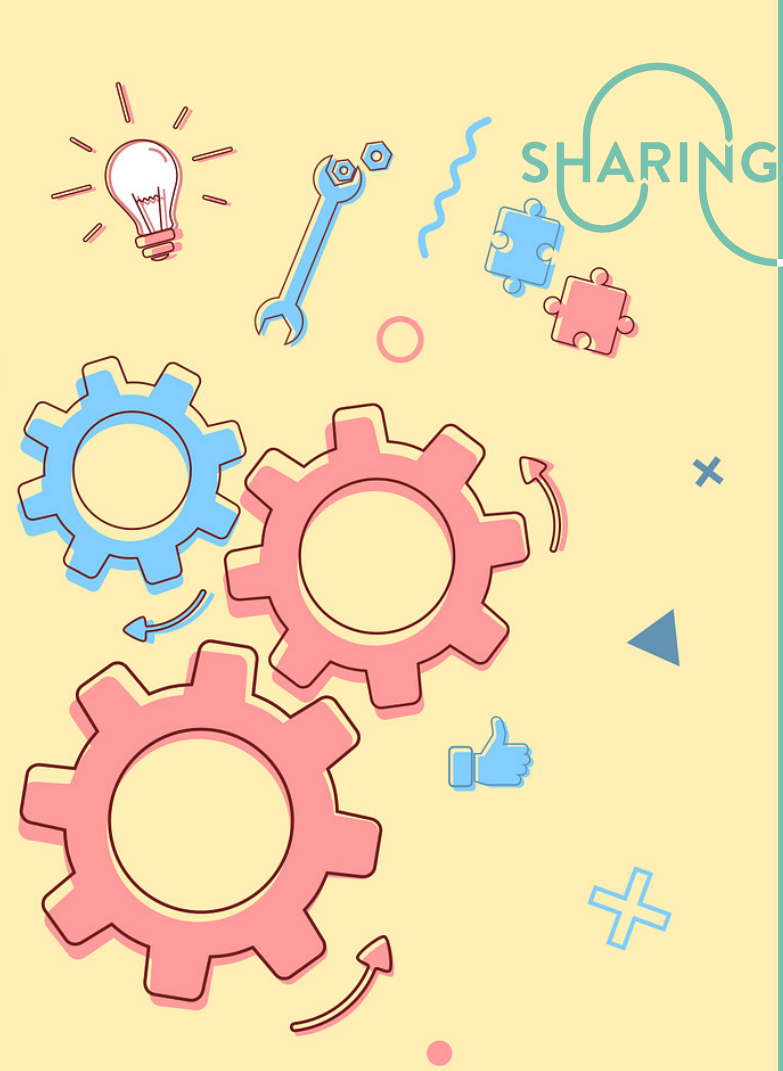

SHARINGCITIES

SMART CITIES IN ACTION:
LESSONS FROM FELLOW CITIES

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement N° 691895

What is this guide about replication for?

This guide gathers and synthesises the insights and lessons from the experiences of the fellow cities. It presents the softer lessons that revolve around smart city solutions. More than a technical document, this replication handbook helps to provide general guidance for cities thinking about implementing smart city measures.

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INTRODUCTION TO REPLICATION

What is replication?

The Sharing Cities 'lighthouse' project is a proving ground for a better, common approach to making smart cities a reality. By fostering international collaboration between industry and cities, the project seeks to develop affordable, integrated, commercial-scale smart city solutions with a high market potential.

In the first phase, the demonstration districts in 'lighthouse' cities Lisbon, London and Milan implemented replicable smart city measures, namely building retrofit, electric mobility, sustainable energy management systems, smart lampposts, urban sharing platforms, and digital social markets. Then, 'fellow' cities Bordeaux, Burgas and Warsaw have been co-designing, validating, and/or implementing these solutions and models.

So, what is replication? In this case, replication is a process by which a city emulates the smart city strategy and/or measures that other cities successfully implemented. Replication for smart cities is more than a copy of one solution, it must take into consideration the circumstances of the recipient city. It is a process in which the preliminary steps consist of researching smart city strategies, assessing what can be done (depending on the resources, time, local conditions, etc.) and then adapting it to the city's context. In a nutshell, replication is not about doing the exact same thing, but about adapting it so it perfectly fits the city's needs and adresses local challenges.

