Report about profiles of social innovation "in action" for each cluster

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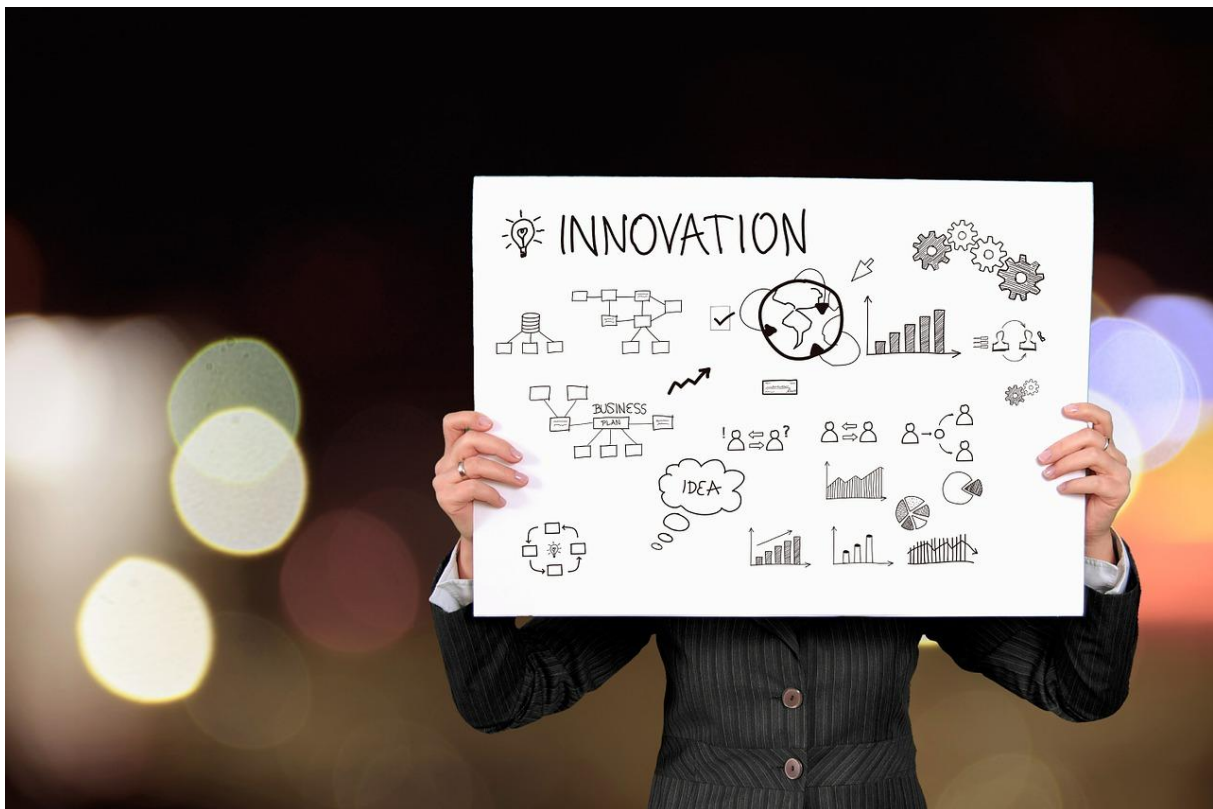
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SMARTEES
local social innovation

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Social innovation; Clusters profiles; Negotiation; Structural change; Energy transition; Empowerment; Gaining social support; Up-scaling

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Executive summary

This deliverable provides a specific overview of social innovation (SI) "in action" in the five thematic clusters, which cases (2 for each cluster, 10 in total) represent the empirical research basis in the SMARTEES project.

The five clusters are (the two reference cases for each cluster are given in parentheses):

a) Holistic, shared and persistent mobility planning (Zürich and Groningen)
b) Island renaissance based on renewable energy production (Samsø and El Hierro)
c) Energy efficiency in district regeneration (Malmö/Augustenborg and Stockholm/Järva)
d) Urban mobility with superblocks (Vitoria-Gasteiz and Barcelona), and
e) Co-ordinated, tailored and inclusive energy efficiency schemes for fighting fuel poverty (Aberdeen and Timisoara).

In the SMARTEES project, social innovation is considered a process, related to energy transition, "of change in social relationships, interactions, configurations, and/or the sharing of knowledge leading to, or based on, new environmentally sustainable ways of producing, managing, and consuming energy that meet social challenges/problems" (SMARTEES Groningen seminar, February 2019), with few additional features, such as:

- A SI can generate new meanings, new behaviours, new organizations and groups
- A SI is supposed to benefit society
- A SI involves a wide set of actors and considers local resources and assets
- A SI holds potential for up-scaling.

On these bases, the following issues have been studied in relation to each SI cluster in this deliverable:

- The starting point (critical attitude towards society, diffusion of new values, promoters, approach, etc.)
- Changes in ways of producing, managing, and consuming energy (towards an environmentally sustainable way)
- Changes in social relationships, interactions, and configurations (of actors, processes, forms of governance, rules, business models, etc.)
- Strategies for gaining social support
- Critical issues (including resistances and conflicts) and how these critical issues have been overcome (paying particular attention to negotiation processes among the involved actors and to strategies for gaining social support)
- Changes in the sharing of knowledge
- Societal/environmental benefits
- Citizens' new behaviours
- Up-scaling/replicability of the experience.

The analysis of each SI cluster has been implemented through two main steps.

- Document analysis (e.g., analysing documents such as case presentation sheets; presentations at conferences and seminars; strategic documents; on-going activities reports; evaluation reports; studies done by external actors to understand specific features of a case; stories by the protagonists of the cases of their own experience; articles from newspapers and social media; university dissertations prepared on a case; etc.).

- Interviews with key-informants (e.g., policy-makers, other public servants at a high level of decision making; NGOs, civil society groups and business as well as private sector representatives; recipients/beneficiaries; scientific community experts; etc.).

For each Cluster a SI profile has been prepared and presented in the sections 2, 3, 4, 5 and 6 of this document. These profiles are drafted starting with 10 detailed information sheets (included in the appendix of the deliverable) on the basis of the information derived from these sources and, considering for each cluster the pair of corresponding cases.

Some common elements to the 5 clusters are highlighted in section 7. Among these, we can list here:

- "Municipality often are as the main promoter of actions in cases of SI"
- "Involvement of citizenship in decision–making and constant negotiation with citizens and/or specific groups as main strategies for gaining and maintaining social support/consensus"
- "Generation of pro-environmental behaviours among citizens"
- "Important escalation in the share of knowledge throughout the development of the SI"
- "Critical attitude against traditional schemes as a driving force of the SI developments (environmental, social housing, post-welfare)".

Social innovation, of course, takes on specific characteristics in each cluster, and specific forms and paths of social innovation towards the energy transition as a larger trend emerge. Among them we identified a progressive increase of the number of involved actors during the years in clusters 2, 3, and 5 vs. a greater stability of participating actors in cluster 1 and 4; a critical initial opposition (always more or less overcome) from parts of the entrepreneurial/business sector in clusters 1 and 4, which was not (so) relevant in the other clusters; formal or nearly formal partnerships among public and non public actors experienced in clusters 2, 4 and 5 and not in the others; a form of upscale/replicability already ongoing for clusters 2, 3 and 4, but less evident or restricted to specific contexts for clusters 1 and 5.

Finally, we discover that, beyond these cluster differences and similarities, every case of social innovation, also within a cluster of similar cases, has its specificity and uniqueness since it was possible to identify further differences, "transversal" to the clusters (e.g., alliances with citizens have been designed since the conception phase in some cases and later in others; and this happened sometimes after forms of conflicts or, in other cases, for preventing them, or, even, independently for any conflict situation).

List of abbreviations

Abbreviation	Full word
ACC	Aberdeen City Council
AHP	Aberdeen Heat & Power Ltd.
AMET	Agency for Energy Management within Timiș County
ANRE	Romanian Energy Regulatory Authority
AREG	Aberdeen Renewable Energy Group
CEA	Centro de Estudios Ambientales (Environmental Studies Center)
CEP	Community Energy Programme
CESP	Community Energy Saving Programme
CHF	Swiss (CH) Francs
CHP	Combined Heat and Power district heating
CLICC	Country Level Impacts of Climate Change
CSO(s)	Civil Society Organization(s)
DEAL	District Energy Aberdeen Ltd.
DIA	Environmental Impact Statement
DKK	Danish Krona
DoA	Description of Activities
ECO	Energy Companies Obligation
E.ON	Electricity company
EED	Energy Efficiency Directive
EfW	Energy from Waste
EPBD	Energy Performance of Buildings Directive
ESCO	energy service company
EU	European Union
FALT	Federation of Owner's Associations in Timisoara
GD	Government decision
GDP	Gross Domestic Product
GHG	Greenhouse gasses
HECA	Home Energy Conservation Act
ICT	Information and Communication Technology

IDAE	Institute for Diversification and Energy Saving
ISTAC	The Canary Islands Statistics Institute
ITC	Technological Institute of the Canary Islands
IVT	Institut für Verkehrsplanung und Transportsysteme (Institute for Transport Planning and Systems)
KTH	Royal Institute of Science and Technology
MDRAP	Ministry of Regional Development and Public Administration
MKB	Malmö Kommunala Bostads AB (Malmö communal housing)
MPT	Motorized Private Transport
MUSIC	Mitigation in Urban areas and the creation of Solutions for Innovative Cities
MWp	Megawatt peak
NESCCP	North East Scotland Climate Change Partnership
NGO(s)	Non-Governmental Organization(s)
NHER	National Home Energy Rating
NRGi	Danish electricity provider (NRGi pronounces "energy")
NTNU	Norwegian University of Science and Technology
OER	Romanian Energy Cities Association
PDMC	Master Plan for Cyclist Mobility
PLOCAN	Oceanic Platform of the Canary Islands
PMU	Urban Mobility Plan
PT	public transport
PvdA	Partij van de Arbeid (Worker's Party of the Netherlands)
RE	Renewable Energy
REI	Renewable Energy Island
ROSENC	Romanian Sustainable Energy Cluster
SBB	Swiss railways
SEAP	Public procurement system
SEK	Swedish Krona
SI	Social Innovation
SUMpsP	Sustainable Urban Mobility and Public Space Plan
TCP	Traffic Circulation Plan
TUVISA	local public transport company in Vitoria-Gasteiz
UIC	Universidad Internacional de Catalunia

UN	United Nations
UNDP	United Nations Development Program
WP	Work Package
ZVV	Zürich local transport enterprise

1. Introduction

1.1. Institutional framework

This document is devoted to provide an overview over social innovation processes "in action" in the 10 cases at the local level (cities, neighbourhoods, or islands). These cases are grouped in five thematic clusters that represent the empirical research basis in the SMARTEES project. For a better understanding of the context of this document, a short description of the SMARTEES project's aim and activities is provided below.

The SMARTEES project

The SMARTEES project, thanks to empirically and theoretically grounded methodological tools to assess and adapt policy strategies, aims at improving the acceptance of the Energy Union by European citizens and at increasing their responsiveness to socioeconomic incentives (in a perspective of an increased ownership, and prosumerism) and at strengthening the inclusiveness and robustness of policymaking. The SMARTEES project is coordinated by the Norwegian University of Science and Technology (NTNU) and carried out by a consortium of 11 organisations from 10 countries over the course of 36 months. It is funded under the H2020 EU Research program.

SMARTEES addresses the need for policy support by adopting a multidisciplinary approach, through the integration of theories and methodologies of social innovation and agent-based socio-economic simulation in a comprehensive and flexible framework based on an empirical analysis of concrete trans-European cases of energy transition in five domains. Each domain, corresponds to a cluster composed by two reference cases which have already implemented a specific innovation at a mature stage; and 3-5 follower cases interested in this innovation; thus, enabling SMARTEES to study replicability of the concepts in different European contexts.

The five clusters are listed below (the two reference cases for each cluster are given in parantheses):

a) Holistic, shared and persistent mobility planning (Zürich and Groningen)
b) Island renaissance based on renewable energy production (Samsø and El Hierro)
c) Energy efficiency in district regeneration (Malmö/Augustenborg and Stockholm/ Järva)
d) Urban mobility with superblocks (Vitoria-Gasteiz and Barcelona), and
e) Co-ordinated, tailored and inclusive energy efficiency schemes for fighting fuel poverty (Aberdeen and Timisoara).

Thus, SMARTEES studies social innovation in a variety of cases of Energy transition around Europe. These cases differ concerning their location in Europe, the types of "technological" innovation (spanning from transitions in traffic to investment in insulation) and also their socio-economic and environmental context (with consequences for the behaviour of the involved people). Moreover, some of the experiences analysed attempted to change a single sector of their communities, such as developing sustainable transport, energy efficient

housing, or the generation of property-level renewable energy. Another important difference concerns their duration. In some cases (e.g., Zürich and Groningen) the experience started in the '70s of the last century; in some others (e.g., Barcelona, Vitoria-Gasteiz, Malmö/Augustenborg or Samsø) around 20-25 years ago; and some others are more recent or very recent (e.g., Aberdeen or Timisoara). Sometimes successful changes create the conditions for further developments, resulting in cascading effects to a more sustainable community culture.

In the SMARTEES project, the case-study research activity entails:

- Analysis of key documents and information
- Qualitative interviews with key actors of the reference case-studies[1]
- A quantitative survey in each case measuring key variables fostering implementation of the innovation and barriers towards it.

WP3

In the framework of the project, the WP3 on "Clusters of case studies of social innovation" is devoted to make sure that the ten reference cases of the five clusters are constantly integrated into the developments in SMARTEES[2] and that coordination between these cases and the empirical work packages is smooth. To achieve this, WP3 has the following objectives:

- Understanding how each social innovation in energy transition works "in action" in each of the five chosen case clusters and on a super-ordinate level
- Securing the constant involvement of the key innovation agents of each case study in the SMARTEES project to facilitate co-construction of the research
- Preparing a specific profile for each of the five social innovations/clusters, providing information about phases, obstacles met, facilitating factors, role of incentives, turning points, etc.
- Informing WP4 and WP5, suggesting phenomena/items to be taken into account in the survey, and indicators to be considered in the scenarios.

WP3 entails four Tasks.

- Task 3.1: Case-studies' main actors involvement (this Task, already completed, has been devoted to the active institutional involvement of the 10 cases in SMARTEES through the preparation, discussion and agreement of a plan of work with the corresponding timeline for each case).
- Task 3.2: Profiles of the different types of social innovation (this ongoing Task is devoted to the preparation of a profile for each type of social innovation through a

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[1] Such as local authorities' representatives, city-planners, other policy-makers, representatives of the private sector/business/energy providers/farmers associations, etc.), think tanks/scientific community, citizens' organizations (e.g., green/ecological movement; NGOs, CSOs, vulnerable groups representatives, etc.), international organizations officials working on the case, social innovation initiatives funders.

[2] The identification and mobilisation of the follower cases in the SMARTEES project is placed under WP8.

description of the social dynamics characterising the different cases and a systematic analysis of each social innovation cluster with its reference framework).

- Task 3.3: Overall analysis of social innovation in energy transition "in action" (this Task is devoted, on the basis of the results of the previous one, to understand "prima facie" how social innovation in energy transition works "in action" as a whole in the Energy transition).
- Task 3.4: Models of social innovation – conclusions and inputs for the following WPs, in particular for WP4 (e.g., a set of phenomena that need further research after identifying knowledge gaps during preparation of the profiles, to be filled through the surveys included in WP4) and for WP5 (e.g., a set of indicators to be considered in the preparation of scenarios).

This deliverable falls under both Tasks 3.2 and 3.4, as said above, and its purpose is to provide a overview of social innovation "in action" in the 10 cases at the local level grouped in the five thematic clusters mentioned above. It represents the final output of Task 3.2, while further elaborations will lead, in the next months, to the draft of the deliverable D3.4 Report on "Five models of social innovation" that will represent the final output of the whole WP3.

1.2. Theoretical framework: the concept of social innovation (SI) in the SMARTEES project

As explained in the DoA document, SMARTEES considers social innovation (SI) "as a change in social relations, involving new ways of doing, organizing, framing and/or knowing and as transformative when it manages to challenge, alter or replace dominant institutions, both formal and informal". The following characteristics of social innovation are of particular interest to SMARTEES.

- **Inclusiveness** – SI involves a wider set of actors, their relations, and the local and economic dynamics that lead to an actual change in the energy system.
- **Contextualisation** – It considers local resources and assets. SI is developed in local contexts with specific assets; and singling out these contextual factors is an important step to identify transferability.
- **Reflexivity** – SI processes are characterized by reflexivity and social learning, which allows identifying "social mechanisms" suitable for transfer or up-scaling.
- **Responsiveness** – SI processes are characterized by protests, conflicts and resistances. Resistances have to be considered for all actors in social innovation processes, not only citizen/consumer behaviour. In social innovation a capacity to deal with and respond to such emerging issues have been developed.

Moreover, the SMARTEES DoA considers social innovations to effectively respond to social challenges (e.g., Energy transitions), by mobilizing people's creativity to develop solutions, make better use of scarce resources and/or promoting an innovative and learning society.

At the SMARTEES meeting in Groningen (25-26 February 2019) a discussion was held in an attempt to (better) determine a working definition of 'social innovation' that will be used throughout the SMARTEES project. The discussion was led by EI-JKU (WP2 "theoretical framework" leader) with inputs from K&I (WP3 leader). Different features of social innovation have been taken into account and various definitions confronted. At the end of this process the chosen preferred definition is:

"Social innovation in energy transition is a process of change in social relationships, interactions, configurations, and/or the sharing of knowledge leading to, or based on, new environmentally sustainable ways of producing, managing, and consuming energy that meet social challenges/problems".

Other definitions discussed in Groningen (and well appreciated) highlight further elements of a social innovation, in particular that:

- A Social innovation can generate new meanings, new behaviours, new organizations and groups
- A Social innovation is supposed to benefit society.

The above mentioned five clusters correspond to specific kinds of social innovation in relation to the Energy transition towards low-carbon societies and the ten reference cases meet all the characteristics of social innovation mentioned above.

1. Holistic, shared and persistent **mobility planning** (Zürich and Groningen); this social innovation is using the mobility plan as a way of mobilizing and coordinating many societal actors (different branches of local authorities, citizens, constructors, transport companies, etc.) towards the common goal of a more sustainable and efficient city transport system.

2. **Island renaissance** based on renewable energy production (Samsø and El Hierro); this social innovation is based on the mobilization of the citizens and innovative partnerships set-up of an island to achieve energy independence through renewable and energy efficiency measures as means to overcome the factors that put the community itself in danger and revive island communities.

3. Energy efficiency in **district regeneration** (Malmö and Stockholm); this social innovation includes hard and soft measures to transform the district such as local energy production and energy efficiency measures, urban green spaces, transport system transition measures and citizen participation.

4. Urban mobility with **superblocks** (Vitoria-Gasteiz and Barcelona); this social innovation is based on an urban innovation (superblocks) that introduce low-carbon mobility practices through the organization of urban space, which minimizes the use of motorized modes of transportation. The city is reorganised into superblocks, car-free areas designed to maximize public space and keep private cars and public

transport outside of the neighbourhoods, redesigning the inner streets for use by pedestrians.

5. Co-ordinated, tailored and inclusive **energy efficiency schemes for fighting fuel poverty** (Aberdeen and Timisoara); this social innovation is characterized by public authorities working in coordination with supply companies and civil society organisations in order to implement energy efficiency measures for houses and buildings with the aim of fighting fuel poverty with a tailored and inclusive approach.

For each specific cluster, we will try to build its "social innovation profile", according to the above contents, considering it as a **transformative process** and taking into account the following features:

- Its starting point (critical attitude towards society, diffusion of new values, promoters, approach, etc.)
- Changes in ways of producing, managing, and consuming energy (towards an environmentally sustainable way), including technology innovation
- Changes in social relationships, interactions, and configurations (of actors, processes, forms of governance, rules, business models, etc.)
- Strategies for gaining social support
- Critical issues (including resistences and conflicts)
- How critical issues have been overcome (paying particular attention to negotiation processes among the involved actors and to strategies for gaining social support)
- Changes in the sharing of knowledge (including social learning and reflexivity as well as new configurations on energy transition)
- Societal/environmental benefits
- New behaviours
- Up-scaling/replicability.

1.3. Methodological framework

For investigating on how social innovation works in these five clusters a qualitative research plan has been implemented.

This qualitative research entailed two steps.

First step: document analysis

As a firts step, a document analysis has been implemented in all 10 SMARTEES cases. Documents have been partially provided by the key actors in the ten cases and partially found on the Internet. There are many kinds of documents, such as:

- General and specific (e.g., on specific aspects) case presentation sheets
- Application reports/documents (for getting EU or other public funds)
- Planning and strategic documents

- On-going activities reports
- Evaluation reports
- Legislative and regulatory texts
- Documents/sheets on technical specificities of a case
- Up-scaling documents/reports (i.e., studies done by external actors to understand specific features of a case and facilitate its replicability) and benchmark studies
- Texts containing stories by the protagonists of the cases about their own experience
- Articles from newspapers and social media
- Eurobarometer data/National statistics documents
- PPT presentations at conferences, seminars, etc.
- Minutes of SMARTEES visits to the cases (e.g., from the follower cities/islands)
- Essays written on specific characteristics of a case[3]
- University dissertations prepared on a case[4].

Second step: key-informants interviews

As a second step, interviews to key-informants, in each case, have been implemented, according to an interview protocol prepared by UdC and K&I and agreed also with the other SMARTEES research partners (HU, NTNU, RUG, UoT), being HU, K&I, NTNU, RUG, UdC and UoT responsible of the research activities in the 10 SMARTEES cases, according to the table that follows.

Table 1: Overview of the SMARTEES social innovation clusters, main and supporting reference cases object of study and 'case research partner' responsible for case study.

Cluster	Case study	'case research partner'
Holistic, shared and persistent mobility plan	Main Reference Case: Zürich	Knowledge & Innovation
	Supporting Reference Case: Groningen	University of Groningen
Island renaissance based on renewable energy production	Main Reference Case: Samsø	Norwegian University of Science and Technology
	Supporting Reference Case: El Hierro	University of A Coruña
Alliance for a district regeneration based on energy transition	Main Reference Case: Malmo	Norwegian University of Science and Technology
	Supporting Reference Case: Stockholm	Norwegian University of Science and Technology
Urban mobility with superblocks	Main Reference Case: Vitoria-Gasteiz	University of A Coruña
	Supporting Reference Case: Barcelona	University of A Coruña
Coordinated, tailored and inclusive energy efficiency schemes for fighting fuel poverty	Main Reference Case: Aberdeen	The James Hutton Institute
	Supporting Reference Case: Timisoara	West University Timisora

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[3] E.g., how does a pioneer community energy project succeed in practice? The case of the Samsø Renewable Energy Island; Intra-Party Democracy in Groningen Early in the 1970s – decision making process within the labour party concerning the traffic circulation plan; Movilidad sostenible en Vitoria-Gasteiz: innovación desde un modelo de movilidad integral y partecipativo.

[4] E.g., PhD dissertation on "Storing the Renewable Energy Island Samsø".

According to this protocol, a number of 7 to 10 interviews have been conducted per reference case. Key-informants belong to the following categories.

a. **Promoters and pioneers**, specific persons that participated in the beginning of the social innovation, starting out the project, and/or that have deep knowledge about the conditions, actors and development phases of the project. These key informants can be policy-makers, public servants, or business representatives involved in the energy initiative at a high level of decision making (e.g. superblocks are local initiatives launched by City Council and key informants can be municipal technicians involved in setting up the pilot initiatives as well as representatives of the transport sector, planning sector, etc.). As the different energy innovations can affect differently the various actors involved, a "representation" of each of them was aimed for.

b. **Third parties groups** (including business-private sector, local authorities' officials, civil society representatives, and other stakeholders) and other actors involved in each case, i.e. people, groups and institutions who know well the process, although they have not had responsibilities in carrying out the initiative.

c. **Key supporters**, stakeholders, social actors and public authorities which developed a significant role at any moment of the process and who are able to provide rich insights on the difficulties and opportunities that the SI experience offers for future developments.

d. **Recipients/beneficiaries** of the initiative. Key informants could be spokespersons of social platforms, representatives of neighbourhood/citizens associations, the commercial and business sector, which could provide different points of view and a critical vision of the process and the outcomes of the SI experience. Collecting external voices and different perspectives could contribute to identify critical points, best practices and proposals for improving and gaining effectiveness in future developments of the energy innovation.

e. **Experts in social innovation**; authoritative voices which provide a well-informed perspective of the process and the outcomes of the case, due to their deep knowledge (e.g., they have conducted studies on the case study). Such external visions might be people belonging to the academy, professional associations or NGOs which might give external/non-partisan perspective about the positive and negative aspects of the energy innovation.

As far as possible, in each case study, the following recommended distribution has been adopted.

- 1-3 members of the category a.
- 1-2 representatives for each of the categories b. and c. (3 in total)
- 2-3 representatives of category d.
- 1 representative of category e.

Of course, a respondent can belong to more than one category. In particular, there could be some overlapping among the categories b., d. and e.

Key informants have been identified on the basis:

- Firstly, of the case-studies contact persons that the research partners had prior to the beginning of the SMARTEES project as well as during previous conversations about the case in the frame of the Task 3.1 (Case-studies main actors involvement) implemented in the first 3 months of SMARTEES implementation
- Secondly, of references found in the document analysis
- Thirdly, of the use of a "snowballing" technique, which foresees asking interviewees/key informants about other persons who could have a deep knowledge or experience concerning the research questions about the concerned case and would be interested to talk about their experiences with the research team?

Being made according to an interview protocol and not to a questionnaire, these interviews should be considered as semi-structured and have been conducted, as far as possible, face-to-face, but also "at distance" through telephone/skype.[5]

The interview protocol is articulated in five blocks, as follows:

1. Case study profiles: general questions oriented to obtain in-depth knowledge about the case, to integrate the information already available from the document analysis (this set of questions being complementary to the document analysis)
2. Motivations for participation in social innovation
3. Factors and dynamics influencing social acceptability of energy innovations
4. How social innovations have enhanced collective empowerment
5. How social innovations have facilitated pro-environmental behaviour adoption.

According to the DoA, as well as the interviews protocol, the qualitative interviews are supposed to contribute not only to this deliverable D3.1 (Report about profiles of social innovation "in action" for each cluster), but also to deliverable D3.3 (Policy brief on "social innovation in energy transition" in action) and deliverable D3.4 (Report on "Five models of social innovation"), as well as to the Task 4.5 ("Development of the questionnaire framework for the surveys").

For this deliverable, we have "only" exploited information coming from the first three blocks of the interviews mentioned above. More specifically information on the following issues:

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[5] Following the informed consent procedures settled in the SMARTEES project, respondents have been informed prior to being interviewed and are asked for their consent. Their participation in qualitative interviews was entirely voluntary and they have been informed both written and verbally of their withdrawal from research activities at any time. Participants have been also informed that they can retract their consent until the data is anonymized without any disadvantages and without having to give a reason as well as about the persons in charge of the research (in each institution) and the person to be contacted (full name, telephone, address and e-mail) in case they need to report any issue, request or suggestion to a responsible person. Each research partner has saved and stored on a safe place the interviews' records and, as far as possible, interviews have been anonymised. If it is not possible to anonymize the data (e.g., because the respondent has an easily identifiable position in the local community), the data have not been published in this deliverable without explicit written consent of the respondent.

- Case study profiles
  - o Transformative ambition of the (Local) Social Innovation
  - o Pioneers and main actors
  - o Development of the Social Innovation process in the case
  - o Critical dimensions of the social innovation process in the case
    - New ways of behaving/doing
    - New ways of organizing
    - New knowledge
    - New relations
    - Impact
    - Replicability
- Motivations for participation
  - o Strategies for gaining social support
  - o How have conflicts and resistance been overcome
- Factors and dynamics influencing social acceptability for energy innovations
  - o Motivations for people to engage in the (particular) social innovation
  - o Motivations for people to maintain their commitment

Presentation sheet for each case

On the basis of the information included in all the analysed documents, a presentation sheet for each case has been prepared according to the following scheme:

- Background (context, antecedents, etc.)
- Implemented actions
- Stakeholders analysis (e.g., involved actors, existing partnerships, leadership, negotiation processes carried out, strategies to gain social support, communication channels)
- Milestones
- Effects (e.g., quality of life benefits, environmental benefits, new behaviours, new governance strategies, new knowledge, technology innovation)
- Critical issues
- Up-scaling (replicability).

This scheme is very similar to the one already adopted in the deliverable D3.2 "Report on inputs for the questionnaire and the scenarios" (submitted in December 2018). However, the sheets contain much more information than the previous ones (between double and triple). Moreover, the information already included in the D3.2 has been carefully revised in the light of the interviews with the key-informants).

1.4. This deliverable

After this introductive section that has been devoted to the institutional, thematic, and methodological frameworks, the deliverable will entail five sections, devoted each to one of the specific clusters with their case-studies.

At the end of this document, some comparisons and conclusions are included in a final section.

This deliverable includes (in the Appendix) also **10 detailed sheets** describing each of the **10 SMARTEES cases** according to the scheme presented above (end of § 1.3.).

This deliverable has been drafted by Giovanni Caiati, Federico L. Marta, Gabriele M. Quinti of the K&I SMARTEES team, with the supervision of Christian A. Klöckner (NTNU), coordinator of the SMARTEES project, and taking into account important contributions provided by all the research partners (beyond K&I), more specifically: Lars E. Egner, Erica Löfström and Giuseppe Pellegrini Masini (NTNU); Adina Claudia Dumitru and Isabel Lema Blando (UdC); Wander Jager and Patrycja Antosz (RUG); Tony Craig, Kathryn Colley and Annabel Pinker (HU); Irina Macsinga and Coralia Sulea (UoT).

