Nantes | Hamburg | Helsinki

Deliverable due date: M36 – November 2019

D1.2: Key Issues for Social Awareness and Acceptance

WP1, Task 1.1

Transition of EU cities towards a new concept of Smart Life and Economy

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Project Acronym	mySMARTLife
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Project Duration	1st December 2016 – 30th November 2021 (60 Months)
Deliverable	D1.2 Key Issues for Social Awareness and Acceptance
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Lead beneficiary	Steinbeis-Europa-Zentrum (SEZ)
Contributing beneficiary(ies)	Nantes Métropole (NAN), Freie und Hansestadt Hamburg (HAM), Helsingin Kaupunki (HEL)
Task description	Subtask 1.1.1: Raising social awareness and acceptance of changes: This subtask intends to raise social awareness and acceptance of changes with the aim of changing consumer behaviours and general support towards the interventions in each pilot. For this purpose in this subtask cities (NAN, HAM, HEL) will prepare: a) dissemination campaigns focusing on awareness built upon local community initiatives; b) study regulatory tools that can counteract unsustainable consumption behaviour; and c) education programmes for leveraging behavioural change, for example, requiring commerce (shopping centres) or local “attractions” (zoo, ferries, …) to provide services or cultural activities that increase resource efficiency. **D1.2: Key issues for social awareness and acceptance [SEZ] [M36 / Nov 19]** Investigation of the factors influencing consumer attitude and behaviour change towards the interventions in each pilot; the regulatory tools and education programmes for leveraging behavioural change.

Date	Version	Author	Comment
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27.04.2019	0.1	Eetu Rutanen (Metropolia)	Section 6.3 Helsinki’s Robot Bus
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15.05.2019	0.1	Marine Buron (Nantes Metropole)	Section 4.4 ICT Mon Project Renov
15.05.2019	0.1	Camille Delanoe (Nantes Metropole)	Section 4.1 Setting the Scene Lighthouse City Nantes Section 4.2 Retrofitting of Individual Houses

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Abbreviations and Acronyms

Acronym	Description
mySMARTLife	Transition of EU cities towards a new concept of Smart Life and Economy
ICT	Information and Communication Technology
TEC	FUNDACION TECNALIA RESEARCH & INNOVATION
LHC	Lighthouse City
WP	Work Package
SEZ	Steinbeis – Europa – Zentrum
NAN	Nantes Metropole
ENG	ENGIE
HAM	FREIE UND HANSESTADT HAMBURG
KON	KONSALT GESELLSCHAFT FUER STADT UND REGIONALANALYSEN UND PROJEKTENTWICKLUNG MBH
ENH	ENERGIENETZ HAMBURG EG
HCU	HAFENCITY UNIVERSTAET HAMBURG
HEL	HELSINKIN KAUPUNKI
FVH	FORUM VIRIUM HELSINKI Oy
HMU	Metropolia Ammattikoek
SAL	SALUSUFIN OY
CAR	FUNDACION CARTIF
BBC level	Low consumption building
PV	Photovoltaic
kWp	Kilowatt produced
HAM-BGD	FREIE UND HANSESTADT HAMBURG, Borough of BERGEDORF
VTT	Teknologian tutkimuskeskus VTT Oy
HSL	Helsinki Region Transport's

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1. Executive Summary

How do we raise social awareness and acceptance with regard to the implementation of interventions in smart city projects? This is the key question that this deliverable tries to shed light on.

The Horizon2020 funded smart city project mySMARTLife is very ambitions with its more than 40 interventions implemented in the lighthouse cities Nantes, Hamburg and Helsinki.

The interventions based in the field of energy, mobility and ICT cover a wide range of projects from retrofitting measures to autonomous driving and electric bikes to various online-based activities.

In this deliverable each of the lighthouse cities presents three case studies, one from each field (energy, mobility and ICT) – describe in great detail their intervention and outline their lessons learnt with regard to raising social awareness and gaining acceptance for the individual action by the citizens.

In the second part of this deliverable we analyse the individual acceptance journey for each intervention based on the process of design, delivery and implementation of each action and on who has influence in the acceptance journey (individual / household, local community / town stakeholders and national / regional policies or stakeholders) at what point of the implementation process. We call these influence levels miso (individual / household), meso (local community / town stakeholders) and macro (national / regional policies and / or stakeholders).

Based on these two categories we have developed three types of acceptance journeys – the binary (inflexible), the semi-flexible and the flexible acceptance journey.

By looking at each of the individual case studies under the lens of the acceptance journey concept – we advise when actions should be taken towards whom so social acceptance can be leveraged the best (intervention points or engagement points).

We believe it is useful for all the actors in a smart city project to better understand the underlying structure of their interventions and through their understanding adapt the process of community engagement. This will allow for an increase in social acceptance and bring us one step closer to the smart city, we all aim for.

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2. Introduction

2.1 Purpose and target group

The task “Smart People” is part of WP 1 (WP1 – Definition of an innovative Urban Transformation Strategy) and is aimed at involving citizens in the urban transformation, either as consumers/users or as city “planners”. Tecnalia (TEC) is leading an open innovation strategy to engage this target group in order to demonstrate that it is possible to efficiently address the energy transition issue whilst keeping high quality living standards. The subtask “Raising Social Awareness and Acceptance of Change” runs in parallel, and from the very beginning develops this concept by finding the key factors that can help raise awareness for social acceptance, engage citizens directly in the development of the transformation and review specific ICT tools that can support the development of both strategies.

The target group of these activities are the citizens of Nantes, Hamburg and Helsinki. As their citizens shape cities, it is important to understand the barriers but also the enablers with regard to citizen engagement and the acceptance of change. Furthermore, citizens are considered not only as final beneficiaries of the many mySMARTLife actions, but are also part of the decision making process.

As part of mySMARTLife, the three lighthouse cities (LHC) Nantes, Hamburg and Helsinki have implemented interventions in the field of energy, mobility and ICT. This deliverable explores the key barriers these cities have encountered during the implementation phase and how they tried to overcome them. This analysis is based on case studies. A multi-case analysis identifies key factors and counteracting measures with regard to raising social awareness and acceptance of change.

2.2 Contributions of partners

The following **Table 1** depicts the main contributions from participant partners in the development of this deliverable.

Table 1: Contribution of partners

Participant short name	Contributions
SEZ	Deliverable leader, coordination of deliverable
NAN	Contributor to Section 4.
ENG	Contributor to Section 4.
HAM	Contributor to Section 5.
KON	Contributor to Section 5.and Reviewer of the deliverable
ENH	Contributor to Section 5.
HCU	Contributor to Section 3 State of Research, contributor to Section 5

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HEL	Contributor to Section 6.
FVH	Contributor to Section 6.
HMU	Contributor to Section 6.
SAL	Contributor to Section 6.
TEC	Work Package Leader, alignment to mySMARTLife WP 1 – Definition of an innovative Urban Transformation Strategy
CAR	Project Leader, overall content alignment to mySMARTLife objectives and expected impacts

2.3 Relation to other activities in the project

The following Table 2 depicts the main relationship of this deliverable to other activities (or deliverables) developed within the mySMARTLife project that could be considered along with this document for further understanding of its contents.

Table 2: Relation to other activities in the project

Deliverable Number	Contributions
D1.1. (M8)	This deliverable describes the design of multi-year campaigns at local and district level to raise awareness and provide information and activate successful consumers and key local actors in the Lighthouse cities Nantes, Hamburg and Helsinki
D1.3 (M9)	This deliverable focuses on the methodology for citizen engagement based on system thinking. The activities described in D1.1 and D6.12 are closely related to it.
D6.12 (M40)	This deliverable outlines the design of campaigns at local and district level to raise awareness and to provide information about the replication plans in the Follower Cities. This is the final deliverable, after the initial planning included in D1.1 from the perspective of the Lighthouse cities.
D8.2 (M12)	This deliverable includes the dissemination and communication plan, providing an overview of all dissemination and communication activities in work package (WP) 8 – “Communication, Dissemination & Exploitation”. A close link exists among the local dissemination and communication activities, as described in D1.1 and D6.12

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3. Social Acceptance Concept Review [1]

The following review of academic literature gives an overview of the current state of research on social acceptance of innovative technologies deployed in smart cities, helps to understand the different concepts, and approaches to the subject.

The research on social acceptance of technological innovations has been a popular research field since the 1980s and gained great scientific importance in the last decades, especially the research on acceptance of renewable energy technologies (GAEDE & ROWLANDS, 2018)[2]. Social opposition and resistance against the expansion of technological innovations, especially of renewable energy technologies and corresponding infrastructure and the question how a greater level of public acceptance can be achieved, generally induce studies on social acceptance. A widespread social acceptance is crucial for the successful implementation and operation of renewable energy technologies. (EKINS, 2004)[3]. Technologies for renewable energies vary from photovoltaic panels and biomass power plants to wind turbines of different sizes and locations. As the specific technologies, capture different natural resources in different ways, the consequences on environment, economy and society deviate from one another (DEVINE-WRIGHT, 2008)[4].

3.1 Concepts of Social Acceptance

So far, there are different popular approaches, concepts and definitions in this field. Firstly, DEVINE-WRIGHT (2008) distinguishes three different scales of implementation of renewable energy technologies considering different impacts on the local economy, community and public attitudes:

- micro (at single building or household level)
- meso (at the local, community or town level)
- macro (at the large scale 'power station' (level)

In a different approach, WUESTENHAGEN proposes a concept breaking social acceptance into the following dimensions: socio-political acceptance, community acceptance, and market acceptance. By

[1] Special thanks goes to Katharina Lange member of the Lighthouse city group in Hamburg, Germany, as she has compiled the state of research regarding social acceptance. Katharina works at HafenCity University Hamburg, HCU.

[2] GAEDE, J.; ROWLANDS, H. (2018): Visualizing social acceptance research. A bibliometric review of the social acceptance literature for energy technology and fuels. In: Energy Research & Social Science, vol. 40, pp. 142-158.

[3] EKINS, P. (2004): Step changes for decarbonizing the energy system: research needs for renewables, energy efficiency and nuclear power. In: Energy Policy, vol. 32, pp. 1891-1904.

[4] DEVINE-WRIGHT, P. (2008): Reconsidering public acceptance of renewable energy technologies: A critical review. In: Jamasb T., Grubb, M., Pollitt, M. (Eds): Delivering a Low Carbon Electricity System: Technologies, Economics and Policy. Cambridge University Press

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considering three dimensions as well as respective sub-dimensions, the proposed model is differentiated and might cover the complexity of social acceptance. [5]

Figure 1: The triangle of social acceptance of renewable energy innovation

In their bibliometric review on social acceptance research for energy technologies, GAEDE & ROWLANDS (2018) conclude that the schema of social acceptance with the dimensions of community, market and socio-political acceptance remains one of the most popular approaches on this topic.

Latest researches focus especially on social acceptance of renewable energy technologies. Studies address specific forms of renewable energy (e.g. solar panels, wind power plants, biogas plants) or corresponding infrastructure (e.g. network expansion, smart metering). Existing studies particularly investigate which factors have an influence on the social acceptance of renewable energy technologies.

3.2 Summary of Scientific Research

However, there exists an extremely wide range of studies focusing on social acceptance of renewable energy technologies, but only a limited number of studies considering the acceptance of smart city solutions. While the research on renewable energy technologies often focuses on siting decisions and respective social acceptance, studies on smart city and its technologies rather investigate the social acceptance in terms of using specific technologies or pursue the question whether the provided technologies cause a

[5] WUESTENHAGEN, R.; WOLSING, M.; BÜRER, M.J. (2007): Social acceptance of renewable energy innovation: An introduction to the concept. In: Energy Policy, vol. 35, pp. 2683-2691

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change of behaviour. Social acceptance of smart city development and smart city solutions in general is a large field as it contains a wide range of different technologies and thematic areas as well as having rather fuzzy limits to distinct it from other fields of research.

BARETTA (2018) conducted an analysis on social impacts of smart environmental projects implemented in Italian cities. The study, which referred especially to social inclusiveness and eco-gentrification, reveals that smart environmental projects focusing on mobility and energy have significant risks for causing eco-gentrification and not including all societal groups due to the use of advanced technical tools (BARETTA 2018: 119f.)[6]

In the following sections of this deliverable, the interventions implemented in each Lighthouse city, the barriers and challenges encountered and how they were overcome in order to gain social acceptance will be described. Furthermore, it is explored how the by Devine-Wright distinguished three different scales of implementation of renewable energy technology can be adapted to the social acceptance journey of the different interventions described. Please see more in the chapter Methodology.

[6] BARETTA, I. (2018): The social effects of eco-innovations in Italian Smart cities. In: Cities, vol. 72, pp. 115-121.

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4. Nantes

4.1 Setting the Scene Lighthouse City Nantes Métropole

Nantes Métropole is the name given to the administrative structure that brings together all 24 municipalities of the Nantes conurbation. As a result of a long history of nearly a century of cooperation between municipalities, Nantes Métropole now exercises enlarged responsibilities instead of municipalities (but also of county-department and region councils) in the fields of mobility, urban development, public spaces, water and sanitation, environment, economic development and employment, climate, energy, waste, housing, higher education and tourism.

Located near the estuary of the Loire River, Nantes Métropole has about 600,000 inhabitants and is experiencing an extremely strong population growth, which places it amongst the most dynamic regions in France. The metropolis of Nantes benefits from a strong attractiveness and a strong economic dynamism. This growth is driven by both dynamism of the Nantes agglomeration and its surrounding environment as well as by the proximity of the Atlantic coast.

Today, its economic fabric is diversified: Nantes Métropole is affirming itself both as a metropolis of services (which represents eight jobs out of ten) and as a territory of industrial excellence, manifesting a transformation from industrial city to a highly innovative technological region. Economic activities linked to the creative and cultural industries are also in full development (notably around the creation district located on the Ile de Nantes).

Nantes Métropole, a pioneering community in France, takes actions against climate change. It acts at local, European and international levels: thus, while acting locally, Nantes Métropole signed the Covenant of Mayors in 2008. By becoming the Green Capital of Europe in 2013, Nantes Métropole has promoted the ability of European regional cities for taking concrete actions to reduce greenhouse gas emissions. As a follow-up to these actions, Nantes Métropole organized the first global summit of non-state actors, Climate Chance, in 2016.

Nantes Métropole has developed the 2018 Climate Plan with several objectives:

- strengthen the adaptation component of climate change;
- act for the protection of air quality in relation to the reduction of emissions of greenhouse gases;
- continue to develop actions with residents and local stakeholders (including companies).

Concerning the last point, Nantes Métropole launched in 2016 and 2017 a "Grand Debate" on energy transition, to create a local dynamic with citizens and local stakeholders and to find concrete solutions to limit greenhouse gas emissions across the territory. A shared roadmap with 33 ambitious commitments was agreed on in 2018.

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The "Ile de Nantes" (Island of Nantes) is one of the eleven districts of Nantes and the demonstration area that concentrates most of the planned activities of mySMARTLife: 4.9 km long and 1 km wide, located in the centre of the city of Nantes, the two branches of the Loire River define the island's boundaries. Main actions in Nantes demonstrator include:

- Energy actions: Digital boiler, energy retrofitting of multi-owner residential buildings and individual houses, organic power plant, power plant on private and public buildings, citizen solar power plant, development of district heating and smart lightning.
- ICT actions: Single desk for energy retrofitting, development of an extension of Nantes' urban platform, solar cadastre, smart data on mobility, energy data lab initiative, and decision-making tool.
- Mobility actions: 22 units of a new 24 meters e-Bus, opportunity charging points for e-Buses, charging points for e-vehicles (cars and bicycles), call for projects for urban logistics, platform for

In this deliverable, three actions will be described in relation to social awareness and acceptance:

- Retrofitting of individual houses
- Mon Projet Renov
- Autonomous shuttle bus

4.2 Retrofitting of Individual Houses

4.2.1 Detailed Description of Retrofitting of Individual Houses

In the mySMARTLife project, several actions on individual house were deployed. These actions consist of ambitious retrofitting, developing smart thermostat, and deploying renewable energy. The concept of energy retrofitting in individual houses comprises in particular insulation of attics and walls. The aim of this action is to increase renewable and local production combined with reduction of energy consumption.