In order to engage in a replication strategy, one needs to be open minded, willing to change the status quo, and ready to work transversally.

Objectives of replication

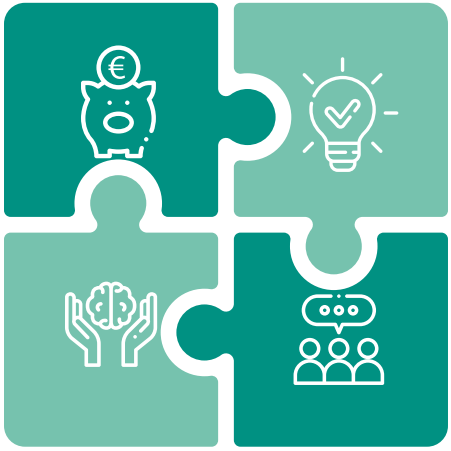
Replication has many objectives, here are the main ones:

Savings on research and pilot projects

While engaging in a replication process, there is the opportunity for cities to save money by not having to do extensive research or invest in a pilot project, since other cities have already done this preparatory work.

Benefit from others' experience and ways to tackle a common problem

Replication means building on trials and errors from previous pathfinders. Those cities have probably encountered many challenges and overcame most of them to implement their solutions. Replication can be used to pre-emptively find solutions to anticipated issues.



Ready to use solution

Although there is no 'one-size-fits-all' solution, some business models, technical solutions, or processes can be used in a replication process. Or maybe solutions were developed on open platforms and therefore can be adapted to local needs and reused.

Build arguments for advocating a smart city strategy

The success of previous smart city measures can help to advocate the replication of a smart city strategy at any level of governance.

Sharing Cities smart city measures

Building retrofit

Social housing & private housing

Retrofitting of residential buildings reduces the energy consumption in these buildings and increases the level of comfort experienced by residents, some of whom will be on lower incomes. Retrofit applies measures to the fabric of the building which reduce the energy needed to live comfortably in the property. Measures include roof and wall insulation, low energy lighting, high efficiency glazing, solar photovoltaics, heat pumps, and heating controls.

Services buildings

Services buildings cover a large range of buildings that are often owned by the municipality: schools, city halls, public libraries, etc. The municipality defines the retrofit measures and directly finances them, although alternative finance options are available (e.g. energy performance contracts). Through deep energy renovations, retrofitting reduces the energy needs of these buildings and increases comfort experienced by users. It results in better quality of life for building users, increases productivity and reduces running costs.

Digital Social Market (DSM)

A DSM is a platform, usually linked to a mobile phone app, through which cities can engage with residents and encourage sustainable behaviour by offering rewards. The DSM creates a connection between city and citizen, whereby citizens (residents, commuters, tourists, students) participate in sustainability focused services or behaviours. Services and behaviours include bike sharing, walking, community participation activities and reducing home energy use. The city and citizens both gain through the associated benefits such as improved air quality, reduction in traffic congestion, cutting carbon emissions, improved health and community cohesion.

Sustainable Energy Management System (SEMS)

A SEMS is a modular system which centralises information from, and control over, many local energy systems and devices. SEMS integrates heat, power, transport, and the built environment, combining data connectivity and the internet of things to optimise energy systems and strategies. For example, through the SEMS, you could see combined information about energy demand from your heating system and electric car chargers, which would be optimised in real time based on your desired outcomes.

Urban Sharing Platform (USP)

A USP is an online platform which integrates a range of data from different sources, such as smart lampposts, smart energy meters, and mobility sharing services. It processes this data and produces a useful overview and analysis, often through a dashboard. Cities can use this to make decisions on services, allowing them to allocate resources more efficiently and improve the quality of life for citizens.

Electric mobility

E-bikes

Take a bicycle, add an electric motor, and voilà, you have an electric bike, or e-bike. You can add it to a standard bike docked or dockless sharing system or offer it for long-term rental.

Electric vehicles (EV) sharing

EV sharing schemes are a model of car rental in which people can rent an electric car for short periods of time. They are often managed by mobility-sharing service providers.

E-logistics

E-logistics is an electric fleet of vehicles that transport goods within cities. This can be made up of electric cars or vans, autonomous vehicles or electric cargo bikes. E-logistics is a way to cope with the growing volume of light freight and associated road congestion caused by increasing online purchases.