2. First cluster: Holistic, shared and persistent mobility planning: Zürich and Groningen

2.1. Starting point

Critical attitude

It should be underlined, that in both cases (Zürich and Groningen) the "starting point" for the process of social innovation lies already in the '70s of the 20th century, i.e. almost 50 years ago (mobility strategy to speed up trams and buses in Zürich; design and launch of a new Traffic Circulation Plan/TCP in Groningen aimed at limiting the use of cars).

Both cases are based on a strong critical orientation against the goal of creating a "car-friendly city", which at that time was widely seen as symbol of progress. Rather, they are oriented towards an alternative model of mobility based on a reduced use of the car, also for improving the air quality and reducing noise pollution. However, a full awareness of the social and environmental dangers and risks that will surface in the short, medium, and long term came only later (around the end of '80s or '90s).

Moreover, in Zürich a further critical attitude was emerging against a "traditional" approach for the improvement of public transport based on underground solutions, preferring a surface public transport, while in Groningen the basic idea was (and still is) to give back public spaces to the inhabitants of the city (the transformative ambition was making the inner city of Groningen the "living room" of the city, and restoring public space for the citizens).

Values

The driving values at that time were not related to reducing carbon emissions. This innovation, indeed, took place in the 1970's, when issues concerning emissions and climate change were not part of the policy debate. The problems of car-traffic were mainly perceived as a public-space problem, and an air quality problem.

Promoters

Since the beginning, in both cases, the main actor was (and still is) the Municipality. However, while in Groningen this is 100% true, in Zürich, the starting point, in 1973, was a "people's initiative" aimed at providing 200 millions CHF for projects to speed up trams and buses (as opposition to the – by two referenda – rejected underground plans). After a (third) referendum, this initiative was endorsed by the Municipality, who generated the new mobility strategy.

Approach

Both approaches were participative. In Zürich, it was based on the Swiss tradition of "direct democracy" entailing period consultations of citizens (through referenda) on diverse issues spurred either by the public authorities (municipality, canton, and federal government) or by a people's initiative. In Groningen, it was based on the leftist idea of involving citizens in the discussion on the liveable cities. However, in Zürich the "paradigm" was participative also in decision-making, while in Groningen it was, in the beginning, top-down (in Zürich, the mobility strategy implementation started after 3 referenda; in Groningen in one night: "Overnight, the centre of Groningen became impenetrable for cars"), becoming participative only later (see below).

2.2. Changes in ways of producing, managing, and consuming energy including technology innovation

As already stated, as both mobility strategies/planning processes started in the '70s, only in later years the energy impacts became an issue. Now, the reduction of energy use and associated reduced emissions are a key-theme in planning, and are an integrated element in holistic planning processes both in Groningen and in Zürich.

Both processes entailed deep changes in the consumption of energy related to mobility.

- In Groningen, mainly by strongly increasing in the use of bikes, transforming Groningen into a Velo-city (nowadays, the inhabitants of Groningen possess an average of 1.4 bikes per person; the average number of bikes per household is 3.1).
- In Zürich, mainly by replacing the use of cars with a more intensive and extensive use of effective and high quality public transports; and secondly, by increasing the use of bikes (Presently 53% or 60% – depending on the sources- of the Zürich households do not own a car).

There were no direct effects, in both cases, on the other sources of consumption of energy (e.g., heating). In this sense, it should be stressed how in both cases a holistic approach was developed in relation to mobility and not in sector of energy policies. Moreover, the Energy Commission of the Zürich municipality complains about the weak integration of the mobility strategy in the broader framework of the energy policies. Nevertheless, at least in the last years, thanks to a greater awareness of environmental issues, generated both in Groningen and in Zürich also by their respective mobility strategies, one can perceive starting effects of the latter also on other consumption categories of energy (beyond mobility).

2.3. Changes in social relationships, interactions, and configurations

Governance configuration

Interestingly, the two cases were very different in their initial approach but evolved to be rather similar now.

In Zürich, the governance of the mobility strategy is rooted in a very strong system of direct democracy characterized by the implementation of various referenda (promoted either by public local authorities or by citizens) and traditional consultations of citizens at the local level. In Switzerland, the referendum is generally the conclusion of a process that foresees the involvement of civil in various ways. In general, the city of Zürich and all the other local planning authorities try to engage stakeholders and do engage them in formal and informal fora as much as they can. Before the final decisions are taken, there normally is a formal request for comments where most of the formal actors get a chance to be involved; for example, in Zürich, there are Quartierkonferenzen (networks of local associations) in each of the 12 sub-areas of Zürich, and these networks of associations are always asked formally to comment and cooperate with the local authorities.

In Groningen, there was an important evolution of the governance model of mobility. The organisation of city planning has changed completely as a result of the paradigm shift in the 1970's. Basically, the top-down approach by the technical planning experts has been changed towards a holistic planning process, where plans are being developed including many relevant sustainability dimensions such as well-being and involvement of the citizens, energy use and economic viability. As a consequence, citizens and shopkeepers/ entrepreneurs are increasingly being involved in planning processes. At the beginning without important influences in the decision-making, later (especially since the 1990s) influencing also decisions thanks to referenda and local consultations more or less binding. The governance model has become quite similar to that of Zürich.

Changes in the operation model configuration in the public administration

In Zürich, new forms of organizing and doing things emerged within public institutions. The following can be underlined (all showing an improvement in the inter-institutional dialogue).

a) Increased cooperation among the three departments in charge of mobility issues in the Municipality of Zürich (Civil Engineering and Waste Management Department, responsible for Road, Building and Recycling; Department of Public Utilities and Transport, responsible, among other things, for public transport; Department of Public Safety, in charge of traffic management).

b) Increased cooperation among the above mentioned three departments and the Energy Commission of the municipality. However, as already stated, this cooperation is still limited. The mobility strategy is included in the broader energy strategy (that entails a transition towards more low-carbon patterns) and this is strategically recognized, but still not implemented enough at the operational level (in the day-by-day work).

c) Increased cooperation among the municipality of Zürich and the Canton, more specifically among the technicians (due to political differences, this cooperation is mainly informal – albeit substantial).

d) Cooperation is also facilitated by the existence of a regional conference concerning public transportation and a separate conference for the city of Zürich (with the participation of the local authorities, ZVV, SBB, etc.). Meetings are twice or three times a year.

In Groningen, currently the municipality is starting with neighborhood-councils that represent a new formal entity under development aimed at further fostering the communication between the citizens and municipality. These neighbourhood councils are composed of random allotted inhabitants of the neighborhood and city-council members. They discuss problems that exist in their neighborhood, and planning on different levels as far as it impacts the neighborhood.

Actors involvement/decision making configuration

In both cases, *strictu sensu*, here is no change in the actors involved between the '70s and now.

- Main actor: the Municipality and in particular the departments in charge of the mobility.
- Other actors:
  - Other public administrations
    - in Zürich: canton, other municipalities, federal level
    - in Groningen: national level, police
  - Transport enterprises
  - Business
    - in Zürich: large enterprises, shopkeepers (business community)
    - in Groningen: mainly shopkeepers (business community)
  - Active citizenship
    - in Zürich: car groups, bike groups, Quartierkonferenzen, "street communities"
    - in Groningen: cyclists and pedestrians' groups; car drivers' groups; old city groups, environmentalist groups
  - "Common" citizens
  - Scientific community (mainly IVT in Zürich and RUG in Groningen).

However, there was, in particular in Groningen, much less in Zürich, a change in the configuration of their relationships/interactions and in the level and kind of involvement of some of them.

In Groningen, relations among actors evolved thanks to the transition from a top-down toward a bottom-up policy via consultation, referenda to a co-creation of plans thanks also to new relations between the citizens, municipality and shopkeepers/entrepreneurs. In the recent years, the shopkeepers were (and are) involved to a much deeper level in the city-planning process, and, as a result, the network of shopkeepers has also become more active. Citizens are involved in the co-creation of plans, however, for more limited plans such as a

bike-roundabout (it is easier to make co-creation in these cases) than for very complicated plans such as the tunnelling of the Amsterdam-Hamburg highway.

Thanks to this evolution, the initial opponents (mainly police, car drivers, shopkeepers, and to some extent the business community) either have become supporters or, at least, have accepted the mobility policy. Moreover, the citizens' support now is strong, and many citizens of Groningen are proud of the biking culture. Among a subgroup of elderly people there still exists a negative evaluation of mobility pattern changes; despite they are positive about the current situation in the city. Yet, still a group exists that would like to have easier access by car.

In Zürich, where since the beginning a participatory model was used in which citizens' involvement was a pivotal aspect of the governance system, the involved actors remain more or less the same. Little changes are more connected to the prevalence of this or that group in any referenda or cantonal/municipal elections.

2.4. Strategies for gaining social support

Strategies to gain citizen support for the mobility strategy in Zürich and in Groningen are now convergent; however, this similarity has been reached through different paths.

In Zürich, the main strategies to gain citizens' support for the mobility strategy can be summarized as follows.

a) Follow the traditional forms of "direct democracy" characterizing the governance system in Switzerland (ask citizens' opinion through referenda; allow people initiative referenda; frequent citizens consultation through Quartierkonferenzen in each of the 12 sub-areas of Zürich; and/or other local consultations on specific projects/measures (see above).
b) Proceed gradually, step by step, avoiding too fast and too big changes in a short time, avoiding almost always radical measures (such as impeding cars circulations in specific areas of the city or between the sectors of the city – as it has been done in Groningen).
c) Negotiate constantly with citizens or specific groups (e.g., the representatives of the main important business groups) on specific measures.
d) Adopt targeted policies (e.g., with contact persons for mobility consultations in large companies).
e) Give priority to "pull" measures (such as intensive improvement of public transport or the set up of bike lanes) over "push" measures, which have however been implemented, but with less emphasis (such as the increase of the parking price).

In Groningen, the main strategies to gain citizen support included a direct communication with the citizens. From the beginning, after the launch of the TCP, the initiators realised the importance of going to the neighbourhoods, shopkeepers and other stakeholders to discuss the plans in terms of the liveability of the city. Hence the overall vision was emphasised when local plans were under discussion. Different neighbourhoods were approached in

different ways, depending on the culture, level of participation and cohesion of the people living there. Discussions took place on the street, either planned or spontaneous.

The initiators had gained serious support in the elections (40% in 1974) and considered that as a mandate to implement the TCP. Negotiations were developed, basically on a micro-level, adjusting the plans on the level of where to place short-park places and the like.

Later the negotiation process was expanded with a more formal referendum, either of a binding or of an advisory type. The experiences with referenda were mixed (from the specific point of view of the planners), as the outcomes were not always in line with their preferences.

The municipality has become very aware of the importance of co-creation and consultation, and depending on the type and complexity of projects, different types of citizen involvement are being used. Also, the provision of information has changed in the time, partly due to new digital formats and channels that are available nowadays. The municipality has changed its interaction from hosting meetings of interested people in the town hall, towards actively going towards the neighbourhoods and finding specific ways to include the local communities in the planning process.

Finally, social support was (and is) maintained thanks to the experience of the city as a pleasant, friendly, clean and accessible place. The inner city has developed into a welcoming and friendly place where people like to shop, walk and visit restaurants and bars. The city centre is vivid in the sense that during day (and night time sometimes) there is a continuous flow of people walking and biking. The air is clean and the acoustic quality is high, creating a pleasant atmosphere. The older neighbourhoods that have been restored are flourishing. Most of the old and relatively small houses have been renovated, and the neighbourhoods are thriving. Due to a strict parking regime the inhabitants are capable of parking their cars in their own neighbourhood, and city visitors from abroad are increasingly using the transfer at the outskirts of the city, where large car-parks are available with cheap and fast public transport for coming in the inner city.

2.5. Critical issues / How critical issues have been overcome

Critical issues were (and are) almost completely different in Zürich and Groningen (despite the similarity of the two cases), except that, in both cases, the holistic feature of the strategy is restricted to the mobility sector.

In Zürich, the main critical issue was (and still is) related to the management of a public sector composed of multiple actors that could develop frictions (between the entities within the Municipality of Zürich; between the canton and the municipality; between the City of Zürich and neighbouring municipalities; among politicians; etc.). This critical issue is often or almost always overcome thanks to continuous/permanent negotiation processes (sometimes informal), which is possible given the often excellent interpersonal relationships among some of the involved actors.

Moreover, the complex consultation mechanism through referenda (and in a less extent through the other consultation) can provoke a slowing down of the decision-making

processes, in the sense that often the implementation of a policy or even a specific activity (and use the already available relative funding) sometimes is stopped because of a referendum, which, in fact, "blocks" an ongoing initiative until the outcome of the referendum in question. This issue is inherent in the functioning of democracy in Switzerland and therefore remains.

In Groningen, the main critical issue has been the adoption of a top-down approach that caused the lack of consensus of some relevant actors in the implementation of the TCP (shopkeepers, the police management, and a significant group of car drivers) and a lack of a real stakeholder involvement (in the '80s, 53% of businesses still regarded the TCP as negative also because the economic risks associated with the introduction of TCP had not been brought under control). Stakeholders and citizens were considered by the municipality as actors to be, at best, simply informed and not really involved. Later this approach changed, and since the '90 the top-down approach was first softened and then abandoned and replaced by a consultation process entailing also negotiations among diverse interests (e.g., car drivers and bike riders in the management of a roundabout). The problem finally disappeared almost completely, thanks to the mentioned "paradigm shift" (see above).

2.6. Changes in the sharing of knowledge

No deep changes in Zürich in the management/sharing of knowledge along the mobility strategy implementation have happened: constant/frequent two-ways communication, both formal and informal, among the involved sectors of the public administration (inside the municipality, inside the canton, between them), with the transport enterprises (ZVV, SBB), business world and citizens. In some cases, the sharing of knowledge has improved and never worsened (moreover, we should remember that the inter-institutional dialogue has improved – see above).

In Groningen, along the years, new knowledge has emerged considering how to develop plans in a participative manner, and how the municipality communicates with citizens. Presence in the neighbourhoods is important, and social media are used to inform and communicate with citizens.

2.7. Societal / Environmental benefits

Both mobility strategies provided some overall benefits in term of quality of life (clearly positive effects on traffic and environment in the inner city). In a 2015 EU survey of the quality of life in 79 European cities (Flash Eurobarometer, 2016) Zürich and Groningen came ex aequo in third place (behind Aalborg and Hamburg). In both cases, air quality and acoustic quality improved and are now considered as very good. Specific actions have made the cities safer.

Even so, air quality and noise emissions are still a major nuisance for Zürich's population, in particular because of the very intense flight traffic, considering that the airport is very close to the city.

2.8. New (citizens') behaviours

In both cases (Zürich and Groningen) big changes in citizens' mobility behaviours towards new behaviours much more pro-environment are well documented.

The big difference is that:

- In Zürich the transition has been from cars to firstly public transports and, secondly, to bikes and walking, and
- In Groningen the transition has been from cars, firstly to bikes and, secondly, to public transports and walking.

This difference between Zürich and Groningen concerns all age groups (e.g., youth in Groningen ride bike, while in Zürich they prefer public transports considered an effective mean of mobility thanks to comfort and to ICT/WiFi availability).

In both cases, change of behaviour in mobility is generally, beginning to imply, the adoption of more pro-environment behaviours also in other sectors (e.g., rational use of water). But this is still very limited.

2.9. Up-scaling/replicability

Maybe also because of their four decades of activity, it is difficult to evaluate how and to what extent the cases of Zürich and/or Groningen influenced other cities. Moreover, in both cases replicability is somehow problematic. In Zürich, many social features of the mobility strategy have been conceived according to an institutional context (e.g., the "direct democracy" through frequent referenda and intensive consultations), which is very specific to Switzerland and not widespread elsewhere. In Groningen, a key barrier towards replication is the biking culture widespread in countries such the Netherlands (or Denmark) and much less elsewhere. Therefore, most of the lessons learnt are useful, above all, in Switzerland (Zürich case) and the Netherlands (Groningen case), that are the countries in which these studies have been carried out (or countries that are very similar under certain respects – e.g., Denmark).

As a result, on the one hand, Zürich and Groningen transport policies are very well known as cases of advanced transport and mobility planning. And of course, there have been many people (also coming from local authorities) who admire and appreciate the excellent functioning public transport in Zürich and/or in Groningen. On the other hand, we have not found outside their national boundaries cases already inspired directly by the mobility policies of Zürich or Groningen. This does not mean that the lessons learned from each of these two cases are few and unimportant.

In this regard, and for all the detailed information, please refer to the analytical sheets attached to this Report.

3. Second cluster: Island renaissance based on renewable energy production

3.1. Starting point

The starting points for the two cases of this cluster are different. Not only the geographical contexts are very different, but the two innovations have been implemented in different time periods. The Samsø project has been implemented, mainly, from 1997 to 2007, but is now in a second or third stage, whereas the activities on El Hierro started after 2009.

Critical attitude/Values

Both projects on Samsø and El Hierro, started with an attitude critical to the dependence of the islands on energy supply from the main land (both islands were entirely dependent on energy imported from outside). Moreover, we can identify a growing criticism of some aspects of the quality of life proposed by contemporary society and the idea of promoting a new relationship with the environment. In both cases, this was connected with strong islander identities of the inhabitants, but also an economic threat of deteriorating job opportunities.

Values

In both cases, the values of sustainability and respect for the environment were (and are) crucial and were already starting to develop before the projects were implemented. At the same time, both groups of inhabitants were strongly identified with living on "their" islands which was also connected to a specific way of handling obstacles.

Promoters

Both projects had among their protagonists a local authority (Samsø Municipality and the Cabildo de El Hierro) and an energy company (SamsøEnergiselskab and the energy company "Gorona del Viento SA" on El Hierro); both companies had among the founders the municipalities (Gorona del Viento Board of Directors is chaired by the president of the Cabildo de El Hierro; Samsø Municipality is part of the Samsø Energiselskab). Both projects benefited from significant government funding. In both cases, some other actors are represented in the energy companies. However, in Samsø, they are from the civil society (e.g., the farmers' union and, indirectly, grassroots organizations representing the general island public); in El Hierro, these actors are mostly from higher institutional levels (the energy company Endesa, the Canary Islands Institute of Technology and the Autonomous Community of the Canary Islands). Finally, the Samsø partnership included also an environemntal NGO.

In El Hierro, initially, approach was not participatory for citizens. Conversely, in Samsø, a participatory approach was adopted since the initial conception of the project. However, in both cases, citizens' involvement was limited in the start., But right from the start, in Samsø, the aim was to involve citizens while this happened only after El Hierro

3.2. Changes in ways of producing, managing, and consuming energy, including technology innovation

This is the only cluster in the SMARTEES project, which has cases aimed at changing not only the ways of consuming, but also of producing and managing energy.

- On Samsø, 11 land based wind turbines and 10 offshore wind turbines, and a 2500 m^2 solar panel system have been built and made operational; the use of biofuels by farmers has been promoted. Now, 100% of the island's electricity comes from wind power, with surplus electricity exported to the mainland grid, and 75% of its heat comes from local solar power and biomass.
- On El Hierro, a wind-pumped hydro power station has been installed, consisting of five E-70 wind turbines capable of producing 11.5 megawatts of wind power to supply electricity for approximately 11,000 residents, an additional number of tourists, and three water desalination facilities; solar panels are also planned to be installed in the near future (and, more generally, self-sufficient energy production-consumption based on renewable sources is encouraged).

Both projects are also centred on changing energy consumption. Many activities have been implemented at that level, too, e.g.:

- On Samsø: Renovation of 200 homes increasing efficiency and energy savings; and some passive buildings such as the Energy Academy.
- On El Hierro: Development of mobility based on electric cars and subsidies for the improvement of energy efficiency in disadvantaged homes.

3.3. Changes in social relationships, interactions, and configurations

The Samsø case has generated a public/private/citizens alliance in the management of the whole project in all its aspects (including its funding that came also from citizens; and the management of the Samsø Energy Company). The governance configuration is a "democratic foundation of the project" characterizing its ownership. This configuration, although intrinsically connected with the project, is founded on the conception of the islanders of Samsø as a strong 'tribe' provided with traditional wisdom and a strong sense of the significance of the place considered as a decisive element that brings people closer to their

own place. This alliance entailed the development of a new business model (a co-ownership in new energy technology).

In the El Hierro case, as already stated, the involvement of citizens is much weaker, and societal actors are less active. Gorona del Viento El Hierro S. A, as already stated, is a public-private enterprise partnership. Such a partnership is an exception in the Spanish energy system.

Actors' involvement

In both cases, the involvement of actors has progressively increased, however, starting from very different points and reaching also very different levels today (still rather restricted on El Hierro; almost universal in Samsø).

On Samsø, various professional groups such as the farmers or the smiths (in part initially hostile) and citizens in general had been progressively involved (included in financing and decision-making), as well as (encountering some initial problems) environmentalist groups (like Greenpeace or other who did not like the wind turbines, because of their potentially negative impact on protected nature). All productive forces have also been involved, even the scientific community (far beyond Samsø) in the Samsø Energy Academy. The latter has after the completion of the main phase of the project been hosting researchers and students studying renewable energies, organizing conferences, managing a show centre, providing consultancies and organizing meetings between research and business people.

On El Hierro, the involved actors were initially from the public administration (such as the Cabildo Insular de El Hierro and the Autonomous Community of the Canary Islands), the private sector (mainly the energy company Unelco, currently, Endesa), the technological sector, and universities (initially the Canary Islands Institute of Technology and the Institute for Diversification and Energy Saving). However, eventually citizens are also more involved (see § 3.4.). Moreover, the involvement of the scientific/technological actors has considerably expanded (Gorona del Viento has recently signed agreements with different universities and the Oceanic Platform of the Canary Islands collaborate in the project).

3.4. Strategies for gaining social support

Strategies for gaining the necessary social support have been (and are still) completely different in the two cases.

On Samsø, the strategy was characterized by an intensive (and progressive) mobilization of the citizens for achieving energy independence through renewable energy and the improvement of energy efficiency with a significant role played by all the societal actors in the design, co-development/co-creation and implementation of the initiative. The main elements of the strategy are listed below.

- Bottom-up approach.

- Progressive character of the consensus building through negotiation and dialogue to overcome conflicts and resistance, also thanks to several workshops and (partly informal) meetings – including:
  - o "Kitchen meetings" (private 'meeting technology' held on friendly terms between the project developers and islanders central to the realization of the renewable energy projects)
  - o Café Good Energy (informal meetings having the purpose of creating an open space for discovering the Samsø citizens common vision for energy, Samsø's long term survival and the related next wise steps in the short term).
- Credible and constant communication.
- Transparency (e.g. open minutes from the meetings and open budget documents; more generally the whole implementation process became "open access" after the initial phase).
- Capitalization on the experience (and lessons learned) through the set-up of the Samsø Energy Academy (see above).
- Citizen ownership of the renewable energy production and the related economic gains.

Over the years, the islanders have become used to discuss and debate more as a community than as opponents and have developed an open process that does not hide its disagreements, but "openly airs" them. Today, more or less all the stakeholders agree with the general ambition of the Samsø renewable energy initiative, but they may well disagree on how to get there.

In summary, the stakeholders have become part of the development and are involved in the continuous debate about what should be done further. The municipality, the local farmers, and to a large degree, all the islanders have become part of the process. Overall, the project has gone from engaging the initial few enthusiasts to a movement that involves almost all actors on the island, i.e. individuals, businesses and professionals.

On El Hierro, as already stated, there have been no citizen consultations about the plant which was implemented top-down. Citizens' involvement was gained by facilitating information and targeting dissemination activities at the population. Gorona del Viento offers guided visits to residents, school children, and visitors, and informative material is also available in the local facilities. "Open doors days" are also organized, inviting citizens to visit the plant and experience the dimension of the project. Nowadays, support from the islanders has increased because the plant has become a key element in job creation and economic development, and some students from El Hierro and from other islands have been employed by the Gorona plant. Moreover, Gorona del Viento strengthens tourism and therefore the local economy. The international reputation gained has become a relevant motivation for people. However, even today the scope of the project appears as not totally well understood by the population (which is only partially involved).

3.5. Critical issues / How critical issues have been overcome

In both cases, some problems arised at the beginning of the project related to consensus from citizens.

On Samsø, this issue limited the initial involvement of citizens in general and specific groups in particular, also due to communication difficulties among engineers involved in planning and other islanders. Only later, through "tools" like "Café Good Energy" and "kitchen meetings", islanders were finally invited into the process and asked to participate and co-develop the project. Moreover, with regard to the selection of the sites where wind turbines were to be installed, plans had to change several times because of the disagreement of the inhabitants (for the devaluation of houses and also of the churches); and in the installation and maintenance of the most complex works, such as the offshore wind turbines it has been difficult to use local labour.

On El Hierro, many residents on the island were quite reluctant, claiming that El Hierro had needs that should have been addressed before building Gorona del Viento such as for example several public services as telephone lines, Internet access and mobile phone connections or water resource management. Moreover, some islanders were critical to the low performance of the plant or the lack of direct impact on their economies (particularly because they were not able to perceive the benefits of the investment in terms of reduction of the energy bill).

Further critical issues and the ways (if relevant) for overcoming them were/are completely different in the two cases.

On Samsø, ight now, the main discussion within the Energy Academy is to ensure continuity in work after the original pioneers are retired. The discussion in the leadership group is now mostly on this challenge, and on recruiting people with the right competences for these new positions. They are discussing how to make Samsø attractive for the people to be hired

On El Hierro:
- The Gorona del Viento energy plant does not commercialize the electricity generated by itself, so the free market for electricity allows that a number of energy providers offer their services in El Hierro. As a result, the population of El Hierro does not have direct evidence of the results of the project, since they have their energy contracts with the traditional energy companies and people do not receive any reward for having the energy plant on the island.
- The lack of regulation stimulating citizen's involvement in energy self-production prevented the development of self-consumption and made the transition towards a clean and accessible energy model difficult because it discouraged citizens to be 'prosumers' and install solar panels on their homes. To this regard, the Royal Decree 900/2015 on self-consumption made the situation worse because it charged Spanish households fitted with solar panels with an additional tax. However, this Decree is presently suspended.

3.6. Changes in the sharing of knowledge

Both cases (Samsø and El Hierro) have led to a significant escalation in the sharing of knowledge.

On Samsø, the overall strategy entailed the acquisition of numerous new technical competences, which was then merged in the design and then the set-up of the Energy Academy that opened in 2007. The Samsø Energy Academy receives some 5,000 visitors annually, including school children, students, business actors, politicians, ambassadors and even members of royal families. In 2011, the Samsø Energy Academy created a biennial leaders meeting called "From Best to Next".

The project on El Hierro is described as the result of three decades of studies, design, engineering development and a complex operation in a location affected by its insularity. A lot of innovative knowledge has been produced and is now shared within the scientific community, including many scholars and students that visit the wind-pumped hydro power station. Gorona del Viento has become a tourist destination for visitors interested in nature as well as "for scientific tourism", which could be experts from the fields of renewable energy, students, responsibles from institutions dealing with energy issues, and the many people who travel to the island just due to the interest generated by this project.

3.7. Societal / environmental benefits

Both projects entailed important societal and environmental benefits.

- Reduction of emissions:
  o Samsø inhabitants are CO_2 negative. Today, Samsø contributes to lower CO_2 emissions for all of Denmark (Samsø has reduced its CO_2 emissions by more than 100%, since it produces CO_2 free energy that is directed to other sites)
  o Moreover, Samsø inhabitants are NOx (Nitrogen dioxide) negative and SO_2 (Sulfur dioxide) negative. The emission of particle matter has decreased from 30 to 10 tons and the fine powders decreased 4,500 tons per year
  o El Hierro, too, is characterized by the reduction of CO_2 and contaminant emissions as well as the reduction of costs connected to diesel generation. The plant management estimates that in 2018 the system saved 24,650 tonnes of CO_2 emissions and 7,460 tonnes of diesel fuel that no longer needs to be consumed by the island. Besides, the website of Gorona del Viento claims that in 2018 Gorona has generated 100% of the island's electricity for 2.300 hours.
- The El Hierro project guarantees the electricity and water on the island which reduces the power dependency on connected vulnerability of the islanders.
- This energy project has also a direct impact on the creation of new jobs related to renewable energies

- The high school of the island "IES GAROE" has implemented new programs training students in electro-technical and automated systems who later enter the work force of the plant.
- Gorona del Viento has improved the local economy also because it has become a tourist destination

3.8. New behaviours

Both projects encouraged or facilitated the following energy-saving behaviours:

- Reduction of consumption of fossil energies in the island energy production system. Samsø is 100% self-sufficient by renewable energy sources and currently the island is committed to become a completely fossil fuel free island by 2030. El Hierro has analogous objectives.
- Self-sufficient energy production-consumption based on renewable sources (e.g., in El Hierro, promotion of self-consumption in farms and wine cellars; on Samsø, development of the use of biofuels by farmers for tractors).
- Energy-saving behaviours in households based on education/awareness measures (e.g., on El Hierro, the electric demand fell by 4.11% in the third quarter of 2018, even with an important increase of tourists in that period) and on the social responsibility plan approved by Gorona del Viento, which establishes that a percentage of the benefits of the plant will be destined to the improvement of the energy efficiency in disadvantaged homes.
- Low-carbon mobility (e.g., on El Hierro, the acquisition of electric vehicles for residents; Samsø has six times more electric cars per thousand inhabitants than the rest of Denmark).

3.9. Up-scaling / replicability

Both islands receive thousands of visitors interested in the projects, attracted by the achievements obtained (often of people coming from isolated territories in the world that need to cover their energy demand with renewable sources).

Both islands projects receive intercontinental recognition. From Japan to EU institutions, from the White House to Danish 'Climate Municipalities', Denmark's Renewable Energy Island Samsø is a role model (i.e., making Samsø's experiences applicable to other contexts in a simple form), a frontrunner and signpost for the energy transitions to come. El Hierro received the interest from Japan and Indonesia, too.

Samsø Energy Academy is regularly invited to international conferences and workshops and takes an active part in the political debate surrounding renewable energy in Denmark. Since the start of the Renewable Energy Island project in 1997, Samsø has been engaged with similar projects elsewhere in the world.