The geographical perimeter of the project is two districts in Nantes and two cities in Nantes Metropole. The number of inhabitant in this area is 92 940[7]:

- Ile de Nantes : 15 818 (2011)
- Nantes South : 10 601 (2011)
- Rezé : 39 649 (2015)
- Saint Sébastien : 26 872 (2016)

[7] Source: www.insee.fr

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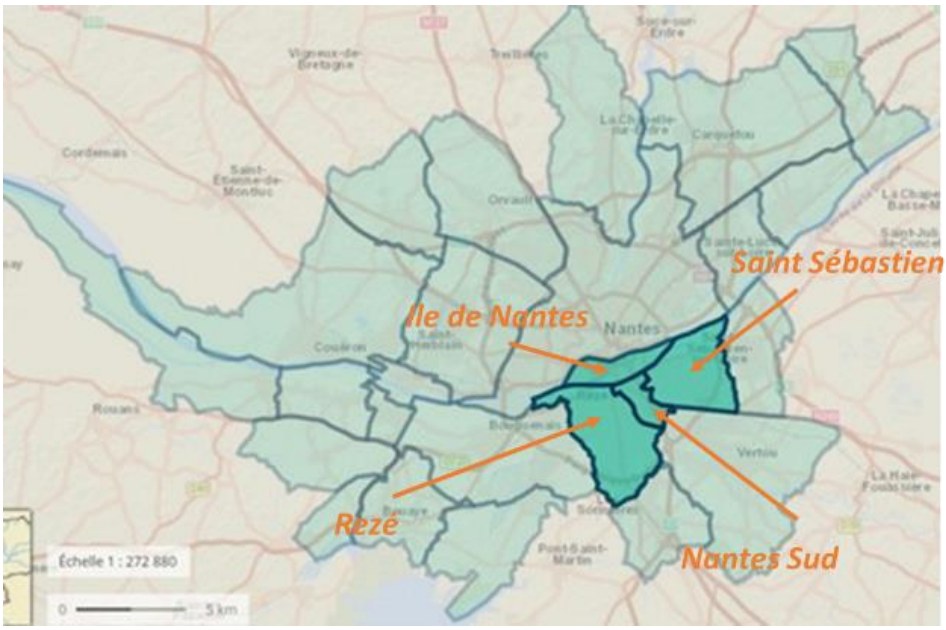

Figure 2: Picture of the project area in Nantes Metropole[8]

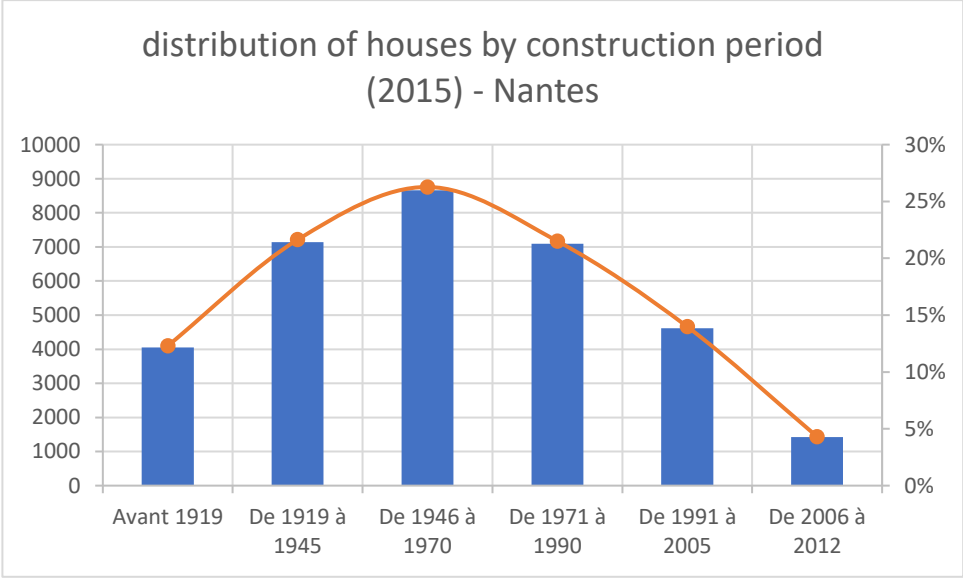

Figure 3: Diagram of distribution of houses by construction period in Nantes[9]

[9] Source: www.insee.fr

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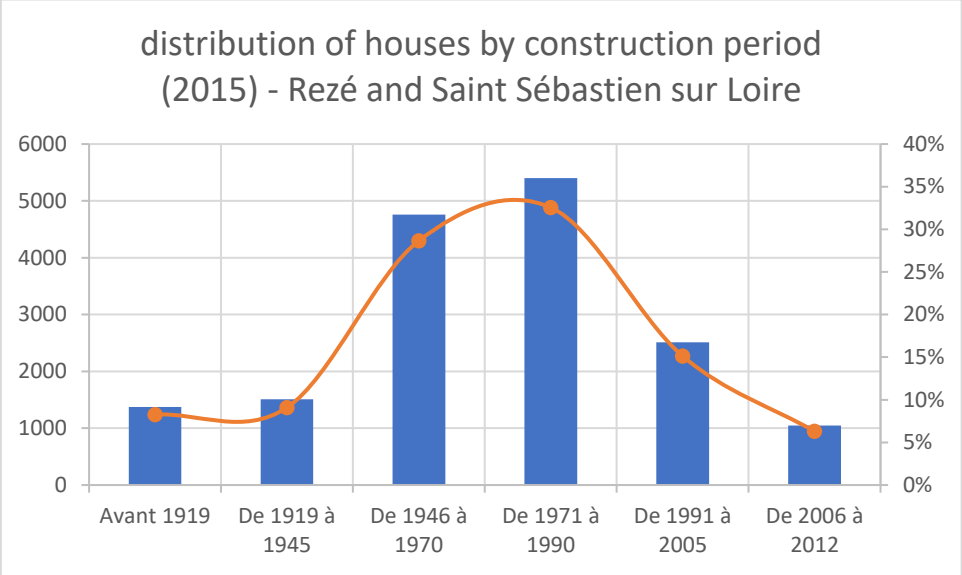

Figure 4: Diagram of distribution of houses by construction period in Nantes[10]

The figures 4 and 5 show the distribution of house by year of construction for Nantes, Rezé and Saint Sébastien sur Loire. In Nantes, most of the houses were built before 1970, in Rezé and Saint Sebastien sur Loire, it's an average around 1970's. At that time, energy standards for construction were very different. Thus, the houses not retrofitting are energy-intensive.

The first step of the project was to find owners of individual houses who would like to participate in the project. The houses involved must require important retrofitting, thus it has to be very energy-intensive.

The technical criteria to participate in the project are:

- **For the major retrofit** - the consumption of the house before the project must be around: 270 kWh/m², the energy saving has to be around 70%
- **Hybrid PV panel installation** - the roof orientation and inclination has to be adapted for panels; and, the roof may not be in the shadow (for example, the presence of tree could decrease the solar production)

4.2.2 Key Barriers & Enablers

Primarily, the action consisted in retrofitting 10 individual houses in Nantes Métropole. The first step was to identify and select the 10 houses for the project.

[10] Source: www.insee.fr

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To be part of the project, the houses has to be high energy consuming residential buildings (231kWh/m²), to have a roof adaptable for hybrid PV panels (with appropriate sun direction, without shadow…). There was no criteria on the size of the house.

Therefore, a call for candidates was launched which encouraged house owners to participate and to profit from mySMARTLife. The following communication tools were used:

- Nantes Métropole website dedicated to the individual retrofitting: https://monprojetrenov.nantesmetropole.fr/
- ENGIE website: www.engie.fr
- Distribution of letters to individual houses in the geographical perimeter

The communication included a technical description of the project and a letter signed by the Vice President of Nantes Métropole (in charge of energy) and by the Director of ENGIE (managing director). All in all, around 15 000 letters have been distributed, 219 applications were received and 145 technical audits have been performed.

In the end, 20 eligible houses (adapted roof for PV and very energy-intensive) were identified. A first analysis focused on the need of the roof requiring a major retrofitting and if is suitable for hybrid PV panels. As soon as the first verification was positive, a technical audit was done while paying a visit to the house.

Afterwards, Nantes Métropole did propose the adjustment measures to the owners in detail. The proposition did also include the financial offer with the subsidy of mySMARTLife project that decreased the price of the work. However, substantial retrofitting is expensive. Therefore, a prize of 35,000EUR remains after subsidy reduction that means that the return on investment requires 15 years and is therefore very long. Indeed, whereas the energy savings are significant, the saving on energy bills did not compensate the overall costs of significant investment in the short and medium term. It explains the long duration of the return on investment.

This is the reason why many people did refuse the proposition or preferred less substantial work and therefore less high-energy savings. Instead, they chose partial retrofitting (like changing a boiler) or the external retrofitting. With this partial retrofitting, the return of invest is significantly faster (in general just a few years).

The people more interested to participate were the ones with fewer financial resources because they could benefit from substantial subsidies. Thus, owners who receive important subsidies from national and local authorities have a very low return of invest for their retrofit. The acceptance of this subsidy is essential for them to signing up to the project. However, the approval of the subsidy requires time, in general several months (e.g., for the house studied, it takes more than one year to get the official acceptation for the grant).

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An association in cooperation with Nantes Métropole in general does the grant application form. Finally, 33 houses participated in the project via different kinds of works, making up a global energy saving of more than 200 MWh/yr.

4.2.3 Lessons Learnt

The decisive criterion remains of financial nature. Therefore, the return of investment is essential for an individual.

An important aspect of the intervention learnt was that for residents the reliable confirmation of the retrofitting offers is very important. Therefore, the retrofitting offers were promoted on the Mon Projet Renov platform / website set up by Nantes Metropole to inform residents about the scheme but also to give confidence. For more information on Mon Projet Renov please see ICT: Mon Project Renov.

The subsidy is essential to decrease the length of return of invest. The local, national subsidies allow financially less well-of people to make an ambitious retrofitting and decrease energy poverty. In France, there is no legislation on retrofitting. There are labels as “BBC renovation”; it requires an annual consumption of primary energy under 80 kWh/m². For selling a house, the seller has to provide a simple technical analysis with an estimation of its annual consumption. It is difficult to value a retrofitting for a sale; this is another challenge for the future to develop ambitious retrofitting in individual houses. Besides, the time between the call for candidates and the actual work can be long; the application for subsidy and the authorization for work (given by local authorities) requires several months. This has to be taken into account for the proposition.

4.3 Nantes’ Autonomous Shuttle

4.3.1 Detailed Description Autonomous Shuttle

The autonomous shuttle is an experiment as a technological demonstrator of research and development, on a 2.5 km long route, on roads open to general traffic in a commercial and industrial activity zone near Nantes Atlantique Airport. The site chosen for the experimentation is located in the southwest part of Nantes Métropole, between the towns of Bouguenais and Saint Aignan Grandlieu. The Jules Verne area includes various industrial companies and delivery service companies. There is also a research centre, some companies like airbus with R&D services. The shuttle can carry up eight passengers seated on board and travels at a maximum speed of 20 km/h. It serves three fixed stops including an Inter-company Restaurant. The pilot took place from Monday to Friday, from 11:30 am to 2:30 pm, between Feb 15 and May 15, 2019.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731297.

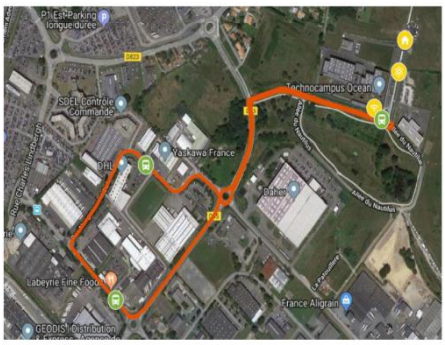

Figure 5: The Navya's shuttle bus and its route[11]

This shuttle bus experiment is based on the combination of three different technologies that make it unique. Taken separately, each technology had already been implemented. However, their combination in this pilot will help to create new mobility solutions. The shuttle pilot should help to develop an autonomous technology based on driving autonomy, energetic autonomy and communication autonomy with its environment. The aim of the intervention is to experiment the use of a shuttle bus, in real conditions. It means that the shuttle is operated in road traffic, passes roundabouts and pedestrian crossings.

In order to achieve this, different technologies were used during this experiment:

- Navya's shuttle bus: 100 % electric and runs on rechargeable batteries by direct power supply. Its high-performance guidance systems use several technologies simultaneously (LIDAR, stereovision camera, a satellite positioning system: GNSS base, odometry, etc.). It identifies on the road all types of fixed (poles) or dynamic (pedestrians) obstacles or signalling, day and night.
- Positive energy road: Especially designed for this project, the prototype, placed on the ground on 34 m² of the course, allows producing enough electricity to compensate the shuttle's consumption. Twenty-four panels of 1.4 m x 0.8m producing 80kW/m²/year were installed. This means that it can exceed 2000 kWh/year (which the shuttle consumes over a year). This energy is fed into the grid.
- Data flow: It provides a dual service: to the shuttle and to users. Commonly called V2X, this bidirectional data flow allows the shuttle to interact with the equipment in its environment. These may include access controls or the activation of illuminated signs providing information to users. Each time the objective is to secure the shuttle to adapt its speed and to guarantee the safety of the users passing nearby. In addition, this technology allows an automatic detection by camera of passengers present at bus stops passengers on the bus. It can also count the passengers that enter and leave the shuttle. Data protection was a strong consideration and as purpose of the data filmed

[11] Photo credits: Nantes Métropole

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731297.

during the experiment was to count passengers and alert the supervisor of the presence of waiting users at the stations. These images have not been made public[12].

4.3.2 Key Barriers & Enablers

The technical challenges encountered are mainly due to the sensitivity of the shuttle, which stops as soon as the slightest obstacle is suspected. Work has been carried out in advance to avoid illegal parking and 120 bollards have been set up to avoid vehicles to park on the side of the road. The experimental area combines a diversity of mobility: cars, trucks, cyclists and pedestrians, so the speed was lowered to 30km. Tree and grass-pruning work was carried out regularly because the shuttle detected the branches of trees and tall grasses and stopped. At each stage, newsletters, informative signs and kakemono, highlighting the context of the experiment and the rules to be respected during the three months of shuttle tests, informed residents, developers and visitors.

This experiment was intended to demonstrate the reliability of autonomous vehicles. However, supervisors reported that the shuttle did not comply with the French Highway Code, for example, the shuttle did not stop at an intersection where it did not have priority, and therefore might endanger in specific cases not only its passengers but also other road users. The presence of a supervisor, even if it is required under the French law to have someone ready to drive in a vehicle, still seems necessary until a technical improvement is made to allow the shuttle to react on its own.

The solar route, on the other hand, was less connected to the success of the shuttle. However, it has experienced technical problems that have been solved through the work of the teams. Various coating and fixing solutions have been implemented.

A study on social acceptability was also conducted with nearly 200 people who were in contact with the shuttle (drivers, pedestrian, and cyclists) and 60 users. This questionnaire analysis is coupled with a study of the videotapes taken to understand changes in the behavior of other users as they approach the shuttle. The results of this study are currently being analysed by Cerema, which is conducting a complementary evaluation, to be published at the end of 2019.