Smart lampposts

A smart lamppost is a lamppost that uses LED lighting and also includes applications such as WiFi, air quality and parking sensors, video cameras for public security, and electric vehicle charging. They can also be used by telecom operators as existing infrastructure for next generation mobile networks. The well-proven lighting and maintenance savings of the smart lamppost offer an attractive bankable initiative. The smart lamppost also presents a proven and visible 'quick win' for smart cities and involves relatively mature de-risked technologies.

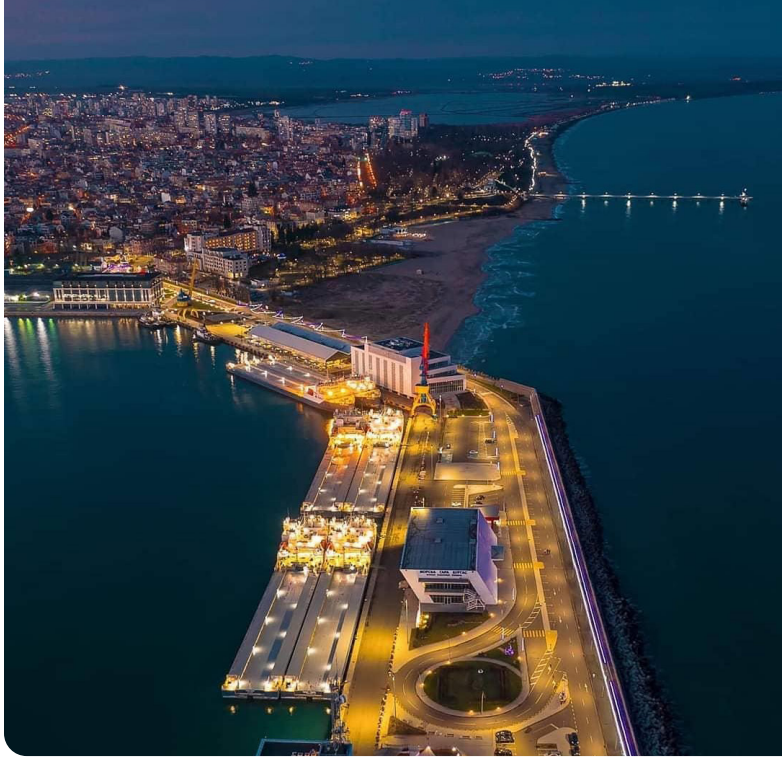
CLOSER LOOK AT FELLOW CITIES' REPLICATION STRATEGIES

Bordeaux replication strategy: Sharing Cities, a catalyst

- Participating in Sharing Cities led to the creation of a Smart City task force to gather existing projects under a single umbrella. Focus groups dedicated to smart city measures have been created. Through these, people from different departments regularly work together on cross-sectorial topics.
- Peer-learning visits were organised in the three lighthouse cities and were extremely well attended by representatives from the mobility, energy, and public lighting departments.
- Then, measures were chosen depending on the skills of the available and interested employees and among subjects on which Bordeaux had not already invested a lot. For example, regarding mobility, most of the bike sharing or EV sharing solutions had already been in place for a while when the project was launched in 2016.
- Mentoring visits were organised during which new persons integrated the project.
- The professional mobility of representatives during the project was a real hindrance to the replication process.

Burgas replication strategy: Sharing Cities, a way to unify a project already begun

- Burgas was already leading some smart measures, without attaching it to a smart city strategy.
- It began in 2010 with mobility as a starting point. The measure encompassed bus fleet renewal and the creation of an intelligent system related to traffic management, electronic ticketing, and real time passenger information system among other features.
- Other measures came, and soon the city realised it could group all the measures with an urban sharing platform.
- Sharing Cities was an opportunity to gather all the measures under one initiative.
- Innovative Systems Burgas was created. It is an external company that is 100% municipal-owned. Using such a mechanism allows for more flexibility and, in the case of Burgas, helped the city to concentrate its efforts.
- Peer-learning visits were organised in the lighthouse cities.



Burgas identified the main priorities according to:

- Citizens' needs;
- The local context: what is strategic for Burgas' sustainable development? In terms of municipal strategic planning, territorial connectivity, urban, social and educational infrastructure, etc.

