Smart technologies entrepreneurs, digital hubs, with innovative investments forms and reward for those who are willing to innovate.

New innovative companies must follow the circular economy approach in all sectors, through redesigned products and services, with more digitalization and dematerialisation of production processes, in order to lower environmental impacts; moreover, they should combine new cultural, technological and tourist proposal, between local identity and commercial projection in a European and international dimension.

Every thematic working table has been linked to one or more specific Sustainable Development Goals (SDGs).

These topics were also included in the **Smart City Protocol** signed in May 2019 to formally engage nearly 40 stakeholders and create a cooperation platform to share projects and



competences with the ultimate goal to firstly build a smart community to become then a smart and green city.

6.2 The Foresight process adopted by Parma in RUGGEDISED

The foresight process adopted in Parma was led by Parma Futuro Smart initiative and involved a wide group of local stakeholders covering all the relevant sector of the city and was structured into a series of events:

- Kick off and brainstorming World Café for Parma Futuro Smart (30 November 2017)
- Scenario – Vision Workshop (6 April 2018)
- From Scenarios to Roadmap Workshop (9 November 2018)
- Smart City Protocol (28 May 2019)
- Co-creation with the 4 thematic tables: (6 August, 8 September, 15 September, 30 September 2020)
- Presentation of the Smart City Plan (Autumn 2022)

Kick-Off Foresight Forum in Parma

Date: 30/11/2017; **Location:** Workout Pasubio – Via Palermo 6, Parma

In the first "Parma Futuro Smart" Forum, the RUGGEDISED project was presented, together with the ambition of Parma of becoming a technological, sustainable and resilient city. After a welcome message from the Mayor of Parma, Federico Pizzarotti, and the introduction by the councillor Tiziana Benassi and Ines Seletti, a presentation session started: local companies, also well known worldwide (Barilla, Dallara, Davines, Docomo Digital, Vislab), Lepida and the Municipality of Milan (Sharing Cities EU-project) presented some examples of smart actions they carry out. The specific objectives of this first workshop were:

- To present the RUGGEDISED project and the activities to be carried out by the Municipality of Parma, through Parma Futuro Smart;
- To promote a first review and comparison of "Smart" cases by some stakeholders from the business world and University on various topics related to the Smart City;
- To share ideas and identify potential paths for collaboration on Smart themes among the participating stakeholders in a creative way.

Scenario – Vision Workshop

Date: 06/04/2018; **Location:** Officine On/Off – Str. Naviglio Alto 4/1, Parma

The aim of this second Workshop was to define different scenarios of Parma Smart City, through a participatory process at a local level. The first part of the Workshop was dedicated to present 16 global Trends, relevant to the four Smart issues addressed, introduced by eight Ambassadors representing the academic and institutional world of the City of Parma. At the end of this session, participants were invited to individually indicate the four most significant Trends for the development of Parma Smart City at 2030.

The overall judgments expressed by participants made it possible to immediately classify Trends in order of priority; this oriented the discussion for the construction of the thematic scenarios

The second part of the event was dedicated to the comparison among participants using the Scenario Workshop method; every working group created two Scenarios for Parma Smart City at 2030:

- Best Scenario
- As Usual Scenario

Within each group, a student of Parma High School for the Arts realized a graphic facilitation work in real time, starting from the results of the discussion.