As mentioned earlier, all individuals entering the shuttle's test area were informed of the experiment by kakemonos and on the shuttle itself, which indicated what precaution should be taken. A communication campaign was also conducted on the Internet and relayed by the local press. This has given the opportunity to interested people to test the vehicle. Nearly half of the people using the shuttle boarded and alighted at

[12] To adhere to data protection, the following measures have been implemented: the images are transferred via a secure VPN link to a server, so there is no risk of interception of the images, the image processing server, hosted in the cloud in a secure infrastructure, is only accessible by a limited number of identified users, the images are automatically analysed by a software program that only looks at the number of people, no facial treatment is carried out, nor is any treatment of number plates carried out, the images are automatically destroyed after 30 days.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731297.

the same stops, many of them in groups. This could indicate that the use has been limited for workers in the zone. The use of the shuttle itself was free of charge.

More communication actions had been set up in order get reactions of the youngest on autonomous vehicles. Interventions have been carried out in universities to address social acceptability and the challenges related to autonomous vehicles.

Other questions and doubts about the shuttle had been raised before the shuttle was put into operation, particularly among bus drivers and other users. The use of the shuttle with the presence of supervisors has made many bus drivers feel more confident about their jobs. Many have noticed that the shuttles would be part of their future, but this would not be immediately.

4.3.3 Lessons Learnt

Through this experimentation, the consortium members were able to test their newly developed technologies and adapt them to the reality of the market and technical expectations.

The collaborative dimension has also made it possible to progress on the project. The partners all noticed that this experiment had been a success because the barriers in the provider relationship had been removed, allowing the comments of each of the consortium members to be taken into account. This partnership relationship also encourages replicability because they have been able to work on things that can be exported to other projects such as the solar road or presence detection to call the shuttle.

Within the teams themselves, the work around the shuttle was well perceived, even if it required more work from them. The employees in charge of road cleaning and pruning, for example, highlighted the fact that their work had been appreciated and that they felt useful.

Through the ongoing evaluation, citizens' feedback on their perceptions and expectations of autonomous vehicles will be useful in identifying points of future improvement. As the autonomous shuttle is still an early experimental phase, for now it is impossible to replicate this action at large scale. Before replicating, the shuttle needs further experimentations in the following points:

- The autonomous shuttle will need a national accreditation to operate all shuttles on the same model. This should make it easier to set up this type of mobility because currently, it is necessary to test for each shuttle all the crossings and other difficulties that may be encountered, and to configure them individually.
- Communication that is more comprehensive must be put in place to enforce speed limits and overtaking restrictions in the area, as this has led to several incidents where the driving supervisor had to intervene. However, this occurred because the shuttle had a speed of 20km. With improvement and more experimentation, autonomous shuttles might operate on general circulation and with a higher speed, which means that no changes will be required for other users.

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- The operating cost is also very expensive for now. In order to be able to integrate the shuttles into the general fleet, it would be necessary to reduce this cost by removing the presence of a supervisor (which is not possible in terms of regulations) or increase its capacity and speed.

4.4 ICT: Mon Project Renov

4.4.1 Detailed Description of Mon Project Renov

Nantes Métropole has written a roadmap for Energy Transition that includes several commitments related to renewables, energy retrofitting, and mobility. Two of them are related to energy retrofitting of buildings. They are about supporting owners' retrofitting by investing money for financial assistances and developing ambitious information and communication campaigns.

The issue was then to find a way to encourage owners to retrofit their house. Different financial aids are already available for retrofitting works, but difficulties were caused by the multiplicity (national, regional, local aids…) and by the lack of information of the owners. Making all financial aids clear and easily available on a single platform is also a way to boost the local retrofitting market. These are the reasons why Nantes Métropole decided to develop an online platform that gathers information and advices about energy retrofitting works, existing financial assistances including a financial help evaluation, energy assessment of a dwelling, professionals linking and a questions form.

Figure 6: Mon Projet Renov portal

The web platform is a free public service. The user can surf on the platform and gather the information and advices he/she needs from physical advisors; the user is asked to enter personal data. Concerning the database of companies listed on the website, companies have to ask to be added to this list on Mon Projet Renov platform.

Calendar of the action

Jan 2016	Beginning of the development of the first version of Mon Projet Renov platform
Nov 2016 – Jan 2017	Work with citizens to test and improve the beta version of the Mon Projet Renov platform
Feb 2017	The first version of Mon Projet Renov platform is launched
Jun 2018	Launch of specific local Mon Projet Renov retrofit funding
Sep 2018	Review of Mon Projet Renov platform with partners

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Oct– Nov 2018	Definition of the orientations for the platform 2nd version
Nov 2018	Start of a strong communication campaign around Mon Projet Renov
Nov 2018 – Oct 2019	Developing the 2nd version of the platform
Oct - Nov 2019	The second version of Mon Projet Renov platform will be launched included in the new Nantes Metropole website and with online service to submit financial aids requests.

Communication campaigns have been realised at two levels:

- **Towards individuals**: with flyers, posters in several public places, articles or advertisement in local press, meetings to inform elected representatives, metropolitan technicians, bankers...
- **Towards professionals**: meetings and professionals breakfasts and e-mailing campaigns

Since the last information and advertisement campaign in November 2018 and February 2019, the number of visits of the platform has increased significantly, as shown on the chart below. Before the communication campaign, the number of visits remains below 700 per month. With the first poster campaign in November 2018, the increase goes up to 1032 visitors and in February 2019, after an online communication campaign, the number of visitors reaches 2108.

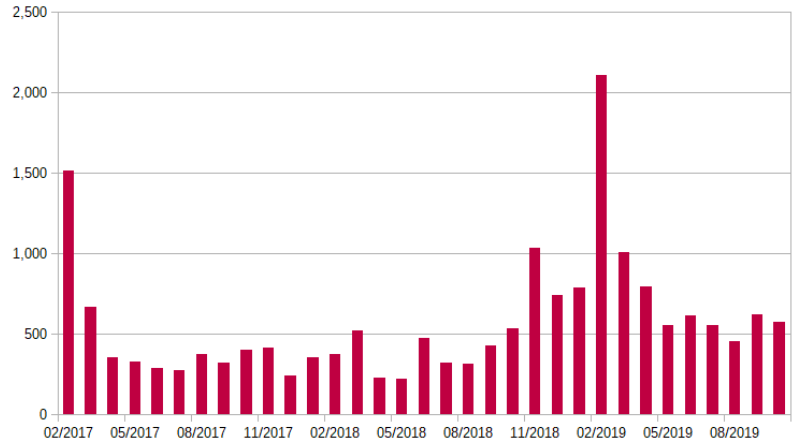

Figure 7: Number of visitors on MonProjetRenov web platform per month

Nantes Métropole chose a service provider to design and operate Mon Projet Renov and funded the platform.

4.4.2 Key Barriers & Enablers

Citizens tested Mon Projet Renov before the launch of the first version and some of their recommendations have been taken into account.

All users that had created an account received a survey. Sixty-six answers were compiled among the 278 accounts that were created by the 31 August 2018 (24% of answers). The answers show that the users

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generally appreciate the platform for its simplicity and ease to surf. 57,6% of the respondents have done retrofitting works, have ongoing retrofitting works or have accepted at least one cost estimate. However, it must be pointed out that 68% of them have not contacted the professionals through Mon Projet Renov platform, mostly because they chose to call them directly.

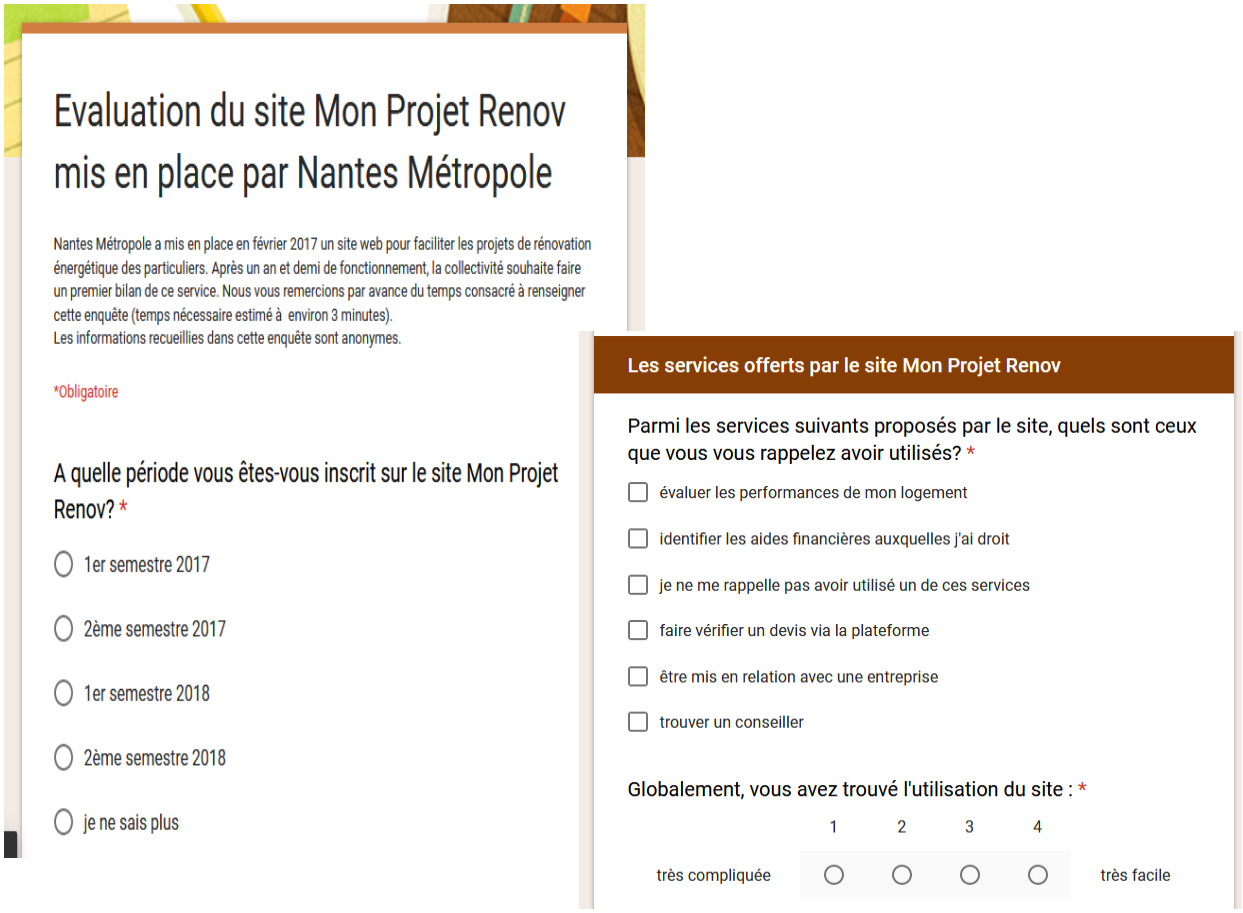

Figure 8: Survey Mon Projet Renov

The first version was reviewed in Sep 2018 with all the partners: professionals and citizen associations in charge of household support in their retrofit works. The review shows that the linking with professionals is not useful; some professionals have validated through the platform some requests but with no further answers from the potential clients – a loss of motivation can appear among them; professionals think that requesting a company for project management if retrofitting works are done on different fields that should be more highlighted. The review also shows that there is a need for readability in the process of requesting financial aids.

Mon Projet Renov benefits are in highlighting the local companies for energy retrofitting: the companies that are listed on the web platform all have a certificate that ensures their ability to carry out retrofitting works.

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The companies from different trades that are familiar to work together are presented to allow an optimized site management.

The partnerships with firms' federation and local stakeholders groups helped to promote good practices and to make new offers: a commitment charter for professionals, a common base for energy audits and the creation of fixed prices for some services to support overall retrofitting.

The data regarding the platform itself was studied: the most frequently visited web page is the "I identify my financial aids" page. The average navigation time is around five minutes, and six pages are visited in average. From February 2017 until the end of August 2018 around 4 000 people living in Nantes Métropole visited Mon Projet Renov platform. From September 2018 until February 2019, 3 000 persons living in Nantes Métropole visited the platform which demonstrates a strong increase in the platform use.

Lessons Learnt

Most of the time, the Mon Projet Renov platform was positively evaluated by professionals and owners. Nantes Métropole seeks to best meet the expectations of the platform users and is currently developing a second version of the platform.

Both professionals and owners have perceived the function "connect with professionals" useless. The latter prefer to contact professionals directly, with their own means, or would be satisfied by a simple list without a computer connection. Moreover, making a list of professionals on Mon Projet Renov platform brings also some kind of difficulties.

First, some professions were not represented on the platform, such as brokers. Then, as a public institution, Nantes Métropole is not supposed to support specific companies; that is the reason why companies should volunteer to be on the platform. It also means that if there are some issues with a specific company, it is difficult to deal with this list, as Nantes Métropole cannot really remove a company from it.

Another observation made by the citizens is that the owners should be encouraged to consult a professional (an engineer consultant or an architect) to have a complete and precise diagnosis before going any further in their retrofitting project. It could help them prioritize their retrofitting works to receive the optimal actions of retrofitting. This has been done thanks to a financial aid to consult these professionals.

On the platform, there is currently no communication about the achievement of the retrofitting works. It would be interesting to mention it and to use open data to do it. For instance, the amount of greenhouse gas avoided thanks to the retrofitting works already realised could be highlighted. It would help at the same time to promote retrofitting works and to raise awareness among the users of Mon Projet Renov platform. This will be possible through the analysis of projects that benefit from the Nantes Métropole funding.

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Following these analyses, Nantes Métropole is to increase its support to retrofitting works in order to accelerate the energy transition on its territory.

In addition to the improvement of the platform itself (e.g. an online service to submit financial aids files will be operating by the end of 2019), additional financial aids Mon Projet Renov have also been agreed on in June 2018 by Nantes Métropole Council:

- Time extension for some of them already in place,
- Additional financial aids for low-income households: help to build the request for financial aids, aids for energy retrofitting works from 50% up to 100% of the costs, depending on the owner's financial situation,
- Financial aids on the diagnosis (50% of its cost), project management (50% of the costs) and energy retrofitting works (1/3 of the costs) for multi-owner buildings that reach the "BBC level" (BBC: low consumption building[13]),
- Financial aids for owners of individual houses: 250€ for the energy diagnosis, 2000€ for the project management and 5000€ for the energy retrofitting works if the Retrofitting BBC level is reached.

A long-term communication plan is being put in place, including two posters campaigns per year and press briefing.

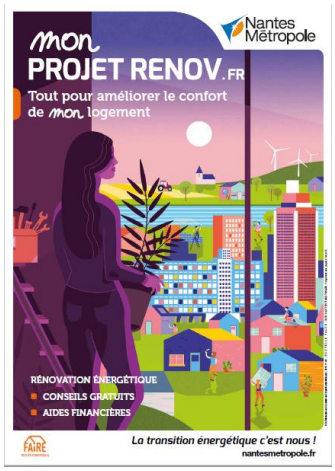

Figure 9: Example of Mon Projet Renov Poster

[13] BBC stands for "Bâtiment Basse Consommation" (Low Consumption Building). It is a French certification level. Amongst other things, it means that the building consumption for heating, cooling, DHW, ventilation and lighting is below 80x(a+b) kWhep/m²/yr. ("a" and "b" being 2 coefficients depending on the region of the building).