Warsaw replication strategy: Sharing Cities, a tool to take more ambitious and more concrete steps

- Warsaw has been a frontrunner in ICT emissions reduction.
- Around 2010-2011, Warsaw started to implement smart measures.
- Slowly, it became involved with the European Innovation Partnership on Smart Cities and Communities, as well as beginning an active cooperation with EUROCITIES in this field.
- The city was already acquainted with the concept of the smart city but held more theoretical knowledge and needed help to move onto concrete steps, which Sharing Cities provided.
- 2016: workshop in Brussels dedicated to replication.
- Then the city started creating the replication strategy with building retrofit and e-mobility as their first priorities, since it stayed in the scope of the one department.
- Then a team dedicated to the project was formed.

- Meetings with other departments (transport, architecture, road department) were held. Some people from these departments participated in mentoring visits as well.

ENABLERS & SOLUTIONS

Tools that can be used to provide guidance in a replication process

Consortium meeting

In order to keep good control and monitoring of any project implementation, good internal communication and exchange of information among the partners involved should be maintained through face-to-face contact.

Mentoring visit

Mentoring visits allow cities to receive support and find solutions to specific projects and issues. These involve people from one lighthouse city (the mentor) giving advice during the visit to the host fellow city. During the visit, mentors and mentees explore together — through interactive discussions — new ideas, options and solutions suitable for the fellow city and assess transferability. Furthermore, they start drafting an action plan to be implemented by the fellow city. The aim of the visits is to support short-term wins and improvements, which can accelerate the fellow city replication roadmap.

Peer learning / study visit

The study visit offers peers from several cities the opportunity to visit another city and see first-hand how that city has successfully implemented its energy and climate change policies, smart city projects and/or initiatives. It also allows the host city to showcase its projects, gain external insight, and get recommendations for improvements.

Webinar

'Webinar' is short for 'web-based seminar', a meeting for the exchange of knowledge, which uses the communication tools of the Internet. Webinars are a powerful medium for reaching varied audiences—small or large. Easy to access as well as convenient, webinars are an effective mode of learning for professionals who can fit the concentrated hours of learning or exchange into their schedules. The use of Internet avoids the need for travelling, which is naturally an important advantage for international networks and projects.

Work-shadowing visit

Work shadowing involves one or two people from one city spending a period of time with one or more people from another city who work in the same field or on similar projects. The aim is to facilitate an exchange of expertise by observing first-hand how things are done elsewhere, thus providing inspiration and new ideas for working methods.

Softer lessons about enablers and solutions

Being part of a project, such as Sharing Cities, that fosters exchange of good practices

OR

Being part of a network

» It allows you to foster the exchange of good practices and knowledge, to have a momentum to start implementing measures.

» It also gives a framework and general guidelines to follow the process.

» If such a project is not currently being led, it is also possible to engage with other cities in the region/country to create an impetus and to recreate this general approach.

> Consortium meetings were important milestones for us.
>
> — Bordeaux

Peer learning visit

Mentoring visit

Work-shadow visit

» Visits amongst peers are very valuable as they show the reality of the measures and their concrete applications, and provides for open exchanges on the challenges and barriers encountered in implementation.

» It also reinforces connections between members of the project.

» It creates closer dialogue between replicators and facilitates further exchange.

> The peer learning visits allowed us to delve into the measures implemented by other members. They erased the scepticism that some colleagues might have had about certain measures. It was a great starting point.
>
> — Bordeaux

Documents of all types (booklets, leaflets…)

» Documents are a great source that can be easily and often consulted.

» It is also easier to send documents to a multiplicity of stakeholders than organising individual meetings.

» It fits better in tight schedules.

» To ensure their efficiency, they must be attractive, clear, and concise.

> Very good documents were produced by all the partners.
>
> — Burgas

Online capacity building events, such as webinars

- Webinars are a good way to provide effective capacity building opportunities for partners. Speakers are often willing to present their achievements as it does not require any infrastructure and is relatively time efficient.
- Webinars can also be easily recorded and then further disseminated.
- Webinars are also very versatile, from being straightforward presentations to being training sessions, discussion hubs, technical series, etc.

> Webinars were very useful.
>
> — Warsaw

Breaking silos

- Breaking silos is a smart city enabler as well as a side effect of implementing smart city measures.
- Measures very often touch upon many subjects and cannot be solely handled by one department. Allowing an easy flow of information will not only ensure more holistic solutions, but also speed up the decision-making process.