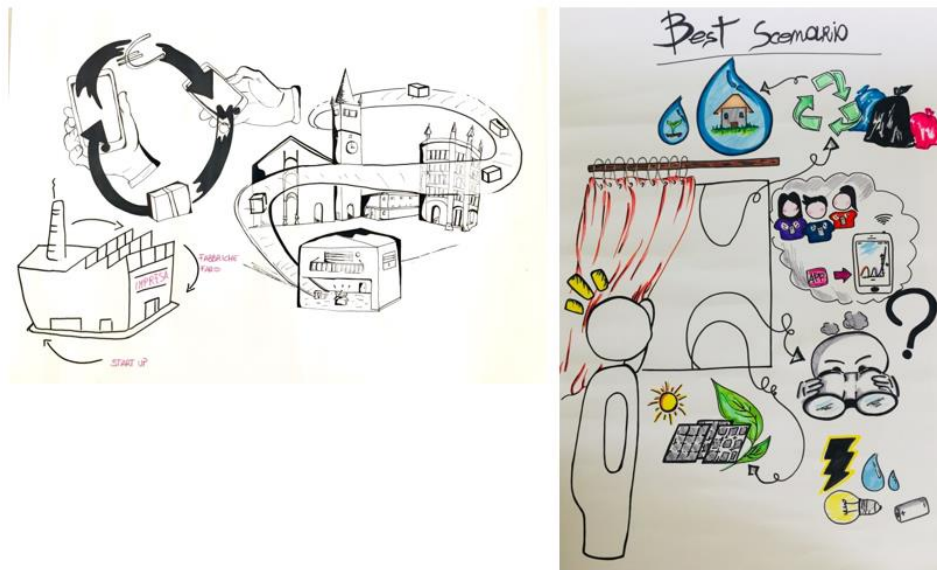


Figure 14: Graphic representations of two scenarios for Parma Smart City at 2030

From Scenarios to Roadmap Workshop

Date: 09/11/2018; Location: Centro S. Elisabetta – University Campus

This workshop aimed at the multi-stakeholder co-creation of an initial draft Roadmap for Parma Smart City 2030. Participants worked in order to create a thematic Roadmap composed of priority and objectives for Parma 2030, and actions. As a result, each thematic group laid out a list of specific actions to be further elaborated in the shared Roadmap to 2030.

Smart City Protocol

Date: 28/05/2019; Location: Centro S. Elisabetta – University Campus

With the signature of the Smart City Protocol, the City formally engaged all the institutions, the University, private companies, NGOs that were already involved in Parma Futuro Smart. Nearly 40 stakeholders have been involved and a cooperation platform has been created with the aim to share projects and competences, to build a smart community and become a smart and green city.

The four main pillars of the Smart City Protocol are:

- Towards a smart, shared and sustainable mobility;
- Towards a carbon neutral city;
- A laboratory for innovation and digital transition;
- A creative, cultured and inclusive city.

Roadmap Forum

Online meetings:

Date: 06/08/2020, Topic: PED (Positive Energy District)

Date: 08/09/2020, Topic: PED (Positive Energy District)

Date: 15/09/2020, Topic: Industry 4.0 towards Energy transition 4.0

Date: 30/09/2020, Topic: Start-Up & Innovation – Green Jobs

Date: 14/10/2020, Topic: Data Platform

The goal of these online meetings was to work on specific topic in order to consolidate the roadmap towards Parma Smart City. For each meeting specific stakeholders were involved.

The results of these online meetings are described in paragraph 6.4 Roadmap towards Parma Smart City.

6.3 Parma Smart City Vision



During the past two years, thanks to the participative foresight process of PARMA FUTURO SMART, supported by RUGGEDISED, Parma set the goals for the next decade. The Administration decided to accelerate the pace to fully turn Parma into a green city and the Smart City Action and Investment Plan will be totally consistent with these goals and will help to achieve them. As a result, a long-term Smart City Vision was developed, as reported in the following.

Parma pursues the farsighted goal to become a green city, based on the most crucial aspects of environmental quality, efficiency and circular use of resources, mitigation and adaptation to climate change, enhancing the economic and social implications of a better quality of life and wellbeing at the urban level generated by a green economy. This view is also reflected in the five core pillars of the infrastructural and urban development planning of Parma, a city without suburbs, with the aim to sew up the urban fabric:

- **Urban regeneration of the existing city:** regeneration of the existing city through economic incentives and regulations that guide the market towards the improvement to extant buildings, banning any further soil sealing. The plan also identifies 15 strategic areas of urban regeneration;
- **Reduced land sealing** (transformation of 4.3 million m² wide land classified to be used for building purposes into agricultural land): enhancing the agriculture and the environment through the transformation of up to 435 hectares of potentially building areas into agriculture land or natural parks also through the creation of the Periurban Agricultural Park;
- **Hydraulic and geological land safety:** assuring the security of the territory and citizens through the Hydraulic Risk Management Plan and Seismic Micro-zoning Plan;
- **Widespread service network:** several socialization places dedicated to culture and sports, to promote the quality of relationships between citizens, civic awareness, social inclusion and perceived safety, particularly in suburbs;
- **Facilitating the birth of centres of excellence:** multiplying the opportunities and maintaining high local production competitiveness and the strategic assets of Parma as trade fair, university, manufacturing, tourism, agro-industry also through city facilities well connected with transport infrastructure.