The El Hierro project has been presented as a workable model that can be replicated by other islands and territories in the world which symbolises the successful management of renewable energy to provide energy self-sufficiency for the island and other, similar territories. An example is the island of Gran Canaria, also in the Canarian archipelago.

In the case of Samsø, one final important issue is that the project tried to demonstrate what could be done without special agreements or deals, so that the model can be exportable to other contexts. It was an important part of the first proposal for the "Energy Island" that there should be no local extra incentives from the public sector, but that the project would work within the limits of the existing conditions set for Denmark at large. This makes the Samsø initiative sustainable without requiring special treatment from the public authorities.

In this regard, and for all the detailed information, please refer to the analytical sheets attached to this Report.

4. Third cluster: Energy efficiency in district regeneration

4.1. Starting point

The two cases of this cluster had very similar starting points. Both cases refer to the regeneration process of two districts built between the 60s and the 70s in the Swedish "million homes program".[6] In the following decades, as a consequence of de-industrialisation processes and of the welfare state crisis, both districts were affected by high rates of unemployment and criminality. Furthermore, the two districts have always been characterised by a high presence of immigrants (mostly from African and Asian countries). Finally, from a technical perspective, both districts were characterised by low energy efficiency of buildings, and by an urgent need of building renovation. In both cases, there was an awareness that something needed to be done to recover and regenerate the related district.

Promoters

Another common feature of this cluster is related to the promoters of the social innovation. In fact, in both cases the district renovation was promoted by the city administration jointly with the local public housing company. In both cases, a set of other actors joined the project during its implementation as promoters of other related small projects, side events and initiatives, or taking the lead of part of the project. In this sense, it can be stressed how the group of promoters was extended during the development of the social innovation.

Values

The main focus of the two interventions was that of improving the quality of life and fostering social cohesion in the area. In both cases, the environmental values were not part of the renovation plan at the very beginning, but were included (in the framework of a sustainability perspective) at the early stage as pivotal for both the projects.

Approach

Overall, both projects were based on a participative and inclusive approach, based on resident involvement in providing suggestions on the foreseen activities. While in the case of Augustenborg, such an approach was foreseen since the beginning, in Järva the participatory feature of the project – that, by the way, was inspired by the Augustenborg case – was

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[6] One third of the homes in Sweden were built as part of the Million Homes Programme in the 1960s and '70s. The Million Homes program was a national initiative from the 1960's to provide Swedish citizens with improved housing conditions. Under the socialist (government, marked by the rise of the Swedish welfare state, 1,000,000 homes of various types were constructed in approximately ten years during the 1960's, adding over 600,000 homes to the national housing stock. More than 200 million Europeans live in similar properties. Many of these buildings are now shabby and in need of renovation, and their energy consumption needs to be at least halved to meet today's demands.

adopted to cope with the emergence of a strong opposition of the residents to the original plan (see below).

Furthermore, in both cases a holistic perspective (toward sustainability, as already stated) was adopted, including: building insulation, mobility, renewable energy generation and the modification of energy related behaviors.

4.2. Changes in ways of producing, managing, and consuming energy, including technology innovation

Energy efficiency of buildings

As already stated, the two districts had very similar technical features. One of the core measures of the two interventions was the refurbishment of the buildings to increase their energy efficiency through insulation of walls and roofs. The effect was a huge increase in energy efficiency of buildings both in Augustenborg and in Järva.

Renewable Energy production

Both cases developed measures for renewable energy production. The Augustenborg project did not foresee renewable production in the beginning but now produces solar energy and small-scale wind, and a pilot project of production of biogas from food waste has started. In Järva, a huge intervention was carried out for installing photovoltaic panels on 40 roofs in the area (10,000 m^2 photovoltaic – 1.4 MWp). The effort on renewable energy and solar cells made Järva one of Sweden's most densely equiped areas in this regard.

Mobility

A wide array of interventions was developed to foster sustainable mobility in the two cases of this cluster.

- As for Augustenborg, such measures foreseen were: speed limits for cars in the area, prioritisation of pedestrians, cyclists and public transport; encouragement of a local use of electric vehicles; development of a Green Line's zero emission electric street train service, car-pooling among residents.
- As for Järva, a series of activities have been developed to support and prioritise cycling in the area, ranging from the infrastructural interventions (introduction and extension of cycle paths, removing of obstacles, installation of street lights for bikes, etc.) to training and awareness raising initiatives (free bike courses for residents, establishment of bike days, etc.).

Energy saving

In both cases, a series of awareness raising and training programs for reducing the residents' energy consumptions have been carried out.

Even if it is not exactly related to change in the energy production or consumption, it is worth stressing that one of the main areas of interventions in Augustenborg was the adaptation to climate change consequences. In particular, a new storm water drainage system was introduced and roof gardens were developed to prevent flooding in the area.

4.3. Changes in social relationships, interactions, and configurations

Governance configuration

In this cluster, the main change in governance configuration is the switch from a governance system based only on formal partnership between different institutional stakeholders (e.g., the municipality and the public local housing company), to a model of extended and informal partnership involving a wider set of actors: universities, schools, citizens groups, individuals, local businesses, etc. In both cases, the extension of the governance system to such actors was a long lasting and progressive process. Interestingly, the informal character of this partnership was stressed both in Augustenborg and in Järva. Notwithstanding that, those actors were an important part of the governance of the projects and of their success.

Actors involvement in decision making

The new governance configuration was possible only through an extensive and direct involvement of the residents in the decision making process. In fact, in both cases, the intervention was to be discussed in advance with residents, giving them the possibility to express their suggestions and observation so to have the possibility to adjust and modify the plan. In certain cases, some aspects of the plan were co-designed by residents. The involvement of citizen was carried out through a wide set of different methodologies: extensive public consultation, regular meetings, and permanent working groups, dialogue with experts, informal gathering and co-design. In Augustenborg, this approach was developed since the beginning, while in Järva a complex system of consultation and cooperation with the residents was developed under the name of Järva dialogue first after a period of serious confrontation between residents and authorities.

New roles, rules, business and institutional models

In both cases, a differentiated set of new rules, roles, organisational and institutional models have been developed. Some examples for Augustenborg are: the obligation for the inhabitants of the new building "Greenhouse Augustenborg" to plant organic food; car sharing models (the organisation of the first "Electric Carpool" in Sweden); the development of the world first botanical roof garden. Some examples for Järva are: the establishment of a women's network; establishment of study group for the different aspects of the project; the development of cleaning and maintenance courses; the establishment of the role of residence hosts – a man and a woman from each building who have responsibility for maintaining the relations between the tenants and the city administration. This role is rotated between the residents of one building through the years.

The two social innovation cases of this cluster are characterised by the rising of a new identity of the district as an environmentally sustainable neighbourhood. A set of symbolic and demonstrative actions have been carried out to represent and to strengthen such a new identity: annual environmental days or weeks, cleaning days, bike days and projects, demonstration sites, symbolic street signposts, organised visits, etc.

4.4. Strategies for gaining social support

In the general framework of the actors' involvement in decision making (see above) a set of strategies have been developed in Augustenborg and in Järva for gaining the social support for the two projects.

a) Cultural sensitivity. Both districts are characterised by the high presence of immigrants. One of the strategies carried out in both social innovation cases was the adoption of cultural sensitivity in promoting and communicating the project. This was done through translating the published materials in the different languages spoken in the neighbourhoods (Augustenborg); using translators (Augustenborg); leveraging on cultural mediator (the residence host in Järva); taking into account different groups' perspectives, especially the one of immigrant women (Järva).

b) Transparency. Another strategy adopted was the transparency in communication and in the implementation of the interventions. The preliminary presentation of all the aspects to be implemented was a central part of this action. In certain cases (as for the roof photovoltaic installations in Järva) residents were allowed to visit the site under construction at any time. This allowed to increase the trust in the project and in institutional representatives.

c) Two-way communication. The most important strategy carried out for gaining social support was a continuous and two-way communication on the project. This communication was realised in many different ways, privileging direct contacts and face-to-face interactions. A prominent role was played by the direct interaction and discussion between technical staff and citizens.

4.5. Critical issues / How critical issues have been overcome

In this regard, there is a distinction between the two cases. While in Augustenborg (as already stated) the participative approach was adopted from the beginning, in the first stages of the Sustainable Järva project a top-down approach was adopted. In fact, the renovation plan was communicated directly with a letter to the residents. The top-down and distant way of communicating created the situation known as "the egg and tomato war" – as the residents threw eggs and tomatoes at official representatives. This initial approach considerably harmed the trust and the relationship with the residents worsened. In response to this situation, the Järva dialogue initiatives – similar to the approach developed in

Augustenborg – were developed, fostering the good collaboration and cooperation work described above.

Another critical aspect, which remains to be dealt with, is the high criminality rate of the two neighbourhoods, recently blossoming up again in the general changing climate of Swedish society.

4.6. Changes in the sharing of knowledge

The main change in the sharing of knowledge was the changed role of residents. In fact, in both the social innovation cases of this cluster residents were considered as experts and bearer of specific and territorially grounded knowledge. This knowledge was further developed during the implementation of the two projects (e.g., with study groups involving citizens on issues related to the project), and was used for the development of the project. In both cases, many different competences and skills showed up among residents, thus allowing in certain cases a direct involvement of citizens in the design of some actions, or in the development of new sustainability oriented projects.

In the case of Järva, new knowledge was developed on the consequences and impacts of the different actions from a gender perspective.

4.7. Societal / environmental benefits

Social benefit

A wide array of societal benefits was fostered in both cases of social innovation of this cluster. One of the main effects in both districts was an increase of the quality of life (perception of safety, new leisure spaces, new green areas, new services), due also to the environmental benefits (see below); an increase of social cohesion (e.g., new places for socialisation, etc.), the decrease of unemployment (Augustenborg), the increase of political participation (Augustenborg).

Environmental benefit

The main environmental benefits are the decrease of energy consumption and the increase of energy efficiency with the consequent savings in terms of CO_2 emissions; the improved air quality; and the noise reduction. As for Augustenborg, it has been estimated that the biodiversity increased in the area by 50%.

4.8. New behaviours

New behaviours have been developed all along the process in the two cases. Particularly, new environmentally oriented behaviours in different aspects (mobility, energy saving, waste recycling, etc.) have been developed. Furthermore, new social interactions have been triggered through a set of different projects and initiatives (bike days, sport club, leisure

times, etc.). An important behavioural change that happened in Järva is the increased mobility of immigrant women thanks to the bike facilities and culture that was spread in the district, allowing them to have more freedom of movement and increase their social integration.

4.9. Up-scaling / replicability

An important aspect of this cluster is that social innovation played a role in the general definition of an environmental commitment of the city as a whole.

Particularly, such projects were considered as experimental or pilot cases. Following up Augustenborg and Järva, other similar initiatives have been developed: in Malmö, the Sustainable Hilda in the Rosenberg district; and in Stockholm the Skærholmen – "umbrella" initiative for the refurbishment of building around the city.

For what concerns the replicability, Sustainable Järva and Ekostaden Augustenborg are good examples of how relatively small amounts of policy funds can be used to initiate much greater actions toward green building. It also reflects the fact that these modernist apartments' blocks are part of a stock of literally millions of apartments of the same type which must be renovated all around Europe to reach the European long term goals for energy efficiency. 200 million Europeans are currently living in similar 60s and 70s building stock. This will be a great inspiration, in particular, for other cities in the northern climate zone.

In this regard, and for all the detailed information, please refer to the analytical sheets attached to this Report.

5. Forth cluster: Urban mobility with superblocks

5.1. Starting point

Critical attitude/Values

Both projects, in Barcelona and in Vitoria-Gasteiz, started with a critical attitude towards the management of the environmental issues within their cities, after the participation of people of both municipalities in the United Nations Conference on Environment and Development (Rio Summit) in 1992.

Values

In both cases, ecological values and environmental awareness were remarkable motivations to launch the Superblocks Programme, influenced by the citizens being more and more concerned with the effects of environmental pollution on their health and quality of life.

Promoters

Both projects had the respective local authorities among their main promoters, and in both cases the "Agencia de Ecologia Urbana de Barcelona" was involved, a public consortium consisting of the City Council of Barcelona, the Municipal Council and Metropolitan Area of Barcelona and the Barcelona Provincial Council. Its multidisciplinary team has initiated both projects in Barcelona and in Vitoria-Gasteiz.

The Sustainability Mobility and Urban Space Plan is a public initiative run by the City Council of Vitoria-Gasteiz but which has originated and been agreed upon in a deliberative process with social actors and with the commitment of all local political parties. The origin of the Plan is related to the work carried out in the Agenda 21 of Vitoria-Gasteiz, the "Environmental Forum" with participation of both institutional and social actors, aiming at elaborating the Sustainability Mobility and Urban Space Plan, the city council created a permanent working group composed by technical staff from the various departments affecting the city's mobility.

The superblock project of Barcelona was implemented, since its start-up, by the Municipality. The local government formed a Technical Secretariat in charge of the superblock programme that provides professional support.

Approach

Both projects were (at least in the intention of the promoters) highly participative since their start-up.

5.2. Changes in ways of producing, managing, and consuming energy, including technology innovation

Both planning processes entailed deep changes in the consumption of energy embedded in mobility through a partial transition that entails a decrease in the use of cars and a relevant increase of bikes and walking. Private cars and public transport are kept outside the superblock while the inner streets are redesigned to be mainly used by pedestrians and bikes. No direct effects on the other consumptions of energy (e.g., home heating) and no actions related to the production of energy were foreseen.

5.3. Changes in social relationships, interactions, and configurations

Governance and business models configuration

The city of Barcelona has a long tradition of social participation at the city and neighbourhood scale, and different formal structures already existed at the beginning of the project to allow for public participation. For instance, the *Conseills de Barri*, which function as small councils, which foresee the participation of the neighbourhood associations, are formal entities in which different projects and changes to be conducted in the neighbourhood have to be presented and discussed. However, the Superblocks Programme has developed a new model of organizing the general public's participation, pursuing co-responsibility as one of the strategic objectives of the programme. It foresees the involvement of the neighbourhood associations and of local residents in determining and applying the criteria in each Superblock area, throughout various work stages and temporary phases, from examination to the implementation of the initiatives. Several participants interviewed in this study have manifested a change in their way of relating to each other and working in their everyday life as a result of their involvement in this project. Furthermore, the city council technical officers experienced changes in the ways they related with the citizens, and became more aware of the need of listening and taking people's opinion and expertise as authorized voices that deserved to be listened to and to be taken into account.

In Vitoria-Gasteiz, it has been pointed out by the promoters interviewed that the Superblocks Model and the Sustainability Mobility Plan have involved the development of new governance strategies based on the participation and commitment of political actors. Different areas of the municipality and the public administrations involved in the mobility sectors and citizens participated in the "Citizens' Forum for Sustainable Mobility", which is a coalition between city-governers, political parties and key stakeholders (representatives of social groups, neighbourhood associations, municipal technicians and political representatives). The Citizens' Pact for Sustainable Mobility is an example of a social innovative strategy to provide the best environment to ease the development of the measure. These representatives were later also consulted for the preparation of sectoral plans (such as the Master Plan for Cycling Mobility 2010-2015) and for the drafting and/or adaptation of various municipal ordinances.

The superblock project is being implemented by both Municipalities.

In Vitoria-Gasteiz municipality, a core role is played by the Environmental Studies Centre (CEA) which is an autonomous local public entity whose mission is to look out for the sustainability in Vitoria-Gasteiz. Other involved entities are the Urban Planning Department, Environment Department, Traffic Service, Local Police and the local public transport company (TUVISA). The CEA organized a series of workshops on mobility, environmental protection, etc. and the outcomes of these participatory processes paved the way for the drafting and signing of a Citizens' Pact for Sustainable Mobility (2007). The Citizens' Pact reflects the commitment of Vitoria-Gasteiz to sustainability and was signed by representatives of 54 associations, institutions and private companies (among others, the Ombudsman or People Defender, Taxi Association, Residents Association, Cyclists and Rollers Association, Ecologist Association, Students and Educational Association, Transport and Technological Companies). Due to the complex power distribution of the Basque Country, there are some issues that must be agreed with other administrations in the region (which are, therefore, involved).

In Barcelona, the municipality integrates and coordinates several city council departments. The principal sectors involved are the mobility and urban design departments together with the local transport system. The local government formed a Technical Secretariat in charge of the Superblock programme that counts on the assistance of different consultancies providing support in the definition of the different measures to be implemented. A key support on the superblock programme comes from the Urban Ecology Agency. At the second-level are involved the different Barcelona's district administrations. The districts usually play a counselling role and some of their members can form part of the superblock working group that defines the action plan, providing expertise and knowledge on the needs of each borough. Other institutional actors are the Catalan govern, and the Metropolitan Area of Barcelona and the Metropolitan Transport Authority. Further involved actors are: District organisations, Non-governmental organisations and associations signing the 'Citizen Commitment to Sustainability 2012-2022' (e.g., several citizens´ initiatives and third-sector entities, such as the bike specialised cooperative "Biciclot SCCL" or the NGO "TaulaEix Pere IV"), universities and other expert institutions, private companies, and inhabitants of city blocks (residents' associations, specific groups of interests – e.g., supermarkets, retail sector – and members of the political parties).

5.4. Strategies for gaining social support

The main strategies to gain citizen support for the Sustainable Mobility and Public Space Plan are listed below.

- The process of public deliberation on the mobility plan, both in Barcelona and Vitoria Gasteiz.
  - o In Vitoria Gasteiz, the participatory meetings contributed to the definition of a first vision of the superblock plan, which was discussed and approved in the

Forum. This process culminates with the "citizen pact for sustainable mobility", public act of commitment of all political groups, stakeholders, social actors and individual persons, who will subsequently also have positions of political responsibility.

- o In Barcelona, a process of negotiation is launched in each district to ensure that all the solutions are implemented according to the needs of inhabitants and to gain social support at the neighbourhood level, and the Action Plan should be also approved by the "Conseill de Barri" (the district political body) before being implemented. Transparency is supported by publishing the minutes of the deliberative processes and public meetings on the municipality Website.
- Public consultation about the measures of the Plan in each neighbourhood both in Barcelona and in Vitoria-Gasteiz. A series of participatory meetings with neighbourhoods' groups in the city were held to give the chance to develop new proposals and suggestions.
- Communication strategies
  - o In Vitoria-Gasteiz, under the claim "I join. It's worth it!", a communication and behavioural change campaign was launched and then played by citizens of Vitoria-Gasteiz, of different ages and neighbourhoods, inviting the whole town to join the Plan; moreover, a media campaign included advertising in newspapers, bus shelters, outdoor advertising (540 bus shelters, street modules and street-lamp banners), radio (234 20-second-spots) and Internet (340,000 banner ads).
  - o In Barcelona, information and communication strategies and channels are based also on the use of ICT technologies (e.g., GIS maps) for illustrating the main changes proposed in the project at the neighbourhood level.
- An "ambassador group" was formed, consisting of representatives from the Municipal Bus Company, Vitoria-Gasteiz City Council and the Environmental Studies Centre.
- Environmental education activities:
  - o In Vitoria-Gasteiz, to raise awareness on mobility and the sustainable use of transport, as the "European Car Free Day" (since 2000) or the "European Mobility Week". The city celebrates this event yearly in and around public open spaces. The idea is based on "recovering the city for the citizens", showing the City's capacity for acting and exchanging information in an environmentally-friendly atmosphere. Some of the events are celebrated using the new public areas provided by the first "Superblocks" implemented due to the Sustainable Mobility and Public Space Plan, demonstrating a different way of understanding the relationship between citizens and open spaces.
  - o In Barcelona, citizens comprehend, thanks to the Superblocks design and implementation, the features of each territory and the systemic interactions and relationships between certain patterns of behaviour and their consequences –(based on scientific evidence) on health, quality of life, life expectancy, etc. (at this regard, some interviewed promoters talk about "doing pedagogy" when they inform and stimulate people's curiosity).
- Bike driving courses in schools focused on increasing youth population competences for cycling on streets and interurban roads. Concerning bikes, there was also social

influence effect when several social groups (such as politics, journalists) started to use them.

5.5. Critical issues / How critical issues have been overcome

Only few superblocks have been fully or partially realized in both cities. Both superblocks programs are far from their completion (also thanks to budget constraints after the financial crisis of 2008, and due to local economy crises).

- In Vitoria-Gasteiz, just two superblocks are fully completed and 19 superblocks have been at least partially realized by now.
- In Barcelona, the superblock project implementation is slower than initially planned and it still involves a very limited area of Barcelona. Along with Sant Antoni and Poblenou (beyond the ones implemented in the past, such as Ciutat Vella or Vila de Gràcia, only few more superblocks have been started in four years).

A further critical issue is related to citizens' participation.

- First, In Vitoria-Gasteiz instances of contestation and resistance were reported by several persons interviewed occurring at the beginning of the project on the new public transport network resulting from the superblock scheme (optimised reducing the number of lines whilst, at the same time, offering more frequent and direct lines; as a consequence, the number of passengers is still increasing) or on the reduction of on-street parking places and the expansion of the regulated paid parking space for the private cars in the city centre (which increased the prize of parking on the street two-to three-fold which was almost for-free before). Furthermore, citizen participation has decreased after a few years. The execution of the mobility plan has led to a certain fracture of the consensus toward the participatory methodologies, since the municipal government adopted political decisions without having first taken them to the Mobility Forum, which did not receive a good acceptance by its members. Therefore, the mobility forum casted in sterile debates that caused people to stop attending.
- In Barcelona, neighbourhood movements emerged in 2016 against the superblocks. They see the project as a very unrealistic proposal, unrealizable in a large city, and even warn of a possible widespread collapse in the city if they spread, with the consequent damage in pollution levels (the levels of acoustic and environmental pollution in the periphery of the superblocks have increased because the traffic has been diverted to the perimeter streets). Such movements consider it an unrealistic proposal and they considered it as "pharaonic". In San Marti, complaints have focused on the "desert aspect" (lack of the people in the streets, mainly in the evening), the null information and the mobility chaos of the superblock perimeter. Moreover, many have criticized the fact that the urban configuration has not been changed (everything has a provisional aspect). In Poblenou (neighbourhood where the presence of shops in the streets is very scarce), results have been controversial. 87% of the 1,739 residents who voted in May 2017 in the consultation promoted by the Plataforma d'Afectats of the Superilla de Poblenou rejected the project. Among other things, citizens and their

associations denounce the lack of security in the night hours and mobility problems. Moreover, the resistance is due to the concentration of traffic, unchanged in quantity and nature by the unchanged habits of people who continue to use the car (using now the perimeter streets) and the lack of places for parking.

Further critical issues have been highlighted in Barcelona.

- Superblocks have been defined as "low cost" solutions, which eliminate traffic without involving a large investment by the municipality (in Poblenou, where a series of elements and street furniture, together paintings on the pavement of affected streets, change the neighbourhood at a very low price; in Sant Antoni, the investment is more expensive, as some pavements have been eliminated and streets and sidewalks are being built again to create unique platforms for pedestrian use).
- It has been stated that removing cars from streets often boosts property values in neighbourhoods with negative gentrification effects (according to some interviewed key-informants).
- In Poblenou, the project has caused a sharp drop in shopkeepers' turnover. Moreover, urban planners and city technicians responsible for the project report the difficult adaptation of a theoretical model (the superblocks scheme was designed 30 years ago) to the reality of the territory and of the selected neighbourhoods. The technicians also reflect on their responsibility when evaluating where the economic (and other) municipal resources are allocated. What happened in Poblenou informed the approach adopted in Sant Antoni where the imbalances would have a greater impact, given that the commercial, mobility and affluence levels are greater.
- In few occasions (e.g., the superblock of Poblenou), the district council has acted in opposition to the implementation of the superblocks, supporting the critical voices that were reluctant to the urban innovation and voted to eliminate the urban interventions and permit road traffic to enter again in the area.
- Public transport for commuters could be considered insufficient; that might become a barrier for a real transformation on people's patterns of mobility towards low carbon transportation.
- The "gentrification process" might transform the neighbourhood in a "trending place" that attracts people from other parts of the city, increasing renting prizes.

In Vitoria-Gasteiz the following critical issues have been underlined:

- Infrastructural changes, on their own, do not solve the pedestrian-cyclist conflict, and both regulatory (police) and educational measures are needed
- As the city extends its size and average trip distances become longer, it represents a challenge to solve how to apply the superblock model in the new neighbourhoods located in the periphery
- The City Council had to deal with the strong resistance of the city centre retail sector against the new parking policy that increased doubled parking fees on the street. Some of the interviewees remember that the retail sector and residents in the centre were able to gather about 13,000 signatures against the measure.

5.6. Changes in the sharing of knowledge

In both cases, instances of policy knowledge were reported by the promoters interviewed, mainly referred to the best forms of gaining social support to the Plans. The following main lessons come from these two experiences:

- Need of providing enough information and reliable data about the proposals and the changes envisaged by the Plan in each neighbourhood. Breaking misperceptions and demonstrating that the plan had more benefits than inconveniences
- Need of contextualization of the plan, explaining the overall ambition and thinking at the city-level scale.

5.7. Societal / environmental benefits

The superblocks project provides many benefits in terms of sustainability ranging from sustainable urban mobility through an increase of public spaces, social inclusion and biodiversity to the optimization and intelligent management of the use of resources, etc.

In Barcelona, the program will certainly significantly reduce energy consumption, environmental impacts of vehicles (also their noise pollution) and hence reduce GHG emissions in the area. Moreover, the creation of new common leisure spaces seems to improve commercial activities. According to the City Council (2018), the main impacts the superblocks programme has on citizens of the city are: "Empowering people, particularly children and the elderly, given the fear that traffic generates; Fostering intergenerational relationships through public areas where people can meet and carry out leisure activities; Strengthening people's emotional bonds with their environment while participating in decision making; increasing public safety by increasing vitality in the streets; making more space available for physical exercise; and so on".

In Vitoria-Gasteiz, there is an evident positive impact of mobility policies on the environmental quality of the city (studies report evidence of increasing air quality and lower noise pollution, reduction of traffic intensity and fuel consumption). The City Council reports a reduction of total of CO_2 emissions (saving of 421.5 tons / year in CO_2 emissions) due to the reduction of motorized traffic in favour of the bicycle. The better environmental quality is related to "a greater well-being of the citizens" (in terms of health, habitability of the city, etc.). Globally (in the pilot superblock), 42% reduction in CO_2; 42% reduction in NO_X; 38% reduction in particle matter; noise measured before the action: 66.50 dBA, and after the action: 61,00 dBA (the result is directly related to the reduction of motorised vehicles in the zone).

5.8. New behaviours

Superblocks implemented in Barcelona and in Vitoria-Gasteiz have enhanced a change in patterns of mobility in residents (the development of a new mobility paradigm). The main changes are related to:

- Decrease in the use of the private cars (some Barcelona estimations talk about a decrease of 8.1% in car use from 2004 to 2015; the city council estimates that car driving decreases by 26% when superblocks are implemented)
- Increase in the use of public transport that is sustained over time; e.g. during the period 2006-2012, there was an 80% increase in the number of travelers/month (tram and bus) in Vitoria-Gasteiz
- Increase in the use of bikes
    - Vitoria-Gasteiz doubled the cycling rate in only three years to the Spanish record level of 12.3%; the bicycle is used by the youngest people in the city, students, university students, etc.
    - in Barcelona, the city council estimates that cycling trips increase by 30% when superblocks are implemented; in the area of Poblenou children and young people usually move using bikes and scooters; biking is a city trend now and superblocks facilitate this form of transport because citizens feel safer, in particular children and young people, when no cars are around
- Change in the use of public space
    - in Vitoria-Gasteiz, pedestrianization measures facilitate socialization within residents living in the superblocks (elderly people like to walk around car-free streets); moreover, the main intervention has been developed in the city centre and the area has become a shopping and spare space for all citizens
    - in Barcelona, people like to spend a long time on the streets; due to the reduction of velocity in internal streets, the prohibition of circulation in others, and creation of new public infrastructures (e.g., new gardens, table-tennis tables) in several areas of the Poblenou superblock, neighbours are said to spend more time on the street, and spaces used before for circulating or parking are used now to have lunch, children playground, table-tennis competitions and even dinners and parties.

5.9. Up-scaling / replicability

Both superblock projects considered in this chapter (Barcelona and Vitoria-Gasteiz) prove that it is not necessary to implement major changes in urban planning or invest in huge infrastructure solutions to improve the lives of citizens. The superblocks model is a great tool to rethink and change existing urban mobility patterns. At the same time, it has become a model for the total transformation of urban neighbourhoods, and superblocks can easily be replicated and modified to suit any other location. Citizens' involvement in the whole process is crucial because it is the best way to ensure social acceptance of new lifestyles.

Based on the experiences in Barcelona and Vitoria-Gasteiz (probably the most advanced in such kind of social innovation), the idea of superblocks is already spreading to other typologically diverse cities in Spain, such as A Coruña, Ferrol,Viladecans and El Prat. Moreover, these experiences have been presented and described internationally as a revolutionary urban innovation and several municipalities are already in contact to learn about the superblocks experiences and adapt it to their social and physical context. An

example of this is the city of Zaragoza (Spain), which invited the members of the Collectiu Superilla Poblenou in Barcelona to present their experience and illustrate to Zaragoza citizens the positive impact of superblocks, as some of the interviewees mentioned. The members of the city councils also reported that the city of New York and the city of Copenhagen are already learning from these experiences. Representatives of both cities have visited Barcelona and the Technical Secretariat of the Superblocks Programme give advice and support to both cities.

Other cities in the world (Melbourne, Toronto, Lisbon, Quito, Buenos Aires, Moscow and Mexico City as well as cities in India, China, Japan, and South Korea) have demonstrated their interest in implementing the superblock model in their territories and the *Agencia de Ecologia Urbana* is becoming the agency that usually provides technical support.

In this regard, and for all the detailed information, please refer to the analytical sheets attached to this Report.

