SMARTER TOGETHER

Smart and Inclusive Solutions for a Better Life in Urban Districts

Smart City Toolbox

Replication Toolkit

Deliverable D8.3.2

Version 1

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REVISION CHART AND HISTORY LOG

Versions

Version number	Date	Organisation name	Comments
V0.1	2019-02	ENC	First draft
V0.2	2019-03-06	ALG	Quality check
V0.3	2019-03-06	ENC	Correction of QC
V1.0	2019-06-28	SPL	Final version ready for submission

Deliverable quality review

Quality check	Date	Status	Comments
Technical Manager	2019-05-06	Ok	-
Quality Manager	2019-03-06	Ok	
Project Coordinator	2019-06-28	Ok	

Glossary

Low hanging fruits	Measures that can be implemented in a limited time with results that are quickly visible.
Planning phase	Planning, preparation and design phase in which the project is developed in detail and the design work for the project is done.
Implementation phase	Phase in which the project will be implemented in real life.
BAU	Dept. of Construction
BM	Business model
EI-SCC	European Innovation on Smart Cities and Communities
EU	European Union
IT	Information technology
IoT	Internet of Things
KVR	Department of Public Order
LAN/ WLAN	local area network/ wireless LAN
LBK	Lokalbaukommission (Local Building Commission)
M	Month, as counted from project start (M1 = February 2016)
MVG	Linked third party of Munich
NeuMo	Linked third party of Wien
PLAN	Department of Urban Planning and Building Regulations
RAW	Department. of Labour and Economic Development
RGU	Department of Health and the Environment
ROI	Return On Interest
SCC1	Smart Cities and Communities
SUMP	Sustainable Urban Mobility Plan
SWM	Linked third party of Munich
WP	Workpackage

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SMARTER TOGETHER BENEFICIARIES

N°	Organization name	Short name	Country
1	Lyon Confluence	SPL	France
2	Lyon Métropole	GLY	France
3	HESPUL Association	HES	France
4	Toshiba	TSF	France
5	Enedis	END	France
6	Enertech	ETC	France
7	City of Munich	MUC	Germany
8	Bettervest	BET	Germany
9	G5-Partners	G5	Germany
10	Siemens Germany	SIDE	Germany
11	Spectrum Mobil	STA	Germany
12	Securitas	SCU	Germany
13	City of Vienna	VIE	Austria
14	Besser Wohnen Seit Generationen	BWSG	Austria
15	Wiener Stadtwerke	WSTW	Austria
16	Kelag Wärme	KWG	Austria
17	Siemens Austria	SIAT	Austria
18	Sycube Informationstechnologie	SYC	Austria
19	Austrian Post	POST	Austria
20	Fraunhofer Gesellschaft	FHG	Germany
21	Austrian Institute of Technology	AIT	Austria
22	Energy Cities	ENC	France
23	Gopa COM	GPC	Belgium
24	University of St Gallen	UNISG	Switzerland
25	Technical University of Munich	TUM	Germany
26	Deutsches Institut fuer Normung	DIN	Germany
27	Algoé	ALG	France
28	City of Santiago de Compostela	STC	Spain
29	City of Sofia	SOF	Bulgaria
30	City of Venice	VEN	Italy
31	SA Régionale d'HLM de Lyon	HLM	France
32	Wavestone	WAV	France
33	WEG Radolfzeller str. 40-46	RZL	Germany
34	WEG Wiesenthauerstr. 16	WHR	Germany

EXECUTIVE SUMMARY

The SMARTER TOGETHER Toolkit is a practical guide targeted to interested bodies willing to replicate measures implemented by the lighthouse cities of Munich, Lyon and Vienna.

The present document is the **first version** of the SMARTER TOGETHER Toolkit that will be updated and finalised at the end of the project (Month 60) in order to include all the relevant results from the monitoring and evaluation phase, as well as any other remarks from the lighthouse cities of Munich, Lyon and Vienna.

This first version of the toolkit includes eleven measures, both soft and hard measures, some of them being low hanging fruits and requiring different levels of investment. The toolbox contains lessons learned as well as a step-by-step approach towards the implementation of the measures implemented by the lighthouse cities.

In its final version (M60), the toolbox will be integrated into the Knowledge Carrier Platform (window display of the SMARTER TOGETHER project developed by GOPA and Fraunhofer IAO) in order to make it more user friendly and accessible to a wider replication target group, involving the SCC community.

This Toolkit will serve the Replication Strategy of SMARTER TOGETHER in the following two years which includes the Club of Cities, Follower Cities and replication activities by the lighthouse cities within their own cities. It will also be a valuable input to the Joint Cross SCC1 Network, Smart Cities and Communities Information System and the EIP-SCC, providing complementary knowledge without being an additional replication instrument.

This deliverable is divided into two main parts:

- An impact table, where the measures selected are assessed in terms of organisational impact, technical impact, financial/economic/business model impact, legal impact, citizen engagement/acceptance, replication potential and policy impact.
- A detailed description of the measures having in mind the replicability potential of the measures, according to Deliverable 8.1.1.

The methodology chosen to achieve the results and develop this toolkit was:

- bilateral meetings and phone interviews with the local teams and the responsible elements for replication;
- Project books from WP2;
- Replication framework (D8.1.1)
- Knowledge carrier platform and interaction with GOPA and Fraunhofer IAO.

1 Overview impact table

1.1 Vienna

Field/Theme	Organisational	Technical	Financial/economic /business model	Legal	Citizen engagement/acceptance	Replication potential	Policy
E-car sharing (in social housing)	Decentralising parts of the maintenance over "active group".	N/A	The BM is not yet feasible, as the user tariffs will increase (till now subsidised by SMARTER TOGETHER) and user habits might change, the concept not being new anymore.	A legal novelty might be a new company set up by tenants	"Active group" (8-10 people) is really engaged in the project, advertising e-car sharing, organising events, thus increasing acceptance and identification. Car sharing created interaction among the tenants, making the community stronger.	Other Viennese social housing companies, depending on the feasibility of the BM. Investigation needed on replicability in the private housing.	Not known
Mobility station	The collaboration increased between the municipality and the Stadtwerke (city owned company) with its numerous departments; among others due to an important impact on the decision making procedure and management thanks to a new group set up as responsible for the project.	N/A as existing technical solutions were used and bought together.	The Stadtwerke provides a platform, a location for different service companies providing e-carsharing, but it is not a new BM per se.	Local ordinances and the legal framework were followed as there is not a normal procedure.	Mode oriented to information, rather than co-creation.	It is already planned to implement 4 or 5 more stations.	N/A
Information and participation of tenants during	Process of dealing with tenants will be improved, moving from top-down communication to a direct one taking into account	N/A	Less delay due to tenant opposition procedures Budget invested for	N/A	Increased acceptance of refurbishment Increase in the knowledge of tenants on energy	Change of the process and info point on site for the renovation, will depend on the site and on how big the	N/A

refurbishment	tenant's needs better: happy tenants don't make problems[1].		measures wanted by the tenants		efficiency – educational advantage Testimonials for future renovations, 1-2 tenants from the existing renovation explain what were the benefits and difficulties.	opposition of the tenants is. New way of communicating makes the replication potential higher.	
Activation & CoCreation	Cooperation with local groups (energy efficiency evenings and impact on a family's budget, focus on specific target groups)	None	Decrease running costs for low income families	None	Aim for groups where energy efficiency has a value Energy Coffee, a session on energy efficiency to inform and focus on small actions for each household. Knowledge of tenants on energy efficiency increases – educational advantage	High if the costs for the courses are covered	None
Logistics at local enterprises	Faster change of e forklifts (6 instead of 2) Department for subsidised projects Charging stations Consider amount of charging electrical power	Feedback to e-vans company Iveco (improvements missing) Continuous charging high load for electrics	ROI for new investments	None	Increased engagement of employees E-forklifts tested by workers	Depending of the enterprise For e-vans not yet (fitting the needs, stop and go, calculated distance etc.) E-forklifts – noise, odour (exhaust gases)	None

[1] In Austria the renting law is very strict and even renters can block renovation.