The 2022 City's commitment and policy guidelines are centered on three major goals:

- **The city of people:** Focusing on a people-centered community, which knows how to be enriched by mutual differences, work as a team without leaving anyone behind. An inclusive city that takes care of all.
- **The changing city:** A city that is ready to bet on a regenerated urban fabric, a widespread and diverse culture, a business community that wishes to thrive in a revival, spreading from neighbourhood to neighbourhood, a vibrant and robust economic and forward-looking framework. A city that is ready to bet on its expertise and excellence to grow further.
- **The city of tomorrow:** A city that is ready to become the place where people want to live, a green, safe, traffic-free, breathing place, connected to the rest of the world in a click.

For the next decade, Parma decided to accelerate its pace to fully become a green city. Through the Sustainable Energy and Climate Action Plan (SECAP), to be completed in 2020, Parma is committed to reducing CO₂ emissions by at least 45% by 2030 and become carbon neutral in 2050. Moreover, to respond to the worldwide mobilization of youth, in July 2019, the City Council declared the Climate and Environmental emergency engaging the Mayor and the City Board to take action to reinforce further the GHG reductions, renewable energy use, climate adaptation measures through the elaboration of a dedicated plan and energy efficiency measure in urban planning, mobility and buildings sectors.

To achieve the 2030 goals the City intends to give continuity to the action that has been initiated, by insisting on implementing the initiatives that have proven to be the most effective and continue the implementation of the priority strategies identified under the SEAP scheme, and in particular:

- To increase the number of schools subject on seismic and energy efficiency actions. Parma wants to have **all its schools in energy class "A"** and has allocated about 3 million €/year to complete the energy efficiency of four or five schools each year. It has also allocated about 10 million € for the conversion of an old, no longer used barracks that will become a "rotation school", where in turn the students of the schools subject



to seismic and energy redevelopment interventions will be placed. This will reduce the costs and time required to implement the strategy;

- To achieve all the SUMP objectives, in particular **a 40% reduction in the use of private vehicles**, which will lead to a substantial reduction of emissions deriving from the transport sector. Some of these initiatives will be led by TEP, the public local transport company that will implement operational and structural solutions (such as the installation of electrical control units at the bus terminus) to encourage intermodality and the use of public transport;
- To **increase the production of energy from renewable sources**, up to at least 15% of the total energy requirement;
- To **complete the retrofitting of the public lighting network**. The investment for the replacement of all the plants and their subsequent management amounts to approximately 29 million € and will allow a drastic reduction in consumption, from 21 million to 7 million kWh;
- To implement **urban reforestation projects** under the MSP Plan, including, in particular, the so-called GREEN KM Project;
- to **increase energy efficiency in the industry and services sector processes and infrastructures**, continuing the win-win partnership between the public sector and private businesses. Reducing emissions in the transport sector remains a strategic goal for the City of Parma.

6.4 Roadmap towards Parma Smart City

From the stakeholders' engagement process, the city of Parma has identified the following actions, for each pillar of the **Smart City Protocol**, to be further defined in the Replication and Investment Plan:

1. Towards smart, shared and sustainable mobility (2020 – 2025)

Intelligent mobility flow management

Traffic optimization through the implementation of a centralized system. Centralization allows to improve the environmental performance, to allow the prioritization of local public transport, to improve the use of shared mobility vehicles (car, bike and electric scooters) and to modify in a smart and adaptive way the responses to certain traffic scenarios.

Intermodal and shared mobility

Adoption of actions of multi-modal integration with cycling and other forms of shared transport, also through the increase of the interchanges and park and rides. Integration of the physical system with vertical and transversal information dashboards through the real-time collection of data related to urban mobility. Implementation of an urban MaaS (Mobility as a Service) platform.