6. Fifth cluster: Co-ordinated, tailored and inclusive energy efficiency schemes for fighting fuel poverty

6.1. Starting point

Critical attitude

In both cases promoters are aware of the social and environmental dangers and risks that will surface in the short, medium and long term, having in mind an idea of a change contrasting the current conception of quality of life in favour of a new relationship with the environment.

Promoters

In both cases, the main important actor is the Municipality (e.g., Aberdeen City Council – ACC, is responsible for the development of the city's strategic approach for energy and sustainability and is driving Aberdeen's low carbon transition; the Municipality of Timișoara is committed to providing citizens access to secure, sustainable and affordable energy). Some other local actors are involved, too (in Aberdeen: Aberdeen Heat & Power Ltd – AHP), a not-for-profit company set up by Aberdeen City Council and the Social enterprise SCARF; in Timisoara: the local district heating company; the Federation of Owner's Associations in Timisoara; the Agency for Energy Management; the Romanian Sustainable Energy Cluster).

Approach

Both approaches are participative, aiming at including citizens, since the beginning.

6.2. Changes in ways of producing, managing, and consuming energy.

The reduction of energy use and associated emissions are nowadays a key-theme in planning, and are an integrated element in both cases. More specifically, both planning processes entail deep reductions in the consumption of energy devoted to house heating.

The Aberdeen project focuses on the development of the Aberdeen Heat Network and associated household energy efficiency schemes in the city, exploring the development of district heating at a city-scale, within a context in the UK where heat networks are not a common domestic energy source, with the primary driving ambition of reducing fuel poverty and provision of affordable warmth in the city.

The Timisoara project is still at an early stage. However, since the beginning, the main objectives proposed in the initiative are the reduction of energy consumption and

greenhouse gas emissions, the use of renewable energy sources in the field of construction, and the use of renewable resources without medium and long-term storage associated with higher energy efficiency and low costs (lower prices for vulnerable consumer).

Both cases can also be viewed in the context of wider city energy transition, integrating existing regional or national programmes aiming to improve the energy efficiency of homes through improvements of the building fabric with a neighbourhood-scale heat network retrofit, providing a common platform for engaging householders and securing maximum benefit in terms of fuel poverty reduction.

6.3. Changes in social relationships, interactions, and configurations

The Aberdeen case relies on a partnership approach, bringing together key regional players from public, private and third sectors in the delivery of an integrated programme of measures which will require uptake by households on a voluntary basis. The case, as of now, entails a closer linkage (formal and informal) among separated policy sectors such as local energy production, household energy efficiency, fuel poverty and housing quality, also thanks to having installed intermediary officials mediating between different council departments (with their "specialisations") for many years now. Moreover, the local-level response in Aberdeen led to the development of a new model of organisation whereby the council established AHP as a not-for-profit company which remains its close partner and leads in taking forward the infrastructural development and operational aspects of the Aberdeen Heat Network.

The Council considered that this organisational structure was more likely to enable rapid progress towards their targets than if the project had been taken forward by ACC itself under its own internal governance systems. It also felt that it would reduce the Council's financial risk. Together, ACC and AHP have formed a partnership with Scarf (a third sector / charity organisation), which is acting as a 'critical friend' in the process. This partnership can provide residents with energy on a cost based heat tariff – rather than market based. While this can mean more affordable heat to the consumer, it also means that households (no longer being part of the wider energy market) can no longer exercise choice over their energy provider. Furthermore, under a fixed rate tariff, there is no economic incentive for householders to reduce their energy use or limit wastage.

The Timisoara initiative is still in a conception stage. Therefore, no new organizational models can be identified, yet. However, the project has already improved the propensity towards a better community engagement and a real partnership working approach, building on existing relationships established through prior actions included in the plan. The number of participants that remained relatively high in the meetings already implemented led to conclude that local stakeholders are interested in implementing the proposed solutions.The aim is to create a strong partnership between the public sector, theprivate sector and citizens to support energy poverty projects and initiatives, bringing also together specialists from several fields: agriculture, engineering, policy makers, etc. Until now, there are no opponents. This partnership should also create the premises for the commitment of

voluntary associations and experts of various organizations (consulting companies, central heat supply system operators, entrepreneurs, real estate agencies, professional associations, universities and local public authorities, NGOs, SMEs, consulting companies, financial institutions, etc.).

6.4. Strategies for gaining social support

In Aberdeen, as a part of the development of the Sustainable Energy Action Plan, stakeholders' engagement activities and statutory consultations have been carried out. A steering group consisting of external stakeholders from both the public and private sectors has been set up to guide the implementation of the Action Plan, providing input from civil society actors. The Action Plan also sits within the wider policy landscape governing low carbon transition at the national level. Partners in this fuel poverty project have identified community engagement as a critical element in the success of the project.

In Timisoara, the project is expected to involve beneficiaries from the start in project implementation through seminars/information workshops, in this way attracting different representatives of beneficiaries and groups of influence, even potential opponents.

6.5. Critical issues / How critical issues have been overcome

In Aberdeen, significant responsibility has been placed upon council officers, councillors and AHP board members, which in the absence of input from the established energy industry, has meant that a great deal of new knowledge and institutional capacity for local-level energy provision had to be developed to take the initiative forward (because of the UK energy market, designed for large-scale centralised provision). This has 'undermined the economics of small-scale combined heat and power production and resulted in the limiting of local authorities' role in the energy industry. The limited autonomy over energy provision at the local government scale inevitably impacts on the institutional capacity of local authorities to progress 'meso-level' or urban-scale responses such as district heating. Same critical issue could affect (in perspective) the case of Timisoara.

Moreover, in Aberdeen initial proposals to establish district heating in some housing blocks were contested in some quarters, e.g. by politicians, and by housing, finance and legal officers, largely on the basis of cost/value for money, the risks associated with the council having to take on liability for tenants' non-payment of fuel bills and general concerns about risks associated with doing something new and out of the council's existing portfolio of work.

6.6. Changes in the sharing of knowledge

To facilitate the development of these cases it is necessary to develop a great deal of knowledge about delivering local energy systems, given that the existing energy landscape (in the UK and in Romania) has been focused on centralised energy production.

6.7. Societal/environmental benefits

In Aberdeen, the buildings served by the four schemes currently in operation have reduced their CO_2 emissions. The average National Home Energy Rating (NHER) in the multi-storey blocks increased from 3.3/10 in 1999 to 7.19/10 by 2009. The replacement of electric heating with CHP district heating in homes is estimated to have delivered a 40% (Scottish Futures Trust, 2015) or 45% (Webb, 2015) reduction in carbon emissions from domestic heating, in comparison to the former electric heating systems in place. Cost and carbon savings should also be considered: because of the high cost and inefficiency of the previous electric heating systems, it is likely that many houses would have been underheated (residents had also been known to limit their use of electricity for heating in order to save money, leading to the generalised underheating of homes). In Timisoara, the project is in a too early stage for recording any environmental and economic effects.

6.8. New behaviours

Due to their early stage, these projects have not generated yet new behaviours. However, both have already improved the propensity towards a better community engagement and a real partnership working approach, building on existing relationships built up through prior collaborative projects.

6.9. Up-scaling/replicability

The Aberdeen case could be replicated by public bodies elsewhere at the following conditions:

1. A proposed project is not financially viable without a component of grant funding and/or low-cost, long-term loans
2. The public sector body is able and willing to provide a significant level of financial resource in the form of loans or guarantees
3. Availability of resource and willingness within the public sector body to develop energy projects
4. Prioritisations of social benefits, and reduction of CO_2 emissions, over other objectives such as income generation
5. A high degree of local control over cost structures and revenues is desired in order to control energy tariffs.

The Aberdeen case has been promoted as a model for heat network development in the UK, and has received several awards in recognition of its achievements. Nothing similar can be said, until now, for the Timisoara case.

In this regard, and for all the detailed information, please refer to the analytical sheets attached to this Report.

7. Conclusions: Going Forward

In the previous five sections of this text, we have produced five profiles of social innovation in energy transition, one for each of the five clusters of cases that represent the "empirical basis" of the SMARTEES project. These five clusters of social innovation cases in energy transition are quite different from each other as shown below.

Cluster	Energy transition "sector"	Implementation period
C1. Holistic, shared and persistent mobility plan (Zürich, Groningen)	Energy consumption: transport/mobility	60s/70s → now
C2. Island renaissance based on renewable energy production (Samsø, El Hierro)	Energy production	90s → now (Samsø)
	Energy consumption: transport/mobility	
	Energy consumption: housing	2009 → now (El Hierro)
	Energy consumption: industry (agriculture)	
C3. Alliance for a district regeneration based on energy transition (Malmö/Augustenborg, Stockholm/Järva)	Energy production	80s / 2000
	Energy consumption: transport/mobility	
	Energy consumption: housing	
C4. Urban mobility with superblocks (Vitoria-Gasteiz, Barcelona)	Energy consumption: transport/mobility	90s → now
C5. Coordinated, tailored and inclusive energy efficiency schemes for fighting fuel poverty (Aberdeen, Timisoara)	Energy consumption: housing	now

The next step of our work in WP3 is devoted to understand "prima facie" how social innovation works "in action" as a whole in the energy transition on the basis of the results presented in the previous sections of this deliverable. Based on the findings of this task, the next deliverable (D3.3 – Policy-brief on social innovation in energy transition) will be prepared.

In this perspective, we can first start to identify (without any claim to completeness) some common elements of social innovation among the five cluster profiles presented in the previous five chapters.

The search for commonalities, of course, does not mean that there are not huge differences. Rather, social innovation takes on specific characteristics in each cluster (which is why it makes sense to have classified the SMARTEES cases in "clusters") corresponding to specific forms and paths of social innovation towards the energy transition. As evidence of this, some important differences have been found among clusters and will be highlighted later.

Beyond these clusters' differences, every case of social innovation also has its specificity and uniqueness, and it is thus possible to identify further differences at the case(s) level i.e. "transversal" to the clusters. Some examples will be reported at the end.

Main common elements in all the five clusters

- A critical attitude against "traditional" schemes of organizing / doing:
  o Mobility schemes based on cars (car-friendly city) or/and underground (years 60s/70s)
  o Social housing schemes (e.g., "million homes program") / welfare state traditional schemes (years 80s)
  o Lack of climate change management and related increase of environmental dangers and risks (since years 90s)
  o Post welfare state schemes characterized by an increase of inequality and by the emerging of new poverties (since years 2000s).
- Environmental sustainability as a core issue (in all cases/clusters since the '90s; however, this was not a concern before, in the older cases but rather entered the discussion later for them).
- Municipality as the main (or one of the main) promoters of actions.
- Some main strategies for gaining and maintaining social support/consensus:[7]
  o Involvement of citizens in decision-making
  o Constant negotiation with citizens and/or specific groups (e.g., "opponents", such as shopkeepers or car drivers).
- Occurrence of more or less intense conflicts in relation to top-down approaches and "push" actions are often an initiator or motor of the development (i.e., actions consisting in prohibitions), or in relation to the lack of consideration of the viewpoint of the actors involved (as it happened in cluster 1, cluster 4 and, where relevant, in clusters 2 and 3 too). So it can be said, that often the social innovation approaches emerge after traditional top-down strategies failed.
- Generation of pro-environmental behaviours among citizens (in all clusters; even if only potentially, due to their early implementation stage in the Cluster 5 cases).
- Improvement in knowledge sharing and management; e.g.:
  o Citizens considered as experts and bearer of specific and territorially grounded knowledge in cluster 3
  o Strong attraction of the international scientific community in cluster 2
  o Intense circulation of (new) knowledge/sharing of (new) knowledge in all clusters.
- Important environmental benefits in relation to the reduction of CO_2 emissions, air pollution, noise pollution, etc.

Main differences between clusters

- Critical relation (always more or less overcome) with part of the entrepreneurial / business sector:

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[7] Included in El Hierro (Cluster 2) and Timisoara (cluster 5), although in these two latter cases, it is still a potential trend.

- o Relevant in cluster 1 (more in Groningen, less in Zürich) and a little less in cluster 4, too
- o Not relevant (at least apparently) in cluster 2, cluster 3, and cluster 5.
- Integrated approach across several domains of energy use / production:
  - o "Full" in cluster 3 (including energy efficiency of buildings, mobility, energy production, education/culture, management of the environmental risks, etc.)
  - o Partial in cluster 2 and cluster 4
  - o Limited in cluster 1 (holistic approach, but only on mobility) and in cluster 5 (focus on energy efficiency and on fight against energy poverty centred on the housing sector).
- Further main strategies (beyond the ones highlighted above) for gaining and maintaining social support/consensus:
  - o Experience of the city as a pleasant, friendly, clean and accessible place as strategy for gaining and maintaining social support/consensus (cluster 1 and cluster 4);
  - o "Celebration" of the new identity of the district as an environmentally sustainable neighbourhood (Cluster 3).
- Experience of formal or nearly formal partnerships among public and non-public actors (cluster 2, cluster 4, and cluster 5[8]).
- Progressive increase of the number of involved actors during the years (cluster 2, cluster 3, and cluster 5) vs. greater stability in this regard (cluster 1 and cluster 4).
- Upscale/replicability:
  - o Quite evident and more or less already in progress (cluster 2, cluster 3, and cluster 4)
  - o Less evident/restricted to specific contexts (cluster 1 and cluster 5).
- Important societal benefits in relation to the improvement of the quality of life/the reduction of social exclusion:
  - o Quite evident in cluster 1, cluster 3 and cluster 4
  - o Less evident in cluster 2
  - o Potential (e.g., reduction of the energy poverty) in cluster 5.

Main differences "transversal" to the clusters

- Alliances with citizenship:
  - o Since the conception, but accompanied, later, by important conflicts (Barcelona/C4)
  - o Since the conception, without important conflicts (Zürich/C1, Malmö/Augustenborg/C3, Vitoria-Gasteiz/C4, Aberdeen/C5)
  - o Later, Later, but soon anyway, for preventing/managing potential conflicts (Samsø/C2)
  - o Later, after conflicts that generated an important paradigm change at this regard (Groningen/C1, Stockholm/Järva/C3)
  - o Later, without conflicts (El Hierro/C2).
- Governance configuration:

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[8] However, still expected in Timisoara.

- o Use of consolidated patterns/schemes (Zürich/C1, El Hierro/C2, Barcelona/C4)
  - o New configurations since the beginning (Samsø/C2, Malmö/Augustenborg/C3, Vitoria-Gasteiz/C4, Aberdeen/C5)
  - o New configurations later (Groningen/C1, Stockholm/Järva/C3).
- Improvements in the business model configuration in the public administration:
  - o Improved cooperation (Zürich/C1, Stockholm/Järva/C3, Malmö/Augustenborg/C3, Barcelona/C4, Vitoria-Gasteiz/C4, Aberdeen/C5)
  - o Apparently not relevant (Groningen/C1, Samsø/C2, El Hierro/C2)
  - o Undetermined (Timisoara/C5).
- Generation of "social cohesion" behaviors among citizens:
  - o Relevant as objective reached in Groningen/C1, Samsø/C2, Vitoria-Gasteiz/C4 and Barcelona/C4
  - o Relevant as objective, unfortunately not reached, in Malmö/Augustenborg/C3 and Stockholm/Järva/C3.
- Further strategies (beyond the ones highlighted above) for gaining and maintaining social support/consensus, specific case by case or common to sets of cases; e.g.:
  - o Capitalization of the experience (and lessons learned) through the set-up of Samsø Energy Academy in Samsø/C1
  - o Adoption of targeted policies, such as the one addressed to the larger companies in Zürich/C2
  - o Environmental education activities in Stockholm/Järva/C3 and in Vitoria-Gasteiz/C4.

Going forward, trying also to consider further issues (e.g., what are the conditions that can allow a social innovation – which we have already called "transformative" – to produce a real structural change able to consolidate and make the energy transition process irreversible?), the D3.3 will be drafted. Later, WP3 will be concluded through the D3.4, which will represent its final product, providing further substantive inputs for the following WPs, based on elaborated models of social innovation.

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Presentation Sheet of the 10 SMARTEES' Reference Cases

(by Cluster)

This Appendix includes 10 information presentation sheets respectively for each of the 10 SMARTEES' reference cases

These sheets are documents (drafted in their first version in September 2018) that are constantly being processed as new information is collected

The present versions have been prepared in April 2019 and are based on the sources (documents and web-pages) mentioned in the References (at the end of the main text), and on the interviews to key-informants implemented in the period December 2018-March 2019

HOLISTIC, SHARED AND PERSISTENT MOBILITY PLAN
Zürich

1. Background

Zürich is the largest city in Switzerland and the capital of the canton of Zürich. It is located in north-central Switzerland at the north-western tip of Lake Zürich. The municipality has approximately 400,000 inhabitants and 330,000 workplaces within the city borders.[1] The urban agglomeration has 1.3 million; the metropolitan area has 1.8 million and the Greater Zürich area 3.2 million[2] inhabitants. Zürich is a hub for railways, roads, and air traffic. Every day, in 2012, more than 1 million people travel across the city borders, more than 400,000 using public transportation and about 700,000 by car. One of the main issues that the city faced and still has to face, is the large number of people commuting during the day for working in the city. This number, as well as the number of Zürich inhabitants, has greatly increased in the past decades and is foreseen to further increase in the near future.

The story of the Zürich Mobility Strategy goes back to the 1970s. Until the 1970s, public spaces in Zürich were designed primarily to handle automobiles. The general public went along with this expansion of streets with the goal of creating a "car-friendly city" as symbol of progress. In the 60s and 70s the city administration developed two different projects for underground solutions for short distance public transport. Both projects have been rejected in referendums – one in 1962 and one in 1973. Indeed there are public transport experts, both in Zürich and elsewhere who still consider this rejection the most strategic and fundamental mistakes in Zürich's transport history.[3] In fact, this vote against large investments in new technologies made clear that tax-payers wanted the existing surface public transport system working better and more efficiently instead of leaving surface to cars and adopt a two level (surface and underground) mobility system. In this regard, immediately after the second referendum (1973) a "people's initiative" was launched with the aim of providing 200 million CHF for projects to speed up trams and buses. As a matter of fact, this initiative (together with the failed referendums) marked a discontinuity in the development of the city and gave the important impulse that a majority of the population expressly agreed to a policy aimed at improving urban space for people, with a residential area very attractive decreasing traffic congestion through an improvement of surface public mobility. It is upon this impulse that the Zürich Mobility Strategy is rooted.

At the beginning, as well for many years, this strategy was focussed only on mobility aims and issues. More recently this strategy has been framed in the overall Zürich energy transition policy towards a less carbon society for a better environment sustainability.[4]

2. Implemented actions

It is not easy to synthesize the wide array of actions developed around the mobility and transport planning in Zürich for over 40 years (from the 70s until now). Those measures were developed

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[1] Data related to 2012 (inhabitants 385,000).
[2] Data related to 2010.
[3] Moglestue, A. (December 2005). "Zürich: A city and its trams". Retrieved 28-09-2018.
[4] E.g., as explained by a key-informant: "I do not think, especially at the beginning, there was the goal of reducing carbon but, of course, this is a good side effect and that has become more important with the time".

gradually with different plans in time. The first idea was centred around a strong improvement of public transport. Later, to give space to all kinds of mobility, the idea was ensuring to people a "freedom in mobility".[5] All the plans followed some political decision approved by a referendum, and relied on the results of previous measures, improving them and going persistently in the same direction.

The main updates of the plan were:

- 1977 – People's Initiative for the Promotion of Public Transport
- 1991 – Verkehrsbetriebe der Stadt Zürich. Beschleunigungsprogramm 2000[6]
- 2001 – The New Zürich Mobility Policy
- 2012 – Urban Traffic Initiative / Stadtverkehr 2025.

In line with the available sources,[7] at least five different types of measures can be identified: a) dynamic traffic management; b) restricting private traffic; c) improvement of suburban public transport; d) strengthening pedestrian and bike mobility; and e) marketing, culture and behaviours.

a) Dynamic traffic management. Studies done in the seventies showed clearly that a better management of the tram and bus network on the surface (without underground) was possible and necessary. Many obstacles along the tracks prevented a quick and efficient tram and bus service. Cars on the track or on the sidewalk forcing pedestrians to invade the track, too long red lights periods, small accidents and other problems prevented the regular circulation of the trams. In 1979, the City Council instructed the municipal authorities to give public transport priority in any conflict of interest in the transport sector. A "speed up program" was started: reserved tracks were created for tram and bus, the traffic lights were programmed to give way to public transport vehicles (through a sensor system), and a central control room was created for the management of the public traffic in real time.

b) Restricting the private traffic. Zürich soon noticed that a better urban living quality could not be reached through good public transports only. This measure alone would not lead to less private traffic because the car still offered a better comfort than the public transport for many people. Nevertheless, to guarantee a high living quality, it was necessary to restrict the presence of cars in town. For this purpose, parking space planning provided effective support for transport policy in the last three decades. One of the specific measures developed in the city was dealing with parking on private property. The parking policy of Zürich regulates not only the number of mandatory parking spaces in new buildings (as already happen in many other cities) but also the maximum permissible number of extra parking spaces (this measure was adopted in 1989). In addition, where good or very good

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[5] E.g. as explained by a key-informant: "the people can choose their mobility form they like; very free. They can decide in which way they travel from A to B. We have to think and to plan all that: for cars, for bicycles, for pedestrians, for trams, for buses, all together", ensuring, as added by another one "a way of freedom to go everywhere".

[6] Nash, A.B., & Sylvia, R.D. (2001). Implementation of Zürich's Transit Priority Program. Mineta Transportation Institute, San Jose State University.

[7] See Ott, R. (2011). Zürich's transport planning for quality of living. www. stadt-zuerich. ch/mobilitaetskultur. and COST8, Best practice for sustainable urban infrastructures, Case Studies – City of Zürich, available at: http://www.cardiff.ac.uk/archi/research/cost8/case/transport/Zürich.html

public transport services exist, more areas have been sorted out for further reductions. The designation of these areas is also related to clean air requirements. Generally, the policy is replacing the on street parking with off street parking spaces. The restriction of private traffic was not a smooth process. In 90s there was a contentious battle for allowing the use of car in downtown. This battle ended in 1996 with the so called "historic compromise". The essence of this compromise between opposite political forces is that in the city centre the number of parking places for visitors and customers is limited to the level of the year 1990. That means, when a new public parking garage opens, the same number of street parking places must be eliminated. The parking policy of the city was confirmed by a referendum in 2010. Furthermore, with the intent of ensuring a better quality of life of inhabitants, a city-wide program for low-speed zones in residential areas (30 or 20 km/h) was launched in the early 1990s and is now very comprehensive. Other measures for restricting the private car traffic consisted in closing some streets, such as Limmatquai after a Referendum in 1999.[8]

Limmatquai closed to the car traffic
Source: received from the Municipality of Zürich

c) Improvement of the suburban public transport. In order to reach the objectives of the transport strategy, an improvement of the suburban connections was needed. On May 27th, 1990 a complete suburban railroad network was activated by the Canton of Zürich. It is the well-known "S-Bahn Zürich" system. The city of Zürich is one of the 171 municipalities in the Canton of Zürich. Approved by a referendum, the investment amounted round about 2 billion CHF. The main part of the regional S-Bahn project was the construction of a four track through-station underground, combined with a new tunnel under the old city centre and the Zürich berg. This meant a doubling of capacity of the former bottleneck located by the central station and made it possible to introduce new connections and diametrical lines within the city. Thanks to this, a 420 km network of railways has been established serving the whole conurbation. At the same time the "Public Transport Community of Zürich" was

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[8] Referendum was held on 13.06.1999. Results: 59.5 % Yes vs. 40.5 % No.

created, whose goal was to co-ordinate the offer of public transport in the region and to organise the ticket selling. The S-Bahn system nowadays includes the incorporation of the individual transport operators within the Zürich Transport Authority (ZVV). The attractive network runs in the whole Canton of Zürich (approx. 50 km north-south and 40 km east-west), and it includes railways, trams, buses, as well as cable-cars, boats and riverboats. The quality of public transportation is very high (frequency, reliability, speed, good connections, WiFi availability, simplified tariff and ticket structures, effective claim system, etc.). In trams and buses seats are almost always available.

d) Strengthening pedestrian and bike mobility. Since the late 80s public administration gave the second priority after public transport to pedestrians and bicycles. All the activities carried out by the plan start from the consideration that the success of public transport is deeply linked with the attractiveness of pedestrian mobility. For this reason a wide array of activities have been developed in order to increase comfort, convenience and security of pedestrian mobility, e.g. removing barriers, the already mentioned low speed zones, street signals, and access to public transports. Bicycle infrastructures and mobility culture has been addressed over 30 years and is still one of the main task of the new plan (see below).

e) Marketing, culture and behaviour. The infrastructural improvements as well as the dynamic and smart way of managing traffic through an information system have been complemented in Zürich through a wide array of soft measures, ranging from marketing to cultural and behavioural work with citizens and public transport (PT) users. On the marketing side the aim of the city is not only to maintain, but also to improve the market position of public transportation. This is particularly complex because every year about one fourth of all inhabitants move houses. So every year, the Zürich Transport Authority (ZVV) has to acquire the same number of customers just in order to keep the status quo. The marketing of public transport was accompanied by many actions devoted to increasing the mobility culture in the city. This idea generates from the observation that the perceptions – and consequently the mobility choices – of citizens are often biased.[9] The activities developed in this regards are several: Information, Consulting – Mobility at companies, Mobility Education for children, and Promotion city-fair choice of behaviours.

The five areas of intervention described above are developed with the idea that the interaction of the different aspects is the key to success of an overall and holistic plan.[10] Moreover, the different aspects presented above, are still under improvement nowadays. In 2012, the Zürich City Council launched the urban traffic programme "Stadtverkehr 2025" to tackle the specific challenges of traffic. The programme further develops the previous urban traffic policy and thus builds upon existing strategies. At the same time the programme pursues six goals.

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[9] Meier-Bukowiecki, Y., Leypoldt, P., &Sieber, M. (2009). Mobilitätsstrategie Stadt Zürich: Controlling an hand von Leitprojekten. Strasse und Verkehr, 95(6), 14-17.

[10] However, at this regard, the present status is not considered satisfactory by everybody, as claimed by one key-informant: „We have an overall strategy and in this strategy, there are a few parts, like one is for bicycles, one is for pedestrians, one is for public transportation. I think that the next step will be to bring all the sectorial strategies again together under one roof and to see how these different strategies work together …".
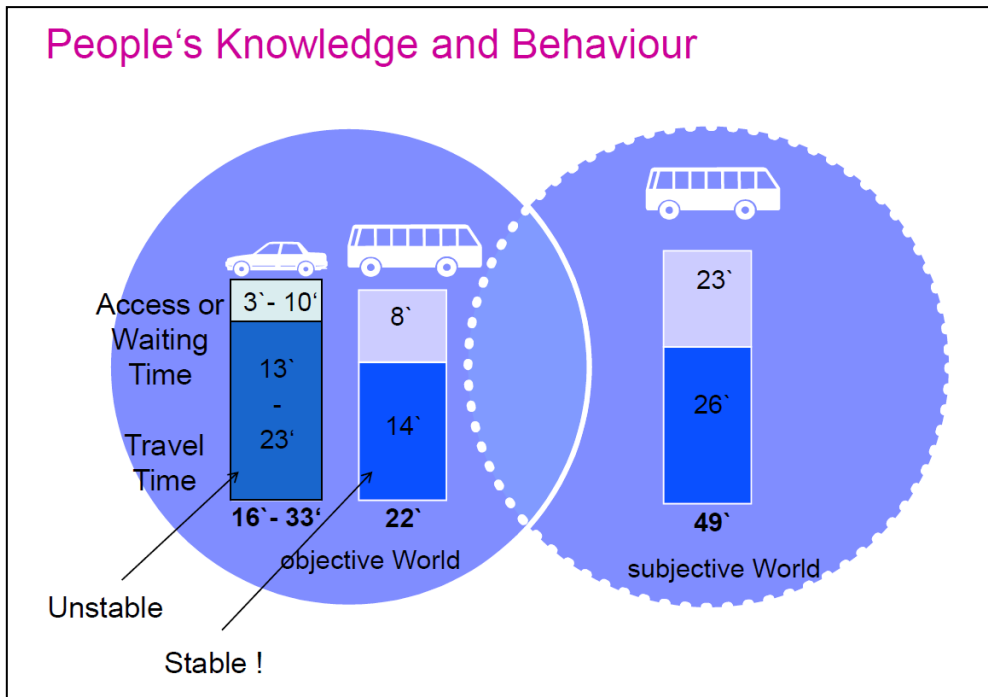
The gap existing between subjective knowledge and objective measurements affecting mobility behaviour.
Source: Meier-Bukowiecki Y., Zürich's Mobility Strategy, September 29th, 2010

- The modal split of public transport (PT), pedestrian and bicycle traffic is to be increased. The target is to increase the percentage of public transport, pedestrian and bicycle traffic within the overall volume of traffic in the City of Zürich by at least 10 percentage points within 10 years after Article 2[quinquies] of the Municipal Code has gone into effect.
- The availability and attractiveness of PT along with pedestrian and bicycle traffic are to be improved.
- The overall capacity of the vehicular traffic network for motorised private transport (MPT) will not be increased.
- The goals of the 2000 Watt Society regards reducing energy consumption to 2000 watts per person and greenhouse gas emissions to one tonne of CO_2 equivalents per person per year by 2050 are to be implemented in the mobility area.
- Residents are to be protected from the negative impacts of traffic (including noise, pollutants, and accidents).
- The quality of public spaces, in other words the design and functionality of streets and public squares, is to be increased.

The programme is based on the City Council's "Zürich Strategies 2025" and makes a significant contribution to the implementation of the new Article 2[quinquies] of the Municipal Code, which voters approved in September 2011 with the acceptance of the Urban Traffic Initiative. The program relies also on the fact that on November 30, 2008 the voters of the City of Zürich approved with 76% in favour an addition of the objectives of a "2000-Watt-Community" to the city's constitution.