1.2 Lyon

Field/Theme	Organisational	Technical	Financial/economic/business model	Legal	Citizen engagement/acceptance	Replication potential	Policy
Holistic eco-refurbishment	The starting point is very complex Involvement of different municipal departments	Requires to meet heritage requirements, energy performance and data collection	Combination of public and private funds. Until now, no profitable (100%) private integrated refurbishment has been found	Contribute to make the local regulation change (e.g. external insulation in the ground floor).	Involvement & support of citizens in their eco-refurbishment project, by offering them free consultation	Yes	Support for eco-refurbishment by the municipality
Dynamic energy data collection on the Lyon Metropole data platform to monitor the environmental performance in Lyon-Confluence area	Increasing involvement of different stakeholders by gathering IT supervisors with experts in the energy field.	Communicating different data to the city platform, through open standards. Expected impacts: Favouring the development of new data-based services and citizen engagement.	Business model not defined so far. High initial costs (and hidden costs) for the IT development and integration. At this stage of the experiment, additional funding is necessary (for instance thanks to SMARTER TOGETHER)	Signature of data sharing agreements, in a way to maintain the control of the municipality over the data Privacy	No personal data collected & stored on the city data platform, but only collective and aggregated data. There is a need to find different decision-making tools for energy management data at citizen level. New urban services developed.	Yes	Contribute to the next step of the strategy of the municipal IT department

1.3 Munich

Field/Theme	Organisational	Technical	Financial/economic/business model	Legal	Citizen engagement/acceptance	Replication potential	Policy
e-Mobility stations	Improved cross-departmental cooperation especially with two other projects from different departments and peer-exchange on how the people are approaching the tasks. There is a common monitoring group and a common monitoring framework. Cross-sector collaboration with other organisations.	The impacts are related with the integration of the IT of different providers (SWM/MVG, the car sharing providers).	Revenues generated through loaning mobility offers (MVG Rad, MVG eRad, MVG eTrike etc.)	N/A Potentially Munich's scenario consider a legal impact on the amount of car parking spaces provided by a developer in the future.	There was citizen engagement process during early planning phase.	Potential to replicate in other areas and spatial and socio-demographic contexts, the offering can be adapted to fit any given location need.	Potential impact on planning/ planning regulations – as part of a standard procedure for urban renewal or new developments.
Munich Smart City App	Cross departmental cooperation Cross cooperation with other organisations Matching of schedules and priorities and sharing agendas	Creating standards and bringing existing modules together, do not mean creating isolated solutions nor developing interfaces for data exchange	Provide more functionalities and services in one single City App. Create more value comparing with multiple and disperse services' sources	The Online-Services and the Content need to be in line with the Law and with the city policies	It is necessary to develop a user friendly and intuitive application. The content must be useful and helpful for all user and there should be an added value for the public especially for the citizens, commuters, tourists or other interested users.	High, as it is an umbrella app integrating other services	It is recommender to define a strategy to define the city policy regarding the smart city related data collection, data analysis, transparency rules and open data portal.

2. Detailed description of the measures

2.1 Vienna

2.1.1 E-car sharing in social housing

Presentation of the measure

In Vienna, electric cars are shared on a residential neighbourhood scale. This included the installation of the hardware (e-cars, loading infrastructure, booking platform) and facilitation of the car-sharing business model at existing social housing and tenant communities.

The station is located in a semi-public area (on the ground of the social housing company called BWSG, however openly visible and accessible) in order to address more tenants. Some of the existing parking slots are reserved for e-car sharing. Four charging points have been installed: three for the sharing cars and one for a potential private e-car charging.

Three e-cars are at the disposal of all tenants with different types of cars targeting different needs and core publics:

- Nissan E-NV200 Evalia: dedicated to serve transport needs,
- Nissan Zoe: dedicated to serve for city excursions,
- BMW i3: dedicated to a public acting especially as change agents in the neighbourhood.

Some tenants are actively involved in the management of the service and are thus called the "active group" as they are acting as a contact point, are involved in the cleaning etc.

The basic fee is 1 euro per hour and 10 eurocents per kilometre. The "active group" benefits from a lower fee of 50 eurocents per hour.

Budget needed

EUR 66.750,00 of investment in cars, loading stations etc.

Funding sources

The investment was done by BWSG (social housing company) with a SMARTER TOGETHER funding of EUR 66.750,00 representing 100 % of the total investment.

Implementation timeframe

Approximately:

- 6 months dedicated to the planning and preparation phase

- 2 months dedicated to installation and testing (hardware, software)
- 1-2 years dedicated to running, support and mentoring

Partners required to implement the solution

- BWSG (social housing company) for the commissioning of equipment
- Caruso as provider of e-cars, loading infrastructure and software solution (booking, billing etc.) and operation
- Wohnbund:consult in charge of the connection to the user target group for information and introduction to the service; daily Questions & Answers

Preparation of the ground to create a fertile ecosystem for this measure to be set up

Partners involved in the preparation:

- SMARTER TOGETHER initiated the process at its very beginning; it finances its implementation and stands as innovation authority backed by a European vision for the global message and goal of the project. As such, SMARTER TOGETHER is key in all field communication events and media communication and promotion.
- BWSG takes decisions and clarifies various framework conditions.
- Caruso provides the vehicles and its expertise in all technical and economic matters related to car sharing.
- Wohnbund:consult communicates to tenants, informs and activates them to get involved in the e-car sharing.

In order to achieve the goals, conception workshops, events, resident talks and an online survey were conducted in advance, as follows:

- In several design workshops between May and September 2016, the framework conditions were analysed, various implementation options discussed and the concept elaborated.
- In order to inform the tenants, two events and communication set-ups were organised in November 2017.
- All residents had the opportunity to participate in a survey on the future electric car rental (e-car sharing) in the residential complex of BWSG. In total, more than 120 people took part in the survey. Thanks to these numerous answers and feedback, it was possible to adapt optimally the mobility offer to the needs of the residents. In addition, a segment of the residents was activated for the offer.

The results of the above-mentioned actions were designed to lead to a tailor-made concept for the housing estate of Hauffgasse and its inhabitants.

Car sharing projects usually take some time to gain widespread acceptance. Therefore, the essential offer of the BWSG and SMARTER TOGETHER was to ensure a long term accompanying of the project process by Caruso and wohnbund:consult. However, the project would have no basis without the energetic and dedicated support of active e-car sharing users.

Step by step approach

- One e-car was offered for testing
- Four charging points installed – three for the sharing cars and one for a potential private e-car charging.
- Three e-cars are in operation (one small car, one transporter and one high class car)
- Mid of September until mid of October there was a survey among the tenants, about their interest and the potential usage of the e-car sharing.
- Setting up the "active group"
- On-site support from independent persons is necessary for answering questions and reduce fear of something new.

Steps for usage:

- Registration via the platform (zukunfwohnen.net/e-carsharing) or during the inauguration event at Hauffgasse
- Getting a customer card at the info point (drivers licence and cash card necessary)
- Booking a car via carusocarhsaring.com

Number of cars	3
Registerd users	ca. 70
Active users per month	15-25
Users in April/May	22
Members of the Active Group	13

Results/benefits available at this stage

Currently (as of October 2018), all three electric cars are in operation. The usage figures are very good, also in comparison to other car sharing offers and are still rising.

The "Active Group" continues to be very committed to the cause and makes it possible to look positively into the future. There is also a small increase in the number of active members since the beginning of the project. The figures for use and utilization (until May 2018) of the cars can be found below:

80 users registered to the online app and there are 40 active users of the app, mainly retired persons.

The figures for use and utilization (until May 2018) of the cars can be found below:

Current figures	Jan	Feb	Mar	April	May	June	July	Aug	Sept.
Kilometres driven [km] - BMW i3	1.772	1.507	2.650	1.876	1.994	1.790	2.132	2.292	3.395
Kilometres driven [km] - Nissan E-NV200 Evalia	308	796	864	451	1.007	1.047	601	1.244	1.427
Kilometres driven [km] - Renault Zoe	-	788	2.302	1.398	2.657	2.237	2.308	2.822	3.894
Kilometres driven [km]	2.080	3.091	5.816	3.725	5.658	5.074	5.041	6.358	8.716
Rental duration day [h] - BMW i3	247,5	242,0	275,0	221,5	243,0	260,5	339,0	313,0	377,0
Rental duration day [h] - Nissan E-NV200 Evalia	67,5	126,0	148,5	98,0	194,0	161,0	113,5	194,0	185,0
Rental duration day [h] - Renault Zoe	-	259,0	267,0	177,5	223,5	277,5	231,5	232,5	399,0
Rental duration day [h]	315,0	627,0	690,5	497,0	660,5	699,0	684,0	739,5	961,0

Is this measure a low hanging fruit?

This measure is not a low hanging fruit as a lot of planning and convincing was necessary and the economic feasibility after the end of the SMARTER TOGETHER project is still unclear.

Lessons learned, enablers, barriers, solutions found

Communication work is very necessary:

- Several information events were carried out on-site for the target group before the installation. This was important in order to avoid mistrust and wrong interpretations as several tenants thought that all of them would have to pay for the e-car sharing regardless of the usage.
- The high support and accompaniment by wohnbund:consult was urgently needed.
- The strong involvement of the sharing provider (Caruso) and the cooperation with the tenants and future users was very important.
- On-site support was required from independent persons and the “Active group” for answering questions and reduce fear of something new.

A specific highlight needs to be set on the “Active Group” who are proud of the e-car sharing in Hauffgasse and they take responsibility for the cars and their role.

They actively recruit new users for the sharing system. Via this group, the new technology is accepted in a better way resulting, among others, in a positive impact on the economic efficiency.

Initially, the fact that the concept was new attracted the users as they had the opportunity to test e-cars, however, it is not yet known how they will react after they get used to this concept.

The business model is the critical point:

- Using a proven business model is very important.
- The "Active Group" increases usage and the economic liability of the business model because the tariff of the users is subsidised by SMARTER TOGETHER and the tariff will increase at the end of the project.
- The higher tariff was previously foreseen, planned and communicated to the tenants.
- The impact of a higher tariff on the usage is not yet known.
- At this stage it is unclear whether the tenants are setting up a new company in the future, as currently it is the housing company that pays and collects the income of the usage, while all the other expenses are covered by the SMARTER TOGETHER project.