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5. Hamburg

5.1 Setting the Scene Lighthouse City Hamburg

The Free and Hanseatic City of Hamburg has a population of 1.8 million inhabitants and it is the second-largest city of Germany, the seventh-largest city of the EU and an important economic and cultural place. Hamburg is a centre of attraction for diverse groups of people, such as entrepreneurs, students and tourists, but also an attractive residential location.

Because of its status in Germany as a big, trendy and innovative city, Hamburg aspires to be a leading city in several fields, such as public transport, efficient energy use and other future-oriented technologies. In order to fulfil this aspiration, Hamburg participates in this lighthouse project to maximise the gain of the implementations using smart technology to reach local, national and European aims.

The demonstration size of the project is in the Borough Hamburg-Bergedorf. Hamburg-Bergedorf is one of the seven districts in Hamburg located in the southeast of the city. It is the largest district by size (155 km²) and the smallest by population (120.000 inhabitants); therefore, it is now a focus area for future urban development because of the potential of free area. The borough offers a wide range of diversity, with a vivid historical centre with shopping streets, parks and lots of water, big agriculture fields and woods in the marchlands at the River Elbe.

In general, Hamburg's objective as a city is congruent with the objective of mySMARTLife: The focus is on sustainability and efficiency, improvement of energy use and mobility issues to reduce CO2 emissions. Further, the quality of life of the citizens should be improved and a supply with housings for the growing city should be ensured.

The energy interventions in mySMARTLife are linked to the implementation of new renewable energy systems and energy storage systems and the improvement of energy concepts for housing development areas. The interventions are:

- The support of the so called "Schleusengraben area development program" of the Borough of Bergedorf, which is an urban development program on the shores of an old industrial channel with housing and commercial use, as well as a research and innovation park. Here, the project, together with Bergedorf's administration, puts many efforts in convincing investors by direct conversations and demonstration of best practice examples to reach higher energy standards.
- The use and improvement of storage of wind energy: a large windpark with 12,6 MW power has been constructed nearby the project area and a buffer storage with 792 kWh capacity has been installed to reduce the times when the windmills have to be shut down because of a network overload in the energy grid.
- The activation of homeowners in the retrofitting area Bergedorf-Süd to encourage and advise them on energetic refurbishment: compared to the high-potential area, the homeowner structure is much more

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fragmented and it takes great efforts to get in contact and encourage a process of collaboration. (See Chapter 5.2 below)

- The use and improvement of solar energy: mySMARTLife promotes and supports sustainable development for the expansion of photovoltaics together with the Hamburg “Solaroffensive” (Solar Offense) to reach the 20 % quota for PV-Power in a long term. Several roofs will be analysed for the use of PV-Plants in combination with tenant or direct presumption and partly with power storage for a better match of the consumption with the production. (See chapter 5.3 below).

In the field of mobility, Hamburg focuses on electrification of vehicles and the creation of charging infrastructures.

- The main intervention here is the electrification of the bus depot and the deployment of the first e-buses. The VHH tendered five solo and five articulated e-buses are set for delivery in 2019, the first workshop team is trained in high voltage technology and a safety-training programme was initiated with the local fire brigades who will be responsible as first responders in case of accidents. Concerning future developments, the local depot grid was re-dimensioned completely to allow successive installation of charging infrastructure up to a fully electrified depot by 2030.
- The electrification of the public fleet with so far 22 new e-cars and a new load management for the fleet at a depot of the municipality. This fleet of e-cars is planned to be completed with e-bikes as a new mobility solution. Here, a survey was written and a demonstration event took place as described in chapter 5.4.
- Concerning its city infrastructure, Hamburg is focusing on the improvement of pedestrian and bicycle connections by the installation of smart streetlights. Therefore, the Borough of Bergedorf has planned a new continuous cycling and walking connection on the west side of the channel “Schleusengraben” and the installation of adaptive LED lighting, a counter for bicycle traffic and Wi-Fi at selected points.

The interventions regarding ICT are focusing on the supplement and development the Urban Platform of Hamburg, improving and increasing the existing infrastructure and data.

- New data from city and third party sensors will be integrated, new processing services will be developed, and a new kind of web services especially for sensor data will be introduced and approved. The aim is to improve the standardized connectivity in order to allocate (open data) apps and services to authorities, citizens and stakeholders.

The interventions regarding the public engagement of the citizens in Hamburg focus on informing and activating local stakeholders on the one side and citizens on the other side. Therefore, two participation programs tailored to the specific target groups have been developed:

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- The “Walks & Talks” is a series of events, addressing interested citizens and local politicians of the Borough of Bergedorf. Here, project partners represent their ideas about the smart city by presentations and discussions with the audience.
- The “Innovation Network Bergedorf” is a community of real estate investors, energy companies, traffic planners, science facilities and project partners under the direction of the Borough of Bergedorf. In this network, the members discuss new opportunities for innovative infrastructure, which opens up the huge urban development that is currently taking place at the “Schleusengraben” area.

In the following, the three interventions the Bergedorf-Süd retrofitting project, the improvement of solar energy with the “Solar offensive” and the integration of e-bikes in the public fleet are described in detail.

5.2 Retrofitting Bergedorf

5.2.1 Detailed Description Retrofitting Project

The following section presents the mySMARTLife Intervention in Hamburg “Bergedorf-Süd Retrofitting Project”. The intervention aims to pursue an energetic retrofitting management in Bergedorf-Süd with the objective to initiate refurbishment activities. The area of Bergedorf-Süd comprises some parts of the historical city, numerous buildings for retail and business as well as diverse areas for housing and business locations. In total, there are around 500 buildings comprising 5,000 flats which belong to a great part to the inhabitants themselves. In Bergedorf-Süd, huge potential for energetic refurbishment and photovoltaics on roofs could be identified. At the beginning of mySMARTLife project in 2016, more than 50% of the buildings did not have an energy saving system on their façade and more than 90% were equipped with a natural gas heating system.

Figure 10: The retrofitting of a building at the Rektor-Ritter-Straße in Bergedorf Süd[14]

[14] Photo credit: konsalt GmbH

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In the frame of mySMARTLife, the consortium partner konsalt is responsible for this intervention. The target groups of the intervention are property owners, housing associations, citizens as well as local businesses. The intervention aims to activate these stakeholders for concrete measures on their buildings by offering consultancy and information in a constant dialogue as well as support for possible retrofitting and consultancy about funding. The retrofitting action for Bergedorf-Süd pursues the objective to initiate the implementation of activities for energetic refurbishment, energy efficiency, and renewable energy generation on district level. In particular, this could be for example the installation of façade insulation or construction of solar panels on the roof or the replacement of insufficient heating facilities and the connection to local smart Heating Island. The retrofitting intervention is closely connected to the "Solaroffensive" described in the chapter below.

The implementation process of this intervention pursued different approaches. First, it was necessary to get in touch with property owners in the respective area. As there are many different owners of single buildings in Bergedorf-Süd, letters advertising free consultancy for energetic retrofitting were sent to ca. 300 private house owners. The respond-rate was up to five percent only, even though a sensor for measuring temperature and humidity was given as a "reward" to those who responded. As it turned out, more than 25% of the owners do not live in Hamburg and because of this it was either very time-consuming to get in touch with them or no contact could be established. Large property owners, such as the building cooperative Bergedorf-Bille that owns many multi-family houses in Bergedorf-Süd, and a private school were contacted separately. The district office of Bergedorf-Süd could be used as a central contact point in the area for interested house owners. Moreover, several events for information as well as round tables took place in Bergedorf-Süd, aiming to inform and activate the property owners for energetic retrofitting and the installation of photovoltaic on roofs.

Altogether, the approaches carried out in the implementation process had a communicative and persuasive character.

5.2.2 Key Barriers & Enablers

Due to the big number of single property owners in Bergedorf-Süd, it was, first, a major challenge to obtain respective contact data. Out of ca. 300 property owners that had been contacted by mail, only 13 responded and made use of the energy consultancy. It was recognized that it is easier and more efficient to come into contact with bigger property owners, such as the building cooperative Bergedorf-Bille. However, after intensive exchange and consultancy, the building cooperative decided against the implementation of retrofitting measures due to economic reasons. In addition, it has been recognized that there are many difficulties to implement retrofitting actions in multi-family houses with a community of owners. In this case, the agreement of every apartment owner is needed before building works can be implemented.

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5.2.3 Lessons Learnt

Altogether, comprehensive experiences could be gained from the retrofitting intervention. Even though only a smaller number of retrofitting measures as expected has been implemented in the course of this intervention, it is still not defendable that continuous information and communication offers are important prerequisites for activating property owners to implement energetic retrofitting measures. The high number of single property owners in Bergedorf-Süd proved to be a main obstacle and led to disproportional high efforts and dissatisfying success with regard to actually implementing retrofitting measures. In this context, it could be recognized that it is more efficient to focus on larger property owners, such as building cooperatives or public buildings than coming into contact with private single owners of buildings.

Very positive experiences could be gained in cooperation with a private school in Bergedorf-Süd. The Rudolf-Steiner-Schule was in urgent need of renovation and for the management of the school, the collaboration with EnSam seemed very promising. Finally, the school did not only implement a comprehensive energetic retrofitting and a new heating system but did also take the topic to the classrooms by involving the pupils in the retrofitting process. Since a private school has shorter decision-making-paths than a public school, the retrofitting activities could be initiated and implemented relatively fast. Students of the school accompanied the measures by producing a movie to show the single steps of the retrofitting actions.

As the collaboration with the school showed success, konsalt and the other mySMARTLife partners in Hamburg could learn from this example that especially buildings, such as schools and public institutions, offer much potential for initiating retrofitting activities and are easier to reach than single residential buildings. Furthermore, the overall experiences in the field of energetic retrofitting show that financial benefits of retrofitting measures are a key requirement for activating stakeholders and private house-owners.

Figure 11: Meeting of the Innovation Network[15]

Figure 12. Retrofitting of the Rudolph-Steiner-Schule in Bergedorf Süd[16]

[15] Photo credit: konsalt GmbH

[16] Photo credit: konsalt GmbH

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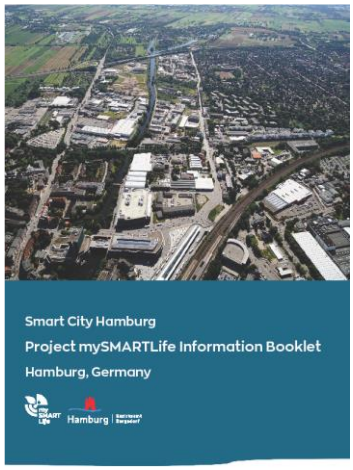

Figure 13: Information booklet about mySmartLife[17]

Moreover, several events for information as well as round tables took place in Bergedorf-Süd. The round tables, which were organised by konsalt, focused on topics like different technical issues of retrofitting and economic issues or the question of affordable rents. The target group of the round tables were local property owners and the aim was to inform and activate these stakeholders for energetic retrofitting and the installation of photovoltaic on roofs. Moreover, the round tables were a great opportunity for entering into dialogue with property owners. For this dialogue, also an information booklet about mySmartLife, its targets and measures, has been produced.

5.3 Solaroffensive

5.3.1 Detailed Description of Solaroffensive

In mySMARTLife, ENH aims in action 5 (PVs on roofs) in conjunction with action 7 (home-batteries for self-consumption) to install photovoltaic systems on suitable roofs. These interventions promote the energy transition as well as climate and environmental protection through regional power generation with solar energy on existing buildings (without additional landscape consumption). The residents or (in trade) the users of the building can get a direct power delivery of the green electricity from their own roof at a low price. The electricity not directly consumed in the buildings is fed into the grid. As a smart solution to increase efficiency through a higher self-consumption rate and to relieve the public power grid, a battery for temporary storage will be integrated into the system.

The public cadastre with the Solar Atlas Hamburg offers a first overview of suitable roofs. However, the data status is from 2012 and newer buildings are not categorised for the use of solar energy (PV or solar thermal).

[17] Photo credit: konsalt GmbH

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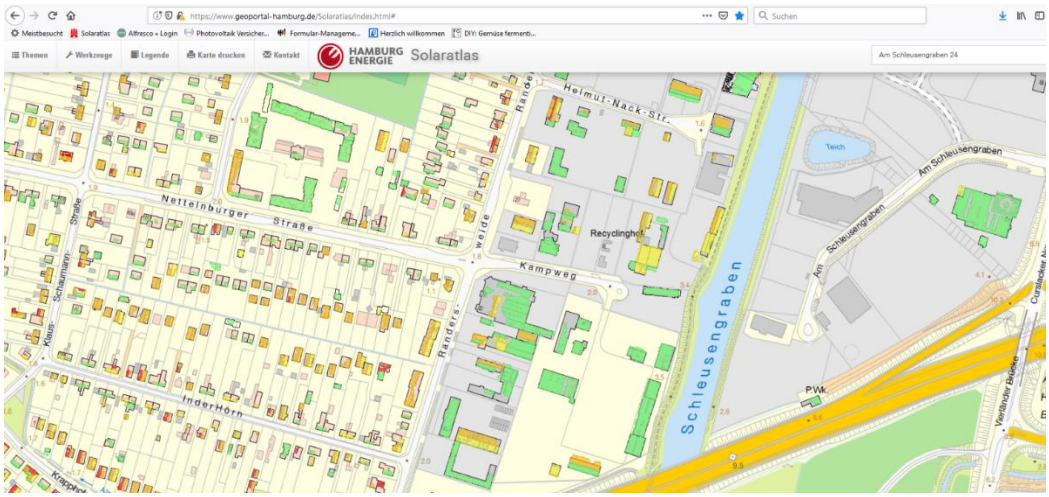

Figure 14. Screenshot Solaratlas Hamburg[18]

To achieve the goal, ten well-structured steps are required:

1. A suitable roof must be found. The roof pitch and the orientation to the sun must be favourable. The roof area should have only few disturbing areas (chimneys, roof lights, antennas) and must not be shaded by trees or neighbouring buildings. The rooftop must be in a condition that ensures a continuous use of at least 20 years (see Fig. 5-2).
2. The owner of the building must agree. This is a difficult aspect and the bottleneck in the realisation of PV projects on roofs. The owner is limited for the duration of the contract (usually 20 years) and refrains from changes and refurbishments of the used roof area. For this, she/he receives a relatively small financial compensation. As a result, only homeowners who are convinced of the importance and urgency of the energy transition and climate protection provide their roofs.
3. The technical requirements must be clarified: What is available? What needs to be renewed? Is there enough space for the additional components (distribution cabinet, battery)?
4. The project is technically and economically calculated. Due to the steady decline in feed-in tariffs in Germany, predominantly PV projects with high self-consumption can be operated profitably. Already additional costs due to required roof or earth works (cable laying) can make projects uneconomically.

[18] Schleusengraben area, green = well-suited, yellow and orange = suited, red = unsuitable for PV-plants, grey = new buildings, not categorized, https://www.geoportal-hamburg.de/Solaratlas/index.html#, Access: 09/05/2019

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Figure 15. Suitable and improper roofs[19]

5. Long-term contracts are concluded for roof use. The detailed conditions have to be negotiated.
6. Residents or other users of the building are being promoted for direct delivery and power supply contracts are being concluded. This is the easiest part since most people are interested in getting low-priced green power.
7. The power requirement is determined and a simulation is used to determine the meaningful integration and capacity of the battery.
8. The approval from the network operator is obtained. In some cases, long processing times can be expected.
9. The PV system is built, the battery is installed and all components are connected.

[19] Photo credits: Doris Willmer

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10. The entire system is technically tested and approved. If everything is all right, the activation follows and the PV-plant has to be registered in the market master data register and in the EEG-surcharge-portal (specific directories of renewable energies in Germany).

ENH has to finance the PV-plant by itself. Only the battery-storage is subsidized with 75 percent of the depreciation costs over the project term of mySMARTLife. The investment volume for a PV system currently is between approx. 900 and 1100 Euro per kWp.