> Thanks to the project, we started meeting our colleagues from other departments and sharing knowledge. In Warsaw, the structure is very vertical, and the project helped to break silos.
>
> — Warsaw

Human resources

- Human resources are probably the biggest enabler.
- Do not forget to assess what you already have in your team. There is no single 'smart city expert'.
- Knowing the competencies of the team involved in the smart city strategy is a good entry point to any smart city measure.
- Some cities decide to start their smart city journey based on expertise that people in the team already have.

> The selected measures were chosen according to the human resources we had. Had we had other skills among us, we might have chosen other measures.
>
> — Bordeaux

OVERCOMING BARRIERS

Technical aspect

- Assess the skills of your own team.
- Reach out to external stakeholders who have the expertise.
- Contact cities that have implemented similar measures and see how they did it.

> At the beginning we thought that smart lampposts would be an easy measure. We thought we only had to add features to existing infrastructure. But then we realised that our lampposts were too old and did not correspond to the technical requirements.
>
> — Burgas

Financial aspect

- Try to engage with private stakeholders and convince them to implement a pilot project in your city.
- Find funding that can support your project. It might be at the state level, or at the regional level.
- Integrate smart features into an already funded project.

> For building retrofit, we had a national programme which invested in the renovation of buildings at local level. It was a trilateral agreement: the state, the city, and the association of owners of private buildings.
>
> — Burgas

> For our building retrofit plan, we applied to get a national subsidy through a bid (available for municipal buildings). However, most of the money came from the city budget.
>
> — Warsaw

Human resources

- Assess the skills and expertise of the people that are in the team.
- Engage with employees from different departments to seek motivated persons.
- Do not focus on building a big team. A small team can achieve a big strategy if connected to the relevant people.
- Motivate the team and engage it through peer learning visit, mentoring meetings, etc.
- Ensure continuous and bilateral discussions with all the stakeholders.
- Try to engage employees in the long term.

> Innovative Systems Burgas is coordinating everything. The company is municipally owned but completely external and operates in a way that offers a flexible mechanism to implement smart measures faster and to avoid administrative obstacles. Its creation was inspired largely by the structure Lisboa E-Nova, partner in the project.
>
> — Burgas:

> The main officer responsible for revitalisation for Warsaw visited Milan, one of the lighthouse cities. What he saw in Milan deeply influenced his vision for Warsaw.
>
> — Warsaw

Legal issues

» Legal issues are a difficult barrier to overcome. But it is important to be aware of them and to develop your plans accordingly.

Regarding e-mobility in Poland, charging points must be built by energy providers. This lack of flexibility is impeding the development of a mobility strategy.

— Warsaw

Smart developments often go faster than laws. Most of the time, the legal framework has to be adapted to what has already been realised. Thus, while implementing innovative measures, there are no legal provisions and subsequently it is difficult to overcome the 'legal gap'.

— Burgas

Lack of political support

» Political will to support the smart city strategy is indispensable. It enshrines the project in a long-term vision and can help overcome many other barriers. As political representatives change, the new ones need to be engaged in the vision.

One of our local representatives pushed the smart city agenda. However, he did not renew his mandate, thus thinning the political support. Later, Bordeaux's mayor resigned, leading to a reshuffling of the local representatives. The new ones were not as involved in the smart city strategy as their predecessors.

— Bordeaux

Absence of citizen engagement

- There can be misunderstanding and/or mistrust among citizens when implementing smart city measures.
- Not communicating with citizens can jeopardize the success of some measures, due to lack of understanding on how measures work. Ensuring communication and engagement with citizens is integral to the success of your smart city strategy.