As a conclusion, the business model is not well defined at this point.

Replicability

The solution is replicable in Vienna via other social housing companies as well as private housing ones. Potentially a new service company would be needed to "build the bridge".

Contact person:

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Further information:

http://www.smartertogether.at/start-e-carsharing-in-der-hauffgasse

http://www.zukunftwohnen.net/

2.1.2 E-mobility station

Presentation of the measure

On September 21st 2018 the WienMobil Station Simmeringer Platz was opened in Vienna. The WienMobil Station is the first public mobility point that was designed and implemented in Vienna. The mobility point is used here as a term referring to the possibility to changeover, in a specific geographical location, from public transport to other publicly available means of transport, such as active mobility, car sharing, bike sharing etc.

The Mobility Point thus combines multimodal mobility offers in a narrow space, including (e-) car sharing, e-bike sharing, charging station for private e-cars, bike boxes for storing bikes, seating options and a bicycle pump, while being close to a public transport stop.

Budget needed

The project implied an investment of 600.000,00 €.

Funding sources

The investment was done by NeuMo respectively Wiener Stadwerke.

Implementation timeframe

For this first mobility station, the preparation and planning phase took up one-two years, while the installation lasted for two months.

Partners required to implement the solution

- Project lead and conception: NeuMo respectively Wiener Stadtwerke
- Responsible for local mobility survey: Wiener Stadtwerke
- Responsible for installation: Wiener Linien (public transport company)
- Marketing: Wiener Linien (public transport company)
- Operation: Wiener Linien (public transport company)
- Provider of charging station and infrastructure: Wien Energie (energy supplier)
- Provider of e-bikes: Sycube
- Provider of (e-) car sharing: private car sharing provider
- Integration into existing public mobility software respectively booking and billing option: Upstream (public company)
- Permissions/ support was offered by: diverse municipal departments (department responsible for public space, department responsible for traffic), political representative of the district, electricity network operator.

Preparation of the ground to create a fertile ecosystem for this measure to be set up

Strategically Wiener Linien sets its focus on developing towards an integrated mobility provider, which offers "classic" public transport services as they are well known to citizens in Vienna, but at the same time expand their service portfolio in the digital sphere and physical form. Since several years, new mobility services have emerged and offer new possibilities to organize urban mobility for businesses and customers. On the basis of these developments by today, Wiener Linien took the chance to realize their own mobility point within SMARTER TOGETHER.

At the same time Wiener Linien supports the City of Vienna and its strategic "Urban Mobility Plan" (Fachkonzept Mobilität) in implementing a mobility point in order to offer new services to the citizens of Vienna.

Step by step approach

- Planning phase and negotiations with relevant stakeholders
- Site permission and detailing of the technical concept
- The budget and concept for the mobility point was accepted at the end of 2016 by the steering committee of the Wiener Stadtwerke. Wiener Linien (operator of public transport) joined the project.
- The detailed design concept was put out to tender and assigned to an external company.
- Responsibilities were agreed on: Wiener Linien does the construction work (foundation, ducts), Wien Energie installs the charging points, SYC installs the rack for the bikes.
- Setting-up of booking systems and software integration. It was agreed that the mobility point (including real time data about the number of available bikes) will be integrated into the existing mobility App "Wien Mobil" which is designed and operated by Upstream (city owned start-up).
- Continuous coordination with the relevant actors was intensified to support a positive attitude of the district.

Results/benefits available at this stage

Finally, on September 21st, 2018 the first public mobility point, called WienMobil Station Simmeringer Platz was opened.

Wiener Linien operates the Mobility Point Simmeringer Platz as coordinator for planning, implementing and operating everything connected to the station. This means that Wiener Linien deals with the approval process and the construction and electric connection for all the facilities necessary. Wiener Linien decides about the composition of mobility services at the mobility point and serves as first point of contact in organisational issues. In fact, Wiener Linien cooperates with most of the (mobility) service

providers via partner agreements, but some services are provided and operated by Wiener Linien.

Is this measure a low hanging fruit?

No, as a lot of planning was necessary, it is cost intensive and very new also in terms of legal permissions.

Lessons learned, enablers, barriers, solutions found

Co-Creation:

- Involvement of potential users at an early stage – during the design process focus groups should be included to increase the usability and user acceptance.

Business model:

- Use of a proven business model is very important.

One specific challenge in organizing the operation of the mobility point has been the elaboration of partner agreements with business partners, which bring in their operating capital (e.g. vehicles) as well as cover the operation of their services. In elaborated partner agreements, it is agreed upon exchange of data, insurance coverage, use of public space, responsibility for electric wires, data protection, etc.

Replicability

Yes, five more stations are planned in Vienna.

Contact person

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Further information

- https://www.wienerlinien.at/eportal3/ep/programView.do/pageTypeId/66526/programId/4401236/channelId/-4400944

2.1.3 Refurbishment: information and participation of tenants

Presentation of the measure

Traditionally, when it comes to refurbishment, tenants are often afraid of changes in general or scared by possible problems due to the refurbishment works. In addition, increase of rents is a highly sensitive issue for the socially weak population.

For counteracting potential problems, a change of the current information method as well as additional co-creation possibilities were developed in Vienna concerning refurbishment works in Hauffgasse and Lorystraße.

Employees from the housing company had a door to door approach, reaching about 70 % of the tenants. This was necessary to get a broad insight into the general opinion.

In addition, an on-site information point was installed. In this container, persons of the "Wohnpartner" are available at predefined times and function as point of contact for all tenants having questions or expressing specific needs concerning the refurbishment.

As tenants of Hauffgasse were initially averse to the refurbishment, a particular attention was paid to discussion in smaller groups. Also Wiener Wohnen (developer) was supported with a different facilitation format during the information evening. The tenants of Hauffgasse had the possibility to participate in the decision concerning the colouring of the façade. Also, they decided that instead of garden furniture, they prefer a stair lift.

The tenants in Lorystraße could decide about the colour of the façade and the balconies, as well as about the design of the community space and the garden.

Budget needed

A precise budget is difficult to establish for such a measure; however, an accurate estimation will be provided at a later stage.

Funding sources

BWSG funded the work of wohnbund:consult as well as the container. The support of other parts of the project team was financed via the budget of SMARTER TOGETHER.

Implementation timeframe

Information events should take place 1 year before the refurbishment is supposed to start. Also the possibilities for co-creation should be made clear and the effective co-creation process should start.

Ongoing information over the whole refurbishment process was guaranteed.

Partners required to implement the solution

- Flat owners
- The City of Vienna as represented by the Municipal Department "Wiener Wohnen" dealing with the dialogue with the tenants
- "Wohnpartner" (housing partners)
- wohnbund:consult

Preparation of the ground to create a fertile ecosystem for this measure to be set up

There was no real "framework preparation" necessary as the measure itself was a kind of preparation measure.

It was necessary to be available on site, so a container was organised and set up in the inner court of the building block.

Step by step approach

A change of the setting of the information events was jointly designed and agreed. Instead of a rather top-down problem-oriented communication in a general assembly form, a combination of general and wider information and issue-related dialogue was established. Smaller issue-related discussion fora were designed where needs and subjective apprehensions would be tackled by relevant staff in a more integrative way.

One main focus was to reach a stronger face-to-face communication on eye level. The aim was to raise the level of trust and reach a more constructive dialogue than in a podium or auditorium situation.

The following persons were included in the different formats:

- Specialized staff from Wiener Wohnen (technicians, refurbishment managers)
- Specialized staff from "wohnpartner"
- Specialized staff from the unit dealing with social subsidies for those cases where increased rents might be problematic

The new event design also included a highly professional debriefing, where specific issues of tenants were discussed on the spot often leading to concrete solutions. The debriefings amongst all participants also contributed to the motivation of staff and to the learning process.

Results/*benefits* available at this stage

One important learning of the co-design especially in refurbishment-processes was, that objection is also a driver for engagement but it needs to be handled carefully. When tenants learn about the refurbishment plans of their apartments, they often react sceptically and oppose the ideas for change. Often they come well-prepared with critical arguments. Within SMARTER TOGETHER, a format and methodology was

developed to give the tenants the chance to individually let off steam with the responsible bodies, but also to find solutions for the most urgent problems or fears concerning the upcoming refurbishment works. Therefore, change creates fears and opposition, but the latter are also motivators to attend information events and to discuss ongoing matters.

Is this measure a low hanging fruit?

The change in the different communication ways, respectively the new design of the dialogue, is definitely a low hanging fruit. However, accompanying the refurbishment works with an info point on the long-term is rather expensive.

Lessons learned: enablers, barriers, solutions found

Changes produce fear and defence but they also move people which increases the engagement.

The communication process has been assessed as being essential for the user acceptance of the solutions and the long-term quality and outcomes of the measures.

Resistance can be solved through good facilitation and carefully selected measures focusing on specific topics to be discussed in smaller groups. This makes people active and the willingness to participate is higher.

The outcome of the co-creation process will not be well balanced if not all target groups are reached.

A better understanding between developers and tenants is crucial especially in new development areas. The participation possibilities should be integrated into the daily processes of the developer / housing companies. This will lead to a better communication with the tenants about the benefits resulting from the refurbishment.