In order to advance the Hamburg energy transition and to support the search for suitable roofs, ENH has initiated and co-founded an alliance called “Solaroffensive Hamburg”. The core of this initiative is an internet platform that enables Hamburg citizens to register their interest in a rooftop PV-plant. ENH contacts them and checks the suitability and conditions of the proposed roofs.

5.3.2 Key Barriers & Enablers

The acceptance of tenant power supply or direct power delivery is high by the tenants and commercial users of the buildings. Unfortunately, this does not apply to homeowners, although many of them are convinced that it is necessary to protect the climate. Nevertheless, most are unwilling to commit themselves to a 20-year contract, thereby limiting themselves in possible future decisions (such as rebuilding). The financial benefit of the roof lease is too low. The low contribution margin for the operator of the PV system, however, does not allow a higher rewarding roof lease.

Unfortunately, this also partly applies to urban buildings. For these, the policy could impose a short-term policy checking the PV-suitability of all buildings to be used by citizens' initiatives or public agencies for PV-plants or solar heat. This would not only promote renewable energy without the investment of taxpayers' money, but would also make the citizens more accountable.

A large part of the roofs is too old and must first be restored. As described in the case of retrofitting (see 5.2), it is difficult to motivate homeowners to energetic renovations. Here, a nationwide combination of promoting roof renovation and making a contribution to the energy transition through photovoltaics would be a necessary support to accelerate the expansion of roof systems.

Unfortunately, the legal framework in Germany complicates the use of the abovementioned potential considerably. The bureaucratic hurdles and the regulatory jungle complicate and delay the implementation of projects. In addition, self-consumed electricity from own roofs for private small consumers is burdened with the EEG reallocation charge (6.405 € C / kWh in 2019[20]) in Germany, while industrial bulk consumers (the large-scale polluters) are exempt from it. For economic reasons, this burden prevents the payment of a roof lease to the house owners and decreases the profitability down to inefficiency of a plant because the

[20] https://www.netztransparenz.de/portals/1/Content/EEG-Umlage/EEG-Umlage%202019/20181015_Ver%c3%b6ffentlichung%20EEG-Umlage%202019.pdf, access; 30/07/2019

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potential electricity rate is limited. This situation requires urgent legislative reforms that promote a fast and socially compatible energy transition.

To provide solar energy for new buildings, the necessary consequences are drawn in some municipalities, and the installation of PV systems is made a condition. Battery storage is promoted with different models. These are steps should urgently be extended nationwide.

To reach the aims first, the roof areas incl. the respective solar potential in the project area were listed. For the rewarding roofs, a more intensive examination was carried out as part of a subcontracting; the owners were identified and contacted. The first goal was a personal conversation with a rooftop inspection, in order to develop and implement a concept for the building with the owner and the user.

ENH participated in the “mySMARTLife Walks & Talks” to promote the power direct delivery concepts. In this context, ENH offered energy consulting for the house owners together with HAM-BGD and Konsalt. In cooperation with Konsalt a circular letter was sent to about 300 house owners in April 2018. They were invited to a free consultation without obligation about energy efficiency measures on the construction and RES energy production at their houses.

Members of ENH from the borough of Bergedorf were motivated to talk to other residents of Bergedorf about the possibility of building and operating a PV system on the roof via the cooperative without own investment. They were networking in several initiatives like “Energiestammtisch”, a regular citizen meeting about energy. In particular, they contacted commercial enterprises with suitable roofs, which could advertise with their use of green electricity.

The mySMARTLife project leader of ENH went door-to-door in Bergedorf's business area of the project zone in personal promotions and informed the organizations about the opportunities of direct delivery of PV power from the own roof. The “Solaroffensive Hamburg” (see above) was promoted. In addition, ENH got in contact with the property management and persons responsible for public buildings to improve a PV-plant on a municipal building.

5.3.3 Lessons Learnt

Although the importance of climate protection is slowly becoming clear to people, the willingness to accept possible restrictions (in this case for refurbishment, etc.) through long-term contracting is often low without rewarding financial compensation. Due to the legal and regulatory framework, the current profitability of PV plants is too low to pay for a significant roof lease. Many tenants of apartments and commercial real estate have great interest in green electricity from the "own" roof, but little influence.

In order to implement the use of solar energy in a broad front on all suitable roofs, clear requirements and obligations are required for the homeowner, possibly supplemented by financial incentives. Politicians must show their will to act and set public institutions by example.

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In the current situation, ENH can only advise house owners with a high level of environmental awareness and declare them the opportunity for PV systems without own investment in order to implement a solar concept on their building together with them.

5.4 Electric Bike Scheme

5.4.1 Detailed Description of Electric Bike Scheme

The implementation of e-bikes is part of the intervention “electrification of the public fleet”. Here, several fleets of cars, which are located at different authorities or public agencies in the Borough of Bergedorf, are reviewed and the conventional cars should be replaced by e-cars. Furthermore, different new mobility offers like e-bikes or e-scooters have been analysed and tested to find out whether they are suitable for the daily demands of the authorities.

After the start with the electrification of public cars, which are mainly used by the department of road maintenance, the department of forestry and the department for maintenance of bodies of waters, the responsible project partners (HAM and VWG) focused on the implementation of e-bikes in the public fleet. The aim was to reduce the use of cars, to reduce the traffic, and to save CO2 emissions.

Thus, for the first step an online survey among the employees of the authorities in Hamburg-Bergedorf was made. 98 of around 580 employers took the survey, which asked about the characteristic of business trips, e.g. the amount of trips, the main mode chosen for them, their average distance, the main advantages/potential of e-bikes, and more. The survey was conducted by with an online-tool and every employee could take part voluntary. The results of the survey have been analysed and aggregated in excel sheets and a presentation. Overall, the survey has shown that many business trips are done by car – often even by the private cars of the employees, which is officially not desired due to insurance reasons. Several trips could be replaced by e-bikes, especially trips through the inner city of Hamburg-Bergedorf. In a free comments box, the employees could additionally insert their opinions and requirements for the use of e-bikes in their daily work. The most comments have been related to the desire for a flexible and easily accessible rent facility.

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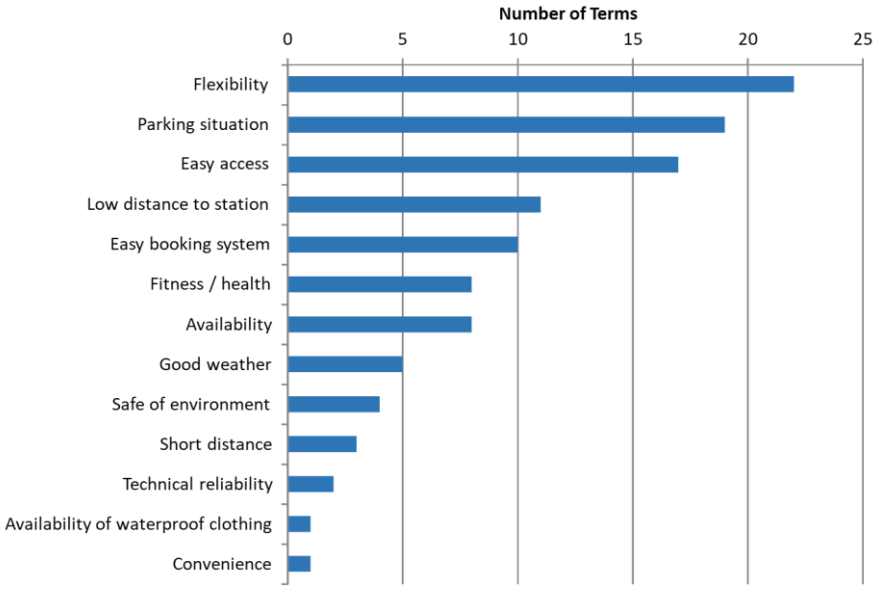

Figure 16: Motivational aspects to use an e-bike at work[21]

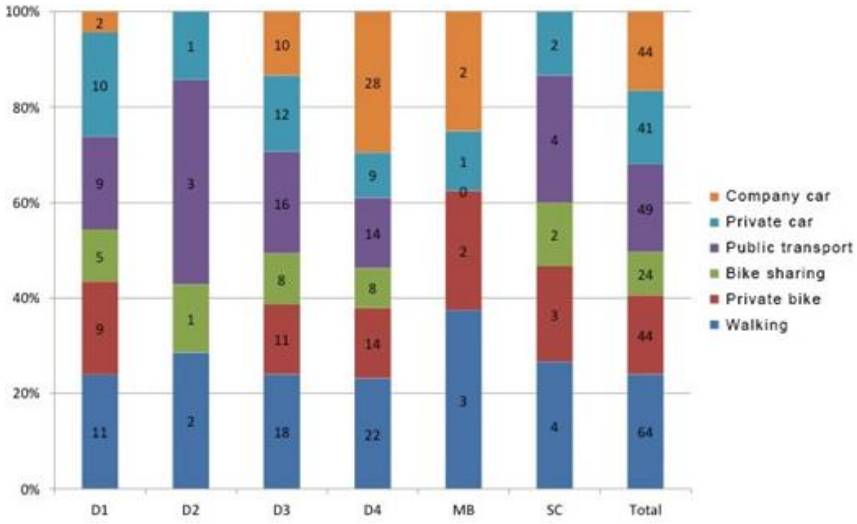

Figure 17: Relative modal split of the municipality employees[22]

[21] Source: Bezirksamt Bergedorf

[22] Source: Bezirksamt Bergedorf, , D1 – Dezernat Steuerung und Service (Department of Services & Controlling), D2 – Dezernat Bürgerservice (Department of Civil Service, D3 – Dezernat Soziales, Jugend, Gesundheit (Department of Social, Youth and Health), D4 – Dezernat Wirtschaft, Bauen, Umwelt (Department of Economics, Building and Environment), MB - Museumslandschaft Bergedorf (Museum Bergedorf), SC - Stabsstelle Smart City & Innovation (Executive Department Smart City & Innovation)

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The figure above shows the relative amount of trips classified into the different transport modes (Y-axis) for the different departments of the Bergedorf authorities (X-axis). The focus is on the orange and turquoise bars – representing company and private cars used for trips. Especially D3 (Department for social, youth and health) and MB (Museums) have a high share of car trips of almost 40%. The other departments have share of around 15 until 25%.

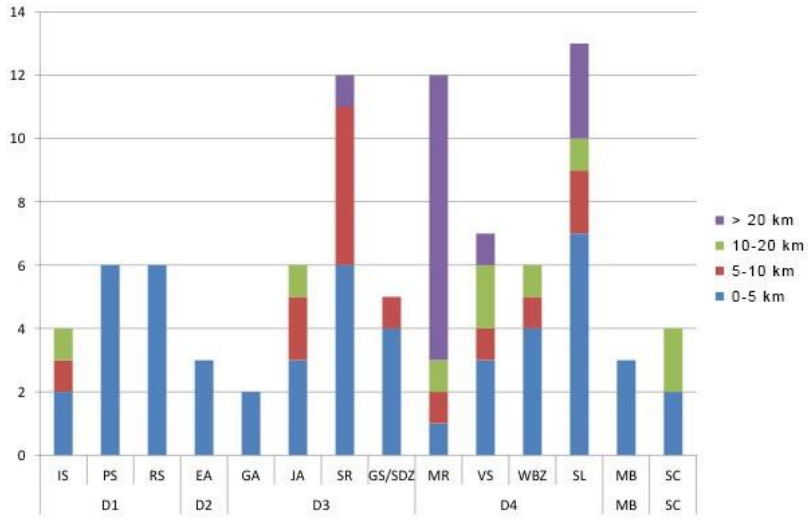

Figure 18: Absolute numbers of distances of business trip[23]

In the figure above, the absolute number of trips (Y-axis) per department (X-axis) is classified into distances of the trips. While some few departments have many long trips, it can be seen that most departments have mainly short trips of 0-5 km which could be done by normal bikes, the main potential for e-bikes has been seen in the distance between 5-10 kilometres.

To raise the acceptance of e-bikes and to give every employee a chance to get in touch with this new mobility and to lower concerns, trial sessions for e-bikes were held in three different locations: at the Bergedorf town hall – the main facility of the Bergedorf authorities – ,at the mySMARTLife-office and at the department for management of public space. The Volkswagen AG provided three e-bikes while the HAW provided one cargo e-bike. Employees of the authorities and pedestrians could try the e-bikes to get a feeling for them and to raise their motivation to use such vehicles for business trips.

[23] Source: Bezirksamt Bergedorf

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Figure 19: E-bike trial session for employees[24]

5.4.2 Key Barriers & Enablers (Challenges encountered and how where they overcome)

The general feedback of the survey and the e-bike event was very positive; especially the employees at the department for management of public space were very interested in the use of e-bikes or e-cargo bikes. Most of the people, who tried the e-bikes at first time were pleasantly surprised and in favour of getting some e-bikes for business trips for the department.

The main barriers for the purchase of e-bikes, as a new element of the public fleet are the high costs of the bikes and the additional costs for installation of parking boxes. Also the e-bike event has shown that the wide range of the height of the employees is a problem because you need at last two different bicycle sizes at one location. It was calculated that a robust e-bike together with the installation and bike helmets will cost about 3000 - 4000€ each.

The e-bikes should be placed at the agencies somewhere where they are secure but easy to lend. Moreover, a system of responsibilities has to be implemented. However, at the most promising location for e-bikes, the agency for public spaces already offers several conventional bikes for short trips and several e-cars for long distance trips. Therefore, the use case must be very accurate calculated for e-bikes to justify the high investments. Currently, the cost are compared to the possible benefit of the e-bikes by the financial

[24] Photo credit: Johannes Mielchen, Bezirksamt Bergedorf

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department of the Borough of Bergedorf, which is in the end, the main decision maker and has to be convinced to go ahead with the investment.

5.4.3 Lessons Learnt

The majority of employees is interested in e-bikes and new mobility solutions. The e-bike event was well attended and many people did show up to test an e-bike for the first time in their lives and to figure out whether it is a suitable possibility to get to work. The event did also provide an excellent opportunity to get direct feedback from the employees. All things considered, it is highly advisable to conduct a test phase to include potential users from the beginning and to build on their feedback.

The main barrier in the implementation of e-bikes are the high costs and their “sandwich position” between cheaper conventional bikes and e-cars for long distance trips, so a very clear use case has to be defined (e.g. use in steep terrain).

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6. Helsinki

6.1 Setting the Scene Lighthouse City Helsinki

Helsinki, capital of Finland, has a population of 648 042 inhabitants, whereas greater Helsinki accounts for 1.4 million. Helsinki is Finland's major political, educational, financial, cultural, and research centre as well as one of northern Europe's major cities.

The Helsinki City board has decided upon Carbon-neutral Helsinki 2035 Action Plan on 10 December 2018. The Action plan was prepared with involvement of all main stakeholders in an open process and outlines how the city can be rendered carbon neutral by 2035. It details in realistic manner how to reduce energy consumption and how to increase on-site renewable energy generation in the city. The plan will be implemented side by side with a program to render the city's centralized energy production carbon neutral.

The two key factors to engage in such an ambitious process was on the one hand the political commitment, in order to streamline it in the work of the municipality, and on the other hand, the involvement of different stakeholders (companies, citizens, tourists) as implementers, since the municipal sector only accounts for 10% of total emissions.