> We have public discussions — it is a national obligation for cities. When we started to integrate specific measures, such as building retrofit, there were targeted campaigns with the association of owners. For the USP, we did a public presentation. It is a question of marketing.
>
> — Burgas

Governance

Centralised governance ⟵ ⟶ Decentralised governance

In a smart city project, governance can take different forms:

Create a team entirely dedicated to the project

Advantages:

- Dedicated team
- Quick decision process
- Choice in the recruiting of the employees (able to select experts)
- Team able to identify long-term opportunities for smart city strategy and solutions

Considerations:

- Likely to require additional resources
- It requires a long-term commitment to maintaining a dedicated team to monitor the implementation of the smart city measures

What you need:

- Strong political support
- Dedicated budget

Transversal governance with different people coming from different departments

Advantages:

- Helps break silos
- Takes advantage of all the departments' expertise
- Holistic solutions

Considerations:

- Decision process might be lengthy
- Smart city project might not have priority over other projects

What you need:

- Robust communication system between the departments
- Preferably, having all the departments in one facility for ease of dialogues and meetings

What stood out from the interviews:

- There is a need to acknowledge that smart city measures are deeply transversal.
- Regular meetings or working groups must be held to ensure continuity and renewed interest.
- One person cannot be a 'smart city' expert and the project leaders need to identify all the participants' expertise to make the most of it.

Examples:

All cities have different governance processes.

For example, Burgas benefitted from strong political support that helped the city build a dedicated team of 5-7 people, with each one responsible for an area of competence. This team oversees and leads the smart city measures implemented in Burgas.

In Warsaw, more people are involved in the smart city project. 10 employees actively work on the project, belonging to three different departments: digitalisation, energy, and climate. Although the group is transversal, each measure is taken on its own and there is no overall smart city strategy for the city of Warsaw.

Lastly, Bordeaux decided to dedicate two fulltime employees to the project with regular group meetings that gather experts. The duo ensures the consistency and the continuity of the project.

Relationships with external stakeholders

Public stakeholders

National and regional government and agencies, national city networks, citizens' associations

What can they offer?

- Consultations at local and regional levels with local stakeholders and/or citizens
- Favour concerted action between cities
- Foster exchange of knowledge and/or knowledge hubs
- Help engage with stakeholders from different levels (European, national, regional)
- Regulatory framework and standards

Private stakeholders

Businesses (big corporations but also SMEs and start-ups)

Universities, research institutes, technology centres

What can they offer?

- Financial help
- Technological help
- Qualified personnel
- Expertise
- Implementation (a measure can be a pilot for a business)
- Viable business model
- Technology/product/service vendor

European institutions and related organisations

European Union, European projects, European agencies, European organisations and networks

What can they offer?

- Financial support through projects, grants, or specific funds
- Networks, such as EUROCITIES, can provide communication channels with other cities, other projects, other partners
- Regulatory framework and standards

Citizen engagement

Citizen engagement has three central motivations:

- Their involvement is needed for the functioning of the measures;
- The insight they provide into their own needs, priorities and lifestyles are essential to developing smart measures which achieve the ultimate end of improving people's quality of life;
- The measures can induce a change or a disturbance that requires good communication for the citizens to accept the temporary discomfort.

Although citizen engagement is crucial for some smart city measures as people's behaviours and acceptance can strongly influence the results or success, it is interesting to note that some measures are less sensitive to citizen engagement. Thus, smart city coordinators can pick the measures they want to implement based on a variety of factors, such as the will/possibility to engage or not with the community.

There are different ways of engaging citizens. For each of these motivations, different tools can be used, with each advantages and considerations:

Co-design

Advantages:

- Engagement with citizens from the beginning and secure buy-in to the solution from the very start
- Ensures a continuous dialogue for lengthy measures and ongoing smart city strategy implementation

Considerations:

- The organisation can be complicated if the citizens are not willing to participate
- For some measures, it can be difficult to make citizens understand the necessity of some technical aspects of a project
- It adds a layer of approval and adds to the length of the planning and design phase

What you need:

- A dedicated team to frame and moderate the co-design process
- A trained team that can make technical information understandable if need be

Consultation

Advantages:

- Good way to engage with citizens to offer tailor made solutions
- Allows to easily collect qualitative feedback
- Needs to be genuine consultation with citizens' views integrated into the final decision, or rationale for why they were not included provided

Considerations:

- The organisation can be complicated if the citizens are not willing to participate

What you need:

- A trained facilitator

Data use and data analysis

Advantages:

- Cities can tailor their services based on how citizens use them
- It creates a data base that can prove useful for other projects

Considerations:

- Citizens can be distrustful concerning the use of their data
- Needs IT expertise

What you need:

- Good communication on GDPR compliance
- Interoperable systems to ease the exchange of data

Online tools (e.g. applications)

Advantages:

- New generation is used for new kinds of online tools
- Easier to collect real-time data