The main innovation consisted in the new design of the dialogue as well as additional personal resources that were committed.

It was helpful that the person(s) from “Wohnpartner” at the information point were mainly the same as this supports a trustful relationship.

Replicability

Wiener Wohnen is adapting its processes in terms of tenant communication.

Contact person

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Further information

- http://www.smartertogether.at/mieterinneninformation-im-gemeindebau/
- http://www.smartertogether.at/mit-der-smarter-together-methode/

2.1.4 Activation and co-creation

Presentation of the measure

SMARTER TOGETHER made at a very early stage an informal cooperation agreement with the "Environment Counselling" ("die umweltberatung"), an institution linked to the adult education centres Volkshochschule Wien (VHS). The environment counselling provides information and council to citizens on every day ways of contributing to environmental goals and saving energy and money for instance. Cooperation was envisaged for specific SMARTER TOGETHER target groups in the area, namely tenants who are the main actors when it comes to consumption and energy efficiency at building level.

The contribution of end-users for the energy performance of a building is essential. Topics like heating demands, ventilation, dew points, biggest consumers, efficient lighting, warm water reduction, e.g. are part of the Workshop. Die umweltberatung was subcontracted for the moderation of these Co-Design events by the City of Vienna. The event was organized in cooperation also with the local VHS Simmering respectively in its facilities.

The method of the Workshops was designed as "Energy Saving Café". Participants get coffee and cake and contribute in a very interactive way to different small tasks and discussions.

In April 2017, the "Walking Café" took place in Simmering, as an event organized by the Mobility Agency Vienna in cooperation with SMARTER TOGETHER. It is a well-established and innovative event format, which offers a tour through a specific area followed by a Pop-up-Café in public space. About 60 people from Simmering, as well as other parts of Vienna, participated. Participants were informed about several demonstration actions on-site. At the Café, a joint reflection of the visited sites and the project as a whole was also initiated to create another added value for the project itself.

Budget needed

The specific budget for this action will be provided at a later stage.

Funding sources

SMARTER TOGETHER budget

Implementation timeframe

Some weeks, depending on the availability of the executing company as well as on the existing knowledge as a basis for the event.

Partners required to implement the solution

- SMARTER TOGETHER team

- Co-creation task lead who initiated the actions
- Mobility agency
- Vienna & Environment counselling
- Other existing institutions, executing companies

Preparation of the ground to create a fertile ecosystem for this measure to be set up

After the experience of former information and participation events, the team looked for established institutions or undertakings for collaborations.

Step by step approach

In April 2017, the "Walking Café" took place in Simmering, as an event organized by the Mobility Agency Vienna in cooperation with SMARTER TOGETHER.

"Energy saving café": SMARTER TOGETHER made at a very early stage an informal cooperation agreement with the "Environment Counselling" ("die umweltberatung"), an institution linked to the adult education centre Volkshochschule Wien (VHS). Cooperation was envisaged for specific SMARTER TOGETHER target groups in the area, namely tenants, who are the main actors when it comes to consumption and energy efficiency at building level.

Die umweltberatung was subcontracted for the moderation of these Co-Design events by the City of Vienna. The event was organized on the 24th November 2017 in cooperation with the local VHS Simmering, respectively in its facilities.

Results/benefits available at this stage

Walking Café: It is a well-established and innovative event format, which offers a tour through a specific area followed by a Pop-up-Café in public space. About 60 people from Simmering, as well as other parts of Vienna, participated.

Energy saving café: The environment counselling provides information and council to citizens on every day ways of contributing to environmental goals and saving energy and money for instance. It has a lot of experience with methods for successful knowledge transfer, which was an excellent basis for the effectivity of the workshop.

Is this measure a low hanging fruit?

If appropriate institutions for cooperation are available and interested, then this measure can be considered a low hanging fruit.

Lessons learned: enablers, barriers, solutions found

Collaborations with other institutions help to reach a broader audience and other target groups. Furthermore, one can also benefit from the experience and relations of already established events.

Replicability

The solution is fully replicable; however, an interested party is necessary to initiate the activity. Also a partner for covering the costs is necessary if there is no EU budget available.

Contact person

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Further information

- https://www.smartertogether.at/workshop-energie-sparen-im-haushalt/

2.1.5 Logistics at local enterprises

Presentation of the measure

Austrian Post is committed to delivering all types of mail items throughout the entire country in a CO_2 neutral manner. One key factor is to equip the capital city of Vienna with electric powered vehicles in order to ensure delivery in a CO_2 neutral manner along the last mile (actual delivery of the mail items). In turn, this requires the use of e-vehicles in parcel delivery operations. This is being tested within the context of implementing SMARTER TOGETHER, mainly to determine the viability of new vehicle models so that they can be deployed in normal postal operations on the basis of their operating efficiency (loading space capacity, battery capacity, mileage, etc.).

At Siemens, the project goal was to find and implement measures within the industrial location Siemens Leberstraße for the internal transport of the delivered goods. This required a conversion of the forklift truck fleet. To understand the importance of this objective, a brief explanation of the environment is given: A metro wagon consists of up to 50,000 individual components. Siemens produces approx. 200 – 300 wagons per year in Vienna. This means that up to 12 million individual components can be installed per year. According to the latest measurements, this means approx. 100,000 movements of individual goods using a wide variety of logistic transport vehicles. Overall, there are 45 different transport vehicles in action at the site Siemens Simmering. Based on previous experiences diesel-forklifts were mainly used for unloading trucks at the delivery yard, as there were no problems with low temperatures or access times. Negative side effect – high CO_2 output, high diesel consumption, noise and unpleasant odour for neighbours and employees.

After a precise analysis and measurement of the hours of operation from all forklifts and transport vehicles, it has been determined, that Siemens will exchange 6 forklifts for the unloading at the delivery yard. There the highest number of hours of operation can be reached and thus also the highest savings in CO_2 emissions can be achieved.

Budget needed

The Post invested in 2 e-vans, loading stations etc.: 277.000,00 €

Siemens invested in 6 e-forklifts: 1.000.000,00 €

Funding sources

Post: 225.000,00 €. The rest of the costs were covered by SMARTER TOGETHER.

Siemens: funding to be precised at a later stage

Implementation timeframe

Post e-vans:

- 9 months for desk research on available models, contact of the manufacturers, ordering process and delivery
- At least 1 year of testing in the field

Siemens:

- 1 year for desk research on available models, contact of the manufacturers, testing phase, ordering process and delivery

Partners required to implement the solution

Post e-vans:

- Austrian Post
- Iveco – vehicle supplier

Siemens:

- Siemens Leberstraße – local production site

Preparation of the ground to create a fertile ecosystem for this measure to be set up

Austrian Post is committed to delivering all types of mail items throughout the entire country in a CO_2 neutral manner. At the Austrian Post a designated project structure was set up to ensure the efficient and resource-saving implementation of the entire project in the Simmering project area. As a consequence, the necessary decisions could be made quickly and the allocation of costs in the Group were defined and clearly assigned from the very beginning, which in turn enabled an efficient realisation of project goals.

At Siemens, high level of commitment to environmental protection, health management and safety has always been a high priority. Due to the differentiated and independent task and implementation area at SIEMENS (within SMARTER TOGETHER), it was possible to obtain the basis for decisions relatively quickly and the project was also very well supported by the plant and site management.
A precise analysis and measurement of the hours of operation from all forklifts and transport vehicles was carried out.

Step by step approach

Post e-vans:

- Inquiries were sent to suppliers of e-vehicles for the CO_2 neutral delivery sub-project.

- Two vehicles supplied by IVECO Austria Gesellschaft m.b.H, namely the Iveco Daily Electric 3.5t model, have been deployed since January 2017. The two regular parcel carriers in the project area were equipped with these two Ivecos.

Siemens:

- In spring 2016, all well-known suppliers of electric forklift trucks were invited by the Siemens purchasing department to a first bidding meeting. After this, an announcement including all necessary features was created and sent to the supplier. Some suppliers did not fulfil the technical requirements or could not exhibit vehicles for testing.
- In the end, three suppliers were in the process for the test phase and final negotiation.
- All bidders provided test vehicles for one week. These were tested in proper usage from the Siemens staff for a few hours.
- Afterwards, the employees were asked to vote for their favourite forklift.
- Linde was commissioned with the delivery in summer 2016.

Results/benefits available at this stage

Post:

On average, the vehicles cover a maximum distance of 55 kilometres in summer and 40 kilometres in winter (manufacturer declared range of about 80 km) and about 130 parcels are delivered during each day of their deployment. Experience has shown that a loading infrastructure in the project area is not necessary considering that the mileage is about 70 kilometres. The findings gathered will be evaluated next year together with the manufacturer.

Siemens:

The project was also very well received by employees and consequential new additional energy-saving topics were found and implemented.

Total operating hours: 8.592 h for 38.100 km. Charging times: ca. 5 h per charge of ca. 50 kWh

Is this measure a low hanging fruit?

This measure is a low hanging fruit as fossil-fuelled vans can be changed to e-vehicles according to the normal renewal rates.