The strategy programme of the City of Helsinki, its environmental policies, its guidelines concerning energy policies and the Climate Strategy of the Capital City Area, sets the general outline for the climate work of Helsinki. In addition, Helsinki has committed itself to various agreements and declarations, such as the city's energy-efficiency agreement (KETS) with the state authorities, and the Covenant of Mayors, a climate agreement between the mayors.

mySMARTLife project areas in Helsinki are divided into four zones. Zone 1 comprises Merihaka residential retrofitting zone, where retrofitting action, that is installation of smart thermostats, has taken place. Smart controls are connected to the Urban Platform. Performance evaluation of the buildings with heat leakage imaging and large-scale energy efficiency evaluations have also been conducted. Management and optimization of the district heating is studied as well. This zone represents an important pilot for the city in terms of finding ways to reduce the GHG emissions from city's existing private building stock.

Zone 2, Kalasatama district, is a new a high-performance residential area in Helsinki. There are buildings that produce energy performance data for mySMARTLife. Many RES investments are also on-going in this zone, like the world's largest cool reserve, crowd-funded solar power plant and the world's largest heat and cool pump. The coal plant is situated in Zone 2 as well and its replacement with RES is a challenge adopted by mySMARTLife.

The third area, Zone 3 is the Viikki Environment House, a high performance office building, where the existing RES production will be maximised through better control and power management strategies.

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Finally, Zone 4 is the whole city. Several interventions (including mobility actions, such as up-take of electric buses and charging stations, ICT actions, such as informational applications about energy issues and urban platform development) influence the whole city area.

In this deliverable, the plan is to display three case studies to explore in more detail the key barriers and enablers as well as lessons learned that City of Helsinki and other project partners have found out with respect to citizen engagement.

First case study focuses on actions in the Zone 1, Merihaka. There have been several implementations to improve the energy efficiency of the buildings. Some affect only one building and some the whole district. This case study is explained in chapter 6.2. The second case study is a part of the mobility actions, an automated electric bus, described in more detail in chapter 6.3. The third case study is the conceptualisation of an application called Carbon Ego. Its development work is described in chapter 6.4.

While in the mySMARTLife project, citizen engagement and social acceptance are crosscutting considerations in all actions, these cases represent a wide variety of types of stakeholder constellations and issues in terms of citizen involvement. The following subchapters describe the characteristics of each case in turn.

6.2 Helsinki's Smart Heating Control

6.2.1 Detailed Description of Smart Heating Control

Merihaka smart heating control is part of *Action 1*, Merihaka and Vilhonvuori: retrofitting of the residential construction from the city's previous rapid construction era and *Action 4*, Demonstration of smart home management (heat demand response) at apartment level at Merihaka/Vilhonvuori. Some of the interventions in the area feed into *Action 32*. Smart District-Level Energy Renaissance Strategy. *Action 40*, Implementing Energy Advisor, supports the other actions. Project partners involved in these implementations are City of Helsinki (HEL), Helen Ltd (HEN), Salusfin Ltd (SAL) and VTT Technical Research Centre of Finland Ltd (VTT).

The Merihaka residential buildings are the project retrofitting targets. As typical buildings of the city's previous rapid construction era, they represent the vast amount of building stock in Helsinki city. The project aims to develop a model for retrofitting of this building stock (Action 32). Key intervention in the retrofitting pilot was an installation of smart thermostats for management of apartment level heating in one of the residential buildings of Merihaka. With smart thermostats, the residents can control and adjust their heating based on their needs and schedules and thus reduce their energy consumption while maintaining their level of comfort. Smart thermostats enable also the implementation of smart demand response experiments that can bring systemic level benefits for the heating grid.

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Merihaka area comprises 12 residential buildings. Merihaka area is described in more detail in the Deliverable 4.2, chapter 3. The installation of smart thermostats has taken place in the residential building in the address Haapaniemenkatu 12, altogether 167 flats.

Figure 20. Merihaka, Haapaniemenkatu 12 encircled[25]

In spring 2017, the housing association of Haapaniemenkatu 12 decided in their annual general meeting to install the smart thermostats in the whole building. Project partners (HEL, SAL, HEN) presented the implementations in the meeting. The whole implementation costs approximately 100 000 € (VAT included) of which the housing association paid 30 %. The installation was done in two phases, first a set of 20 apartments in the end of the year 2017 to get proper feedback of the installations and user experiences of the solution. Then, based on those results, the installations were done to the rest of the building in spring 2018. Installations are described in more detail in the Deliverable 4.4 chapter 3.

Prior to the annual general meeting, there had been several discussions with the board members of the housing association. The City of Helsinki, service provider Salusfin and utility company Helen organized meetings. The service and the functioning of the thermostats were also presented to the maintenance, management and customer Service Company of the area called Helsingin Merihaka Oy. The implementations have been executed in close collaboration with the maintenance company.

The residents of the whole building were informed about the installations through info leaflets, delivered to their homes and housing associations, and internet pages containing information about the smart thermostats and possibilities to reduce energy consumption. There has been information also in the

[25] Photo credit: : Helsingin Merihaka Oy

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message board of the building. Manuals were also distributed to the apartments during the installation phase. Furthermore, info evenings for the residents have been organized, altogether 6 events. The first set of end-users was contacted personally and feedback was gathered regarding the usage of thermostats. The experiences and resulting ideas and opinions from the interviews were taken into account in the installation of the final set of thermostats. A press release was also sent after the first set of installations. The housing associations of the area have regular board members´ meetings and information about the implementations have also been shared with them.

Service provider Salusfin has arranged on-site support and guidance possibilities in the building on how to install the application and how to use the service in order to have the maximum impact and effectiveness for the implementation.

As part of Actions 32 and 40, two energy related workshops for the board members of housing associations of Merihaka has been organised. The first workshop addressed and presented the results of the energy efficiency report that had been done for two of the housing associations in the area and the topics of the second workshop were the results of the heat leakage studies, centralized intelligent heating control and a draft of energy renaissance strategy.

Figure 21. Energy related workshop for the board members of housing associations in Merihaka 6.11.2018[26]

6.2.2 Key Barriers & Enablers

The installation of smart thermostats can reduce energy consumption in two ways. The thermostats have built-in intelligence; hence, the installation itself in most cases reduces energy consumption. The most

[26] Photo credits: Marja Vuorinen

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efficient way is when the end-users install the service application on their smart device and dynamically control the heating, for example lowers the temperature during absence (working hours or vacations).

In order for the residents to use the smart thermostats in a way that would bring the most efficient results, they need to have an internet connection and a smart device to use the application for dynamic heating. That alone narrows the possible end-users for this solution.

When dealing with smart devices and applications, instructions should be carefully planned and there should be resources to allocate a lot of working hours to the support provided to the residents. The support should be provided through different channels (information letters by mail, social media, events, on-site support) and feedback should be gathered in different phases of the intervention.

The work will continue in different ways of convincing and motivating people to see the benefits of the solution and how it can improve indoor conditions and the environmental impact.

In Merihaka, the board members of the different housing associations of the area have regular meetings. Those meetings are a good opportunity to spread information from one association to another and to discuss about the possibilities of district level solutions in energy saving. Furthermore, the two workshops that were organized for the board members of the area were very successful.

6.2.3 Lessons Learnt

As said in the previous chapter, the instructions for the installation of the application should be as simple as possible, and that has proven to be a difficult task to deliver. Instructions should be proof read several times before the implementations. In a project like this, the instructions itself could be done and developed with the residents.

The instructions have now been improved based on feedback from the inhabitants/apartment owners by adding more detailed instructions and providing videos on the Salusfin webpages. The feedback has also given input to improvements to the solution itself, i.e. updates to the functionality and correction of processes.

Smart devices always face resistance or have learning costs for the users; hence, it takes time for solutions like this to be widely accepted. That aspect should be taken into account when planning the replication activities.

6.3 Mobility: Helsinki’s Robot Bus

6.3.1 Detailed Description of Robot Bus

The aim of the intervention (mySMARTLife Action 23. Autonomous Electric bus pilot to address urban last mile mobility issues) is to investigate and find out what is the maturity level of automated electric first/last mile small buses (robot bus/shuttle) and how would they fit to the current transport system as well as work as part of public transport. Automated public transport has the potential to make public transport more cost

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effective, attractive and comprehensive. With the help of automated technology, public transport can possibly be offered to areas and routes where traditional means of public transport are too expensive to be operated. Therefore, the assumption, automated electric first /last mile buses can reduce the need for private cars.

In cooperation with Helsinki robot bus project (Helsinki Robobus Line), an automated last mile bus (Autonom Shuttle) from manufacturer Navya is deployed on open roads.

Figure 22: Navya robot bus on Kivikko Sports Park bus stop[27]

The aim of the pilot was to operate the robot bus in active road traffic amongst other road users. The bus follows a predetermined route at low speed (18 km/h) similar to a tram on virtual tracks. The robot bus in use is not able to operate in cold and harsh weather conditions, so the piloting period was in the warmer season of the year, comprising of two test periods of ca. 6 months per year. In 2018, the bus was operated in the east of Helsinki (Kivikko) on a route that was also integrated into the public transport authority Helsinki Region Transport's (HSL) mobility planner with line number 94R.

[27] Photo credits: Eetu Rutanen, 2018

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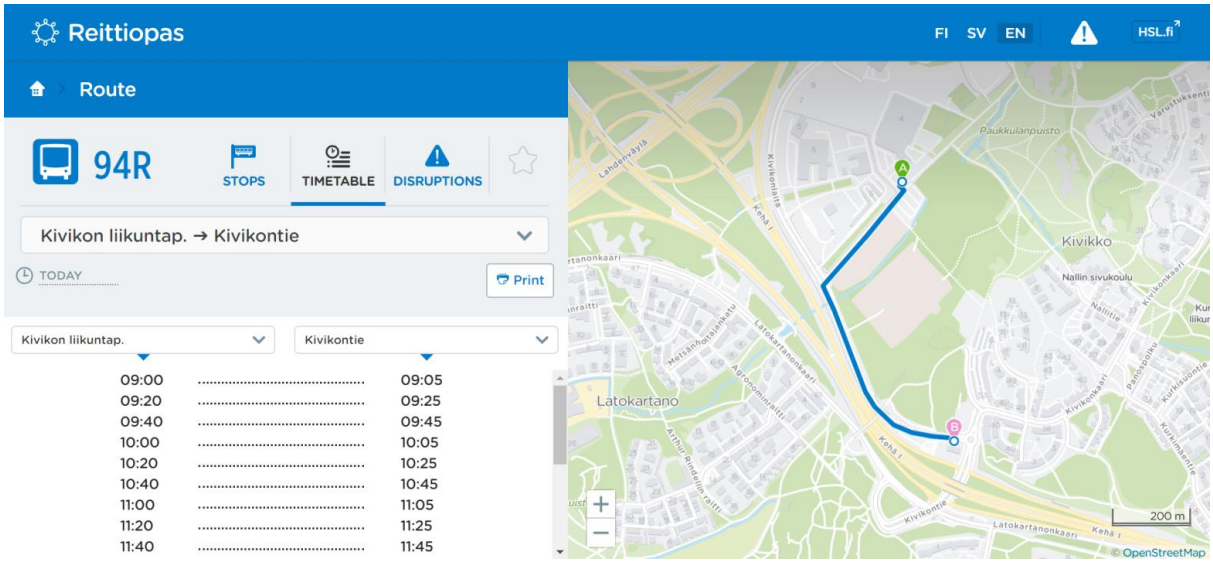

Figure 23: Robot bus route as shown in Reittiopas journey planner[28]

The robot bus line had two bus stops. One was located on the same stop as a regular HSL bus line 94B near trunk line bus routes; the other stop was at the end of the route approximately 1 km away on Kivikko Sports Park. The shuttle operated between these two stops working as a first/last mile solution. The bus ride was free and open to the public offering everyone from normal public transport users to city planners the experience of driverless driving. Metropolia University of Applied Sciences (Metropolia) implemented the intervention.

The deployment of the shuttle to Kivikko started on 2 May 2018 commencing with the programming of the bus route that was conducted by the bus manufacturer (Navya) with support from Metropolia. Prior to the deployment preparatory work was delivered:

- planning and finding the route itself
- applying for the test license plate certificate from Finnish Transport and Communications Agency (Traficom),
- finding a storage place for the shuttle close to the route
- planning the operational hours of the robot bus
- making arrangements on the route including for example warning signs
- minor changes to the road infrastructure.

After the robot bus was commissioned on 14 May, passengers could hop on. Metropolia operated the shuttle on weekdays from 9 AM to 3 PM. At least one responsible person (operator) was always on board guiding the passengers, taking care of the safety, collecting user feedback and other relevant data from the service such as reasons for interference in shuttle operation as well as realization of the planned operational hours. During the service period between 14 May and 14 Nov 1564 departures, 516 operational hours and 96

[28] Reittiopas. 2018. Website. Helsingin seudun liikenne -kuntayhtymä. Available at: https://reittiopas.hsl.fi/ [30 October 2018

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731297.

operational days were realized that 32 % of the planned departures, 33 % of planned hours and 26 % of planned operational days were missed. Reasons for deviations were:

- Problems between the satellite signal correction connections between the shuttle and base
- Heavy rain
- Solving vagueness which had been noticed in the bus operation or in the route
- Construction equipment on the shuttle's trajectory
- Parked vehicles for example on bus stops
- Temporary traffic arrangements by the route
- Warm weather during summer for which reason air conditioning consumed a lot of energy and last few departures were missed during the day because the battery run out of energy
- Software update done on the shuttle which caused problems
- Problems caused apparently by cold weather (below 0 Celsius) towards the end of the operating season

It should be noted that in the pilot, there was only one shuttle in use and if a more serious and longer lasting problem occurred, there were not replacement vehicles available. Due to the energy consumption of the air conditioning, the shuttle was not able to operate all day long (6 hours) on hot summer days. However, when the air conditioning could be turned off, the shuttle could run more than two days (12 hours) without the need for charging. Many things can affect the reliability of the service of automated shuttles and a lot depends on how the operational hours are designed, what are the route characteristics and what is the time of the year when operated. The above list and realization of the planned schedule describes the reliability of one vehicle on a certain area with a certain type of operation and the results may not be generalized to every place. In any case, the same kind of results and issues can be expected currently on any open road conditions and if having four distinct seasons during the year. In 2019, the robot bus pilot will continue with another trial period and route.[29]

6.3.2 Key Barriers & Enablers

The biggest challenges with the robot bus intervention are related to the technological capability of the shuttle. It is not able to keep up with the traffic flow and can easily cause small congestions as well as ending up in dangerous overtaking situations if the requirements with the route characteristics do not match with the shuttle's abilities. On the other hand, taken into account the technological limitations, it has been difficult

[29] The intervention is partially funded by mySMARTLife project (Horizon 2020 program) with 219 000 €, Helsinki robot bus Line project (Helsinki Innovation Fund) with 260 218 € and by Metropolia with ca. 85 000 €. Helsinki Innovation Fund financed mainly the purchase of the shuttle used in the intervention. Price of the shuttle was 260 000 € including the shuttle itself, commissioning of the shuttle to one route as well as relevant maintenance measures, licences and supervision (remote assistance) for operating the shuttle in theory for 6 months. This price did not include the actual service of the shuttle, for example having an operator inside the robot bus.

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to find suitable open road routes and applications where they could function sensibly as part of public transit and as a cost-effective public transport solution. Amongst other things, this can be traced back to its speed of less than 20 km/h and the circumstance that an operator on board is still needed. These limitations have been noted especially in Helsinki where public transport works very well and where it is difficult to find gaps in last/first mile service. As the technology is not yet ready, it is important to test the vehicles in real open road conditions amongst other road users. This has been a rather straightforward process in Finland were the legislation allows automated vehicle testing in open road conditions. The experimenter must apply for a test plate certificate from Finnish Transport and Communications Agency (Traficom) and carry out the trials according to the test plan presented to Traficom.