Considerations:

- Citizens can be distrustful concerning the use of their data
- Need IT expertise
- Often outsourced

What you need:

- Good communication on GDPR compliance
- Avoid vendor-lock-in

User guide, leaflet, booklet

Advantages:

» Tangible material can be easily handed-out and is understandable by all generations

Considerations:

» Can be lost by citizens and requires them to either hold on to the physical document, or retrieve it online

» Difficult to update

What you need:

» A designer to create impactful yet short communication material

Communication campaign (on-site and online)

Advantages:

» Effective at providing a message for people that are 'in front of' the measure (online or in person)

Considerations:

» Usually communication campaigns are rather short given their costs

» Generally outsourced

What you need:

» Must be well thought, otherwise it can be a financial failure

» Easier if the measure has a clear graphic identity

What measure was the easiest?
What measure was the hardest?

Surprisingly, building retrofit has been the most cited as the easiest measure to implement, generally where a national thermal renovation plan in in place, which eases the process on the financial level. Besides, it engages citizens and is a very good first step in learning how to create a dialogue with citizens and private stakeholders. The knowledge for building retrofit is rather well developed and underpins any type of initiative in that field.

> "Building retrofit was easier because it is something that we have the knowledge for, and the energy monitoring system is progressing.
>
> — Warsaw

On the other side, e-mobility related measures were often cited as being the hardest ones. Many reasons were mentioned. First, there is an issue of energy distribution and energy generation. Then, it poses the question of parking: should existing parking spots be mobilised? Or should new parking be created? Another concern is the size of the city. Some private technology or service providers are not interested in small cities as being pilots. At a small scale, it can be harder to reach break-even, which deters investors.

Another aspect mentioned as being challenging is citizen engagement, as well as communication. As mentioned before, efficient citizen engagement can be the key to successful replication. Yet, there is no one-size-fits-all solution, which complicates the systematising of any citizen-oriented communication campaign. Whether it be towards citizens, partners or internal departments, communication is one of the most challenging parts of any replication activity. However, some measures require more or less citizen engagement, which can mitigate this hurdle.

Collaboration with other cities

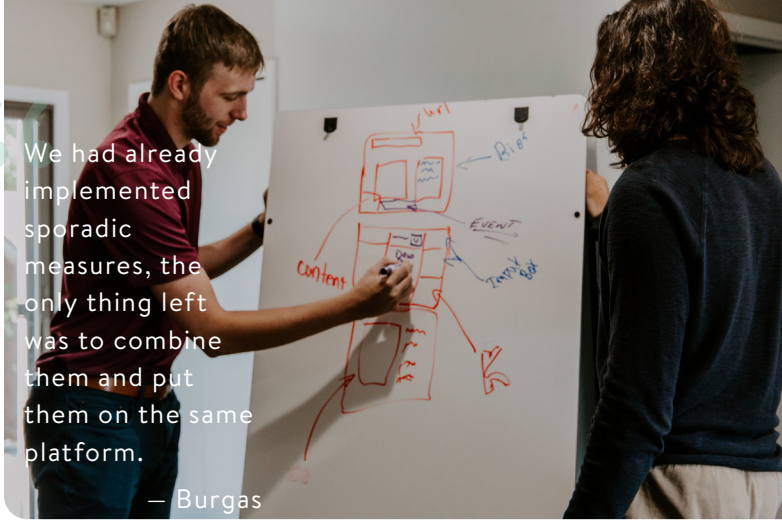
Collaborating with other cities in your region/country can be a good way to create momentum and foster good practices. The three cities reported having engaged with other cities, mostly in their own countries, on smart city related topics. It can take different shapes and forms: organising events (like scale-up events organised by Burgas), engaging in informal discussion about dissemination (like Warsaw did), or exchanging and sharing knowledge with other cities enrolled in lighthouse projects (like Bordeaux did with Lyon and Nantes). Nevertheless, engaging with other cities can be challenging because of the different budgets, sizes, and political support.