Lessons learned: enablers, barriers, solutions found

Post:

- The main barrier is the low mileage. As soon as the manufacturer solves this, the usage is feasible.
- The biggest challenge in achieving the designated targets is to get all the players such as the residents, property management firms, public authorities involved and "on board of one shared boat" in order to succeed in reaching these goals.
- Another challenge is to integrate the local Mobility Strategy (municipal authority MA18 in Vienna) and the Mobility Points (NeuMo) for installing the logistics infrastructure in public areas.

Siemens:

- The testing by the employees was of high importance, since the employees have to work with these vehicles on a daily basis. Hence, they can judge the handling better than an employee can from the purchase or logistics department.
- One experience that was made with the charging of the electric vehicles was the right dimension of the electric supply. It is often underestimated how a constant high-power supply is stressing the electric installations. This was also the case at Siemens (they became very hot and fuse broke), so the electric installations had to be changed for the charging as well.

Replicability

E-vans could be certainly used for parcel delivery purposes provided that higher mileage is possible. Austrian Post is continuing to support the expansion and realisation of a smart mobility strategy in the Simmering area.

Contact person

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Further information

- https://www.smartertogether.at/oesterreichische-post-erhaelt-den-energy-globe-award/

2.2 Lyon

2.2.1 Creation of a local public company

Presentation of the measure

The SPL ("Société Publique Locale") Lyon Confluence is a private company with public shareholders (most of the capital is owned by Lyon Métropole) that is in charge of implementing the Lyon-Confluence urban project. 24 employees are working for the SPL Lyon Confluence.

As urban developer, the SPL Lyon Confluence:

- Conducts the studies needed to realise the urban project (masterplan, etc.)
- Sells the land to the real estate developers, with guidelines (and works with the real estate developers to implement the guidelines in the various projects)
- Carries out the works for the public spaces (construction of underground networks, pavements, roads, squares, etc.)
- Coordinates all the actions related to information and communication on the Lyon-Confluence urban project: targeting the press, national and foreign delegations, general public (including public consultation)
- Implement urban innovative projects such as smart city projects.

Setting-up a special (small) purpose company to make an urban project allows the public authority to keep influence on the decisions, without the difficulties related to the decision-making process in a large municipal administration.

Budget needed

The budget depends on the scope of intervention. The type of budget needed:

- Staff costs
- Investment expenditures
- Operational expenditures

Funding sources

- The municipality and/or other public authorities
- Land sale to real estate developers
- Other (European projects for instance, calls, national or international subsidies)

Implementation timeframe

It requires one to several years to create such an organisation. The timeframe of the activities (once created) depends on the scope of the organisation and the time needed to implement its activities.

Main milestone/timeframe of the SPL Lyon Confluence:

- 1997: Lyon Métropole starts to mobilise a dedicated team to the first studies on the Lyon-Confluence area.
- 1999: Lyon Métropole and the City of Lyon create the society "Lyon-Confluence" to continue the first studies (until the implementation and operational phase).
- 2003: "Lyon Confluence" is officially appointed urban developer of the neighbourhood by Lyon Métropole, with 177 million euros of investment planned between 2003 and 2016.
- 2012: Change of the status of the company Lyon-Confluence, that becomes an "SPL" (Local Public Society; meaning private company with only public shareholders).
- 2013: Lyon Métropole adds a new assignment to the SPL Lyon Confluence: the construction of the Lyon-Confluence district heating system.
- 2015: End of the first phase of the urban project (500,000 m2 built on 41 hectares) and beginning of the second phase (500,000 m2 to be built on 35 hectares).

Partners required to implement the solution

Public organisations that can invest and be a shareholder in the creation of such an organisation; such as:

- Local administration: City of Lyon and Lyon Métropole. Lyon Métropole gathers the city of Lyon and 58 smaller cities for an overall population of 1.3 million inhabitants
- Regional authorities: Région Auvergne-Rhône Alpes
- Other public authorities: Département du Rhône, the city of Sainte Foy-les-Lyon, the city of La Mulatière

Preparation of the ground to create a fertile ecosystem for this measure to be set up

It is required that the territory and the urban project are large and ambitious enough to justify the creation of such a special purpose public company. Political willingness of the city and/or other public authorities is key.

Step by step approach

In the French regulatory context, the creation of a "SPL" (Local Public Society) exempts from a tender procedure (but needs official validation by the elected representatives of the city administration and the public authorities involved).

- A "concession contract" is signed to specify the assignments, the area and topics of intervention of the company, its budget, its objectives, etc
- Planning phase: definition of the scope of activities, the area concerned, the public organisations willing to be the shareholders, the governance and the budget.
- Official creation of the company: official deliberation by elected representatives is needed in each public organisation that is a shareholder.
- Operation phase: development of the projects by the company, board of shareholders gathers several times a year.
- Closing of the company once all the projects are finished.

Results/benefits available at this stage

- Agility of a small size company
- Faster urban (re)development
- The public local authority keeps influence on the decisions, without the difficulties related to the decision-making process in a large city administration
- Act as project leader to implement smart city projects on its territory

Is this measure a low hanging fruit?

This cannot be considered a low hanging fruit as it takes several years to create such a company and make the first results visible. This depends on the scope of the activities, the first studies, first reflexion to create such a company, time needed to change the status of the company including informal agreement and official validation by each public organisation that is a shareholder.

Lessons learned: enablers, barriers, solutions found

Though the Lyon-Confluence urban project is not finished yet, the specific type of governance of the SPL appeared to be successful in the implementation of the features of this urban project.

The fact that the president of Lyon Métropole is also the president of the SPL Lyon Confluence is an enabler.

The main barrier is the different pace of advancement between the municipal administration and SPL Lyon Confluence.

The solution found was to reinforce the role of leader of the SPL Lyon Confluence on several features of the urban project such as district heating implementation or eco-refurbishment projects.

Recommendations for a similar project elsewhere:

- Political support of the local public authorities for the creation of such dedicated organisation (like the SPL Lyon Confluence)
- Dedicated team and financial ressources
- Clear assignments officially validated the by the public authority(ies)
- A decision-making process on a daily basis that takes advantage of the small size of the dedicated company (just a few points on the advancement with the contact persons in the city each year).

Replicability

The creation of such special purpose public company has been already replicated for "Lyon Part-Dieu" (urban project of the business centre, around one of the train station), in 2014, on a territory of 180 hectares [150 ha for Lyon-Confluence].

A special purpose company can also be created with public and private shareholders.

Contact person

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Further information

- http://www.lyon-confluence.fr/
- https://www.ceep.eu/ [European network / lobby for companies such as SPL]
- http://www.lesepl.fr/Anglais.php [French network / lobby for companies such as SPL]

2.2.2 Holistic refurbishment

Presentation of the measure

In order to accelerate the eco-refurbishment in the Lyon-Confluence area different funding and support frameworks were combined:

- one targeting private groups of owners (with reinforced support by the SPL Lyon Confluence at the operational level and some additional subsidies thanks to SMARTER TOGETHER)
- one targeting social housing (with additional subsidies from SMARTER TOGETHER)
- no particular support from the municipality to eco-refurbish office spaces and public facilities. However, there was willingness of the SPL Lyon Confluence to conduct directly such projects in the neighbourhood, with the approval of the municipality, as this is considered as being a part of the Lyon-Confluence urban renewal project.

Integrated approach to design and support the eco-refurbishment projects in the Lyon-Confluence area within SMARTER TOGETHER:

- exchange with the local public authority in charge of heritage protection from the start & integration of their requirements in the design of the eco-refurbishment work programme
- Financial support provided to the owners (or groups of owners) who eco-refurbish their building with conditions to comply with a level of energy performance to reach, to connect to the district heating network and to sign a data sharing agreement with the city data platform
- Evaluation & monitoring after the eco-refurbishment works, thanks to the data sharing agreement, and restitution of the results to the owners of the building. The data collection must comply with guidelines set-up by the SPL Lyon Confluence, Hespul, Enertech and the city data platform.

Budget needed

On average the cost for eco-refurbishing a building in the Lyon Confluence area is between 10,000 to 30,000€ per housing.

Funding sources

- Private investment (from owners)
- Grants (local, national, European)
- Loans

On average, and for the confirmed eco-refurbishment projects so far in the Lyon-Confluence area:

- Private group owners get subsidies for half of the costs of the eco-refurbishment works. Furthermore, private groups of owners can subscribe to collective loans at an interest rate of less than 1%.
- Social housing operators get subsidies covering 15% to 25% of the eco-refurbishment works
- Office spaces generally do not get any subsidies; however, there are some exceptions thanks to the support of SMARTER TOGETHER

Implementation timeframe

At least 2 years are required, starting with the beginning of the feasibility study and the end of the eco-refurbishment works. However, this timeframe could be much longer, depending on each operation.

Partners required to implement the solution

Owner(s) of the buildings, tenants, construction companies, consultants, local public authorities, local organisation supporting the owner(s), district heating operator, city data platform, etc.