In total 1.294 passengers travelled with the robot bus during the trial period on 2018 in Kivikko and the feedback was mainly positive. The users were excited about the technology. 141 passengers answered to a survey that dealt with questions about the following issues:

- Comparing experience of travelling in a robot bus to travelling in a conventional bus
- Estimation on changes that will happen in responder's mobility routines and habits by 2030
- Responder's vision about privately-owned cars in the future (by 2030)
- How important responder consider different things (such as environmental friendliness, health benefits, costs, etc.) when deciding how to move from one place to another.

The questions were answered on Likert scale from one to seven where for instance one represented "much worse" and seven "much better". For example, when asking about traffic safety, 85 % considered it to be on scale 4 or higher. Same kind of results occurred with the question of personal security on board, where the majority of the responders, 92 % thought that it was 5 or higher. According to these results, passengers generally thought that they felt safer while travelling in the shuttle than in a normal bus. However, it must be considered that a responsible person was still on board in the shuttle and the atmosphere was happy and conversational between the passengers who usually knew each other already. Approximately 70 % of the passengers were just trying out the robot bus without it being part of their travel chain and many of them came with groups to try out the bus together. In summary, the user feedback regarding the robot bus was positive.

However, other road users became often nervous when the robot bus was driving slowly in front of them. In some cases, this led to dangerous overtaking situations where the vehicles could hit each other. Furthermore, when vehicles overtake the shuttle and steer into the same lane right in front of the robot bus, the shuttle brakes quite heavily. In that case, there was the danger that another vehicle could drive into the robot bus due to its sudden stop. When the shuttle was leaving from a bus stop, other road users did not always know if they should give priority to the shuttle. This could end up in situations where both vehicles just stand still. By installing warning signs on site describing the automated vehicle pilot as well as distributing leaflets to companies on the area, attempts were made to affect drivers' behaviour. However,

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these actions did not have the desired impact. In summary, it can be concluded that current automated buses have been designed for certain types of environments and conditions. After all, it became clear that the route characteristics in Kivikko — especially the road profile that did not encourage driving slowly — were unsuitable for the technology in use.

6.3.3 Lessons Learnt

Automated vehicles have been heavily featured lately and their potential benefits in public transport have been noted. This intervention provides information about the present state of the technology of first/last mile automated small buses and what should be taken into consideration if piloting and implementing those as part of public transport. Robot buses as a complementary service in first/last mile mobility, replacing walking and cycling as well as serving people who are already using public transit, will only produce more CO2 emissions. The key to success is to effect private car users by making the service more attractive and offering mobility solutions to areas where it has not been possible due to high costs. It is important to find sensible routes that drive this purpose and not implement automated buses anywhere (considering the technical limitations) blinded by the novelty charm.

We must be keep in mind that automated vehicles are not ready for road traffic and are in the stage of development. The technology itself and related systems need to be developed. This could be done by finding a sensible route where there is a need to improve mobility, implementing a shuttle/shuttles and improving the technology and service step by step closely together with the technology supplier[30], relevant authorities from the city as well as the service subscriber[31] .It would be good to have frequent travellers on the route, see how their attitude changes during the trial, and see when they will start using the service in everyday commuting. However, perhaps even before this, the technology should be improved without having passengers on board and without the pressure of meeting for example any fixed schedules. At some point, it is also vital that the operator inside the vehicle becomes superfluous. Instead, there should be one person who remotely supervises several vehicles (at least two) for automated transport in order to become more cost effective compared to traditional means of transport.

6.4 Carbon Ego App

6.4.1 Detailed Description of Carbon Ego App

Carbon Ego (originally Carbon Neutral Me) is an app that is expected to make project interventions visible according to Action 46. The app would depend on datasets opened on the project and aims for behaviour changing, in part supporting the city climate goals. The app should be an open source and should be based on the open APIs supporting relevant data.

[30] Which should have a local office on site for quick responding time

[31] For example the public transit author

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The main challenge in the development process was the multitude of similar apps on the market and bad experiences from previous projects regarding the availability and the quality of existing data sources. It is known that many of the apps fail to keep the level of interest when requiring manual work, for example to manually enter food and commuting information.

Since the budget was reasonably good for an app development project, a major effort would be put on a professional service design phase, also emphasizing the ambition on behaviour change. After a tender process, a Finnish design company - Kuudes Helsinki - was chosen to provide the research and design phase, also based on their ongoing consumer research database[32] After several workshops, expert interviews, questionnaires and revisions of concept drafts, the concept plan was tested with pilot users and specialists of the area.

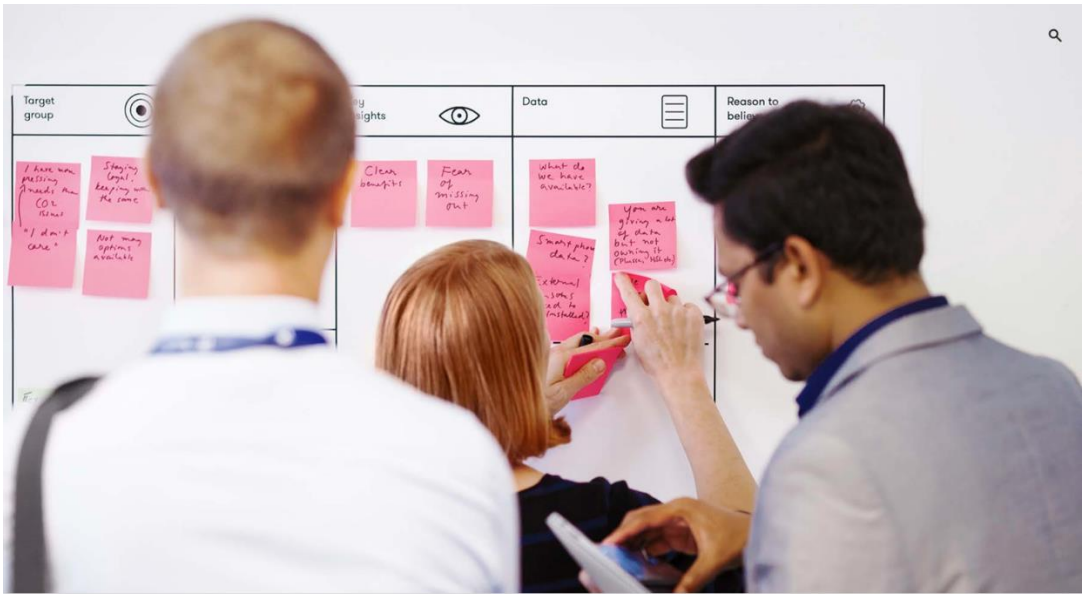

Figure 24: Carbon Ego co-creation workshop as part of the MyData 2018 seminar in September 2018[33]

Based on the previous experiences and the consumer research, the following key insights were identified:

- *Information should be linked to everyday life*: Many services provide general information about carbon neutrality but personal data is hard to reach
- *The abstract should be made tangible*: Good choices are not always visible in your everyday life, and it's hard to see how they influence the big picture

[32] www.theinformedconsumer.fi

[33] Photo credit: Igor Väisänen, Kasakkamedia

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- *Good choices need to be the easiest ones*: Many consumption decisions are guided by routines and habits that are not actively reflected upon
- *Understand what really motivates the consumer*: Different matters motivate People – carbon neutrality is merely one of them. How can it be linked to other values?

The increasing volume of information around climate change creates more anxiety than relief, so the app needs to be empowering and uplifting. It should be supportive and solution-oriented. Instead of pointing fingers, the Carbon Ego app encourages the consumer to adopt a climate-friendly lifestyle with a positive and solution-oriented angle. By visualizing data, the app gives an understandable overview of how moving, living, eating and consumption habits produce carbon emissions. The app assists users in improving their daily behaviour by giving tangible, straightforward tips and invitations to challenges. The Carbon Ego character communicates with the user, making the topic more approachable and fun.

In the future vision, more functions will be built on real-time data and automation. This requires organisations to share their data with the public. The 'minimum viable product' version of the app aims to lower this threshold; it offers organisations an example of creating common good by opening up data sources. Presently, the MVP version is being built and it will be tested with potential users in late summer 2019.

As part of the future support of the service, plans are made how to best support the user community with technical support, new information feed and effective challenges. The strong element of gamification in the service is seen as important to support the behavioural change, but it is also challenging to set up and maintain. Lighthouse City Helsinki has an ongoing discussion with experts in the field about creating partnerships with universities, research institutes and companies to support the process. While mySMARTLife can support the service until the end of year 2021, it would be beneficial to start transferring the collected knowledge and the service itself to a party that has interest, skills and the resources to maintain it beyond the end of project.

6.4.2 Key Barriers & Enablers

The service has been using various co-creation methods and was tested extensively with pilot users. The main barriers are therefore not on what the initial acceptance of the public is but how to maintain the interest later on and how to provide enough data for a holistic view of daily life. While the project has had many successful interventions that resulted with new types of open data, many major factors remain closed. Some data such as daily food consumption would require more technical resources to implement a secure privacy and authentication mechanism in order to access the account information of grocery stores.

The app concept provides some unique benefits on measuring the acceptance and usage. Naturally, the downloads of the app are an important indicator but so is the average time spend on the app and the activity

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timeline of the users. Being able to monitor the user pool anonymously is elemental when producing challenges and tips for the users to stay relevant and interesting.

6.4.3 Lessons Learnt

In many projects the app concept has been a “default” part of interventions. There are numerous apps though and it is getting difficult to enter the market and be visible in the app stores without marketing budget that Horizon calls typically do not have. At the same time, creating the apps has been faster, easier and therefore cheaper: In another project, the creation of a simple data consent app only took 43 person hours of a skilled developer. While the implementation is cheap and fast, the same does not apply to the design phase. It is easy to create apps for oneself, but they tend not to be successful. Also from an innovation point, it is important to think the app concept as something that can generate new knowledge and better understanding of the citizen. In the case of Carbon Ego, about 75% of the budget goes to the design phase and only 25% on technical implementation, “coding”.

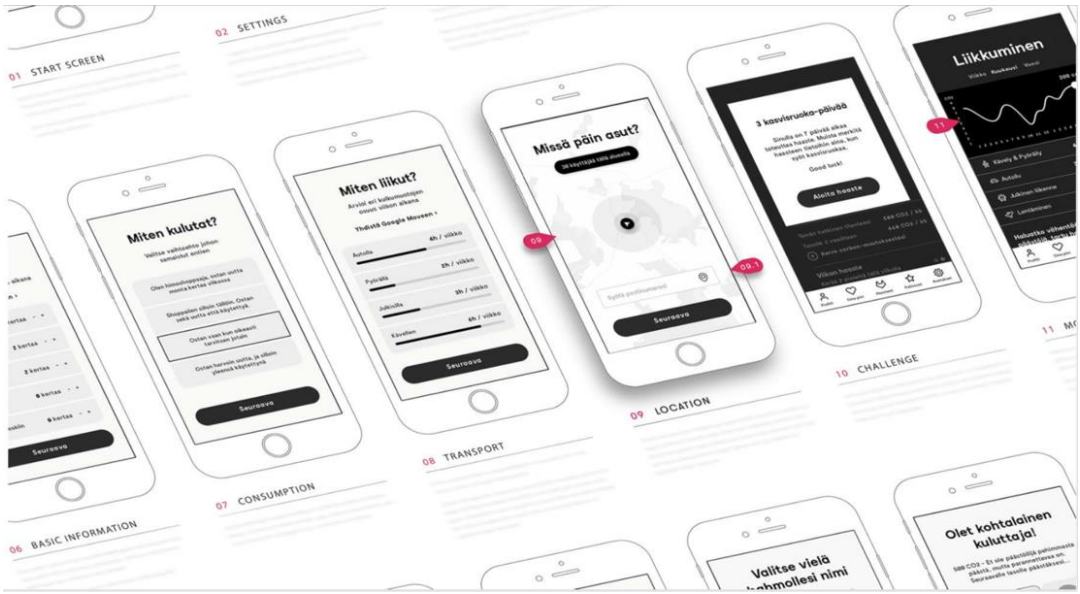

Figure 25: Carbon Ego screen flow design by Kuudes Helsinki ©2019

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7. Multi-case analysis

7.1 Methodology

A common structure for the case studies was developed, discussed with the three lighthouse cities and amended accordingly. Based on this structure, the lighthouse cities then developed their case studies, which were discussed. This was followed by the multi-case analysis. The preliminary results of this analysis were discussed with all lighthouse cities in a virtual workshop, and finalised afterwards.

During the multi-case analysis, we found that all case studies can be analysed according to two criteria: **three different phases of their journey over time** (design, delivery and use) and **three different levels of actors (micro, meso and macro)** which have an influence during these phases. Based on these criteria we can distinguish three different patterns, which we present below. The different patterns help to see which tools for social acceptance need to be employed for whom and at what time in this journey.

The definition of the **three different levels of actors** is based on 3. State of Research – Social Acceptance of Modern Technologies where the distinction according to Devine-Wright into three different levels of interventions and their impacts on the local economy, community and public attitudes is introduced: These are characterised as micro (at single building or household level), meso (at the local, community and town level) and macro (at the large-scale level).

For the following, we have adapted and redefined Devine-Wright's categorisation as follows:

- Micro level –individuals & households influence the intervention
- Meso level – the local community & town actors influences the intervention
- Macro level – the regional & national actors / policies influences the intervention

These constitute the levels of actors which have an influence on the acceptance journey at different times. In addition to these different levels, the journeys consist of the following three phases:

- Design – where the details of the interventions are decided
- Delivery – where the intervention is put into place
- Use – where the intervention is used

7.2 Acceptance journeys - Overview of the three types identified

Based on an analysis of these two categories of levels and phases of acceptance journeys, we can find differences in the levels of actors, which have an influence on relation to the stages of the journey. According to these phases, we have identified three different types of acceptance journeys. For the visual representation, we have displayed the different phases at an equal length. This is to offer an easy visual

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comparison on the differences in the levels of actors involved. In practice, the length of the different phases may of course not be equal.

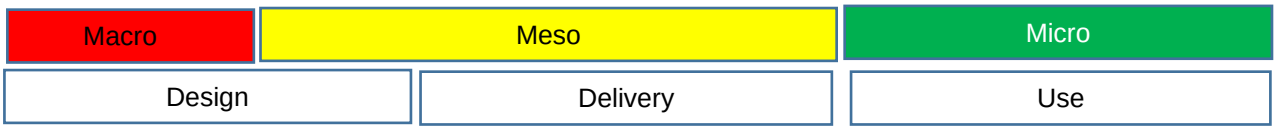
The respective levels of actors that influence the different phases strongly influence the scope and the point of time during the acceptance journey when different measures to increase social acceptance for an intervention are to be implemented. The three different acceptance journeys are described as follows:

Binary Acceptance Journey:

The binary acceptance journey (delivery is final without influence of micro level) is characterised by the fact that the macro (regional & national) and meso (local community & town) levels of actors of this journey influence both the design and delivery of the intervention. The micro level (individual & household), and hence the user, only influences the use of the intervention. The journey is considered “binary” in the sense that once the intervention is delivered the infrastructural decision being made beforehand cannot be reversed. Therefore, it is crucial to include important points for user acceptance into these infrastructural decisions.

The divide between the **macro/meso** and micro level characterises the binary acceptance journey as an acceptance journey that consists of two parts. Regional / national level such as policies as well as local, community stakeholders, influence the binary acceptance journey in the **design** and the **delivery** of the intervention. The decisions made in the design phase are influenced by national policies / financial investment decisions. In the binary acceptance journey’s, the **micro** level influence is limited to the **user** phase.