Dissemination of sustainable mobility practices

Awareness-raising and dissemination of sustainable mobility practices, such as increasing cycling (more bike lanes, bike racks and bike Sharing) and cycling safety, dissemination of sustainable home-work mobility practices (Car Pooling), increase of pedestrianized areas, increase of public transport (day and night), electric mobility.

2. Towards a Carbon Neutral City (2021 – 2030)

Smart buildings and smart neighbourhoods

Realization of energy requalification projects of buildings through the introduction of innovative technologies and solutions, also through the FEASIBLE project (H2020), which focuses on the fostering of actions for the energy efficiency upgrading of residential and public buildings. Piloting of PED (Positive Energy Districts) solutions and creation of green infrastructure for the removal of CO₂ from the atmosphere and contrasting heat island effect. Data acquisition through drones on thermal bridges / heat points in buildings.



Sustainability and Carbon Neutrality practices in the business world

Dissemination of Circular Economy, Carbon Footprint Analysis and Sustainability Reporting actions in companies in Parma. Use of international references to improve the sustainability profile with the 17 Sustainable Development Objectives (SDGs) of the UN Agenda 2030.

Smart Energy Grids

Dissemination of widespread renewable energy production systems by private individuals. Collaboration with energy providers in order to create synergies through the development of Power2X centralized systems, and relationship with end users for local DSM (Demand-Side Management). Use of energy consumption forecasting models based on RES (Reference Energy System). Creation of energy communities.

3. Towards digital transition and innovation: The City as a laboratory (2021 – 2030)

Smart Platform of Urban Governance

Development of a distributed IoT (Internet of Things) infrastructure for the creation of a system of data collection and use in order to promote Urban Governance. Provision of the available Open Data to the Administration and local stakeholders (companies, start-ups and citizens). Accessibility to all network nodes to promote the growth of the system and the interoperability of applications with other services.

Strengthening of the enterprise acceleration system

Collaboration between territorial actors to facilitate the birth of new innovative enterprises and the development of skills for entrepreneurship in the digital and environmental sustainability sectors. Use of the existing structures on the theme of business acceleration and the provision of services to young creative people.

Widespread system of environmental monitoring

Realisation of a network of sensors located in public places (e.g. sensors for wind measurement, flooding, air quality) and private places (e.g. indoor building quality, security, etc.) for the monitoring of urban environmental variables. Use of drones for real-time data collection and creation of 3D maps and real-time data accessibility.

4. Towards a creative, cultural and inclusive city (2020 – 2030)

Attractivity based on culture and creativity

Increasing the ability to attract talent from other Italian regions and abroad, through innovation of products, processes and services to develop excellence, coordination of territorial marketing activities and strengthening of cultural activities. Creation of new spaces of culture, comparison and knowledge on the local territory.

Competence Economics

Support to the development of new transversal key competences for the future of employment and new economic scenarios among companies and schools in Parma. Improve information on demand and supply of new skills with appropriate training and refresher courses. Dissemination of Soft-Skills and the culture of Sustainability starting from Schools.

Multi-Stakeholders Partnership

Promotion of partnerships between the business and non-profit world on thematic projects in line with the 17 SDGs of the UN Agenda 2030, encouraging Engagement Modalities such as Corporate Volunteering. Promoting the inclusion of disabled people also using tools such as agreements (foreseen by a Regional Law).

The final version of the Parma Smart City Plan containing the detailed description of the measures, including timeframe, responsibilities and resources to be committed, will be presented to the City Board and the stakeholders by December 2020. During the next two years (2021-2022), Parma Futuro Smart will outline context and priorities that will be included in the Replication and Investment Plan of RUGGEDISED (D7.4).



7. Conclusions and Lessons Learned

This report shows how through the RUGGEDISED replication process the three Fellow Cities of Brno, Gdańsk and Parma have been guided and supported in their path towards the future replication of smart solutions. Along with the **capacity building** and **knowledge transfer**, **participatory foresight** is one of the focal points of this intensive itinerary of replication and has been developed at local level in order to deliver a **strategic city vision** and an **implementation roadmap** of upcoming actions and investments.