Preparation of the ground to create a fertile ecosystem for this measure to be set up

- Feasibility studies realised before the start of SMARTER TOGETHER
- Willingness of the SPL Lyon Confluence to implement projects contributing to the reduction of the energy consumption of the existing buildings
- Experience of the SPL Lyon Confluence in dealing with public authorities in charge of heritage protection (same administration as the one that gives authorisation for new constructions), which helps to reach an agreement and an acceptable balance between energy performance and preservation of the heritage
- Additional grants and subsidy schemes (on top of SMARTER TOGETHER)
- Human resources to spend time with owners of the buildings until the approval of the eco-refurbishment work programmes

Step by step approach

1) Inform target groups on the possibility to realise the eco-refurbishment projects and the support available for these works, increase acceptance of the project.
2) Undertake feasibility studies with a rough estimate of the main features of a work programme regarding the situation of the building, as well as a first estimation of the costs based on a site visit but only for a sample of few flats.

This is preferably co-financed between the public authority in charge and the owners of the buildings.

3) Presentation of the results of the feasibility studies, including an estimate of the eco-refurbishment costs and the subsidies the owners can get for that.
4) Decision of the owners to pay a more detailed study for specifying in details all the features of the eco-refurbishment project (detailed visit of all the flats, and not just a sample), including upgrading of the buildings when necessary, tender to have a sound financial proposal of construction companies for all the works, concertation with the local authority in charge of heritage protection to pre-validate the work programme, prior to officially asking for their formal approval.
5) Selection of a consultancy/engineering company to prepare a detailed study (including tender with construction companies).
6) Decision of the owners to realise the eco-refurbishment works based on the conclusion of the detailed study and the final budget based on the results of the tender process.
7) Eco-refurbishment works.
8) After the works, monitoring of the energy performance and feedback given to the owners, including support for better managing their energy consumption.

Results/benefits available at this stage

- These eco-refurbishment projects are considered satisfying by the local authority in charge of heritage protection; therefore, start of the works was not blocked. This helps to build confidence on the long-run for future eco-refurbishment projects.
- Valuable help for owners and engineering/consultancy companies who are not used to deal with constraints of heritage protection.
- Cost reduction of the eco-refurbishment works for owners thanks to several types of subsidies and grants.
- Data-based monitoring on actual performance of the eco-refurbished buildings after works are carried out. Potential help for owners and tenants in the energy management of their building even when eco-refurbishment works are finished.
- A better coherence for the whole Lyon-Confluence urban project, that combines high energy efficiency for new buildings with several eco-refurbishment projects in the existing neighbourhood.

Is this measure a low hanging fruit?

This measure is not a low hanging fruit as it takes several years between the first contact and feasibility study and the end of an eco-refurbishment project.

Lessons learned: enablers, barriers, solutions found

Enablers: technical solutions with the right balance between cost of implementation, energy performance, and integration from a heritage protection point of view. This facilitates the approval by the authority for heritage protection.

Lessons learnt on the requirements to respect the heritage protection:

- For the change of windows, use of wood (not plastic windows)
- Not reducing the glass surface of the windows when we need to change it
- Try to find alternative solutions to outside insulation when designing an eco-refurbishment project. Thin outside insulation does not seem to be a relevant technical solution due to low energy performance and difficulties to implement.

Barriers:

- Most of the eco-refurbishment projects take place in occupied housing.
- Almost impossible to make inside insulation for housing as this is too expensive and it is difficult to convince people to reduce the surface of their housing.

Replicability

This is potentially replicable in any neighbourhood, however, without as much financial subsidies as the ones available now in Lyon-Confluence. Potential difficulty to replicate a solution without a proper business model.

Contact person

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Further information

Not yet available

2.2.3 Energy data collection through the city platform

Presentation of the measure

Dynamic energy data is collected on the Lyon Metropole data platform to monitor the environmental performance of the Lyon-Confluence area: energy consumption of new and eco-refurbished buildings, renewable energy production, energy distribution, electric mobility, etc.

Budget needed

The required budget lines to be taken into account are:

- IT development
- Instrumentation (sensors, meters, concentrators, etc.), depending on the size of the buildings
- Human resources to work with companies, owners of the buildings and the city administration

Between 500,000 to 700,000€ of staff cost, indirect costs and subcontracting costs are planned to be used in SMARTER TOGETHER by the Lyon Métropole data platform for data integration on the city platform and development of the data visualization tool (Lyon Confluence Monitoring System).

Funding sources

Grants and municipal budget

Implementation timeframe

The implementation timeframe might take several years. It is difficult to be specific as this depends on the projects. In any case, a lot of anticipation is needed to integrate some requirements before the tender process. The duration of the test phase might be long or short depending on the reactivity of the stakeholders and the possible technical difficulties. Similarly, the signature of the data sharing agreement might take a long or short time depending on the level of priority of the stakeholders involved and the level of details of the discussion between legal departments.

In the case of Lyon, the timeline was as follows:

- 2005-2010: FP6-Concerto project involving Lyon Métropole, Lyon-Confluence, Hespul (local energy agency) and Enertech, focusing on the improvement of energy performance of new buildings.
- First return on experience in Lyon-Confluence on the importance of detailed monitoring after the commissioning of the buildings to identify possible discrepancies between expected and actual energy performance.

- Beginning of 2016: end of the 5-year project "Lyon Smart Community", implemented in Lyon-Confluence (thanks to a partnership with NEDO, Japanese governmental agency in charge of energy and innovation), with Lyon Métropole, Hespul and other partners. First lessons learnt after a test phase of a prototype of a data visualisation tool of few data sets of the neighbourhood, developed by Toshiba.
- Beginning of 2016: start of the SMARTER TOGETHER project in Lyon-Confluence with a strong feature on data collection and analysis through the city data platform; with SPL Lyon Confluence, Hespul, Enertech, Lyon Métropole, Enedis (electric grid operator).
- Beginning of the involvement of the IT department of Lyon Metropole (in charge of the city data platform) in the Lyon-Confluence area, to work on the data collection of Lyon-Confluence in SMARTER TOGETHER.
- July 2018: first version of the Lyon-Confluence Monitoring System (data visualisation tool using energy and mobility data of the Lyon-Confluence area to monitor the energy performance of the neighbourhood) with the first 10 data sets.

Partners required to implement the solution

Public and private data providers:

- distribution network operators (electric grid & district heating)
- producers of renewable energy (mainly photovoltaic installations)
- owners of new and eco-refurbished buildings
- facility managers
- operators of electric mobility services
- etc.

Preparation of the ground to create a fertile ecosystem for this measure to be set up

- Long-term sustainable development strategy of the Lyon-Confluence urban project with continuity in the objectives and the stakeholders involved, coherence between the features of the project.
- Several people involved "on the ground" on a regular basis to make the connection between operation, IT and financial support.
- Fruitful relationships with important public and private data providers.
- Willingness of the city data platform to solve complex technical issues for such data collection.

- Guidelines set up by SPL Lyon Confluence for real estate developers (in the contract to sell the land) for making compulsory the signature of data sharing agreements with the city platform.
- Guidelines set up by SPL Lyon Confluence, Hespul and Enertech for eco-refurbishment projects making compulsory the signature of data sharing agreements with the city platform.
- Guidelines set up by SPL Lyon Confluence, Hespul and Enertech with the electric mobility service providers part of SMARTER TOGETHER, for the signature of data sharing agreements with the city platform.
- Willingness of the SPL Lyon Confluence, operator of the district heating system, to set up communication infrastructure in its substations and share dynamic data with the city platform.
- Technological progress that ease the data collection and reduce the price, such as the implementation of smart electric meters by the electric grid operator (deployment at the national scale).

Step by step approach

- Setting-up guidelines for data collection, for the different type pf data source (building, photovoltaic installations, district heating substations, electric mobility solution etc.).
- Work with the data providers to help them comply with these guidelines.
- Early involvement of people from the city data platform to design the guidelines and work with the data providers.
- Test phase.
- Signature of data sharing agreement between the data provider and the city platform.
- Data collection and monitoring.

Results/benefits available at this stage

- Public control on the data collection and analysis.
- Feedback on the actual energy performance of the project with the same data collected on various projects, to ease the comparison and assessment.

Is this measure a low hanging fruit?

This is not a low hanging fruit as it can take a long time between the first contacts and the effective data collection.

Lessons learned: enablers, barriers, solutions found

Barriers:

- A lot of different data format and data protocol for communication between the data providers and the city platform as there is no standardisation so far in this field.

Solutions found:

- An open-source based city data platform allowing a wide range of data format and communication protocol helps.
- Improve the guidelines to ease the next data collection and make it more precise.
- Anticipation of the technical exchanges with the real estate developers and their consultants.
- Anticipation of the technical exchanges with the engineering companies of the eco-refurbished housing, prior to the official decision to fund the works.
- Continuous support towards the different stakeholders involved (building owners, building managers, facility managers, consultancy companies, etc.), including time spent to explain and convince these stakeholders of the interest of such data collection and monitoring.

Enablers:

- An existing city data platform that has been running for several years.
- Level of expertise of people involved in the development and management of the Grand Lyon data platform.
- Use of data standards.
- (Open source) technologies that makes the evolution of the IT tools easier.
- Consistence and coherence in the features of the Lyon-Confluence urban project with several key people being involved in these topics for many years: SPL Lyon Confluence and external partners.
- EU subsidies that allow to make a significant step forward.
- Willingness of the city administration to experiment new data-based services in Lyon-Confluence.