The programme is realised through a concrete Action Plan which organizes the specific activities to be developed in time. The Action plan foresees continuous monitoring actions, specific indicators for each task and annual reporting for communicating the progress achieved during time.

The contribution of the different lines of intervention of the Action Plan to the different goals of the programme are shown below (green= strong contribution, light green= light contribution).

	POSITIVE CONTRIBUTION TO THE GOALS							
	Improve availability and attractiveness of			Do not increase MPT capacity	Implement the 2000 Watt Society in mobility	Protect residents	Increase the quality of public spaces	Increase the modal split of PT, pedestrian and bicycle traffic
	PT	pedestrian	bicycle					
VBZ network development strategy and trolley bus strategy	green			green	green	light	light	green
City centre traffic concept and upgrading of urban areas in neighbourhood centres		green		light		green	green	
Bicycle Master Plan			green	green				green
Parking area planning and management				light	light	light	light	light
Reducing street noise						green	green	
Mobility consulting and education			light		light			green

Source: City of Zürich, Urban Traffic Programme – "Stadtverkehr 2025" – 2012 Report

It can be also noted that the planning of the public transportation system follows a demand-oriented approach. This means that not only is the capacity of the public transportation system continuously adapted to the growing demand for mobility, but also that there is pro-active planning at the appropriate moment.

Moreover, some specific future (but already designed/expected) projects have been highlighted as important by the interviewed key persons:

a) to enlarge further the public transport; development will go further in the metropolitan area during the next years (e.g., many tram lines extensions or new lines projects have been mentioned)
b) the enlargement of the station of Stadenholfen
c) the improvement of Zürich streets in the urban area to enhance the attractiveness for people who walk and cycle (e.g., Smarter plan velo: to build more lanes for cycling in an

intensive way in the next 2 years, develop bike sharing, and more stations and parking stations at the train stations also for cycling.

Some other projects are at the study or testing level (e.g. to increase tram speed by giving them priority at the crossroads thanks to automatized green light when the tram arrives; to develop Smartphone applications that enable customers or travellers to choose between various options of transport means in real time).

Few financial data

In over forty years of activity, a lot of investments were made in Zürich related to traffic and mobility. Some of the figures that are highlighted in the available documents are reported below.

- A bottom up initiative was launched in 1973 with the aim of providing 200 million CHF for projects aimed at speeding up trams and buses.
- The Canton of Zürich invested in 1990 about 2 billion CHF for developing the S-Bahn, the suburban railway. Also in this case, the investment was approved by a referendum.
- The Civil Engineering Office invests annually approx. 80 million CHF for road and public space construction and/or renewal.
- 120 millions of Swiss francs for investing in Zürich streets are presently spent every year for investing in Zürich streets for their improvement.

3. Stakeholders analysis

The initiative has been promoted, firstly (see § 1.) by the citizens of Zürich themselves who launched a referendum in 1973 about the "people's initiative" with the aim of providing 200 million CHF for projects to speed up trams and buses. The initiative was approved (by referendum) and the initiative was endorsed by the municipality. Since then, the municipality is the main promoter of the initiative in strongly cooperation with the citizenship (through many further referenda and a structured process of people consultation).

Involved actors and negotiation processes

The actors involved in the Mobility strategy may be divided in different levels: a) the different actors within the City Government; b) other institutional actors; c) territorial actors (business included); d) experts, scientists and policy makers; e) citizens and city populations. All these actors are involved in the plan through a widespread and continuous negotiation process. This negotiation process involves the different types of actors with different tools and at different moments.

a) *The city government actors*

The implementation of the plan is carried out by services belonging to different departments of the administration. Such services work together for the implementation of the plan. For this reason a continuous work of negotiation is ongoing within the administration. It is worth noticing that each department is guided by a member of the city council, and these members are elected directly, and thus they may belong to different political parties (today they are all from the same

political orientation but this has not been the case often in the past). The three services involved in the plan implementation are:

- Civil Engineering and Waste Management Department (Road, Building and Recycling). This department covers aspects such as public infrastructures, pedestrians and bike mobility. This department takes care also of monitoring the advancement of the plan in coordination with the other two departments.
- Department of Public Utilities and Transport (Public Transport Services, Water Supply, Electricity Services). This department is in charge of Public Transport management. Specifically, this department takes care of tram and buses, since responsibility for trains is located at a higher federal level. The public transport company is therefore connected with this department.
- Department of Public Safety. They are in charge of the Motorised Private Transport (MPT) and in general of traffic management, so they manage all the aspects of traffic related to ICT and road safety.

Moreover, two additional departments are involved:

- Presidential department. This department works in a holistic way on urban development, which is something that should be closely coordinated with the other aspects above mentioned. They also are involved in understanding what the outcomes of the choices made in the plan are.
- Health department. They work on aspects such as checking the quality of air, and controlling transport and car noises.

Divergences among the involved departments are due, beyond (eventually) political motivations, also to specific objectives pursued (e.g., the Civil Engineering and Waste Management Department wish to reduce the motorized vehicles speed from 50 km/h to 30 km/h against the wish of the Department of Public Utilities and Transport that wants that public transports can travel up to 50 km/h for keeping their effectiveness; conflicts are also on the use of roads/streets spaces: if you build a bike lane, there is less space for buses and trams – and for cars).

Thanks to the set-up of specific arenas (e.g. meetings among the involvement departments), these actors work together for the joint design and negotiation of the measures to be adopted. This allows to have a shared and coordinated vision among different players who are in charge of the city development, thus preventing and managing possible conflicts.[11] However, it happened in the past that, despite the permanent process of negotiation, some projects have been stopped for a while due to the above mentioned divergences.

    b) Other institutional actor

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[11] However, according to an involved key-informant: "we have to coordinate more and more because there are more people on a way; there is more mobility…. And because we have also different parts in the government: one part is for the public transport; one part is for bicycles and pedestrians; and one part is more for cars, like traffic lights… we are pressed for coordination".

Similar forms of negotiation and coordination are carried out between the City Government and other institutional actors. Among them, the following can be mention:

- Canton of Zürich. The Canton is organised in different departments, following the same logic as the City Government. In particular, two departments are directly involved in the planning: the Building Department and the Department for Economic Affairs (engaging and financing public transport). The Canton of Zürich has many responsibilities on mobility also within the borders of the municipality of Zürich (the canton owns some of the main roads within the borders of the municipality and plans the measures to be adopted there; the municipality of Zürich is responsible to build, maintain and operate that part of the road network, but they cannot do this without consent given by the canton).[12] It happened that such a situation generated conflicts solved through negotiation with the search of compromises among the technicians. However, sometimes it takes a while and some activities/projects are slowed/stopped.
- Other cities. The City of Zürich works in agreement with other cities in the Canton (and in the metropolitan area that corresponds to the Zürich canton plus some little areas of some surrounding cantons) and develop common programs and plans.
- The Federal government that gives funds directly or through the Canton.
- Transport enterprises (SBB-Federal railways, ZVV).

c) Territorial actors (business included)

A different type of negotiation is implemented with the territorial actors (business included). These actors are consulted and involved in participatory process for the development of the different projects. The level of engagement varies and depends on the project raging from co-design of the measure to invitation to provide feedback. Examples of the actors involved at the territorial level are:

- Almost all the large enterprises (e.g. UBS, Crédit Suisse, Google, etc.) working in the Zürich territory have a person in charge of the relations with the municipality (for mobility, sustainability and things like this) consulted at least twice a year[13]
- Car group "Touring club Switzerland" – they represent the interest of car owners.
- Bike group "ProVelo" – they represent the interest of bike traffic
- Business community "City Vereinigung" – they are a business community that works together with the city in the plan implementation and design in the city centre
- Shopkeepers of a specific street or square where a project will be implemented (e.g., pedonalization).

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[12] However, according to an involved key-informant: "the canton has certain rules on how it can give this consent and the city of Zürich has to obey by these rules and sometimes this needs some negotiation process that is going on just before hand and actually comes to implement the schemes. The city of Zürich is always more like creating a more liveable urban space with low speeds giving public transports, giving pedestrians their spaces, whereas the canton is interested to have relatively high capacity roads, whereas the city tries to limit and to adapt uses for pedestrians and cyclists and so on. So there is an intrinsic conflict of interest there which has to be negotiated project by project and we do this".

[13] Moreover, as declared by a key-informant, the municipality "give them some aims to improve the mobility; there is a good exchange". These companies are „very very comfortable with that; and they are very satisfied to have this exchange of opinions".

Moreover, car sharing (as well as bike sharing) enterprises, born thanks to groups of "active citizens" in the mobility sector, operate as an actor in the day-by-day implementation of the mobility strategy.

Negotiation processes have been very important in the frame of this category of actors. In particular, some measures aimed at reducing car circulation (e.g. car spaces in the streets; reduction of car speeds from 50km/h to 30 km/h) and car parking (increase of the cost) had not (and are not still today) seen with favour by a part of Shopkeepers and by car owners, represented by the car group "Touring club Switzerland".

d) Experts, scientists and policy makers

Policy makers and expert consultations are carried out in order to develop the plans and also for the implementation of specific measures. Moreover, it is worth mentioning the collaboration between the city administration and the university for conducting studies and monitoring action for detailed knowledge on mobility dynamics upon which the measure implemented are based. Particularly relevant is the IVT – Institute for Transport Planning and Systems of the Department of Civil, Environmental and Geomatic Engineering of the University of Zürich. They carry out a lot of research on the Zürich Transport system.

e) Citizens

Finally it is important to stress again that all main decisions must be endorsed by citizens through public consultations i.e. referendums (citizens, through referenda are the only "actor" that has the power to stop a policy, a strategy, etc.). Referenda can be initiated (and this happened in relation to the mobility strategy, since the "people initiative" in 1973) also on the initiative if citizens.[14]

Moreover, a vast variety of instruments were put in place to build and cultivate public awareness on the goals and principles of the Mobility Plan, allowing people to dialogue on proposed measures or to suggest alternative ones (key informant evaluations on these instruments are not homogeneous[15]):

- The network of 12 Quartierkonferenzen (networks of citizens'/stakeholders' associations) in each of the 12 sub-areas of Zürich that are periodically consulted for any important decision concerning mobility (among other).
- Specific citizens' groups (e.g., street communities) related to specific projects (e.g., in relation to the extension of a tram line, the pedonalisation of a square; the change in traffic fluxes in a street; the development of piazza pop-up, etc.).

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[14] In Zürich, you have to have 10.000 signs for political initiative and then, when you have to vote, you need more than 50% of the voters.

[15] According to a key-informant: "people having the same interests, the same goals and then they start a small group and start collecting signatures (i.e., for a potential people initiative referendum) so they have more interactions among themselves"; according to another key-informant "it is quite difficult to involve people, in a strategic way of thinking, because our experience is that people just come … it is difficult for them to think in a upper scale and often we see that people just think for their personal needs, so meaning door to door what I need for my area and not what the other wants"; and between them: "people are much more interested in what is going on with the public transportation system; (however, often) if you look around, the average age there was 70+ may be … in the local area were mobilized a lot of people but it was only old people joining this process".

- Children educational activities.
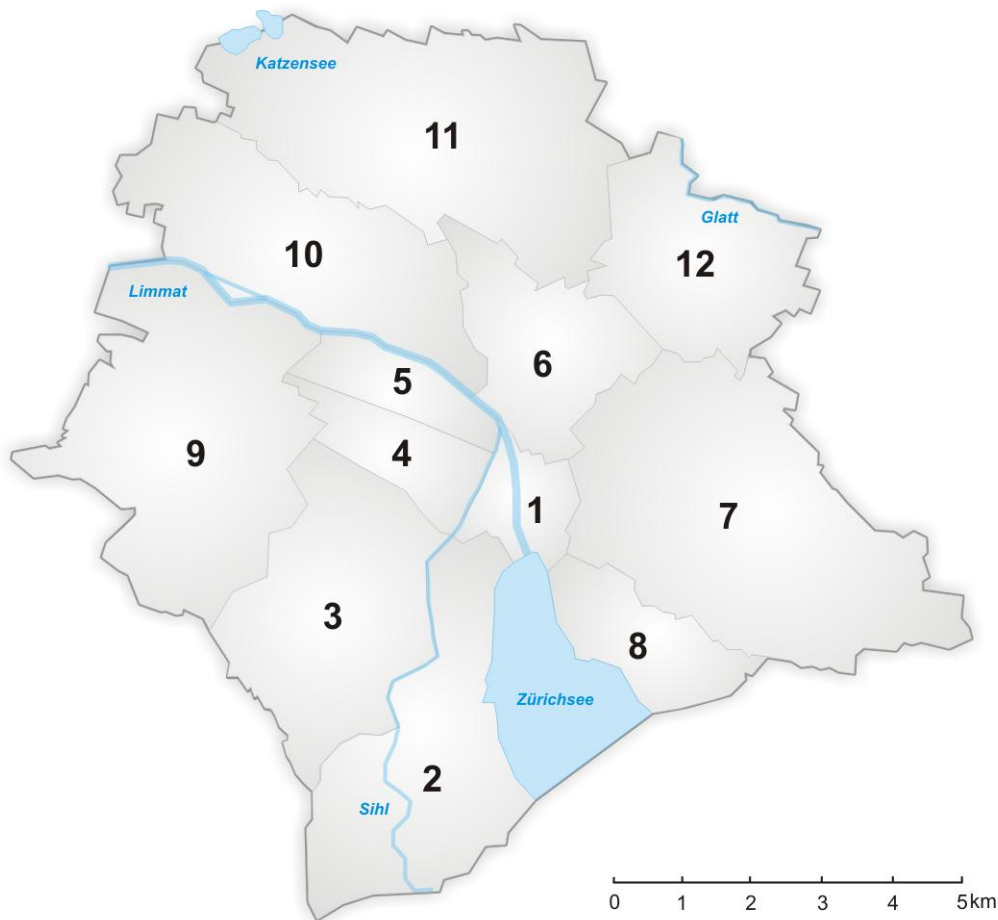
The 12 sub-areas of Zürich

f) Politics

A high influence on the municipalities, canton and federal level is also exercised by all political parties. "Officially" the objectives of the mobility strategy are (and were in the past, too) shared by all parties. Conversely, deep divergences emerged often, on specific activities, in particular the ones linked to car traffic limitations (that had and have a more or less strong opposition from rightists and liberals). Therefore, an intensive negotiation has been often operated at this level, taking into account the differences among the political majorities in the Municipality and in the Canton.

Partnership

There is no a formal or informal partnership among the Municipality and the other actors involved in the implementation of the mobility strategy (such as a Forum, a Pact, or something similar). However, as stated just above:

- The different plans (in the Strategy), as well as many specific measures, along time, have been ratified (or, sometimes, rejected) through referenda; and other initiatives have been proposed directly by citizens and then approved through a referendum (starting from the 1973 "people's initiative" that represents – see below – the starting point of the whole "history").
- A wide consultation and participative processes were always carried out in the city (and are carried out now), involving stakeholders and expert consultation (at the city level but also at the neighbourhood level from local issues), awareness raising, inter-institutional dialogue, etc.

Leadership

There was never a "charismatic" leader or leadership along the whole implementation of this mobility strategy. The leadership has been always from the Zürich municipality. Political majorities in the municipality have changed during the years but have been predominantly composed by leftists and green; however, in certain periods also by rightists and liberal. In principle, the implementation of the strategy was more quickly with leftists and green and more slowly with liberals and rightists. However a good "continuity" was assured by the technicians and by the unanimous sharing of the objectives of the strategy.

Strategies for gaining social support

The main strategies to gain citizen support for the mobility strategy in Zürich can be summarized in the following points.

a) To benefit from the traditional forms of "direct democracy" characterizing the governance system in Switzerland (ask citizens opinion through referenda; allow people initiate referenda; frequent citizens consultation through Quartierkonferenzen (networks of citizens'/stakeholders' associations) in each of the 12 sub-areas of Zürich; and/or other local consultations on specific projects/measures (see above).

b) To proceed gradually, step by step, avoiding too fast and too big changes (within a short time).[16]

c) To negotiate constantly with citizens or specific groups (e.g. in the frame of business) on specific measures.

d) To adopt targeted policies, such as the one described above with large companies.

e) To avoid almost always radical measures (such as the impediment of cars circulations in specific areas of the city or between the sectors of the city – as it has been done in Groningen).

f) Give priority to "pull" measures (such as the ones related to the intensive improvement of public transports or the set up of bike lanes) over "push" measures, which have however been implemented, but with less emphasis (such as the increase of the parking price).

g) To highlight, step by step, the success of the strategy getting high satisfaction levels from people.

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[16] As declared by a key-informant: "If you do too big steps, there is small confrontation and there is more resistance from the people. Because people do not like too big changes"; "you have to take time for long time projects".

Communication among the involved actors, considering also the negotiation processes described above, seems to work as follow.

a) Constant/frequent two-ways communication, both formal and informal, among the three departments of the Municipality of Zürich that are the most involved in the implementation of the mobility strategy (from periodic formal meetings to everyday formal and informal contacts). This communication entails continuous feedbacks and, as stated above, in case of divergences, a well established process of negotiation.

b) More or less frequent (formal and informal) communication in the municipality with other less involved departments (Health Department and Presidential Department) and with the Energy Commission. This communication is sometimes two-ways but also, too often, one way in the sense that many communications remain without a feedback (in particular, between the three departments in charge of mobility and the Energy Commission).

c) Constant/frequent two-ways communication, both formal and informal communication with feedbacks between the municipality and the transport enterprises, in particular ZVV. ZVV (and federal railways) participate also in formal periodic meetings.

d) Constant/frequent two-ways communication, less formal and more often informal among the technicians in charge of mobility in the municipality and the two correspondent departments in the canton. Less communication, always formal, among the politicians (due to political differences/divergences). As already stated, the communication among municipality and canton entails almost always frequent negotiation processes (due to the political divergences, often solved, by the technicians through these negotiations often informal).

e) Periodic communications among the municipality (people in charge of mobility) and the business world. As said, all the large enterprises working in the Zürich territory have a person in charge of the relations with the municipality. There are formal meetings with these persons at least twice a year.

f) Periodic communication with citizens:
   i. In case of referenda promoted by the municipality or the canton (these referenda represent also a "feedback mechanism" from citizens on the activities promoted by the public sector)
   ii. In case of referenda promoted by the citizens themselves (these referenda represent bottom-up initiatives)
   iii. Through Quartierkonferenzen (apparently a form of top-down communication with feedback is adopted in these conferences)
   iv. Through further local consultations (apparently same type of communication there, too, but in some cases bottom-up, too)

v. ZVV has a city manager who is just a connecting point to all the local areas. He is in contact with all the presidents of these local areas and he shares ZVV ideas and strategic moves with them and reflects on them.[17]

4. Milestones

- 1962: a first major project for underground solutions for short distance public transport was rejected in a referendum.
- 1973: a second major project for underground solutions for short distance public transport was rejected in a referendum.
- 1973: a "people's initiative" was launched with the aim of providing 200 million CHF for projects to speed up trams and buses.
- 1977: the People's Initiative for the Promotion of Public Transport was accepted by referendum.
- 1979: the City Council instructed the municipal authorities to give public transport priority in any conflict of interest in the transport sector.
- 1987: the City Council consolidated its five main goals in transport policy, especially to promote public transport and to reduce motor vehicle traffic.
- 1989: the city added parking maximums to the standard minimum parking policy.
- 1990: opening of the S-Bahn, the suburban railway. Approved by referendum, the investment amounted round about 2 billion CHF.
- 1991: A new plan was approved, namely: Verkehrsbetriebe der Stadt Zürich. Beschleunigungsprogramm 200.
- 1996: After contentious battles for the use of cars and for the presence of parking lots in the downtown the '*historic compromise*' was adopted.
- 2008: the voters of the City of Zürich approved with 76% in favour an addition of the objectives of a "2000-Watt-Community" to the city's constitution.
- Opening of the "western bypass".
- 2010: a referendum ratified the current parking policy of the city. 55% of the population was in favour to a strict parking policy specifying both parking maximums and minimums.
- 2012: Zürich City Council launched the urban traffic programme "Stadtverkehr 2025" to tackle the specific challenges of traffic and for further reinforce pedestrian and cycle mobility.

5. Effects

Quality of life benefits

The Zürich mobility strategy provided some overall benefits in term of quality of life.

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[17] As stated by an involved key-informant: "*We just 2 weeks ago we were here because we have a new idea for a bus line extension, maybe, and we reflected it and we got feedback and we just look how we can improve what we want to do for the people, just feeling their needs*".

First of all, Mercer's worldwide Quality of Living Survey has ranked Zürich in the top position for the years from 2000 to 2008 and second (behind Vienna) in the years 2009/2010. One of the categories upon which the total index is based is "public services and transport" in which the main factors for sustainable mobility are considered.

Secondly, the modal share of local traffic over the last years has continuously shifted from motorized individual transport to public transportation and bicycles and pedestrians. The consequent implementation of promoting public transportation has led to simplified tariff and ticket structures for the public transportation system and the passenger frequencies on the public transportation system as well as pedestrian and bicycle trips have increased substantially in the last ten years. In the same period, trips with motorized individual vehicles have stayed at practically the same level.

Thirdly, air quality in Zürich has improved significantly over the last decade, and substantial improvements in noise protection for residential areas along major thorough fares and rail lines have been achieved. Even so, air quality and noise emissions are still a major nuisance for Zürich's population, in particular thanks to the very intense flight traffic, considering that the airport is very close to the city; it will remain high on the agenda for future actions, but specific measures are still not under implementation (the airport is under the responsibility of the canton and the federal levels).

Fourthly, increased safety, especially for very young children attending kindergarten as well as grade-school students, was achieved through low-speed zones programme.

New ways of behaving/doing

The implementation of the mobility strategy encouraged or facilitated (new) behaviours among citizens.

> a) To not use the private cars for mobility. Presently from 53% to 60% (there are little differences at this regard according the various sources of information)) of the Zürich households do not own a car (one of the higher numbers in Switzerland). Car sharing has increased and is used by people that normally use public transports, ride or walk and need a car only from time to time. The population that lives and/or works in Zürich has increased substantially in the last decade, but the numbers of cars and trips with motorized individual vehicles has stayed at practically the same level. Moreover, fewer youths take a driver's license or take it at an higher age. Even people who live in the canton outside the city who have a car and take a lot of trips using the car in their normal life, if they go to Zürich, they choose to come here by railways.[18]

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[18] According to a key-informant: "*There is also a big structural change if you are looking at the commuters or people working or studying or something like that and you see that there is a big change going on. In the past, a lot of people got in the city by car because it was also a status symbol and that changed very clearly and they see if I use the car to get into the city, I lose my time, so I do not want to use my time, I want to do economic decisions and that is why I use the train. Then I can work in the train, I can use that time in the train and therefore, it is quite important to have enough capacity to provide a good quality of travelling time … also young people*".

b) To use much more public transport (passenger frequencies on the public transportation system have increased substantially in the last ten years), which are considered, thanks to their speed and reliability an effective means of mobility also considering that thanks to comfort (free seats almost always available) and to ICT support (WiFi is available), transport time is enhanced by working, studying and/or leisure.

c) To ride bikes somehow more, but not so much, because, thanks to their comfort and ICT support public transport is very often preferred, mainly in winter (due also to the cold); however, especially in hot months bicycle trips have increased substantially in the last ten years (including electric bikes). Apparently, there are more men who ride bicycles.

d) Change of behaviour in mobility is beginning to involve, more generally, the adoption of more pro-environment behaviours also in a more rational use of water and in reducing the temperature of the heating in the houses during the winter or the air conditioning the summer. But this is still very limited.

However, changes of behaviour are limited by the NIMBY effect: often people do not want changes affecting their personal life/environment.[19]

People who live in the countryside, particularly, in the rural communities in the canton of Zürich seem to be the more resistant in changing their behaviours (according the above mentioned trends).

New ways of organizing/doing things

The implementation of the mobility strategy has not generated new governance strategies. It is rooted in a very strong system of direct democracy characterized by the implementation of various referenda (initiated by public local authorities or by citizens) and traditional consultations of citizens at the local level. In Switzerland, the referendum is generally the end point, but on the way, civil society gets involved in various ways. Certainly, the city of Zürich and all the other local planning authorities do engage and try to engage stakeholders as much as they can in formal and informal fora. Before a final decision is taken, there is normally a formal request for comments where most of the formal actors get a chance to be involved; for example, in Zürich, there are Quartierkonferenzen in each of the 12 sub-areas of Zürich, and they are always be asked formally as well informally to comment and engage with the authorities.

Conversely, new forms of organizing or doing things emerged within the institutions/actors/agents involved in the project. The following can be underlined:

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[19] E.g. as explained by a key-informant: "*I saw some different things when you speak or when you vote about a strategic topic, like to decrease car traffic by 30%. We have the targets; citizens are happy with that. They say 'yes, this is a good idea'. But the same citizens, when you like to implement it, then you have to use some instruments, you have, f.i. to reduce parking spaces, the same citizens say 'Oh no, reducing parking spaces that is a bad idea'. Another example: We like to have more bicycles and people on a bicycle and that is for everything; everything is OK, I really like it but when you like to sign in a street a bike lane, and then I have less space to drive my car 'No, that you can't do, you can't do like that. You have to have other solutions'*".

- Increased cooperation among the three departments in charge of mobility issues in the Municipality of Zürich (see § 3., a)
- Increased cooperation among the above mentioned three departments and the Energy Commission of the municipality. However, this cooperation is still limited. The mobility strategy is included in the broader energy strategy (that entails a transition towards more low-carbon patterns) and this is strategically recognized, but still not enough at the operational level (in the day-by-day work[20])
- Increased cooperation among the municipality of Zürich and the Canton, more specifically among the technicians (due to the political differences mentioned above, this cooperation is mainly informal – albeit substantial[21]
- Cooperation is also facilitated by the existence of regional conferences concerning public transportation and a separate conference for the city of Zürich (with the participation, in both cases, of the local authorities, ZVV, SBB, etc.) that are twice or three times a year.

New knowledge

Periodic reports of implemented activities and their results also in terms of use of transports, behaviour changes, citizens' satisfaction, etc. are prepared and discussed, involving the Municipality, the Canton and the other implementing actors (e.g., ZVV), including assessments on public transports.[22] Moreover, in Zürich twice a year, there is a survey, asking people if they are satisfied, and if public transports are being on time, if it is clean, if it is travel friendly enough and so on and a ranking is established among all the canton of Zürich over all the transportation companies. It includes a ranking system depending on how expensive a transportation company is and how happy customers are (the idea is: if you are more expensive than others, you have to provide a better quality and you have to have happier passengers).

6. Some critical issues

Present critical issues

Even if Zürich may be considered a model for public transportation and for its plan, there are still many critical issues to be faced. The current traffic programme "Stadtverkehr 2025", provides a first list of those issues, which are summarised below.

- The number of residents and workplaces is growing. Associated with this is an increase in demand for transport and in requirements on viable future traffic solutions, on the quality of public spaces and on the quality of life for the residents: 100.000 more inhabitants (around 40.000 to 50.000 more working places) that could represent a big challenge in a

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[20] As explained by an involved key-informant: "*For the energy strategy is that we really have to work together, that we really gain reminded that we are one city and that you have to find solutions over the departments and may be having a common strategy… Actually we asked for more involvement, but we haven't got yet. They have just to structured a little bit … it is very important also to have the focus on energy also, and greenhouse gas emissions*".
[21] As explained by an involved key-informant: "*Informal cooperation increased in quality and in quantity*".
[22] E.g., "For knowing if we are going in the right direction or no; for having a better view of what people are really doing in the city".

near future. However, the city has coped pretty well with the substantial population increase in the last decade and a half.

- The need of close collaboration between the Canton and the City. Only a close collaboration between those two institutions with regards to public policy and finances will make it possible to reach the goals of the plan, i.e. the large expansions of trams and bus networks, the redesign of individual street sections to promote pedestrian and bicycle traffic, etc.
- Need of inter-institutional dialogue. For a successful implementation of the measures and to achieve the intended effect of the traffic policy measures of the City of Zürich, dialogue with neighbouring municipalities is of great importance.
- Need of traveller's awareness. All those who move about in the City of Zürich make regular decisions about when, how far and how frequently they travel, which routes they take and at which times of day they travel. Thus, providing information to travellers and building awareness among them about their travel behaviour and any resulting individual contribution are of paramount importance in achieving the ambitious goals of the plan.
- Need of political support. Major efforts are needed at the political level and also in the city administration to implement the measures in the established timeframe. The lack of political support was proven to have the capacity to slow down the plan.
- Legal oppositions. Some projects foreseen in the plan could be delayed due to legal appeals.
- Plan paradoxes. Sometimes in the plan implementation some paradoxical situations emerge connected with the city development. For example the increase of the quality of life of a certain area may evolve into a gentrification dynamic.

Some actual further critical issues have been highlighted by interviewed key persons.

- The holistic feature of the mobility strategy is restricted to the mobility sector (plus, as stated in § 2, an array of soft measures, ranging from marketing to cultural and behavioural work with citizens, but always related to transport). The Energy Commission of the Municipality of Zürich complains about an insufficient integration of mobility/transport policies in the broad frame of the energy policies (e.g., highlighting that policies related to housing energy efficiency are much better integrated in this frame). A concrete consequence is that electric mobility has not been considered (or considered little and only recently) in the mobility strategy (e.g., the lack in the development of electric charging stations).[23] Moreover, if the City Council has had the permission by the people to subsidize electric cars, so far, it has not done it. And finally, the whole mobility strategy does not include air traffic (and air traffic in Zürich, presently, emits more CO_2 than power provision[24], despite that today, ZVV is transporting 80% of passengers by electric system

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[23] As stated by a key informant: "*There is no clear strategy actually; because when I discuss with my colleagues (of the mobility departments)... I tell them 'Ok, we have electric cars, we can give funds for electric cars and this would be better if they drive electric than if they drive fossil'. Right? From our perspective. And then, they answered 'No, no, we do not want cars'. So I ask: do you have a strategy? if we have a strategy for 2030, they want that there will be no cars in this town and we have to do this and this to get there and then I'll be happy to do not have to discuss on electric cars. But if they do not have a strategy like this, and the reality is that there will be cars, then better to talk about electric cars, so I do not feel really the strategy is very fine*".