The participatory foresight adopted in RUGGEDISED has achieved the objective of facilitating **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 **Governance Groups**, made up of a core team, a steering board, an advisory board. Each City Governance Group in turn involved a **wider group** composed by all the **stakeholders** relevant for the development of the Smart City, i.e. industry, research, civil servants, non-governmental organisations etc.

In RUGGEDISED 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 **Communities of Practice (CoP)**, which supervised the Smart City leaders and core team members in the local foresight processes.

As extensively outlined within this report, all Fellow Cities **have already finalised their local participatory foresight process** and their medium-long term city visions and roadmaps. Going into more detail about the outcomes of the foresight process within RUGGEDISED, several clear and concrete results can certainly be identified for the Fellow Cities.

Brno has produced, through participation by both the broad public and experts, the strategic document **#brno2050** that establishes a framework for setting key goals and priorities of the city medium- and long-term development. Brno's vision includes **23 proposed strategic values** within **five thematic groups**: environment, prosperity, service, resources and governance.

In **Gdańsk**, the participatory process, mainly visible in the Foresight Forums, resulted in the update of "**Gdańsk 2030+**" strategy and a vision of the city in 2050 that support the objective of high quality of life for its citizens; and an "**Urban Innovation Agenda**" that, once officially adopted, will constitute a framework for the design and implementation of the operational programmes beyond 2023. Innovation priorities for a long-term perspective were defined in terms of **nine missions and their respective roadmaps**: Zero-Waste City, Energy Self-Sufficiency, Local Food Supply Chain, Modal Split in Favour of Carbon-Neutral Mobility, Green Energy Generation and Management, Zero-Emission Gdańsk, Green Infrastructure, Sustainable and Accessible Multimodal Mobility, and Friendly and Resilient Infrastructure.

In **Parma**, following the lead of the initiative **Parma Futuro Smart**, the foresight process was divided into **four thematic working tables**, linked to one or more specific **Sustainable Development Goals (SDGs)**, which elaborated the Smart City Vision and a draft Roadmap for Parma Smart City 2030. Parma set the goals for the next decade with the signature of the **Smart City Protocol** and the identifications of the actions associated with its **four main pillars**: a smart, shared and sustainable mobility; a carbon neutral city; a laboratory for innovation and digital transition; a creative, cultured and inclusive city.

Summary of the outcomes of the foresight process



In October 2020, the **last CoP meeting** was held with the aim of collecting opinions and perspectives of the three Fellow Cities on the complete Foresight process carried out at the local level. On the whole, it can be said that the **entire process was successful** and that it brought **positive results in all the cities**.

Below we report what emerged during the meeting regarding the **individual lessons learned** from Brno, Gdańsk and Parma as well as some **recommendations** that they elaborated for other cities wishing to undertake the same path.

For the city of **Parma**, it was the first time a similar exercise was done and they found it was a **very positive experience**. The process has brought the city new perspectives at the municipal level and the stakeholders involved have led in completely new foci that are very valuable for the city. The **increase in the cooperation** between different city departments as well as with many external stakeholders is one of the main outcomes of this four-year work and this new collaborative context generated **many other projects and pilots outside RUGGEDISED**. All that resulted in the setup of an Ecosystem of many actors from many different sectors.

Tiziana Benassi, Deputy Mayor – City of Parma:

“RUGGEDISED has been a turning point for building our city strategic vision and our relationship with the other actors of the quadruple helix: thanks to the foresight process carried out with Parma Futuro Smart we have been able to build a solid relationship with the research, the private sector and associations also on sustainability and smart city issues, involving all the different parties in building the city of 2050. This is the greatest legacy of the RUGGEDISED project and a big challenge for the future: making Parma Futuro Smart a permanent forum able to drive the strategic development of our city”.

Parma

The main recommendation from Parma is that a **political commitment is needed from the beginning** and without it, it's hard to move on. Sometimes these strategic and long-term processes are too abstract for politicians and shorter-terms policies are more relevant for them. In this regard, it would be helpful to **shorten the process** so that it wouldn't last more than 2-3 years.