Replicability

The solution is replicable in Lyon-Confluence, for other data sources (non-electric mobility services, health-related data, other energy data, etc.) as well as elsewhere in the Lyon Métropole area.

Contact person

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Further information

data.grandlyon.com

2.3 Munich

2.3.1 E-mobility stations

Presentation of the measure

The measure consists in the deployment and running of 8 e-mobility stations with e-car and (e)-bike sharing and charging points to foster intermodality, complement public transport use and change mobility behaviour.

The 8 e-mobility stations in Neuaubing Westkreuz are inspired by the mobility station of Münchner Freiheit, a pilot deployed in 2014. In addition, the SMARTER TOGETHER mobility stations integrates new elements, such as technology for e-mobility solutions, a district sharing box and the integration with the Smart City App. In two of the 8 stations there are district sharing boxes.

Components of the e-mobility stations:

- Public rental bike sharing system called MVG Rad;
- eBikes for cycling longer distances
- Cargo eTrikes for transporting objects and enabling also an easy use for mobility disabled citizens
- E-CarSharing vehicles from CarSharing provider STATTAUTO
- Public charging stations for eCarSharing and private vehicles
- Shared district box
- An interactive screen that informs about all mobility options and further services
- Integration with the SmartCity App

Further mobility stations are currently being tested in other projects and in different areas of the city: 4 stations in the Civitas Eccentric project (edge of the city location) and 4 stations the City2Share project (city centre). This allows observing the impacts of the solution in different spatial and social contexts of the city and take into account different framework conditions such as densities, surroundings, different inhabitants and socio-economic backgrounds.

The comparability of the solutions allows to draw early conclusions on replicability, including potentially standardised approaches to mobility stations in Munich.

In the current set-up of the mobility stations, ownership and liability is in the hands of the public transport authority.

Budget needed

- Financial allocation for 8 mobility stations SMARTER TOGETHER: approx. 120.000-180.000 Euro per mobility station (depending on mobility components and equipment)
- Financial allocation for 4 mobility stations City2Share (including invest for civil engineering, structures, markings and signposting and operation = approx. €195.000 per mobility station
- Financial allocation for the erection of 4 mobility stations Eccentric (approx.. €100.000 per mobility station)

Funding sources

- City Council and European Commission

Implementation timeframe

- From completion of planning documents to inauguration: approx. 6 months
- This includes the "Spartenverfahren", i.e. the lengthy formal participation of all affected public agencies in the authorization process and the construction time (approx. 4 weeks)

Partners required to implement the solution

- SWM/MVG and construction and project planning office: Coordination and operation of the mobility services, ordering of stations and components, maintenance of own components and station
- City of Munich:
    - Department of Urban Planning and Building Regulations (PLAN): Examination v. Planning objectives for location, permits, funding opportunities; coordination of schedules and to do's with BAU;
    - Department of Construction (BAU): Marking of parking spaces
    - Department of Public Order (KVR): designation of parking spaces
    - Department of Labour and Economic Development (RAW)
    - Department of Health and the Environment (RGU)
    - STATTAUTO (for CarSharing)

For mobility stations on private space:

- Nature conservation authority (Untere Naturschutzbehörde)
- Local Building Commission (Lokalbaukommission LBK)

Preparation of the ground to create a fertile ecosystem for this measure to be set up

Enablers:

- Spatial:
  - Availability of space at a central junction or at a central or important district square;
- Organisational:
  - Good collaboration with representatives of different departments for early coordination and preliminary agreements;
  - Tight schedules and time-pressure in EU-funding project triggering support from the top decision-making levels;

Barriers:

- Planning:
  - Unexpected objections (i.e. from local residents or local authorities) can occur during the whole planning and implementation process of the mobility stations;
  - Numerous agreements are necessary and stakeholders have different planning, organizational or legal interests.
  - The “Spartenverfahren”, a mandatory standard approval process of all affected public agencies, is lengthy with often-unpredictable outcomes;
  - Lengthy coordination processes in a strictly regulated environment including, ecological construction supervision for the protection of trees; construction of foundations for components, power lines, telecommunications, conduits; necessary works for soil compaction, etc.
- Legal:
  - Legal questions are particularly relevant when building on private property (ownership, decision-making, etc.);
  - It is more difficult to get agreements from the private owners, much more complex process to deal with different regulations, safety etc. The planning procedure took time as it was more difficult to agree on the layout etc. several legal restrictions were faced, for instance if When converting a parking space into mobility station, it must be ensured that it is voluntarily offered and it is not obliged to be there for the apartments. This needs research and updating of documents. If the parking space is connected to the building, you need to undergo a procedure to get the permission to use it. Also, if you want to use funding for e-mobility infrastructure as a private owner, you need to support to understand the procedure. All these aspects need to be cleared in the planning process.
  - In the future, one guideline book to the private owners, to make the process easier, cab be developed.

Step by step approach

Preliminary Planning

- Ensuring public or private funding, including grants and incentives (e.g. for e-mobility, space design, etc.)

Recommendations:

- Early involvement with stakeholders and target groups for user-cantered mix of services;
- Early considerations of potential locations: include all planning requirements early on, e.g. fire protection regulations, traffic restrictions, public space, clearances, ecological conditions, etc.
- Draft detailed timelines (including involvement, approval processes and construction times).

Design planning

- Defining the locations cooperatively with the planning office and municipal departments;
- Collection of a variety of permits (green space planning, traffic planning…);
- Public space: combined participation and consultation procedure for the issuance of the special use permit.

Recommendations:

- Involve all stakeholders in the design concept;
- Involve urban planning department in the decision-making process for deciding the location of the station;
- The consultation procedure should be simplified, as too time-consuming;
- Early considerations of potential locations: include all planning requirements early on, e.g. fire protection regulations, traffic restrictions, public space, clearances, ecological conditions, etc.
- Draft detailed timelines (including involvement, approval processes and construction times).

Procurement procedure for components and underground works:

- Tendering of civil engineering work and surface work (by external companies);
- Ordering of individual components (for several stations at the same time), i.e. bike docks and charging points are missing.

Commissioning and installation:

- No storage of components possible, coordinate delivery with the appropriate execution activities of the station.

Operation

- Testing components for functionality after delivery (including the connection to GPS, etc.);

- Approval of surface works / mobility station including technical examination (also connection to app etc.).

Recommendations: more needs based, more flexible infrastructure, easier and low cost infrastructure and lighter infrastructure. Mobility stations that are "movable".

Results/benefits available at this stage

- Early findings suggest that the offers were well received (bikes, e-bikes, Stattauto) by users and generated larger public interest;
- In 2 years, there will be an analysis and better understanding of the right direction for future development, after the evaluation phase.

Is this measure a low hanging fruit?

The mobility stations are in line with the overall mobility planning approach for Munich, the policy landscape is favourable to a rollout of additional mobility stations. Moreover, the solutions are mature and the processes are known. Dedicated standards were developed: tender documents.

An overall mobility plan (SUMP) will be developed for Munich and learnings will be included there from the mobility stations. The City considers that these solutions are still too expensive to be replicated, so cheaper solutions need to be sought for.

Lessons learned

- Planning lead-time has to be considered: Location planning takes a long time and diverse departments have to participate (green space planning, traffic planning, etc.);
- Clarify budgeting;
- Early and permanent involvement of citizens;
- Complex coordination procedures with cooperation partners (contract, timetable, requirements, IT integration);
- Long lead-times for procurement of mobility components, especially e-vehicles and batteries;
- Regular meetings for integration of components (components, electricity, construction, planning office etc.).

Replicability

- 8 additional mobility hubs are currently erected in two other pilot projects across the city;
- The city will evaluate all locations with the aim of drawing conclusions for a standardised roll-out across the city.

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Further information

- Knowledge Carrier: https://www.smarter-together.eu/cities/munich#/
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2.3.2 Smart lampposts

Presentation of the measure

Development of lampposts with a structure that provides a sensor-backbone for the Smart City and sets of innovative use cases to offer more public services in the district, support safety, reduce energy consumption and offer sensoring based, innovative solutions within lighting infrastructure.

For achieving that, requirements for the multipurpose use of intelligent lampposts were defined together with the local public administration, industry and other involved organizations leading to a standardized tender for the lampposts. Moreover, this solution allowed the city of Munich to gather and provide a set of recommendations for local authorities regarding legal, security, organizational and business aspects, related with the infrastructure and the services provided.

In Munich, two lamppost versions were conceived: 10 meters high for usage on road traffic streets and 3 meters in green space/public parks.

To validate the replication of this solution, an "Open-urban-lab" in Limesstrasse and Wiesenfelderstrasse was established. Namely to co-create the most adequate use cases and sensoring needs, for e.g. traffic flow measurement, parking space detection, local weather conditions or air quality information. Hot spots for free Wifi have been installed on some of the intelligent lampposts.

Budget needed

Not provided at this stage

Funding sources

Not provided at this stage

Implementation timeframe

This project started from zero with no available previous experience (design and statics for the new lamppost, coordination with ongoing road working activities, acceptable weather conditions to install, ...)

The approximate overall timeframe was about 1,5 years from start planning to installation of the lampposts.