[24] As stated by a key informant: "*We (Energy Commission) have discussed this many times with people from mobility strategy and at the beginning years the really didn't get it and then they really said ,'no we are only responsible for land traffic'. And so we have no owner for air traffic in the whole city administration, for this topic*".

and this percentage is increasing). However, presently, there is some progress in this regard (Energy Commission, obviously, consider mobility/transport one of its main working areas and, recently, contacts and common work among the Energy Commission and the Departments in charge of mobility have increased but not enough).

- Public transport efficiency should increase. If, on the one hand their quality is excellent, on the other hand, public transport does not seem to be very efficient, because of a lack of flexibility according to the demand that is very different along the seasons or the days. ZVV hopes to set up a system very soon which is more flexible or adaptable to demands (demands during the different seasons and in the different times of the day); more modular in respect to the present one which is too static and, therefore, sometimes very expensive. To be taken also into account is that sometimes, in some areas, public transportation is too dense; there are too many trams or buses coming and then it is no possible to cross roads.

- Consultation mechanism is too heavy. The complex consultation mechanism through the two kinds of referenda (and to a lesser extent through the other consultation) can provoke a slowing down of the decision-making processes, in the sense that often to implement a policy or even a specific activity (and use the already available funding) sometimes things stop because a referendum is hold; and, in other cases, processes stop when a referendum of a popular initiative appears, which, in fact, "blocks" an ongoing initiative until the outcome of the referendum is clear.[25]

- Bike development has also negative effects. The relative increase in the use of bikes, due to the limited space (which is given) in the Zürich streets (many of which predate the start of the mobility strategy) increased the number of accidents between bikes and public transports, between bikes and cars, and between pedestrians and cyclists, also because there is not enough space for walking.[26] Moreover, this increase in the use of bikes has been accompanied by the development of bike sharing (positive) and by car sharing; which has led some citizens to reuse the car even though through car sharing.

Potential future critical events

Moreover, interviewed key informants have dealt with some future potential critical events or trends that may jeopardize the right development of the Zürich mobility strategy.

a) An (unlikely) change of the political majority (from leftists and green to rightists and liberals) at the next municipality elections in Zürich. Moreover (less critical but more

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[25] As stated by a key informant: "*There are some projects that cannot be realized because two parts are struggling against each other and then we had to stop and re-start these projects; so it is very delicate or to find solutions that the majority can agree. The dialectic between implementation and feedbacks is anyway complex „when we do too little or too less and know what is the right work. The citizens say 'Eh, you have to do more' and put the stick in this direction. Otherwise, when you do too much, it is also right over this limit then the citizens can say 'Oh no, you do too much; go a bit back'. I think that every time when the citizens say 'No' or 'Yes' to a thing of us we do, then we got the bill of the things we have done too less or too much. So every voting, every referendum we have gave us the bill on what we have done*".

[26] As stated by a key informant: "*So that means today you may have a car lane and a bus lane or a tram lane next to each other and also the bicycle strategy wants to go through this street, may be. So the question is that if you want to implement bike lanes, there is a discussion to share the bus lane or the tram lane with the car lane"; „it is often a struggle between walkers, cars, public transports and bikes*".

possible) the rejection of some mobility initiatives that should be approved by referenda (already established) in this and the next year.

b) A lack of capacities of the municipality to go beyond the present "business as usual". More specifically, technology innovation will entail in the next 10/15 years mobility problems that are not on the agenda, not even in perspective, such as autonomous vehicles that will disrupt mobility policies.[27]

c) A conflict of interests among Zürich citizens and people coming every day to Zürich for working: the first want to push the pro-environmental features of the strategy and the latter want only an effective mobility. A partial divergence among these two goals can appear in a near future and feed the already existing political divergences between the canton and the municipality.

d) A potential conflict with the federal government that is developing cars traffic infrastructures in the country pushing "de facto" people to use the car.[28]

7. Up-scaling

Zürich transport policy is a very well known case of advanced transport and mobility planning. Of course, there have been many people (also coming from local authorities and local transport companies) who admire and appreciate the excellent functioning of public transport in Zürich. Maybe also because of its four decades of activity it is difficult to evaluate how and to what extent the lesson learned from Zürich influenced other cities. It is worth mentioning here that the City of Zürich is actively part of networks and initiatives of inter-city collaboration in Switzerland. Indeed, during the "Urban Mobility Conference" on 12 November 2010, the City of Zürich and 14 other Swiss cities established an institutional framework describing how they could work together to coordinate their efforts in addressing basic goals and developing perspectives for sustainable mobility. This collaboration was intensified when in 2011 six Swiss cities brought the urban traffic initiatives of the "umverkehR" Association for sustainable mobility to a vote. The initiatives or counterproposals were accepted in all six cities. To be underlined, also, that some other cities in Switzerland (e.g. Basel) are presently inspired by the mobility strategy of Zürich.

With respect to up-scaling potentialities, it should be noted that many social features of the Zürich mobility strategy have been conceived according to an institutional context which is very specific to Switzerland and not widespread elsewhere. Most of the lessons learn are, therefore, useful primarily in Switzerland. Moreover, the mobility strategy, along the years, has been developed in a

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[27] As stated by a key informant: "*That is something that can come more quickly than we now may think and that may change people travels, people patterns, travel behaviours; drastically change the movement of cars in the roads in terms of that you may have in 10-15 years cars floating without any person driving, leave somebody or bring somebody somewhere, someone ... traffic ... on the roads more cars ... We are not care to that now. We are not really prepared*".

[28] As stated by a key informant: "*The highways are enlarged and enlarged and enlarged and we have now the problem, we have this intersection at the border of Zürich and there is more traffic coming, but we can't take them in the city and the federal institutions think this is because we do not want; but it is because we (the municipality) can't. So, there will be really a big challenge in the future how to manage this intersection between highways and the roads of the city*".

very positive financial context that many European cities cannot share (unfortunately). However, some lessons learn are useful everywhere. Among others:

a) Give priority to "pull" measures (such as all the ones related to the intensive improvement of public transports or the set up of bike lines) over "push" measures, which have however been implemented, but with less emphasis (such as the increase of the parking price)

b) Not to want too much in a too short period of time

c) Implementation of a permanent negotiation process also thanks to the work that technicians can implement within the public authorities also (and sometimes mainly) in an informal way

d) Need of an holistic approach, considering also "soft measures" even when a strategy (or a policy) tends to be mono-sectoral

e) High importance of the design and implementation of a mechanism that allows the allows a very frequent availability of feedbacks from the involved actors

f) Implementing a mobility strategy in the way (see above) that has been adopted in Zürich is good for mobility but not so much for limit climate change. Although we have more people that do not own a car, more people travelling on public transports, we have still CO_2 emissions not going down in the transports (considering also that the cars are bigger and use more and more energy).

HOLISTIC, SHARED AND PERSISTENT MOBILITY PLAN
Groningen

1. Background

Groningen is an old, compact city originating from the third century with around 200,000 inhabitants. The demographics of the city show a high number of young and highly educated people with 60,000 students living in the city. Due to the many students and the relative low employment rate of the non-student population, the average income is one of the lowest in the Netherlands. Especially single-parent families experience low income, 25% of them living on 105% of the social minimum income.

Groningen is famous for the successful implementation of the compact city-concept. The guiding principle of 'compact urbanization' is intended as a contribution to the strengthening of the position of the cities and to help reduce the steady growth of car use. Groningen has been advocating and implementing this policy very strongly, not only by the planning of new residential locations but also of work locations. The basic principle underlying the choice of these locations as well as recreational amenities and shopping centres is the minimisation of bicycle distances.

The visual quality of the city of Groningen is high. The combination of many old buildings and monuments with modern architecture such as the Groningen museum, together with lots of green areas and waterways provide a rich visual experience. The air quality of the city is rated as (very) good by 94% of the population. Occasionally, a sharp nose smells the presence of the sea from 40 kilometres away. The acoustic quality of the city is generally high as well. 85% of the Groningen inhabitants are satisfied with the noise level. Due to the absence of a constant humming from car traffic the sounds cape is open and provides references to special places, such as the carillon of the academy tower and the large bells of the Martini tower.

Since the early 1970's, the city planning has focused on facilitating cyclists and pedestrians in the city, and de-intensifying car-use in the city. The implementation of the Traffic Circulation Plan (TCP hereafter) in 1977 was the start of a transitional process in the traffic system in Groningen.

As background, it should be underlined that the TCP grew out of the debate in the 1960's in many places in the Netherlands where more housing was needed and existing housing needed to be improved. An existing technocratic spatial planning culture existed where plans were made by experts involving the demolishing of low-quality housing and replace them by modern housing. The social networks/cohesion in neighbourhoods was hardly under consideration. The country was still recovering from a strong shortage of housing after the Second World War, and in Groningen it was still recent that families were living in old trams. Moreover, many old houses in old neighbourhoods were badly maintained, and the discussion on renewal did not motivate people to further invest in their houses. As a result, these neighbourhoods were in decline. New built neighbourhoods would also provide more space for car traffic, offering wider roads and parking space. These were the times of economic growth where many people aspired for having a car to enjoy a free life. The car was a strong symbol of prosperity. The municipality already owned a lot of housing to prepare for this transformation. Even some typical old houses were prone for demolition in the plans.

Post war housing shortage was solved with "tram village"
Photo: Fotobedrijf Piet Boonstra, 1952, www.beeldbankgroningen.nl (1785-28815)

This narrow street (Lutkenieuwstraat) was aimed to become a main street
https://commons.wikimedia.org/wiki/File:Overzicht_Turftorenstr.-Lutkenieuwstr._-_Groningen_-_20092377_-_RCE.jpg

2. Implemented actions

Five actions have been selected that fit within the context of a "holistic, shared and persistent mobility plan". First (and mainly) the implementation of the TCP as the starting point of the process. Later, three actions built upon the favourable conditions created by the implementation of the TCP. These three actions relate to (1) the closing down of the city park for cars in 1994; (2) the promotion of city-campus biking routes from 2015 onward; and (3) the new (2017-2018) development of a cyclist-prioritised roundabout that mitigates a dangerous traffic situation. And finally, a further action (parking garage under the Grote Markt in 2001) that was stopped by the citizens.

Traffic circulation plan (TCP)

The transformative ambition of the TCP was making the inner city of Groningen the "living room" of the city, and restoring public space for the citizens. A key question was "Why do we have the all of those cars from outside in the city centre, when we live here".

In the 60s, the number of cars was growing rapidly. In that period the idea of planners was that all traffic passing through Groningen should be routed via the central market of the city.

Thereafter people increasingly started to realise that a growth of car traffic could have a negative impact on the living conditions and started opposing the plans and developments (mentioned in § 1.), considering their old neighbourhoods as their home community, more than just individual housing. Young people at that time were inspired by visions of and ideas on the liveable city, and had visited for example old Italian cities to experience what a liveable city centre looks like. Some were already exploring these ideas during their study/working at the University of Groningen.

Hence, in 1975 the city council decided to work on the division of the inner city into four sectors (confined by physical barriers or signs that cannot be crossed by the cars), making it impossible to drive with car directly from one sector into another. Cars had to take the ring-road around the inner city, whereas cyclists could move about freely on new cycle paths constructed to accommodate them. The idea, at the basis of the TCP, was to discourage motorised traffic and to give priority to pedestrians, bikes and public transport (considering the short distances that can easily be covered by foot or by bike).

The values underlying the TCP thus strongly relate to assumptions on how public space could be given back to the inhabitants. An important element was banning the parking of cars on the Grote Markt (Great market) and Vismarkt (fish market), and restoring market functions. This demonstrated that the centre was again the place where the citizens do their shopping, meet each other and enjoy the atmosphere of the city. The division of the city centre in four sectors to block transit traffic further reduced the presence of cars. The vision not only addressed the city centre, but the city as a whole. It included ideas on prohibiting shops to open at the outskirts of the city (e.g., larger warehouses at industrial areas accessible by highways) to protect the vivid commercial atmosphere in the city centre. It also included ideas on building new neighbourhoods (Lewenborg, Beijum) closer to the city centre than earlier planners had envisaged to facilitate biking to the city centre.

The values were not related to reducing carbon emissions. The innovation took place in the 1970's, where issues concerning emissions and climate change were not part of the policy debate. The problems of car-traffic were mainly perceived as a public-space problem, rather than as an air quality problem. In later years the energy relevance became an issue as well. The reduction of energy use and associated emissions are nowadays a key-theme in planning, and are an integrated element in holistic planning processes in Groningen.

In 1977, the TCP was implemented over a single night (September 19). Hundreds of new signs were put up to create one-way streets or change their direction. Overnight, the centre of Groningen became impenetrable for cars. The next morning, hostesses greeted confused

motorists (that, as far as we know, have not had any idea before about this change) with flowers and leaflets that explained the new situation.[1]

One of the most significant features of the TCP, was to not considerably interfere in urban physical structure, using the existent roads and streets, in some cases widening the sidewalks. The TCP served as a tipping point in the traffic management of the city: from a car-minded planning the management turned towards an integral perspective on traffic. This emphasized the importance of quality of life in the city, and contributed to a mind-set that led to pedestrians and cyclists being provided with high quality infrastructure. Other important development was the development and implementation of plans to renovate and improve the schools in the somewhat deprived neighbourhoods.

There were some previous plans related to the city centre of Groningen, which were implemented in parallel with the Traffic Circulation Plan and reinforced its effects, such as the Structure Plan Inner City Groningen of 1969 and the Parking Plan Centre Groningen 1970-1975. On this last point, more specifically, when the TCP was implemented and put into work, parking garages were built either in, or close by, the old town area in order to enable visitors and inhabitants of the area to park their cars. Although the TCP originally interdicted to build new garages inside the old town area, several garages were built after its implementation. Inhabitants of the old town and the neighbouring quarters were granted a parking possibility either in the streets or in one of the garages (see below).

An external traffic planning agency was involved in the design and implementation of the TCP. This agency was already involved in the old planning process, and they were developing these plans with a certain reserve, being aware of the new visions on city-development. As a consequence, they were cooperative in abandoning the old plans and working on the organization of the new TCP as a part of the new city policy.

The TCP launch quickly reduced the car traffic in the inner city by 50%, making cycling the safer and faster option.

After the TCP was implemented, new cycle paths were constructed (particularly in the 1990ies) and trees were planted in the centre. Measures such as narrowing streets for cars and thereby leaving more room to bikers or pedestrians were taken, and in many places the concept of shared space was introduced in order to give more rights to the non-motorized traffic. 10,000 parking places for bikes have been built near the main train station and further 5,000 are under construction. Moreover, now cycle paths are created outside of the city of Groningen, to make it possible to reach neighbouring villages and towns by bike safely and comfortably.

The ring road around the city centre mentioned above in relation to the TCP, nowadays, decreased its relevance since the city has a greater ring road.[2]

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[1] How Groningen invented a cycling template for cities all over the world (The Guardian); available at: https://www.theguardian.com/cities/2015/jul/29/how-groningen-invented-a-cycling-template-for-cities-all-over-the-world

[2] Therefore, there are actually two ring roads. The first one is the so called "Diepenring" which is not a built ring road but a combination of roads running along the canals that confine the old town area. This ring road was not a planned one but has been created of already existing ones. This ring road is quite heavily over-passed. The other ring road is

Despite the TCP, car traffic and car ownership increased during the 1980s and 1990s and the existing garages soon turned out to have capacity that was too small to handle all the cars that needed to be parked. To solve this problem, on the one hand the number of parking permissions for inhabitants was increased, forcing the people coming to the city centre by car to park their car further away from it. On the other hand, park and ride facilities were built, which enabled car users coming from out of town to park their car in the outskirts and then take a transfer bus directly into the old town. As an incentive for using these facilities the prises were set in a way, which made it much cheaper to park the car outside town and then travel by bus into the city centre.

Today important plans are under development concerning the tunnelling of the highway between Amsterdam and Hamburg (A7) that runs through the city, the reconstruction of the railway station area, where a train-park will be removed, and new biking and bus tunnels will improve accessibility. Biking highways are being developed to support e-bikers and pedelec users at a commuting range to 25 kilometres.

Closing down of the city park for cars

Several developments took place in the context of the "liveable city". The closure of the Noorderplantsoen Park for car-traffic is an example of such a milestone.

Despite the TCP, the traffic situation became more problematic over the years. In particular, sharing of the road by cars and cyclists turned out to be unsafe. The road in the middle of the Noorderplantsoen Park from south to north-east connected and still connects the north-western part of the inner city with the north of the city, and is a popular commute, especially during rush hours. This road was increasingly used by cars and cyclists, on top of large numbers of pedestrians visiting the park. Therefore, quality of the Noorderplantsoen Park decreased due to increasing emissions of NO_x and small particles, increasing sound emissions, and most importantly, a lower safety, especially for playing children. This resulted in the local neighbourhood to ask for a closure of the park for cars.

A test period of a year has been held in 1993, when the park was closed for cars. The temporal nature of this was expressed by having a steamroller partly blocking the entrance. After a year, during which the population could actually experience the impacts of the interventions on their lives, a referendum was organised (for the first time in Dutch history), promoted by the local population and policy makers together. The local population could either vote for or against a permanent closure of Noorderplantsoen for car traffic. One intervention that supported the "closure" was the printing and distribution of a poster in favour of closure. This made the support for closure in the neighbourhood visible, and attended people on the vote they had regarding the future of the park. For many citizens, the vote on the park was a possibility to express their disagreement with the continuation of the "anti-car" policy of the municipality. Especially since the whole population of the municipality had a vote on an issue that had mainly neighbourhood consequences implied that the motive to vote in favour or against were different depending on the closeness to the park. On 5th of October 1994, a majority vote of 50.9% decided in favour of a

the highway that surrounds the city centre and that also channels the bypassing motor traffic around the city of Groningen.

permanent closure. Following this outcome, vivid discussions emerged on the plans associated with the closure.

The Noorderplantsoen, where cars have been restricted

Currently, the Noorderplantsoen is used by many people from the neighbourhood for leisure. In August an annual 10-day theatre and music festival (Noorderzon) is organised, and the ecological quality is carefully monitored and cared for. Yet, tensions between the different functions of the park remain. Despite some of the conflicting interest, it is very unlikely that a significant group would today be in favour of re-opening the park for car traffic. The system converged in a new, car-free stable state.

Parking garage under the Grote Markt

Another milestone was the referendum on building a parking garage under the Grote Markt. This was negotiated by a large warehouse as part of the plan to redevelop the north face of the market, which in principle was supported by many citizens. The parking garage plans generated in a strong rejection of the redevelopment plans by the citizens. This rejection was fuelled by a strong campaign with a poster suggesting that the main tower might collapse, quite a manipulative emotional approach that was questioned by the campaigners themselves. The advisory referendum on February 21 2001 resulted in 80% of the citizens rejecting the plans, which was reason enough to stop, and focus on the east face of the market instead with the forum plans.

Promotion of city-campus biking routes

The growth of the University of Groningen required more space, and in the 1960' a new campus was started north of the city. Originally, the idea was to move the whole university to this area, but plans changed and still a significant part of the University of Groningen is located in the city

centre. The Zernike campus did grow over the years, and both the Hanze University of applied sciences and many companies have found their location at this campus site. Students and employees make their daily commute by bike from the city to the campus and back. Many of them used the "Zonnelaan route", where several crossings with traffic lights made the commute problematic for cyclists and cars. To reduce these problems, two alternative routes for cyclists were upgraded and made more attractive.
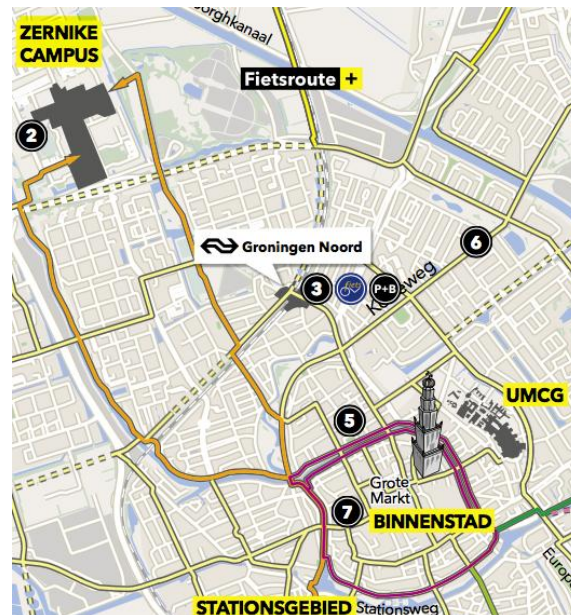
A map displaying the 2 Zernike biking routes in red
Source: https://gemeente.groningen.nl/kruising-wilhelminakade

The routes consist of high quality cycling roads covered with the typical red tarmac. In some cases, cars of local inhabitants had to use the road, and here the full road was reconstructed in red, indicating "shared space" with cars as a "guest" on this route. From the inner city to the Zernike campus road signs indicate the route. Additional campaigns are organised at the beginning of each new academic year to stimulate freshman (and others) to use the Zernike route as their habitual commute route. The Zernike routes seem to be the favourite commute of many people, and the original pressure on the Zonnelaan route seems to have significantly diminished.

Cyclist-prioritised roundabout

A part of the western Zernike route is the Herman Collenius Bridge over the Reitdiep and the road crossing of Wilhelminakade and Prinsesseweg. This crossing is processing a lot of traffic from cars, buses and delivery trucks, as well as cyclists and pedestrians. In particular, during rush hours a significant amount of traffic has to pass this bottleneck. The crossing has a history of incidents. The (near) accidents with children going to the neighbourhood school in particular resulted in concerns among the local community. Some adjustments have been made in the past, but these did not suffice to improve the situation. One experiment, involving the positioning of rectangular bumpers on the street resulted in several cyclists falling. Soon after, the bumpers were removed. People from the local community were concerned about the traffic safety, and approached the local representative of the VVD party. They developed a motion to address this situation, which was accepted by the city council.

The council allocated budget to develop five alternative plans which were being presented to and discussed with the local community. The five alternative plans were developed by the municipality, and shared with the neighbourhood in December 2016 in a local centre. Many people from the local community attended this meeting, and people could rank the plans and leave their comments or suggestions. On the basis of this, the preferred option was further developed and presented to the community in March 2017. The new roundabout was constructed in the fall of 2017.

First experiences of the users of this new roundabout seem to be positive. Car drivers appear to be much more careful, now they have to give priority to cyclists. Most cyclists seem to use the roundabout properly. Some cyclists do not comply with the rules, and sometimes near misses are the consequence. However, until now, there is no indication of serious risks, and the safety seems to have improved on this crucial part of the Zernike route. The roundabout is thus expected to have a positive impact on the local traffic, as well as on the quality of the larger Zernike route plan.

3. Stakeholders analysis

Involved actors: from top-down decision to a broad involvement

The pioneers of the TCP originated from a young group within the political party PvdA. This group of young people was inspired by literature and ideas of scholars on the liveable city from the 1960's. This network of "young socialists" was very active in local and national politics and had regular meetings, also in the neighbourhoods. They were backed up by a number of reputable elder party members that had the respect of people in the neighbourhoods, in particular those belonging to the political silo of the PvdA. The network of people linked to the PvdA was strong, was present in the older neighbourhoods that were considered for renewal (Oosterpoort as key neighbourhood) and followed the paradigmatic shift in the view of the city, and the city planning process. Whereas the older paradigm was based on top-down decision-making by experts, the new paradigm wanted to include and involve the citizens in the discussion on the liveable cities. A key element in this new view was that neighbourhoods have their own identity. This implied that the different neighbourhoods were approached in different ways. Discussions were focussing on what the people wanted in the neighbourhoods, renewal or renovation.

The ideas on the liveable city were backed up by these older party members, and resulted in a support from many citizens. When the PvdA succeeded in 1974, this served as a message of trust of a large part of the citizens to work on a liveable city. Two of the young socialists became "elderman" in the city council, and they started working on the plan for the city (after an important political conflict within the main left party – PvdA – and with the other parties). For the plan a majority was needed in the Counsel, and at national party-level discussion was taking place on supporting this "PvdA plan" (the national government, who should cover a major part of the investment costs of the scheme).

The sectors involved in the planning were manifold, and express the holistic view on city development. In particular housing departments, representatives of economics and business, police and traffic control, educational services and the hospital were involved in the discussions.

Concerning education it is worth mentioning that the University as one of the largest employers was included in the discussions concerning where to develop new educational facilities. Also a discussion took place with the management of the Academic Hospital, a very large hospital that was considering moving away from the location next to the city centre. The holistic view on the future of the city was discussed with these parties.

Further actors involved in the TCP implementation were various economic interest groups,[3] a citizens' pressure group (as well as some citizens groups[4]), and – last but not least – two local newspapers.

Despite many protests of in particular shopkeepers, in 1977 the plan was implemented. Satisfaction levels (enthusiasm) have been expressed from different groups of citizens. Beyond cyclists and pedestrians, many people who lived in the old (somewhat deprived) neighbourhoods, developed a trust in the support of the Counsel for supporting the liveability in these areas (where, as already said, schools were renovated/improved in the frame of the TCP implementation).

However, this satisfaction was expressed despite no real involvement of the societal actors in the design and in the first implementation of the TCP. The process was mainly top-down (the new paradigm, although predicate, was applied, at the beginning, to a very partial extent). The new left had consistently rejected compromise with the nongovernment parties. The TCP was decided and started literally by political sheer weight, while there remained conflicts. This uncompromising strategy was blamed as "dictatorial" by the nongovernment parties, while it was advocated and praised as "polarisation" by the new left. It was explained that the omission of participation was inevitable in order to draft and submit the TCP within the tight time limit imposed by the National Government.

This is all the more important, being some other actors much less satisfied. First of all, the generic category of the car drivers (some of them considering the – often relatively new – availability of going onto town by car as an acquired freedom, now lost), but mainly the business sector and, above all, the shopkeepers that manifested a fierce opposition because they were convinced it would mean the end of their business if cars could no longer cross the centre (they were convinced they would go bankrupt if customers would not be able reach their shop by car).

Discussions took place on what it would mean if a larger flow of pedestrians would pass the street for business. Angry shopkeepers painted slogans on their store windows, collected signatures and demonstrated at the city hall.[5] The not flourishing of a number of shopkeepers was associated partly with the low entrepreneurial and adaptive capacity. The network connecting shopkeepers was rather weak. The main function of the formal network – a predecessor of the Groninger Cityclub – was organising and supporting events such as the arrival of Sinterklaas (the Dutch

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[3] KNOV: Koninklijk Nederlands Ondernemers Verbond (Royal Dutch Business people Associaton);KvK: Kamer van Koophandelen Fabrieken (Chamber of Commerce); NCW: Nederlands Christelijk Werkgeversverbond (Dutch Christian Employers Association); OVG: Ondernemers Vereniging Groningen (Business people Associaton Groningen).

[4] ENFB: Enige Echte Nederlandse Fietsers Bond (Dutch Cyclists' Union); ROVER: Vereniging Reizigers Openbaar Vervoer (Associaton of Public Transport Passengers).

[5] How Groningen invented a cycling template for cities all over the world (The Guardian); available at: https://www.theguardian.com/cities/2015/jul/29/how-groningen-invented-a-cycling-template-for-cities-all-over-the-world

Santa). Yet the shopkeepers had a strong voice through the newspapers. Not only local newspapers, but also regional editions from national newspapers were receiving advertisements from the shopkeepers/entrepreneurs in Groningen. As a consequence the arguments against and concerns about the TCP were voiced often.

Moreover, the staff of police was a strong opponent of the plan. This opposition was related to very personal levels.

The municipal authorities responded to that mainly by investing much of their time in visiting neighbourhoods and individual shopkeepers and entrepreneurs. They tried to explain that TCP aimed to create a pleasant urban environment that eventually would attract more people to the centre and to their shops, and to convince this suspicious public without having, in those days, good references to successful examples elsewhere in the Netherlands. Unsuccessfully: shopkeepers or business organisations had insisted denouncing "a frustrated and poor relationship between the municipal executive and business community".

The situation changed slightly after the TCP implementation mid-term review. The municipal council conducted two rounds of discussion on the TCP revised proposal in May 1980 (one mainly with the business sector; the other mainly with citizens groups). The municipal proposal to modify the TCP was approved without major changes (demands from the business community continued to be hardly accepted).

Contrary to the period before, the policy makers could be seen more on the street talking with people. Sharing the vision and acknowledging the problems that people had with the plans and convincing people about the consequences of continuing in the old way helped to reduce resistance among certain people. The fact that a significant part of the population was in favour of the plans created a generic support for these developments too, but it has to be acknowledged there was a certain polarisation between different political silos's in the population.

Over the years the opposition has disappeared. Today, as the "communicative turn in planning" has been experienced during the 1990's, the situation is very different. Decisions cannot be made anymore solemnly by the majority group in the city council without hearing the different interest groups and stakeholders that are affected by the decision. Currently most citizens and entrepreneurs appreciate the situation as it is. Yet older people often still have a very negative emotion amount the TCP, even if they appreciate the city as it is flourishing today.

Generally it can be said that the political culture is positive in the city concerning the development plans. Whereas some projects obviously result in some critical discussion, as in the case of the Forum and the delays in the tunnelling of the Amsterdam-Hamburg highway, there is no large discontent among large parts of the citizens on the development of the city. Public resistance against a municipality plan was basically limited to the cutting of a few old trees in the inner city, and due to the protests the municipality has halted these plans and is discussing with the involved people. The current planning culture could be described as more organically collaborating with the inhabitants. A nice example of this would be the development of the former terrain of the sugar factory. The closure of this factory provided the municipality with space for a new neighbourhood close to the city centre. Instead of having a top-down plan for development the municipality decided to allow different small and in principle temporarily start-ups using this space. As a result

student housing is emerging, and social-cultural functions start to grow. From these processes it is expected a type of neighbourhood will develop where bottom-up processes are fostered by the municipality.