> “Communication as well as convincing partners and departments was challenging.
>
> — Warsaw

TAKE-AWAY TIPS FROM FELLOW CITIES

Pick the low-hanging fruit

- Start with the ‘easy’ measures and then assemble them under a bigger strategy. For example, USP should come after having implemented a variety of smart city measures.
- It is important to have this in mind for the longer term so technicians and engineers don’t shut off future options by picking a system that cannot be changed in the future, or standards that are not shared across technologies. The more modular and flexible it is, the better. To that end, some cities recommend opting for open source models that can be tailored.
- Do not hesitate to advance more quickly on easier measures.
- If you do not know where to start, it is recommended to establish the needs of the citizens and the current assets of the cities. Building a smart city with a citizen-oriented focus is a good approach.
- Start with measures that fall under a national plan, as available funding can help to make progress and build momentum around smart cities.



Be mindful of your surroundings

- Do not hesitate to enter a consortium.
- Get in contact with cities that implemented smart city measures successfully.
- Surround yourself with skilled people.
- It is preferable to have a horizontal team on the topic, as well as constant communication with different departments. Favour transversal governance.
- This also allows you to find funding from different sources.

» Secure political support and maintain it, even if politicians change.

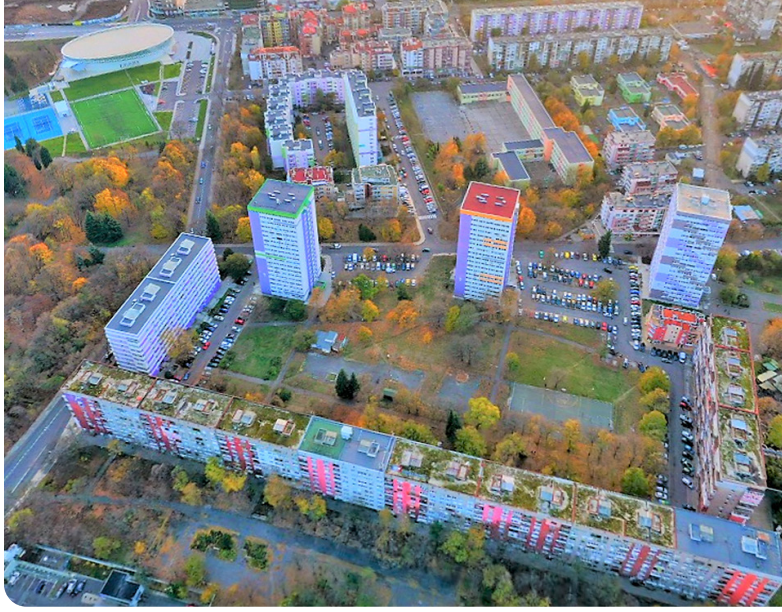
» Engage and educate different people in the municipality on the question of smart cities because once the project is done (if there is a project led by an external team), the municipality can be left without a team to continue the work. Thus, it is important to ensure that the knowledge is further transmitted internally.

> We try to integrate smart city measures into other projects. For example, Burgas has a plan for the refurbishing of urban space, in which pedestrian areas are comprised. Why not integrate smart lampposts?
>
> — Burgas

» Explore the private sector: a big corporation can be interesting, but small start-ups offer solutions too.

Think ahead to ensure future advancements for your smart city

» Implement standards or research existing frameworks for implementing smart city measures, so there is at least a minimum level of interoperability between the different measures.



» Try to think of performance indicators before the beginning of the project to compare pre-measure data with post-measures data. This strengthens the advocacy for further smart city measures.

» If you have the political support, draft a strategic plan with identified milestones and follow it. This ensures accountability and continuity in the long term.

» Get involved as soon as possible.

FURTHER INFORMATION

- To find out more about the Sharing Cities project, check out Sharing Cities website: http://www.sharingcities.eu
- For more information around smart cities and additional resources, check out the Smart Cities Information System (SCIS) website: https://smartcities-infosystem.eu
- For comprehensive implementation toolkits, check out Sharing Cities' Playbooks: http://www.sharingcities.eu/sharingcities/resources Playbooks are comprehensive implementation toolkits that dive into each of the ten measures. They also include references to a range of tools to support smart city measures' development and delivery plans. The playbooks provide in-depth information.

- To find out more about what lighthouse cities did for each measure, check out Sharing Cities' Smart Booklets: http://www.sharingcities.eu/sharingcities/smartcities Each booklet is dedicated to one measure and describes how lighthouse cities engaged in this measure: overall description, technical solutions, funding and financing, common challenges and recommendations. The booklets provide general overviews.

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