Partners required to implement the solution

- City of Munich (multi and cross department collaboration: Urban Planning, Public Works, IT)
- Citizens.

Preparation of the ground to create a fertile ecosystem for this measure to be set up

Main barriers*:*

- Social & behavioural
  - Citizens worry about potential surveillance and active monitoring of the neighbourhood
- Finance & business model
  - Lack of a wider substantiated strategy and precise use cases from technical departments for the collection of sensor data.
  - This strategy should be supported by a cost-benefit analysis to help identify the most cost-effective means for the collection of relevant data.
  - Financial: The largest costs pertain to the infrastructure equipment of the smart lamppost (installation and connection to power supply for sensors, data transmission, LAN / WLAN etc.).
  - A blanket replacement of all existing lampposts with intelligent lampposts might not be financially viable or sensible.
- Competences & risks
  - Public procurement – lengthy, focused on price
  - Lack of experience in innovative procurement (there has been no comparable IT-Open Call scenario in the City of Munich to date)
  - Lack of knowledge about new technologies
- Regulatory & juridical
  - Any collection of personal data is to be avoided, only bespoke data pertaining to the optimum provision of public services is to be collected.
- Governance
  - The capacity for standards & asset allocation in municipalities is low.

Enablers:

- Planning: precise preparation work of the department of construction (BAU).
- Legal support: The wording of a reliable and legally well-defined open call document is managed by involving an experienced external lawyer.
- Future data transport medium like LoRa, 5G etc. might be interesting to test and/or implement and could drive down costs.

- Policy recommendations
  - Political leadership can drive change
- User incentives
  - Demonstrate value of data including social and environmental value
  - Build system for local businesses to benefit from

Step by step approach

Phases of the implementation:

- Preparation of Open Call for innovative solutions based on lamppost infrastructure
- Call for infrastructure (physical lampposts)
- Selection of the infrastructure
- Production of the infrastructure
- Installation of infrastructure (construction and public space intervention)
- Call for sensors/IoT
- Installation of sensors
- Collecting data

Recommendations for each step:

- Plan additional time to coordinate planned installation with projects that are scheduled in parallel (cost saving).
- Involve all city stakeholders early enough to detail the responsibilities and duties as well as possible costs or budgets to be scheduled

Results/benefits available at this stage

Not yet available

Is this measure a low hanging fruit?

This is a medium hanging fruit:

- Decision makers can be convinced, that all new neighbourhoods and all infrastructure replacements (approx. 2000 lampposts /year) could consider the introduction of some smartness as a citywide standard procedure.
- However, a blanket replacement of all existing lampposts with intelligent lampposts might be neither financially viable or sensible.
- A wider strategy needs to be developed and agreed upon for the city-wide use of sensor-data, and precise use cases need to be established from the technical / planning departments using this data.
- This strategy needs to include a cost-benefit analysis to help identify the most cost-effective means for the collection of relevant data.

Lessons learned: enablers, barriers, solutions found

- A comprehensible market research concerning existing “intelligent lampposts” must be always done, when starting a similar project.
- Business driven decision was taken to design own intelligent lampposts in order to assure an optimized cost and functionality driven model fitting to the Munich needs, as the availability of solutions in the market was very expensive.
- Consider a well-structured and long enough planning phase: a well-managed milestone planning coupled with a very early involvement of all relevant city-stakeholders can avoid implementation costs and misinterpretation. (incl. necessary additional infrastructure like e.g. power-supply cabling for Sensors)
- Projects that contain new or additional infrastructural elements in a city have various implementation-owners and stakeholders to be involved.
- Plan additional time to coordinate planned installation with projects that are scheduled in parallel (cost saving).
- Involve all city stakeholders early enough to detail the responsibilities and duties as well as possible costs or budgets to be scheduled.

Replicability

- There are 80.000 lampposts across the city, of which 2.000 are replaced every year (standard procedure). However, a blanket replacement of all existing lampposts with intelligent lampposts might be neither financially viable or sensible.
- Additional opportunities in new development areas and in retrofit areas (Sanierungsgebieten).
- Policy makers are to agree that investments in new infrastructure should be future-proof.

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Further information

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2.3.3 Smart City App

Presentation of the measure

The Munich SmartCity App provides a central and user-friendly access point to all the innovations of the SMARTER TOGETHER project, including smart lampposts, and other services. The first objective was to develop a new "Neighborhood App" as a central access to the new and innovative services. The preliminary needs' assessment revealed that there were already many existing websites, native apps and web applications for local government digital services and for mobility in Munich. Therefore, the decision was to further develop the existing *muenchen.de* app, because of the high download rate, the guaranteed safeguarding of operation after the end of project, a low budget and the overall sustainability. The City of Munich developed the app together with two partners: the operating company of the city website muenchen.de and Munich SmartCity App and the local transport company MVG Münchner Verkehrsgesellschaft. The app offers new services and functions, as well as providing access to existing digital services, becoming an umbrella for all the other existing apps.

This app allows partners and service providers to offer innovative smart services to the people in project district. Activate the IT-community, start-ups and companies to develop and run innovative services.

Residents have digital access to their "personal neighbourhood" whenever and wherever they need to. The app's intuitive user interface aims on encouraging and motivating residents to use innovative smart services.

The key smart services are:

- Access to existing local government digital services
- A digital city map, allowing users to display and access a variety points of interest around the city like sights, restaurants, mobility stations or smart lampposts.
- A login functionality to store preferences and personalize the app.
- Direct access to data measured with sensors on smart lampposts such as current environmental, weather and traffic, especially parking conditions.
- A partner interface to integrate add-on and external services.
- Access to mobility offerings such as public transport, bike- and car-sharing, as well as sharing district boxes.
- Access to existing and new local government digital services of the City of Munich, organised in significant categories ("situation in life").
- Local information about events or cinema.

Budget needed

By using existing modules, not starting a new project, and relying on existing activities and projects, no other costs were needed, apart from personnel costs for developing the new features and interfaces. The City is considering budget needs for the operation of the application and maintenance of the content.

Funding sources

- European Commission
- City Council resolution for budget if further development of the modules and functionalities by the partners and the eGovernment of the City of Munich is *envisaged.*

Implementation timeframe

- The needs use cases and architecture for integrating all the modules and developing of new interfaces took approximately 24 months.

Partners required to implement the solution

- City of Munich
- Stadtwerke – SWM
- MVG
- Portal München Betriebs-GmbH & Co

Preparation of the ground to create a fertile ecosystem for this measure to be set up

Barriers

- City App is not accepted by the end users or community
- High competition on the market of mobile solutions
- Insufficient funding for cost-intensive modules of the City App.

Enablers

- Integration of 'all' existing- not just new - smart services offered by the City of Munich and based on existing systems

Step by step approach

Needs assessment

- Development for and with users, use feedback, involve users for example use barcamps or co-creation workshops;
- Assure an ongoing communication, synchronization and feedback with all stakeholders.

Architecture

- Effort on using what already exists and not in developer another App from scratch;
- Use existing modules and systems;
- Assure establishment of a clear and cooperative governance;

Prototype

- Develop a prototype adding some new features and get feedback from internal and external users;
- Prototype to get a feeling of the handling and usability.

Development

- Close coordination and cooperation with partners (governance);
- Make human resources available for development

Launch

- Assure the appropriate marketing and effective communication and advertising;
- Use press conferences and events with politicians to publicise the product;
- Organise training sessions and present the product at events.

Results/benefits available at this stage

- The Munich SmartCity App with extended functions for iOS and Android is available for download, since January 2018.
- There will be two new releases for iOS and Android in December 2018 and in January 2019
- The partners Portalgesellschaft and MVG developed new ideas for new features and further development irrespective of SMARTER TOGETHER
- Other departments of City of Munich are considering including other online services and integrating them it in the Munich SmartCity App

Is this measure a low hanging fruit?

Yes.

- The Munich SmartCity App is developed for both operative systems iOS and Android and includes e-government services;
- There is a back office for the maintenance of information and services for the employees of the city administration;
- There are standardised interfaces to integrate new and external services and datasets;

- There are intelligent gateways allowing crossing different applications to enhance the usability of the apps, in comparison with the individual use of each one of them.

Lessons learned: enablers, barriers, solutions found

- Assure a strong coordination and communication management, with clear roles and responsibilities assigned.
- Promote integration and don't provide single solutions
- It is helpfully to implement a prototype for the discussion with all stakeholders involved and especially for the technical coordination of the standard interfaces and data exchange

Replicability

More solutions are planned to be integrated in the app and:

- offer citizens and users added value in the form of higher efficiency, productivity, and quality of the services and solutions
- offer fresh and useful services
- increase quality of life with intelligent solutions
- create one point of access for all services

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Further information

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3. Conclusion

The measures described in this Toolkit are subject to monitoring and evaluation in the coming two years. Therefore, by Month 60, the final measures to be included in this Toolkit will be reassessed accordingly by the Lighthouse cities.

Furthermore, the measures described here will be upgraded with key information that is currently unavailable due to the recent implementation of the solutions.

Finally, the Toolkit will be integrated in the knowledge carrier and made public to all interested cities in replicating these pilot solutions.