The case of "Cyclist-prioritised roundabout" is based on the perception of an initial dissatisfaction of the local community. Later, the success and satisfaction with the followed procedure (described above) appeared as an important factor in determining people satisfaction with the solution adopted. Finally, the level of satisfaction of both commuters (cyclists and car drivers) and neighbourhood has been taken into account.

In the case of "closing down of the city park for cars in 1994", there was a referendum and the municipality organised a broad discussion that served as a platform for colliding interests of different groups. One interest group defended the ecological value of the park, as the Noorderplantsoen hosts monumental trees, shrubs, wild and semi-wild plants, birds, bats, butterflies and mushrooms. Organizers of cultural events emphasized the cultural value of the park, proposing a flexible, open roof construction on the playground for stage activities for an audience of around 500 people. The local residents were mainly interested in the use of the park for leisure. These three different groups engaged in discussion with the municipality, and neighbourhood organizations contributed to achieving an acceptable balance.

Another referendum, as already stated, was organized in 2001 on building a parking garage under the Grote Markt (and the proposed was rejected by a high majority of citizens). The development of the "Forum" in the city centre, where a parking garage was replaced by a cultural centre to be completed in 2019 also used a referendum. On June 29 of 2005, 53% of the population voted in favour of the plans, however, due to a turnout of only 38.59%, the results were declared invalid. At a later stage the citizens could speak out their preference for one of the 7 designs for the Forum. From the top 3 selected by the citizens the municipality selected their favourite (not the number 1 of the citizens). Referenda helped to create agency in the population and contributed to discussions on plans. The experience was mixed, as referenda did not always result in outcomes the policy-makers hoped for, or displayed a lesser support than hoped for (e.g., the 50.9 % of the citizens voting in favour of closing the Noorderplantsoen for car traffic).

*Left the poster opposing the parking under the Grote Markt,
right the poster supporting a car-free park (for a livable city).*

A final actor who played (and plays still today) an important role along this whole history is the University of Groningen (RUG). In the 1970's, in particular, the Sociology department of the university was focussing on city developmental plans. At the end of the 1960's a chair in Urban Planning was installed at the University, along with a study programme and an independent doctoral exam. In 1987, an independent Faculty of Spatial Sciences was started. Many academics interested in urban planning were in some way involved in politics on different levels and in different degrees. In particular, the young PvdA "elderman" were originating from this academic background. This academia-municipality connection on urban planning has certainly played key role in the transition from a top-down to a participatory approach. Also studies have been performed on the urban-planning and introduction of the TCP, the 2005 report of Tsubohara on Intra-Party Democracy in Groningen Early in the 1970s being a nice example.

Leadership

Charismatic leadership played an important role. One of the young "elderman" bought and renovated a house in a neighbourhood that originally was nominated to be demolished, which had a strong signalling function to the neighbourhood and the rest of the citizens that this group of young politicians really were involved with the neighbourhoods and the quality of the city.

The leadership has always been taken by the municipality, but not always by the PvdA. Whereas the implementation of a new vision on city development originated from young members of the PvdA becoming "elderman" in the city, and despite some loud voices against this development, the majority of the people experienced that the city improved as a result of the changes. Old houses were not demolished but restored. This "wind of change" in city development was present in many places in the Netherlands. As a consequence, when at later stages the PvdA lost their power in the municipality, the reversal of the plans has never been a discussion point. Also, current policies are firmly rooted in the city vision on liveability.

Partnership

Whereas the interaction between the municipality and citizens became, as already stated, more participative in the last decades, there was never formal public/private/citizens partnership in the planning processes. Currently the municipality is starting with neighbourhood-councils, composed of random allotted inhabitants of the neighbourhood and city-council members.

Strategies for gaining social support

The main strategies to gain citizen support involved a direct communication and involvement with the citizens. From the beginning, after the launch of the TCP, the initiators realised the importance of going to the neighbourhoods, shopkeepers and other stakeholders to discuss the plans in terms of the liveability of the city. Hence the overall vision was emphasised when local plans were under discussion. Different neighbourhoods were approached in different ways, depending on the culture, involvement and cohesion of the neighbourhoods. Discussions took place on the street, either planned or spontaneous.

The initiators had gained serious support in the elections (40% in 1974) and considered that as a mandate to implement the plan. A negotiation was developed, basically on a micro-level, adjusting the plans on the level of where to place short-park places and the like.

Later the negotiation process was expanded with a more formal referendum, either binding or an advisory referendum. The experiences with referenda were mixed (see above), as the outcomes were not always in line with the planners' preferences.

The citizen support now is strong, and many citizens of Groningen are proud of the biking culture. Among a subgroup of elderly people there still exists a negative evaluation on what has been done, despite they are positive about the current situation in the city. Yet still a group exists that would like to have easier access by car.

The municipality has become very aware of the relevance of co-creation and consultation, and depending on the type and complexity of projects different types of citizen involvement are being used. Also, the provision of information has changed, partly due to new digital formats and channels that are available now. The municipality has changed its interaction from hosting meetings of interested people in the town hall, towards actively going towards the neighbourhoods and finding specific ways to include the local communities in the planning process.

Finally, social support was (and is) maintained thanks to the experience of the city as a pleasant, friendly, clean and accessible place. The inner city has developed into a welcoming and friendly place where people like to shop, walk and visit restaurants and bars. The city centre is vivid in the sense that during day and night time there is a continuous flow of people walking and biking. The air is clean and the acoustic quality is high, creating a pleasant atmosphere. The older neighbourhoods that have been restored are flourishing. Most of the old and relative small houses have been renovated, and the neighbourhoods are thriving. Due to a strict parking regime the inhabitants are capable of parking their cars in their own neighbourhood, and city visitors from abroad are increasingly using the transfer at the outskirts of the city, where large car-parks are available with cheap and fast public transport transfer to the inner city.

We can conclude that the policy making in Groningen went through a paradigm shift, (first affirmed, but practiced only minimally and then more and more effective). Originally the city plans were made by the experts, and without much consultation implemented and accepted by the citizens. The combined pressure on the inner city by increasing car traffic and parking, the housing problems and the "change of the times" resulted in an increased awareness and demand for participation and involvement. Before the first referendum (1994) this translated into visiting neighbourhoods and acknowledging the local communities. Later on, referenda were used to allow more formal channels for this participation. And currently new plans are often co-created with local communities, as for example in the case of a new revolutionary bike-roundabout.

4. Milestones

- 1969: structure plan Groningen with a series of plans for the inner city. Among them the 'Traffic Plan Centre Groningen'.

- 1970: renewal of PvdA (new left[6] and emphasis of the public participation).
- May 1971: inner city team composed of municipal planners and external experts.
- May 1972: the inner city team submitted the 'Document Objectives Inner City Groningen', generally called the 'Objectives Document'.
- 1973: citizen "Working group Inner City" starts a campaign for pedestrian areas in the centre.
- September 1974: new board in the Groningen council with an important presence of the left PvdA (PvdA succeeded in getting 40% of the votes in the Groningen elections).
- 1974: citizens survey on traffic modes – opposition from the Chamber of Commerce and from other business groups going on in the following years.
- 1974: the city council starts to work on the traffic circulation plan commissioned by the municipality to a consultancy bureau (Dwars, Heederiken Verhey).
- May 1975: public meeting on the traffic circulation plan (however only on the prognosis of the traffic and not on measures to be implemented). No public participation later.
- August 1975: the city starts to work on the division of the inner city into four sectors.
- September 1975: public meetings with business on the traffic circulation plan and later with citizens.
- 1977: the TCP starts to be implemented; the inner city was divided into four sectors literally in one night on September 19th.
- 1980: mid-term review on the TCP.
- 1982: completion of the implementation of the TCP.
- May 1982: round of discussions on the proposal of TCP revision.
- 1987: Groningen's master plan: to locate work places in the vicinity of public transport services.
- 1990's: a network of bicycle routes leading through the city centre and connecting with two quarters and suburbs is created.
- 1992: "Hand on Heart" plan which has been approved in 1993 by the municipal council to promote the concept of Compact City and restrict car use in the city centre.
- 1993: Noorderplantsoen Park closed for cars as a 1-year experiment.
- October 5, 1994: referendum on closing the Noorderplantsoen for car traffic.
- 1996: "New master plan": to solve congestion problems and promote accessibility to the city. It proposed a mix of public transport measures (new bus routes and a tram system), new parking facilities and improvement to the existing ring road.
- 1997: "Accessible and Liveable City": as a sub plan for 1996 master plan: this is the most recent step in transport policy and planning in Groningen.
- February 21, 2001: referendum on building a parking garage under the Grote Markt.
- June 29, 2005: referendum on the development of the "Forum" in the city centre.
- December 2016: five alternative plans for Herman Collenius Bridge over the Reitdiep and the road crossing of Wilhelminakade and Prinsesseweg presented to the neighbourhood.
- March 2017: the preferred option among the five alternative plans (further developed) is presented to the community.
- Fall 2017: The new roundabout was constructed.

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[6] Since the middle of the 1960s this situation in PvdA changed due to a movement called 'the new left'. The new left, consisting of 'angry young men and women', especially students of the University of Groningen, demanded that the discussion in the PvdA should be open and stimulating on one hand, and they criticised the modernist urban development by the municipality on the other hand.

5. Effects

Main environmental, economic and quality of life effects

The TCP had clearly positive effects on traffic and environment in the inner city, while the effect on economy turned out to be, at least, not so bad as insisted by the business community. More specifically, the following can be noticed.

- Overall the quality of the public space in Groningen is experienced as very positive by the inhabitants. If you ask people if they want the city to become more accessible by cars, and e.g. re-open the park for cars, we expect a large majority to resist the return of intensive car traffic. Since 1978, the environment-circumstances in the inner city have been substantially improved, not only objectively, but also in the judgement of visitors and residents; the average level of noise had decreased from 67.0 dB(A) to 64.1 dB(A); among visitors from the region, those who sensed odour had decreased from 43% to 24% from 1977 to 1978; moreover, the city is considered more attractive (e.g., huge increase of 22% in visitors to the whole inner city, from 357,500 to 436,300 per week from 1977 to 1978).

- Immediately after the TCP introduction, the per capita expenditure in the inner city shops had decreased by 20%/30% from 1977 to 1978; moreover business reported the decrease of the number of visitors by 2,2% on annual basis in the first years after the TCP introduction and then by 1,15% (with a consequent decrease of sales and an increased rate of unemployment); finally shopkeepers complain about delays in the freight transport that, despite some specific measures (e.g., allowing "adapted vehicles" to guarantee the freight), had not improved; however, according to the municipality, "no negative relation can be established between the economic development of businesses concerned and the introduction of traffic measures as part of the TCP". Later, the situation improved.

- Groningen tops three categories in a 2015 EU survey of the quality of life in 79 European cities (Flash Eurobarometer, 2016), with 94% of the Groningers reporting to be (very) satisfied with the public space. Health service (95%) and education (89%) also scored very high in this survey. In terms of its total score, Groningen came in third place, behind Aalborg and Hamburg. Zürich, also a case study in the SMARTEES project, Oslo and Copenhagen were ex aequo with Groningen.

- The air quality of the city is rated as (very) good by 94% of the population (Flash Eurobarometer 2016). The acoustic quality of the city is generally high as well. 85% of the Groningen inhabitants are satisfied with the noise level (Flash Eurobarometer 2016).

- Specific actions have made the city safer (e.g., strong decrease of incidents and related experienced unsafety in the case "Cyclist-prioritised roundabout" with the new roundabout).

New ways of behaving/doing

The rise of the car as means of transportation consumed a lot of public space that devaluated the social functions of the inner city. The TCP and the other following action restored the idea of the city centre as the "shared living room of the citizens". People use much more bikes and much less cars. Traffic, has been drastically restrained, public transport acquired strongly improved accessibility and the bicycle traffic was improved; the hourly traffic intensity of private cars had

reduced by 47% on average after the TCP (1978 vs. 1976); two-thirds of all trips (61%) made by bike rising to more than 70% for trips made to educational institutions. Nowadays, the inhabitants of Groningen possess an average of 1.4 bikes per person; the average number of bikes per household is 3.1; busses could run on schedule in the inner city after the TCP, because private cars decreased dramatically and bus lanes were introduced on some streets. The increase of biking and walking in the city centre made this place more social, allowing for more spontaneous meetings, contributing to the "living room" concept.

New ways of organizing/doing things

The organisation of city planning has changed completely as a result of the paradigm shift in the 1970's. New ways of organising refer to the transition from top-down policy/approach by the technical planning experts via consultation to referenda and co-creation of plans, being developed including many relevant sustainability dimensions such as well-being and involvement of the citizens, energy use and economic viability, thanks also to new relations between the citizens, municipality and shopkeepers/entrepreneurs. This started by consulting the people and visiting neighbourhoods, thus an active approach from the municipality. Increasingly, the municipality is exploring ways to involve people in planning processes. Then, the development of new plans is happening in a co-creative manner. The shopkeepers/entrepreneurs are involved in a much deeper level in the city-planning process, and as a result the network of shopkeepers has also become more active (Groninger Cityclub). The citizens are involved in the co-creation of plans; however, for more limited plans such as a bike-roundabout it is easier to co-create than for very complicated plans such as the tunnelling of the Amsterdam-Hamburg highway.

Presently, we can say, in Groningen, the top-down and bottom-up approaches meet in a meaningful way.

In this context, new institutions have been generated: we can refer to the Neighbourhood Councils that represent a new formal entity under development aimed at further fostering the communication between the citizens and municipality. These Neighbourhood Councils are composed of random allotted inhabitants of the neighbourhood and city-council members. They discuss problems that exist in their neighbourhood, and planning on different levels as far as it impacts the neighbourhood.

This increased communicative culture is also being reflected in the good relation between the Groningen City Club, representing some 300 businesses, and the municipality.

New knowledge

New knowledge emerged on how to organise the traffic. Increasingly a more organic view is being adopted in traffic planning. Especially where traffic has a low speed, sharing space has become an important principle, where people develop norms and habits in how to avoid collisions in a more self-organised way. A key example here is the simultaneous (and therefore longer) green light for bikes from 4 directions. In Groningen, the biking culture was developed sufficiently to let this self-organisation work, whereas implementing this in Rotterdam resulted in many accidents.

Also new knowledge has emerged considering how to develop plans in a participative manner, and how the municipality communicates with citizens. Presence in the neighbourhoods is important, and social media are used to inform and communicate with citizens.[7]

Technology innovation

Concerning technological innovation a few examples can be mentioned. A rain sensor has been connected with some traffic lights to prioritise bikes when it rains. A variety of bike-road solutions have been tested and implemented, the bike-roundabout being a recent innovation. Biking parking-lots have been developed with an electronic system monitoring free spaces. Different rental systems have been developed and are running, such as the OV-fiets that connects rental bikes with train travelling, and the SwapBike for hiring a bike for longer periods of time (popular among new students).

6. Some critical issues

Some past critical issues

A critical issue was the fact that the economic risks associated with the introduction of TCP would not have been brought under control (at least in a starting phase). Many businesses had suffered, as already stated (according to the opinion they expressed), from a delay of freight transport, resulting in the increase of the operating cost; and from a decrease of sales and income (related to a decrease of visits).

The main critical issue has been the lack of consensus of some relevant actors in the implementation of the TCP (shopkeepers, the police management and a significant group of citizens) depending from issues such as the ones mentioned on § 2. and § 3., and related to the adoption of top-down approach, avoiding a real stakeholder involvement (in the '80s, 53% of businesses still regarded the TCP as negative, but according to the municipality "The plan is not seriously controversial any more"). Stakeholders and citizens were considered by the municipality as actors to be, at best, simply informed and not really involved. Later this approach changed, and since '90 the absolute top-down approach was first softened and then abandoned. The problem was then attenuated to finally disappear almost completely, thanks to the "paradigm shift" of which we have spoken.

Present/future future critical events

Critical issues now are the financial and planning problems that may occur in large projects. The building of the Forum was substantially delayed, as some already built constructions had to be renewed to make them earthquake proof (Groningen has a problem with earthquakes resulting from natural gas exploitation). The tunnel project on the highway Amsterdam-Hamburg deals with considerable delays due to technical complications and a complicated planning.

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[7] For example, you can find a YouTube video used to show the citizens of Groningen the plans for a reconstruction of the Amsterdam-Hamburg highway through Groningen: https://www.youtube.com/watch?v=SzbhPzmnTio

7. Up-scaling

The replicability of the Groningen case is high. Many European cities are relative compact and share the same basic constellation. Recent developments with e-bikes and pedelecs make biking also an option in cities with a more accentuated terrain.

However, a key barrier towards replication is the biking culture. In the Netherlands biking was already a normal means of transportation, and kids grow up using a bike. Moreover, the way in which TCP has been designed and implemented at the end of the '70s and in the '80s (from a societal point of view) would have been difficult to repeat in subsequent years and even less so today. Therefore, it is not surprising that cases of up-scaling from the Groningen experience *strictu sensu*, have not been identified.

Nevertheless, as urban planning, although it is rare that small cities inspire larger ones, Groningen is a brilliant exception to this rule. Many of the ideas spawned in Groningen have far reaching effects on cities around the world, regardless of size (e.g., in many ways, Groningen as host city of Velocity 2017 has been a kind of homecoming for the Velocity Conference and for bicycle urbanism).

Lessons learned in Groningen henceforth quickly find their way in the rest of the Netherlands (and the other way around). For cities outside of the Netherlands often a cultural shift is required in favour of the bike. This cultural shift seems to be one of the main challenges in replicating the case of Groningen in different cities. Anyway, a key lesson would be that participation requires also a good information strategy, and that participatory processes need to be tailored considering the type of plan (complicatedness) and neighbourhood (community, culture, history).

ISLAND RENAISSANCE BASED
ON RENEWABLE ENERGY PRODUCTION
Samsø

1. Background

Samsø is a Danish island in the Kattegat 15 km off the Jutland Peninsula. The community has 3,724 inhabitants and is 114 km² in area. Samsø is in the Central Denmark Region. Agriculture has been the primary occupation on Samsø for millennia and nearly the entire island comprises of cultured landscapes. Ecological agriculture and production is growing on Samsø, with a broad network of cooperating associations. It comprise farming of a large variety of vegetables, grains and fruits, livestock meat and products, a dairy, a brewery, restaurants and cafés, candy production, permaculture and forest garden experiments. Three hundred years ago, the island of Samsø had hundreds of operating windmills (therefore, there is a long tradition of using wind energy on the Island).

The islanders of Samsø are a strong 'tribe' filled with traditional wisdom provided with a strong sense of the significance of place considered as a decisive element that brings people closer to their own place – where they live, the place they identify with. Place must be a strong locality characterized by a healthy mentality and local activities.

In the final years of the nineties, Samsø was in a state of crisis. The island's slaughterhouse, one of the largest employers on the island, was closing, and hundred people faced unemployment. Moreover, the island was facing the threat of depopulation, with many young people moving out without coming back. Therefore, the Renewable Energy Island (REI) project (a community-based transition from fossil fuels to renewable Energy) presented itself in 1997 at just the right time.

2. Implemented actions

In 1997, Samsø was entirely dependent on oil and coal, both imported from the mainland. Between 1997 and 2007, Samsø Island developed a plan that allowed it to cover 100% of its energy use from renewable sources (wind and district heating with CHP56). The project originated from the initiative of three citizens and was immediately supported by the municipality. It won a government competition to become a model renewable energy community, has obtained funding, albeit limited, at the local, regional and national level. The Samsø project also had the objective of reviving the local community endangered by the already mentioned threat: the low employment of the more industrialized agriculture, the migration of businesses away from the island, and the migration of young people for study purposes.

The founding of the Samsø Energy Company, a local energy development company funded and owned by the island's citizens, benefited the realization of the entire project. From the outset, a bottom-up approach has been used and through workshops the citizens contributed to the design and implementation of the plan. With the project, the Samsø Energy Academy was funded.

The REI Masterplan' has been the key report detailing the plan for a total conversion of Samsø's energy supply system to renewable energy sources during the course of 10 years. The energy technologies proposed in the masterplan to cover heating were: four district heating plants, one of which would be straw-fired, one would be based on woodchips and solar energy, and two would be powered by a combination of biogas, waste disposal, energy crops and surplus heat from the

ferries. To produce electricity the plan originally proposed to build 15 land-based wind turbines, 15 offshore wind turbines (to offset fossil fuel-based transportation), 15 household wind turbines, two large biogas plants, five farm-based biogas plants and 70 smaller solar cell plants.

After the 10-year period, the following had been implemented.

- Eleven land based wind turbines and ten offshore wind turbines (as powerful as the originally proposed fifteen offshore and fifteen onshore mills). In essence, the projects realised were the ones based on well-known technology while the experimental and more demanding forms, such as producing biogas or harvesting the surplus heat from the ferries, were abandoned early on. Keeping it simple meant that the technologies were not very technically demanding or overly complicated and could be established and maintained almost exclusively by local workers. And most important they were financially viable!
- Three new district (10 villages) heating plants, two of which were straw-fired (same as Samsø's original plant which preceded the REI project) and one powered by woodchips and solar panels (2500 m^2 solar panel system).
- A district heating system developed in several areas of the island.
- 200 homes have activated efficiency and energy savings through the renovation of homes.
- Construction of some passive buildings such as the Energy Academy.
- Purchase of a small fleet of electric cars for the Municipality (unsuccessful – see § 7.).
- Development of the use of biofuels by farmers (for tractors).
- Creation of an Energy Academy dedicated to hosting researchers and students studying renewable energies, with the organization of conferences, a show centre and consultancies and meetings between research and business (an hub for the "Energy tourism").

After the success in making the island 100% self-sufficient by renewable energy sources, currently the island is committed to become a completely fossil fuel free island by 2030 (Samsø 2.0).

A further step is making Samsø a circular bio-economy (Samsø 3.0). In this respect, the discussions now are about building a local biogas-facility on the island. This is now being debated in a similar manner as wind turbines were discussed in the past, with heated discussions and debates, and the Energy Academy is willing to move the facility around, and to discuss how to compensate those living close to its location. They are cooperating with the municipality in finding the right location for it.

Regarding the financing of the project, according to the ten year evaluation report produced by the Energy Academy, "it is difficult today to calculate exactly how much money has been invested, because many citizens have invested in individual [household] units. An estimation is DKK 468 million (62.4 million EUR). 70% of the total invested came from local investors: around 330 millions. The direct public subsidies granted the district heating projects, the offshore wind farm and the private energy projects add up to 30 million DKK[1] (four million EUR)".

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[1] Jørgensen, PJ, Hermansen S, Johnsen, Aa, Nielsen, SP, Jantzen, J and Lundén, M (2007) – Samsø, a Renewable Energy Island: 10 Years of Development and Evaluation (10 year evaluation report). Project report, Samsø Energy Academy.

This means that each islander invested on average 100,000 DDK (14,000 EUR), which was made possible by people's own savings and the island bank's cooperativeness: the bank created loan packages enabling prospective shareholders to borrow money to buy one, ten or thirty shares in the collaboratively owned technologies. 4,700 shares in the windmills were sold, each at a price of 3,150 DKK (422 EUR).

Not all the RE technologies are cooperatively owned. Samsø's district heating systems and wind turbines are organised in many different ways, including several different forms of ownership. This was not a specific goal set in the project, but the specific practical possibilities of each sub-project led to different solutions, and left the community with a myriad of different ownership models specific to each renewable energy installation. Following this pragmatic approach, one district heating plant, one offshore wind turbine and two land-based windmills are owned by local cooperatives. The rest are owned by the farmers who own the plot where the onshore windmills are based; five offshore mills were bought by Samsø Municipality in support of the project; a few are owned by larger private investors and by the cooperatively owned regional utility company NRGi (previously ARKE). This mix of ownership technologies made the REI project realisable, flexible and complex, and it secured local ownership. While the cooperatively owned RE technologies are generally highlighted, the farmers who have made individual investments of millions of DKK, many of which have completely turned their businesses around, focusing on electricity production and e.g. selling their livestock, have also been actively engaged in the project from the onset.

It is worth to be noticed that the co-ownership business model was already traditionally used on the island in other context such as: co-ownership slaughter house; farmers and fishermen in the past, who were having their own little business and who usually were co-owners of the diary; handling berry for making jam in co-ownership.

3. Stakeholders analysis

Rural development problems on the one hand and a strong innovative drive on the other were good catalysts for entrepreneurial individuals to search for new opportunities for the island. The long experience with local (agricultural) cooperatives served as an organisational background for the project. Dedicated individuals in the local municipality and business network were willing to invest extra time in creating positive development on the island. Local tradesmen had since the 1980s gained some experience in the construction and operation of (small) wind turbines. The community on Samsø was characterised by respect for alternative opinions and inclusiveness, especially among the businesses, but also by a certain natural resistance towards change.

The Samsø Energiselskab (Samsø Energy Company) was established to facilitate the REI project. In Samsø Energiselskab the business council, the farmers' union and Samsø Municipality were each represented with one member, while Samsø Energiog Miljøkontor (Samsø Energy and Environment Office), the oddly named grassroots organization representing the general island public, was represented by two individuals to secure the democratic foundation of the project. Samsø's energy utility company ARKE (today NRGi), a large co-op firm based in Aarhus, initially wanted to play a central role in the project, but the islanders wanted to define and plan the project themselves. The only external actor central to the development of the REI project was the

engineer, who after being hired by the project moved to Samsø. He took care of the technical dimensions while Søren Hermansen, then a farmer and teacher, was hired as the island's 'energy counsellor' to manage what is commonly termed 'the social aspects' of the project: getting the island public to accept and contribute to the REI project. Today Søren Hermansen is the director of the Energy Academy.[2]

Søren Hermansen and his group managed to integrate the Renewable Energy Island into the community life in the villages, applying processes of sensing and priming in order to achieve successful meetings before, during and after which the locals committed themselves to the project. Hermansen's role as a mediator between different local interests and between local interests and the county/national interests was a crucial ingredient in the process, making possible the successful combination and adaptation of various contextual conditions. In that sense, the Samsø community energy project was more than just (externally induced) local ownership and participation linked to renewable energy. It was also a deep, bottom-up integration process into the life of the local community.[3]

The Renewable Energy Island Masterplan played an important role as it helped translate national goals and guidelines into concrete local action and served as a common guiding vision on Samsø. It was well designed to serve as a credible communication and guiding tool internally on Samsø, as well as externally between the local, county and national level. This 'Masterplan' was communicated to the islanders in several meetings when the most fundamental technical details had been settled.[4]

An example: the involvement of the smiths (plumbers)

"Hermansen was met by a lot of downturned thumbs at the first public meetings about the project. The smiths, for instance, reacted with scepticism toward the news that the REI project developers were planning to replace the old oil-fired burners in the islanders' homes, which the smiths used to service, with individual RE technologies or district heating pipes. How would they continue their business under these new circumstances? Hermansen initially did not have an answer prepared, feeding the islanders' scepticism: the green project was irresponsible gambling with people's money, a romantic idea they could not support. Hermansen had to reconsider his tactics.

Before the next public meeting, he called up the smith(s) and talked to him (them) about the possibilities inherent in the project. Hermansen together with the engineer had prepared some calculations enabling him to tell the smiths about all the new heat exchangers and pipes he would get to install. And they would be offered further training so he could service the RE technologies as well. The smiths did their own calculations and accepted. They were in, and they promised to show their support at the next meeting. Hermansen then asked the spokesman for the smiths to point out other actors central to making the district heating projects work. 'We need a few farmers to deliver the straw for the burning. The chairman of the civic organisation and the nature conservancy association need to get on board. And the principal of the continuation school and some other workmen'. Hermansen called them all up and asked them to join the next meeting and the working group that was

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[2] Storying the Renewable Energy Island Samsø. PhD Dissertation by Irina Papazu.Availableat: http://www.dasts.dk/wp-content/uploads/2016/04/Irina-afhandling-til-print1.pdf

[3] Storying the Renewable Energy Island Samsø. PhD Dissertation by Irina Papazu.Availableat: http://www.dasts.dk/wp-content/uploads/2016/04/Irina-afhandling-til-print1.pdf

[4] Storying the Renewable Energy Island Samsø. PhD Dissertation by Irina Papazu.Availableat: http://www.dasts.dk/wp-content/uploads/2016/04/Irina-afhandling-til-print1.pdf

> forming. At the meeting, the engineer presented the numbers and calculations and skilfully answered the incoming questions. Then the strategy was put to the test: would people show their support and sign up for the project work? After a long wait, the smith finally raised his hand: "I think what we need to do now is start working on the district heating project. We can't rely on oil forever." The locals started joining in. In this way the project developers learned that there had to be a business case, that each project needed to be endowed with a 'what's in it for me' or a 'what's in it for the community' logic. The green ideas were not automatically accepted by the workers and farmers on Samsø".[5]

This happened, essentially, since end 1998, but before the projects started rolling, there was a period following the nomination in 1997 when the public was not directly involved. Technical calculations, plans and preparations were made, but no practical activities were making the REI project visible to the island public. People were getting discouraged and some perhaps started to fear that things were happening behind their backs. Resistance grew, as is evident from the debate in the local newspaper and a report prepared by Geography students from the University of Copenhagen which showed that the public knowledge, accept and participation in the REI project were low in 1998. In the beginning of 1999, SamsøEnergiogMiljøkontor held a big public meeting inviting all islanders to 'Café God Energi' (Café Good Energy), which had the purpose of creating an open space for "discovering our common vision for the energy project's contribution to Samsø's long term survival and the next wise steps in the short term".[6] Through this setup, the islanders were finally invited into the process and asked to participate and co-develop the project. One hundred and fifty people showed up. It was a very controlled process with carefully planned questions. A very important seed was sown regarding the rolling-out of the coming heating plants and windmills. The REI Masterplan was never presented at that meeting although it lay underneath it all. Another commonly practiced 'meeting technology' was the kitchen meeting, private meetings held on friendly terms between the project developers and islanders central to the realization of the RE projects.[7]

Everybody could read the minutes of every meeting, an open budget has been adopted, people could see what the running costs were. Meetings were open (towards not invited people too, if interested). That also created an atmosphere of trust that set people that there was nothing to hide. Some of the organization that was already in Samsø to protect nature, like Greenpeace or other groups (who did not like the wind turbines, because they protected nature), have been also invited, asking them also to be part of the transition, instead of sit down and say that they did not like. And at the end they said "yes" to the development and became co-responsible. And they were invited to every meeting. They accepted it. But they were not used to do it. They were used to sit down and shout against the decisions.[8]

Over the years on the island people discuss and debate more as a family than as opponents and have maintained an open process that does not hide its discussions, but openly air disagreements.