Furthermore, **including big local companies** is another crucial factor that would help a lot in creating and maintaining momentum among the stakeholders of the city.

Brno found the foresight exercise **new and interesting** and also **professionals and companies were enthusiastic**. Stakeholders were curious and willing to talk about distant future and this helped to open up the mind of people before discussing about shorter horizons.

Lukáš Grůza, Brno, Project RUGGEDISED city manager:

“It was an amazing experience. Participatory foresight was a great added value for creating our city strategy #Brno2050. Especially the scenario workshop, where we were able to assess individual trends and megatrends and how they can affect the development and direction of the city, was very beneficial and also successful from the participants' point of view. I know now that our city is much better prepared to seize the right opportunities and also to be resilient and rugged against all possible pitfalls. Thanks to the team from AIT and ISINNOVA for making this experience possible!”

Brno



Long-term thinking is a rare capability and attitude and both politicians and private sectors are used to look for short-term victories, but a **broader and forward-looking perspective** is needed.

For a successful process, **an expert team** able to conceptualize and steer the process is necessary. Being **persistent and never give up** is another key ingredient to address the numerous difficulties that are inevitably part of the process. Besides, it would be preferable that **the mayor takes over the role of process leader** and that activities are aligned with elections periods.

Motivating stakeholders is another difficult issue and is not easy to attract the interest of all parties, especially from the private sector where speeding up is a need. A good practical suggestion would be to **kick off the process** by asking people about their **individual dreams**, as it was perceived that it really helped motivating people and getting them involved.

Gdańsk also considered this activity **beneficial** for the city. The joint Vision has given an **orientation to politicians** and the local ecosystem, built up thanks to RUGGEDISED, is now able to **influence the final decisions of the mayor**. This aspect is important and makes the city and citizens feel much stronger.

Politicians in Gdańsk learned and understood why they should implement measures to reduce climate change, and another key and concrete result is the provision of **financial resources for sustainable energy projects** (e.g. thermal refurbishment and energy efficiency in houses).

Joanna Tobolewicz, Gdańsk, Project RUGGEDISED city manager:

"RUGGEDISED project gave our city the chance to prepare the roadmap Gdansk 2050 in the most important areas of green deal and climate protection: energy, mobility and ICT tools. Thanks to the methodology provided by AIT we built strong relationships with local ecosystem, developed creativity in the team and prepared our city for the challenges of the future".

Gdańsk

Gdansk's team stresses the need for a **strong political commitment**, as did Brno's and Parma's. Furthermore, the foresight process is deemed to be a valuable support instrument for better managing and dealing with **uncertainties**, indeed it helped the mayor and politicians in not being afraid but open to cooperation with the city stakeholders. Moreover, having **external support in the lead of the process** could also help to establish local cooperation.

In addition to what reported by the cities, some general conclusions can be drawn.

First of all, it can be said that the set-up of a **clear and solid methodological structure**, at the same time **flexible**, was one of the main success factors of this process as it allowed the Fellow Cities to easily **understand and adapt the approach to the specificities of each local context**, making sure they could start off on the right foot the path towards the definition of the city strategy with the **active involvement of all the relevant stakeholders**.

Secondly, the establishment of the Community of Practice was another key aspect especially for creating valuable occasions for the cities to **share experiences, knowledge, doubts, difficulties**, so that they could **learn new lessons** every time and build on for the future steps.

Last but not least, the whole process pursued during these four years was an excellent opportunity for all the RUGGEDISED project partners to **gain insights** and keep track of what



was going on in the individual cities, enhancing knowledge exchange and supporting the replication process (see Chapter 2).

In the next two years (2021-2022), Fellow Cities will focus their efforts on the development of their own Replication and Investment Plans which will be built upon the long - term strategies and roadmaps defined in this engaging and successful foresight exercise, which allowed them to select and properly identify the most suitable Smart Solutions from those under implementation in the Lighthouse Cities (the list of Smart Solutions identified is reported in D7.3 “Intermediate Replication Assessment”).

This forthcoming activity will be reported in D7.4 “Replication and Investment Plans”.



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