The binary acceptance journey’s phases are illustrated below:



Semi-Flexible Acceptance Journey:

Compared to the binary acceptance journey (delivery is final without influence of micro level) in the semi-flexible acceptance journey the macro (national & regional) as well as the meso phases (local community & town actors) cover the design of the intervention and the micro level (individual & household) is covering the delivery and the user phase. This implies that changes to the intervention can still be made during the delivery phase depending on users’ feedback for example what part of a retrofitting package to use. During the design and the delivery phase of the intervention, regional and national factors play a role; however, the micro level (individual & household) plays also a part (user orientation). This means that there is room to adapt the delivery of the intervention according to users’ feedback, which can be used to increase the intervention’s acceptance. The semi-flexible acceptance journey’s phases are visualised below:

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Flexible Acceptance Journey:

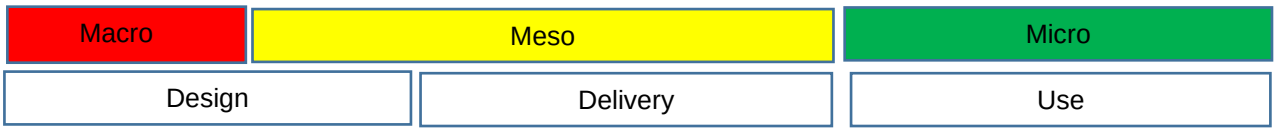
The flexible acceptance journey is characterised by the **macro (national & regional)** and **meso (local community & town actors)** level only covering part of the **design** phase and the **micro** level (user level, individual & household) influence during the **design** (to a limited extent) and **delivery** of the intervention as well as the **use**. Therefore, the user can have an influence already earlier in an intervention's journey. This means that feedback loops can be implemented with the users, where even the design of the intervention can be adapted. This is a very important opportunity to increase the acceptance of an intervention. This journey is outlined in the visual below:

In the following chapter of the deliverable, we will categorise and analyse each of the case studies presented by the Lighthouse cities Hamburg, Nantes and Helsinki based on these different acceptance journey, and hence the influence of the macro (national & regional), meso (local community & town actors) and micro (individual & household) level during design, delivery and use of the individual intervention.

7.3 Types of acceptance journeys in detail

7.3.1 Binary Acceptance Journey

Upon review of the described interventions, the case studies Autonomous Shuttle (Nantes), Electric Bike Scheme (Hamburg) and Helsinki's Robot bus represent a **binary acceptance journey**.



Autonomous Shuttle Lighthouse City Nantes Metropole:

The design and delivery of the autonomous shuttle in Nantes is a technological demonstrator for research and development purposes. Due to the technical complexity of the shuttle, it has been deployed on a route in an industrial area with three stops during a two months test period. The sensitivity of the autonomous shuttle with regard to perceived obstacles on the road or on the side of the road led to a host of activities such as deployment of bollards as well as tree pruning.

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Users such as residents, developers and visitors informed by newsletters, information signage on the side of the road as well as banners describing the context of the intervention and the traffic rules to be respected.

During the autonomous shuttle intervention in Nantes, citizens were mainly informed about the action through a communication campaign and press releases. This gave interested residents the opportunity to test the shuttle but had little impact on the intervention itself.

In summary it can be noted that the user of the shuttle have little or no influence with regard to the design and delivery of the intervention. Autonomous driving is in the market entry phase, so the market for shuttles is very limited, the decision making process is not influenced by users as is the delivery phase. However, due to the novelty of autonomous driving the interest from users is large.

Robot Bus Lighthouse City Helsinki:

The aim of the autonomous shuttle (Robot Bus) in Helsinki is similar to its implementation in Nantes a pilot to address urban last mile mobility and to test the maturity of the automated electric vehicle. The delivery of the interventions was compared to Nantes (testing for three months) expanded to two test periods of approximately 6 months in 2018 and in 2019, this was also due to the cold weather and the operational limitations of the shuttle in snow and ice. The biggest challenge of the Robot Bus was due to its technical limitations that similar to Nantes make it hard to find suitable roads in the delivery phase. Due to the technical restrictions of the shuttle, it was not possible to take into account the suggestions for routes by the transport authority, because those were too demanding for the vehicle in use. To evaluate social acceptance in Helsinki users of the Robot Bus filled out a questionnaire – the key findings of the survey can be found in the description of the case study in section **¡Error! No se encuentra el origen de la referencia.** of this deliverable. One of the main points to take away from the survey was that users of the bus in general felt safe with regard to their personal security as well as the traffic safety. However, other road users where less supportive because the bus was driving slowly in front of them and in some cases this led to dangerous overtaking situations. Therefore, it was noted that to increase social awareness, the engagement process would not only include users of the Robot Bus but also other traffic participants when the bus is used on open road traffic.

Electric Bike Lighthouse City Hamburg:

The design of the electric bike scheme in Hamburg is part of the mySMARTLife intervention package “electrification of the public fleet”. Regarding the delivery, Hamburg’s consideration to purchase e-bikes was based on an online survey amongst the employees of the demonstrator district Bergedorf and the results are outlined in Mobility: Electric Bike Scheme. Based on the results of the survey and the high acceptance of e-bikes HH set up trial sessions prior to the planned purchase of the bikes. However, the high acceptance of the intervention demonstrated through the feedback of the online survey did not affect the delivery of the intervention. Local factors such as limited financial resources led to putting the implementation on hold.

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Therefore, the design and delivery phase of this scheme are influenced solely by the macro/meso level of actors, and the electric bike scheme in Hamburg can be considered a binary acceptance journey.

Conclusion

In summary, we characterise binary acceptance journey with a sole influence of the macro / meso level during the design and delivery phase of the intervention (the autonomous shuttle or the e-bikes). This includes little or no opportunity to make changes to the intervention as such once it has been deployed. The only changes that can be made to increase user acceptance would be i.e. in the case of the autonomous shuttle the decision the schedule of the shuttle. Even the choice regarding the route of the bus is limited due to the technical limitations described in both case studies. On the micro level (users), users of the bus have were not able to have an influence in the decision making process regarding the intervention in terms of design and delivery, because the technical limitations were so high. Users' acceptance level can only be raised after the intervention has been deployed. However, both autonomous bus interventions in Nantes as well as Helsinki can be described a highly innovative and pioneering which explains the interest from the public as well as the limitations when it comes to design and delivery of the intervention.

One of the key findings when exploring the binary acceptance journey is to ensure that the acceptance of interventions described is sought parallel to the design level. In many infrastructure decisions, the consultation of residents is not included in the process; therefore, the level of acceptance needs to be addressed parallel to the decision and financial investment point. In the case of the Autonomous Shuttle in Nantes as well as the Robot Bus, there were little options with regard to shaping the decision process due to the technical restrictions of the interventions. The electric bike scheme in Hamburg however, is a good example of testing social acceptance prior to the design / delivery.

7.3.2 Semi-Flexible Acceptance Journey

Upon review of the described interventions, the following case studies Retrofitting Individual Houses (Nantes), Retrofitting (Hamburg), Solaroffensive (Hamburg) and Smart Heating Control (Helsinki) represent the **semi- flexible acceptance journey.**

Retrofitting of Individual Houses (Nantes)

The overarching framework for Nantes retrofitting intervention is the 2018 Climate Plan that clearly states the reduction of greenhouse gas emissions as well as a comprehensive engagement process with the public (macro level, regional / national level). Nantes has launched a Grand Debate on energy transition to create a dynamic local engagement process as part of the roadmap to implement the Climate Plan (meso level,

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local, community and town level). To further analyse the macro / meso level of the retrofitting intervention in Nantes it is important to understand the external policy framework under which the retrofitting intervention is set. On the design stage the retrofitting measures included in Nantes intervention where energy retrofit including PV installation. For the delivery phase, ENGIE engaged with stakeholder on the micro level to, i.e. with residents, by contacting 15.000 households and conducting 145 energy audits and through which they found 20 eligible houses. ENGIE found that even with a subsidy included the payback period for the investment period was perceived as too long by the residents and uptake was slow. Further hindrance was the long duration between the application of the subsidy (with the local authority) until the work was delivered. Both of those factors therefore had a negative effect on the delivery and use of the intervention, as these phases are influenced by the micro level stakeholders, including residents.

Retrofitting (Hamburg)

The case study on the Hamburg "Bergedorf Süd Retrofitting Project" describes the pursuit of an energy-retrofitting scheme with the objective to initiate retrofitting actions. Therefore, the design of the intervention is rooted in the meso level. On the delivery level, similar to the retrofitting action in Nantes, Hamburg also distributed letters to inform residents of the retrofitting programme. Potential users were offered the district office of Bergedorf Süd as a central contact point and several events were organised to engage with residents.

On the delivery level, Hamburg initially focused on individually owned properties but quickly changed its focus to bigger property owners, adapting its intervention. As a side note: out of 300 property owners contacted via mail, only 13 responded. Bigger property owners were easier to engage and more efficient in respect to energy savings. Also, it was recognised that multi-owner buildings where every apartment owner needs to give consents to the retrofitting action were also a huge challenge.

Hamburg noted that the engagement with single-family homeowners is often time consuming and challenging and in that context it seems more efficient to focus on larger property owners. The very positive engagement process with the school and the retrofit actions delivered there, demonstrated that single ownership of a big building, offer much potential for retrofitting activities. Furthermore, with regard to the school the inclusion of energy and sustainability subjects in the classrooms as a complementary part of the retrofitting actions happening in the school was perceived as a big plus.

In addition to the previously mentioned mailing and contact point, the setup of round tables led to further engagement with stakeholders and residents in Bergedorf. Also, the Innovation Network as a format aiming at stakeholders, experts, politics and administration is very helpful to establish a network and exchange among different groups.

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Solaroffensive (Hamburg)

The Solaroffensive Hamburg aims to install renewable energy in conjunction with home-batteries for self-consumption. These intervention targets promote the energy transition and involves single-family homes as well as business buildings. According to Hamburg, the acceptance for tenant power supply or direct power supply is high by tenants and business owners. Whereas single homeowners are more reluctant to take up the intervention. Reasons for this are the unwillingness of homeowners to commit to a 20-year contract that might limit them to any further building activities as well as the limited financial benefit as long as energy prizes are low. . A detailed analysis of roof space available as well as the solar potential was done to focus a targeted doorstepping campaign. Additionally, a mailing was delivered to 300 house owners and residents invited for a free-advice session about energy efficiency measures on RES energy production in their homes. Only a small number of house owners took advantage of this offer, though.

The legal and regulatory framework in Germany is perceived as a hindrance when it comes to implementing community energy schemes. The willingness of property owners to engage in a long-term contract as mentioned before is low without rewarding financial compensation. This again influences the delivery and use phase of the intervention.

Helsinki – Smart Heating Control

The implementation of smart heating control in Merihaka is part of the Helsinki actions to retrofitting homes in the city's previous rapid construction era. The intervention is based on the Helsinki carbon reduction targets on a national as well as regional / local level. In spring 2017 the housing association in Merihaka decided to install smart thermostats in their building. After several discussions with the housing association, the city of Helsinki organised meetings for the management, maintenance and customer service company in the area. For the delivery of the scheme residents of the building were informed through leaflets and information was also provided on internet pages. Information was also included on various messaging boards and in events such as workshops for the board members of the housing association.

The delivery of the intervention (installation of the smart heating controls) was done in two phases. This allowed for feedback on the installations and user experience (micro level). Based on the results of the first phase the second phase was delivered a year later, taking initial feedback into account. Because the use of the smart thermostats is based on the use of the internet Helsinki recognizes that this reduces the number of possible end-users of the intervention. However, the need to allocate resources to the support provided was one of the main points given by Helsinki.

Conclusion

In summary, we can conclude that the characteristics of semi-flexible user journey are rooted in the macro / meso level for the design phase of the intervention, with an influence of policy frameworks (local and national carbon reduction targets). Delivery and use (take up) of the described interventions are influenced

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by the micro level, here the existing funding opportunities (feed in tariff, subsidies for retrofit measures) proved to be an important aspect. This means that for example regulations on the macro / meso level leading to low payback periods hinder retrofitting actions in both Nantes and Hamburg. The legal framework predefine how the retrofitting offer is designed – however, when and how the package is delivered is done on an individual user level. The focus on individual homes seems to be a logical approach for many local authorities however, when reconsidering both Hamburg and Nantes state approaching multi-story bigger buildings under single ownership seems to be more “rewarding”. Under the semi-flexible user journey, the possibility to adapt the intervention after an initial roll out with a user feedback loop as done in some case studies, i.e. smart heating control in Helsinki, increases social acceptance. However, especially with regard to retrofitting actions that depend on national and in some case regional legislation such as the availability of subsidies the option to use user feedback and to amend the intervention may be limited.

7.3.3 Flexible Acceptance Journey

Upon review of the described interventions, the following case studies Mon Projet Renov (Nantes) and Carbon Ego App (Helsinki) represent the **flexible acceptance journey.**

Mon Projet Renov (Nantes)

Mon Projet Renov is a digital platform for retrofitting advice and actions in Nantes. Similar to the retrofitting action for individual homes the design of the platform is based on the Nantes carbon action plan and its energy transition (based on local framework). However, the user impact on the Mon Projet Renov is high. Citizens tested the platform before the launch of the first version and some of their recommendations where taken on board and added to the second version. Therefore, users had an influence in the design as well as the delivery phase of the project. On a micro level home owners (users) were targeted through information and advertisement campaigns to increase the number of users significantly.

Carbon Ego App (Helsinki)

The Carbo Ego App aims at creating behaviour change in terms of the carbon use of citizens. From previous work it was known that apps often fail to capture the audience long-term. Therefore, it was very consciously decided, that the design phase should be emphasised and in-depth feedback collected by potential users. Notably, 75% of the budget is allocated to the design phase and only 25% to the technical implementation, the “coding”. A design company was chosen to carry out the professional design phase, and user testing started already with the concept plan. Key insights were identified which shaped the further design of the

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app. This is expected to positively influence the initial acceptance of the app, and it is hoped that this will also lead to a continuous acceptance in the longer term.

Conclusion

The flexible acceptance journey is the one of the three journeys where the influence of the micro level stakeholders begins the earliest. As a consequence, the micro level stakeholders influence all three phases of the journey: the design, delivery and use. This offers the unique opportunity to include users' feedback throughout the entire process. Tools such as trialling interventions in the design phase can be used. This can contribute significantly to the acceptance of the intervention by the users, as it can be shaped according to their needs and preferences. If such an intervention is to be deployed, it is therefore crucial that all this advantage is used as much as possible, and input collected and included in the design and delivery phases of the intervention. This also means allocating an appropriate amount of funding to this phase. In summary, this journey offers the opportunity to "build in" acceptance already at the design phase.

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8. Conclusions

So what have we leant and what are our main conclusions when it comes to raising social awareness and acceptance with regard to the interventions implemented in mySMARTLife?

One of the first lessons learnt is that by analysing the individual acceptance journey for each intervention based on the phases of design, delivery and implementation of each action and on who has influence during the acceptance journey (individual / household, local community / town stakeholders and national / regional policies or stakeholders) intervention points can clearly be defined.

Assuming that the increase of influence that the user has will lead to an increase in acceptance as such it is important to include the user as early as possible in the design and delivery phase of the interventions. We have also demonstrated that this can be difficult when it comes to large scale infrastructure measures. There is a need across all smart city projects to increase the influence of users at the town / community level and also to allow users views and perceptions influence national and regional levels. Users must be heard and be able to influence interventions – to increase social acceptance.

The findings of this deliverable have been shared with WP 6 – Replication Strategy. As part of WP 6, the follower cities of mySMARTLife have committed to deliver social acceptance campaigns at local and district level. These campaigns / events can be used to engage residents in future interventions, and their design can be based on the insights regarding different acceptance journeys developed in this deliverable.

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