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[5] Storying the Renewable Energy Island Samsø. PhD Dissertation by Irina Papazu.Availableat: http://www.dasts.dk/wp-content/uploads/2016/04/Irina-afhandling-til-print1.pdf

[6] Møller, T, Schmidt, SO and Nielsen, JH (1999) Dokumentationfra seminar. In: Café GOD ENERGI, 1999: available at: http://energiinstituttet.dk/337/

[7] The mayor: "*I knew that we had twenty dynamic farmers and ten good business people, so when we ran into problems and needed their help, I knew that if I went out and talked to them, in the way that you and I are talking right now, over a cup of coffee or a beer in the kitchen, they would come up with ideas and offer their help and support*".

[8] Storying the Renewable Energy Island Samsø. PhD Dissertation by Irina Papazu.Availableat: http://www.dasts.dk/wp-content/uploads/2016/04/Irina-afhandling-til-print1.pdf

Transparency is the main point on Samsø. Furthermore the Energy Academy has never decided for itself exactly how to achieve a goal when they open up for discussion. They always show what is not decided, and which aspects are discussed and using which arguments.

Another important aspect is that today, more or less all stakeholders are in agreement of the general ambition, but they may well disagree on how to get there.

In synthesis the stakeholders have become part of the development and in the continuous debate about what should be done further. The municipality, the local farmers, the islanders, but to a large degree, everyone has become part of the implementation process. Overall, the project has gone from a few enthusiasts to a movement that involves all actors on the island, individuals, businesses and people in their professions.

The case of Samsø shows how a project evolved in an open process connected with the island survival. The citizens have become more and more part of the initiative, and the difference between the citizens, businesses and experts are more and more blurred as the Samsø initiative is a big part of the survival of the island community. People have become naturally involved and are actively involved in the Samsø initiative as part of their life, either by family, business, and professional life or indirectly by people visiting the island to study the Samsø initiative.

4. Milestones

- 1997: Samsø won a national competition to be 100% energy self-sufficient within 10 years. Samsø was appointed Denmark's Renewable Energy Island at a press conference in the Ministry of Energy and the Environment in Copenhagen. Establishment of the Samsø Energy Company.
- 1997: Samsø's REI masterplan.
- 1998: Launch of the project – working to create ownership for systemic change in the wider community along social and cultural lines started.
- End 1998 (or beginning 1999): Café Good Energy invited citizens to an informal setting where people could talk about what it would be like to be a renewable energy island.
- 1999: Intensification of the local actors' involvement in the REI project.
- 2002: Working group for the creation of an energy centre for collecting, storing and disseminating the learned experiences in REI.
- Mid 2002 – end 2003: pre-project planning phase of the Samsø Energy Academy.
- October 2005 – end 2006: implementation phase of the Samsø Energy Academy.
- 2005: the Renewable Energy Island began to reach its goals, and visitors began to arrive from everywhere.
- 2007: Completion of the REI project.
- 2007: the Samsø Energy Academy is opened.
- 2011: the Samsø Energy Academy created a biennial leaders meeting called "From Best to Next".
- 2012: the Samsø Energy Academy received the European ManagEnergy Award, which focuses on supporting local and regional sustainable Energy.

- 2015: the change to a conservative Danish government in 2015 has meant a dramatic reorientation of budgets and priorities.

5. Effects

A number of favourable external and internal contextual background conditions enabled the successful emergence of the Samsø project. Externally, a concrete national energy policy with clear guidelines regarding, for instance, the local participation and development aspects of the Renewable Energy Island provided an important overall frame. Several funding programs for local renewable energy projects and the establishment of local energy organisations constituted a 'toolbox' for the Samsø project.

- Samsø has roughly 100% renewable electricity and heat supply (the people of Samsø heat their homes with straw burned in a central heating system). Now 100% of the island's electricity comes from wind power, with surplus electricity exported to the mainland grid, and 75% of its heat comes from local solar power and biomass energy.
- Samsø inhabitants are CO_2 negative. Today Samsø contributes to lower CO_2 emissions for all of Denmark (Samsø has reduced its CO_2 emissions by more than 100%).
- Moreover, Samsø inhabitants are NOx (Nitrogen dioxide) negative and SO_2 (Sulfur dioxide) negative. The emission of particles has decreased from 30 to 10 tons and the fine powders decreases 4,500 tons each year.
- Samsø has six times more electric cars per thousand inhabitants than the rest of Denmark.

Furthermore the overall strategy entailed, as an indirect consequence, the acquisition of numerous new competences. Technical competence, business model developing (co-ownership in new energy technology), communications competence (they use very unconventional means of communication) and also have resulted in a support for young farmer families to buy a farm with the support of the local farmers organisations.

6. Some critical issues

Some past critical issues

- Some problems, as already stated, rose at the beginning of the project in the involvement of citizens in general and specific groups in particular, also due to communication difficulties among engineers and people.
- Difficulties have been met in the selection of the sites where wind turbines are to be installed. Actors had to change hypotheses several times because of the disagreement of the inhabitants (for the devaluation of houses) and also of the churches (fear of noise during the services).[9]
- Samsø's Masterplan was to switch to an intensive use of electric cars, relying on a potential development of this type of technology, which would make it more sustainable in terms of

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[9] Interview by Giovanni Caiati to Søren Hermansen in the frame of FP7 EU project molesecure2050 (www.milesecure2050.eu)

costs and performance. As it emerges from an evaluation implemented 8 years ago,[10] this plan was shipwrecked for the substantial stagnation of the technology in question (found then solution of off-shore turbines) and for the absence of professional profiles able to intervene in the repairs of such cars in the Island (the cost of electrical vehicles are still too high compared to combustion engine cars – so based on the pragmatic philosophy for financing this is not possible today)

- Failure to use local labour in the installation and maintenance of the most complex works, such as the offshore wind turbines.

Present/future future critical issues

- The island ambition is vulnerable to change in national general incentives policies. In fact, if the politics changes drastically for Denmark as a whole, the Samsø model is equally sensitive to these changes as society at large. Samsø has no special agreement with the state, but only adhere to the existing incentives that can be applied for by anyone.
- What is the main discussion right now within the Energy Academy is to ensure that the Energy Academy continues the work it has done until now even after the original pioneers are retiring. The discussions in the leadership group is now mostly on this challenge, and on which competences to recruit for these new positions, and not the least to make sure to have the right people applying for the job. They are discussing how to make Samsø attractive for the sought after competences.

7. Up-scaling

The island of Samsø has received worldwide attention as a model community in this regard, having been able to transform large parts of its energy system in a period of 10 years Samsø succeeded not only in becoming self-sufficient with renewable energy,[11] but also in becoming influential. From Japan to EU institutions, from the White House to Danish 'Climate Municipalities', Denmark's Renewable Energy Island Samsø is a role model (i.e., making Samsø's experiences applicable to other contexts in a simple form), a frontrunner and signpost for the energy transitions to come.

Samsø Energy Academy receives some 5,000 visitors annually, including school children, students, business actors, politicians, ambassadors and members of royal families. In addition to that, the Energy Academy is regularly invited to international conferences and workshops and takes an active part in the political debate surrounding renewable energy in Denmark. Since the start of the Renewable Energy Island project in 1997, Samsø has been engaged with similar projects elsewhere in the world.[12]

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[10] In the frame of the project PACT (Pathways towards a low-carbon society), funded by EU Commission in the frame of FP7. This evaluation has been implemented by Giovanni Caiati and Gabriele Quinti.

[11] Karl Sperling (2017). How does a pioneer community energy project succeed in practice? The case of the Samsø Renewable Energy Island. Available at: http://www.sciencedirect.com/science/article/pii/S1364032116311789?np=y

[12] The Energy Academy acts as a consultant and partner to EU projects , island states in the South-Pacific, American islands and cities (E.g., Renewable Energy Vermont and Fund for Maine Islands), Japanese decision-makers and diverse educational programs in sustainability.

One final important issue is that the project tried to demonstrate what could be done without special agreements or deals, so that the model can be exportable to other contexts. It was an important part of the first proposal for "Energy Island" that there should be no local extra incentives from the public sector, but that the project would work within the limits of the existing conditions set for Denmark at large. This makes the Samsø initiative sustainable without it requiring special treatment from the public authorities.

SMARTEES
local social innovation

ISLAND RENAISSANCE BASED
ON RENEWABLE ENERGY PRODUCTION
Gorona del Viento – El Hierro

1. Background

El Hierro is an island of the Canarian archipelago in Spain, which covers an area of 278 km^2 and has a population of 10,679 inhabitants according to the ISTAC in 2017, which for several decades has been characterized by the search for a sustainable growth model, favouring the conservation of its environmental wealth and the use of its own resources in the framework of development actions.

Also known as the Meridian Island, El Hierro rises 1,500 meters above sea level, which results in a unique landscape with steep slopes permanently hit by the wind. This contributes to an annual average wind speed between 7.2 – 8.4 m/s and a maximum wind speed of 30.8 m/s.[1]

El Hierro suffered from a double isolation due to its small size and low level of economic development and strong dependence on the primary sector. Also, the lack of natural resources like water (e.g., desalination plants consume more than the 45% of the total energy of the island) historically forced dramatic periods of emigration, decreasing the number of inhabitants on the isle (in specific young generations that had to emigrate to the islands or in other countries).[2] In this context, it maintained a total external dependence on energy supply. Until the Wind Pumped Hydro Power Station entered into operation in 2014, the generation of electricity was based on fossil fuels (diesel) with the consequent environmental and economic costs.

The challenges addressed throughout the project "El Hierro 100% renewable energy island" are twofold: (1) gaining resilience and autonomy in energy supply while (2) becoming a sustainable island substituting fossil fuel-based energy by renewable energy sources.

Several energy issues have been mentioned by the promoters of the project.

- El Hierro, like the rest of the Canary Islands, is not connected to any continental electricity network and it is not interconnected with any of the other islands. El Hierro has, therefore, a weak and isolated electrical network that depends on external resources and its efficiency might jeopardize access to electricity or water supplies in households, specifically when climate conditions (e.g., storms) impede boats to approach the port, "leading to

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[1] Data obtained from the Gorona del Viento systems, 2017.

[2] Thus, the interviewees emphasize that this sustainable strategy and the different actions developed in the last 20 years aimed also to guarantee their population "to live and work in the island and also, to permit new generations to come back to their family´s homeland". Then, the search for a more sustainable method of supplying drinking water have been one of the main challenges underlining this project as two interviewed explain. The first one: „*El 50% de la razón por la que se hizo Gorona del Viento, que motivó las grandes emigraciones, y es la gran desgracia de El hierro, es no tener agua. Y ahora, gracias a Gorona del Viento tenemos agua garantizada" (*translation in English: *"50% of the reason why Gorona del Viento was made, which motivated the great emigrations, and it is the great misfortune of El hierro, is not having water. And now, thanks to Gorona del Viento we have guaranteed water*"). The second one: "*Hay que decir que el consumo energético de El Hierro se dispara cuando se instalan las desalinizadoras y el bombeo. Con las desaladora que te llevan a que tengas q elevar el agua desde una cota 0 a una cota 600, 800 metros. Entonces, se dispara el consumo energético insular, debido a la producción del agua, y elevarla también para el consumo. Es una de las bases de Gorona. Garantizando el autoconsumo energético garantizamos la producción de agua y que no nos quedamos sin agua" (*translation in English*: "It must be said that El Hierro's energy consumption is triggered when desalination and pumping are installed. With the desalination that take you to have to raise the water from a level 0 to a level 600, 800 meters. Then, the insular energy consumption is triggered, due to the production of the water, and to raise it also for consumption. It is one of the bases of Gorona. By guaranteeing energy self-consumption we guarantee the production of water and that we do not run out of water*").

blackouts and limiting access to drinking water on an island affected by drought" (El País, 2018).

- The electricity supply of the island depended in the past on a conventional thermal power plant of 13 MW. El Hierro thermal power plant uses as fuel diesel-oil that is transported to the Island by boat, being necessary to transport the equivalent to more than 43,000 barrels of oil per year. From this plant, and through medium voltage power lines (15 kV), electricity is distributed to the different buildings and enterprises.
- The island has great potential in renewable resources, especially taking advantage of wind (windmill technologies were well developed in other islands and territories) but wind energy has one important limitation: its variability and dependence on climate conditions.

The project was in a certain sense "unexpected", considering that peripheral and isolated territory like El Hierro, according to the promoters interviewed, in the 80s, was not in the focus of international agenda, and they "had neither the influence nor the money to transform the El Hierro Island in a completely self-sufficient island in terms of energy".

The need of becoming self-sufficiency in the energy domain and to develop a renewable energy strategy was one of the strategic objectives established in the document "El Hierro Sustainable Development Plan" approved by the local government of the island, the Cabildo Insular de El Hierro, in the 1997 and revised in 2006.[3] In words of one of the members of the Cabildo interviewed,[4] the local government of the Island was concerned about the economic development of the other Canary Islands (e.g., Tenerife, Lanzarote or Gran Canaria) in the 90s, which was based on tourism and land occupation for housing and tourism development and they were convinced that the economic development of El Hierro should be based on natural conservation and sustainable exploitation of its natural resources.

The sustainable strategy of the island included also an energy transition plan which pursued to supply the island of El Hierro only with renewable energies, further developed in three sub-programs: (1) An energy saving program; (2) A program to supply the 100% electricity demand of the island by renewable energies; (3) A clean transportation program.

Considering the global environmental degradation and the impact of climate change, the isle of El Hierro accelerated its commitment to biodiversity conservation, reduction of greenhouse gas emissions, and rapid energy transition to renewable energies through the creation of a renewable energy system capable to cover the electricity demand of the island and has been materialized in the construction of the energy plant "Gorona del Viento".[5]

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[3] Within the frame of the Sustainable Development Plan the following measures were taken: (i) Protect the island (60% of the territory of the island is protected, under different forms of natural spaces); (ii) Promote organic agriculture and sustainable fishing local industry; (iii) Protect natural resources by the creation of the maritime reserve in *La Restinga.*

[4] That said: *"El Hierro protected the 60% of their natural territory, even their natural maritime reserves and developed a strategy to introduced 'organic agriculture', sustain the traditional fishing industry and promote an active and nature-based tourism, promoting scuba diving, trekking and biking across the island".*

[5] One of the key-informants interviewed explains that the plant was called Gorona remembering the legend of the Garoé tree which provided original islanders water and that, in the 21st Century Garoé are the windmills of El Hierro: "*Tomás Padrón, que es uno de los principales impulsores que ha tenido este proyecto bautizó a Gorona del Viento como el Garoé del Siglo XXI. El Garoé es un árbol que suministró agua a los herreños en épocas de sequía. En época de los aborígenes, los bimbaches, cuando no tenían agua se suministraban a través del árbol Garoé. De ahi viene la*

2. Implemented actions

The overall ambition of El Hierro was to transform it to a front-runner island in the implementation of self-sufficiency energy systems based on clean and renewable energy sources, with a strong commitment to sustainability in terms of "fostering green economy and social development compatible with the preservation of the environment".

Beneficiaries of the project are the residents in El Hierro. However, a key-informant mentions that beneficiaries are the complete population of the Canary Islands, due this project have boosted that other islands launch their own projects on renewable energies.

In 2000, the island of El Hierro is declared a Biosphere Reserve by UNESCO. According to this organization, this seal "serves to harmoniously promote the integration of populations and nature, in order to promote sustainable development through participatory dialogue, the exchange of knowledge, the reduction of poverty, the improvement of well-being, respect to the cultural values and the capacity of adaptation of the society before the changes". A 2001 meeting with Loyola de Palacio, a Spanish politician who was then the EU Commissioner for Energy and Transport was signalled by one of the promoters interviewed as "the first step for starting out the project" which permitted them to participate in the EU FP5-EESD Programme for research, technological development and demonstration on "Energy, environment and sustainable development". The research and innovation project – that developed specific technologies – took advantage of the renewable energies of the island. Finally, the project "Gorona del Viento" was included in the Insular Plan of Ordination of El Hierro, definitively approved on June 17, 2002.

The project consists of the development of a Wind Pumped Hydro Power Station on the island of El Hierro with the aim of making this island the first capable of self-supplying electrical energy by means of totally renewable energy sources. The system is composed of two water tanks, a wind farm, a hydroelectric plant, a pumping station and a diesel engine centre (existing). The operating philosophy is based on supplying the island's electricity demand with renewable sources, guaranteeing the stability of the electricity network. The diesel engine plant only enters in exceptional cases / emergencies when there is neither wind nor enough water to produce the demanded energy. With the hydroelectric plant it is possible to transform an intermittent energy source into a controlled and constant supply of electricity, maximizing the use of wind power. In this way, the thermal power plant operates by supporting as a reserve only in periods of absence of wind, minimizing the consumption of fossil fuels.

During the first stage, a technical feasibility study was carried out to identify the optimal configuration of the wind turbines, the hydraulic turbines, the volume of the water reserves and the respective water pumping equipment that will be installed in the new plant.

After the visit of the President of the Government of Spain, in 2006 a budget of 5 million Euros for a first phase of the project has been allocated and thus was able to finance the works of the plant.

leyenda del Garoé. Por eso a esta central se la llama el Garoé, porque es la que nos garantiza el agua" (translation in English: *"Tomás Padrón, who is one of the main drivers of this project, named Gorona del Viento as the Garoé of the 21st Century. The Garoé is a tree that supplied water to the Herreños in times of drought. In the time of the aborigines, the bimbaches, when they did not have water, were supplied through the Garoé tree. That's where the legend of Garoé comes from. That is why this plant is called the Garoé, because it is the one that guarantees water"*).

The General Director of the Institute for Diversification and Energy Saving (IDAE)[6] and the President of the Council, on behalf of Gorona del Viento El Hierro SA, signed on March 20, 2007 the agreement that regulates the mechanisms for the contribution of public funds and control and monitoring of the actions of this initiative. With this contribution of 35 million Euros, the execution of the project was guaranteed.

On July 12, 2007, another important agreement for 12,250,000 Euros for the same purpose was signed by the Ministry of Industry of the Government of the Canary Islands, plus another agreement for 2,075,270 Euros for the purchase of land where the facilities will be set up.

Gorona del Viento

Gorona del Viento initiates the public tenders of the different works that comprise the execution of the project (detailed engineering, civil works, components of the power station, etc.). In July 2008, the Environmental Impact Statement (DIA) of the project was approved. One year later, Valverde Town Hall granted an urban planning license for the works of the plant. With the guaranteed financing and the license granted, Gorona del Viento processed the contracting of work and the first earth movements began in La Caldera, near Valverde on August 25, 2009.

During the phase prior to the start of operation of the wind hydro pumped power station of El Hierro, a study of the entire work environment was carried out identifying the possible elements of patrimonial importance from the archaeological and ethnographic point of view. In the area where the wind farm was installed, a space with archaeological remains was detected. After the discovery, the necessary changes were made to safeguard the archaeological site, maintaining the conditions of environmental respect and minimization impact according the project. The situation of the wind farm and the layout of evacuation lines and pipes considered other aspects such as the preservation of the local flora, the conservation of the Camino Real (old path that linked outstanding sites) and the low visual impact.

This hydro and wind-power project has been officially inaugurated in 2015. It consists of five wind turbines capable of producing 11.5 megawatts of wind power to supply electricity for approximately 11,000 residents, an additional number of tourists, and three water desalination

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[6] Institute of Diversification and Energy Saving [http://www.idae.es/].

facilities. The hybrid wind/pumped hydro storage system stores surplus wind power by pumping water 700 meters up (approximately 2,300 feet) to the crater of an extinct volcano. When winds are calm or when demand exceeds supply, water is released from the crater to generate 11.3 MW of electricity, filling a smaller artificial basin created at the bottom of the extinct volcano. Water in the lower basin is then pumped back up again to the upper reservoir when there is excess wind power. 2016 was the first whole year in operation for the power plant.

In 2017, several works were carried out at the plant´s facilities, which have allowed it to improve its operation. Concretely, the improvements consisted in a revision of the speed governor logic of the hydro turbines, with the aim to enhance the response of the hydro turbine units during wind ramps. This improvement has increased the injection of wind energy directly into the energy system, avoiding pump units shedding and therefore a reduction in the wind energy consumed by the pumping station.

Since 2018, Gorona del Viento has become a profitable project that benefit the island's population through the distribution of share capital among Gorona's shareholders (among whom the Island Cabildo is the majority shareholder). Due to the new lines of work resulting from the benefits of the company and the mentioned expansion, the Cabildo de El Hierro has launched several measures focused on enhancing resident's mobility with electric cars by installing charging points on the Island for electric vehicles and facilitating subsidies for residents that want to change their regular car for an electric car (subsidies are up to 7,000 Euros in 2018 and the plant is preparing a new line of subsidies in 2019). Gorona del Viento has installed electricity charging points[7] to fulfil the demand of existing electric vehicles on the Island in line with the sustainable transport plant launched by the local government. The promoters claim that the use of electric cars will further reduce the demand for fossil fuels.[8]

The local authorities approved a plan of subsidies in 2018 that encourage farms and wine cellars owners to install solar panels in their exploitations (isolated and not connected to the island grid). A new line of subsidies (funded by the profits obtained in the energy plant) has been announced by 2019 which covered public and private buildings and will encourage self-sufficient energy production-consumption based on renewable sources.

From the project's starting phase to the present, a policy of information and dissemination among the population has been maintained with talks, guided visits, informative material and dissemination of news in local media, excursions with schools and associations for the elderly, days of open doors for the population, specialized days with participation of social and cultural representatives of the Island, etc.

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[7] The recharging facilities were placed strategically around the Island (with three in the capital, two in El Pinar, and two further points in La Frontera). Each semi-fast recharging point has 22 kW of power, which will recharge an electric vehicle in a short time and is compatible with the various vehicle models currently on the market. In addition, the energy supplied at these points will be free for the next two years".
Source:http://v2018.goronadelviento.es/en/gorona-del-viento-el-hierro-launches-recharging-points-for-electric-vehicles/
[8] In words of the Vice-president of the Cabildo: *"The implementation of electric vehicles will not only prevent emissions, but also provides a form of energy storage. If this project is properly managed, in the near future electric vehicles will become batteries that will be available on the streets of the Island"*.

Education activities have been also implemented by distributing over 4,200 low-energy light bulbs with LED technology among the Island's school population. This activity was part of the company's "Campaign to Raise Awareness of Energy Saving" (set out in its Social Corporate Action Plan). Gorona del Viento has also given subsidies for residents to change their old home appliances (e.g., refrigerators) for A++ and purchase energy efficient appliances. Moreover, aiming at to strengthen the research and innovation capacity of the project "Gorona del Viento, El Hierro 100% renewable" the promoters of the project reached an agreement with the Canarian Universities of La Laguna and Las Palmas "to drive forward academic activity and research, including student exchanges, the training of teaching staff, research studies and all activities aimed at improving training and education for future professionals and making the technological innovation sector of the Canary Islands into an international benchmark".[9]

Finally, in recent years and, according to the directors of Gorona del Viento (2018[10]), the power plant has reached agreements "with over twenty educational institutions, including those from the Canary Islands such as IES Garoé (El Hierro), IES San Matías (Tenerife), and the Universidad Europea de Canarias, as well as other institutions within Spain and abroad. The Power Station has become also a training institution for students from the Eibar School of Engineering at the University of the Basque Country, the Universidad CEU Cardenal Herrera, the Universidad Politécnica de Madrid, the Eibar School of Engineering, the Universidad Alfonso X El Sabio and the Universidad de Alcalá. Agreements have also been reached with several French and German institutions, such as the OSZ TIEM (Berlin).

The cost of this project amounts to a total of 64.7 million Euros, of which 60% of the total is assumed by the Island Council, 30% by Endesa and 10% by the ITC.[11]

3. Stakeholders analysis

Involved actors

This project is an ambitious initiative that requires multilevel governance collaboration. Many types of actors are involved.

1) Public administrations involved in the energy transition strategy, such as the Cabildo Insular de El Hierro, which approved and developed the sustainable development plans for the island in 1997

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[9] http://v2018.goronadelviento.es/en/on-el-hierro-antonio-martinon-and-rafael-robaina-sign-an-important-partnership-agreement /

[10] http://v2018.goronadelviento.es/en/gorona-del-viento-practice-range/

[11] However, according to an interviewed promoter, the cost is higher: *"Que es lo que ha supuesto el mayor coste de estos 80M€? El parque eólico supuso una inversión de 15M€. Los depósitos de agua y tuberías alrededor 20M€. Turbinas, bombas, también costó más o menos 20€. Estos 80 M€ no son solo fondos de la isla. No. Del estado hay una parte, se han conseguido fondos estatales por un total de 35M€. Fondos propios, del Cabildo y del gobierno de Canarias y de Endesa, unos 20 millones y préstamos de los bancos, 24M€. Ya hemos pagado la deuda bancaria, tras tres años de funcionamiento"* (translation in English: *"What is the biggest cost of these € 80M? The wind farm represented an investment of € 15M. Water tanks and pipes around € 20M. Turbines, pumps, also cost around € 20. These € 80 million are not just island funds. No. There is a part of the state, state funds have been obtained for a total of € 35M. Own funds, the Cabildo and the government of the Canary Islands and Endesa, about 20 million and loans from banks, € 24M. We have already paid the bank debt, after three years of operation"*).

and 2006 and who was the promoter of the energy company "Gorona del Viento SA"; and, the Canary Island government, who supported the creation of such energy company and has developed a series of political measures to enhance energy transitions in the region; and the National government which founded the major investment to build the energy plant (thanks to the political activity carried out by the local and regional Government).

2) The Gorona del Viento hydro-wind power station is operated under the supervision of Red Eléctrica de España.[12] Red Eléctrica is the sole transmission agent and operator (TSO) of the Spanish electricity system, which operates in Gorona del Viento as the national actor that establishes the priorities in the type of energy source to be used in each period of time.

3) The private energy sector plays also a key role in this social innovation so as the Canary energy company the initial idea for the Wind-Pumped Hydro Power Station came from the offices of energy company Unelco (currently, Endesa),[13] providing their technological expertise in the design and exploitation of the plant (that will allow an integrated hydroelectric-wind energy management model).[14]

4) Besides, universities and the technological sector are also sectors involved in this project. The Canary Islands' Institute of Technology became involved since the beginning (developing a "cutting-edge model for energy generation on islands") as well as the Institute for Diversification and Energy Saving (IDAE[15]) depending on the National Government. Moreover, Gorona del Viento has recently signed agreements with different universities (see § 2.) and the Oceanic Platform of the Canary Islands (PLOCAN) collaborate in the R&I project for the development of wave energy technologies in El Hierro.[16]

5) Press has been highlighted as one of the major actors in disseminating the activity of the plant and informing residents about the features and achievements of Gorona del Viento and the directors of the Plant maintain a good relationship with local media. Journalists from national and international media have covered the development of the project.

According to the promoters, this multilevel collaboration includes modelling of the whole electricity consumption of the island and its management (operating as isolated system), planning

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[12] According to RE's Website "Red Eléctrica is a National company with a majority of public capital, made up of Red Eléctrica is created as a company with a majority of public capital, made up of capital contributions of a group of public electric utilities (Endesa and ENHER) and private electric utilities (Iberduero, Hidroeléctrica Española, FECSA and Unión Fenosa, amongst others). The INI (Instituto Nacional de Industria), the predecessor of SEPI (State-owned Industrial Holding Company), held a direct shareholding of 1%".

[13] One of the engineers of this company, Juan Padrón, has been acknowledged as "the father of Gorona del Viento", as one of persons in the Island more dedicated to persuade public and private actors to support the research and innovation project that eventually become the first step in a trajectory of almost 30 years working in the developed of Gorona del Viento wind-hydro power station.

[14] Endesa states that "El Hierro 100% Renewable is a ground-breaking challenge that applies a new energy model. It is one of Endesa's landmark initiatives to contribute to sustainable development and help fight climate change" (Endesa Website: https://www.endesa.com/en/projects/a201611-el-hierro-renewable-sustainability.html

[15] IDAE governed the mechanisms for the provision of public funds, as well as control and monitoring of the actions of the project. IDAE contributed with its experience to this project ensuring the correct application of budget funds by performing monitoring, inspection and control tasks related to budget execution during design, supply, assembly, start-up and operational testing.

[16] http://www.goronadelviento.es/index.php?accion=articulo&IdArticulo=225&IdSeccion=89

of future electricity consumption and continuous monitoring of its operation to assure its proper functioning, and defining a strategy to guarantee the electricity supply to all inhabitants of el Hierro.

Partnership

Gorona del Viento El Hierro S.A., is a public-private enterprise partnership including the El Hierro Island Council (65.8%), private energy company Endesa (23.2%), the Canary Islands Institute of Technology (7.7%) and the Autonomous Community of the Canary Islands (3.2%). The Gorona del Viento Board of Directors is chaired by the president of the Council of El Hierro.[17] This public-private partnership is exceptional in the Spanish energy system. Gorona del Viento El Hierro, SA was constituted on December 4, 2004, chaired by the president of the Council of El Hierro for the development of the project "Wind Pumped Hydro Power Station of El Hierro". It is established that Gorona del Viento will be a 100% public company for 50 years after its constitution. However, the promoters feel happy to collaborate with the private sector and they acknowledge that the existing public-private agreement is beneficiary for all parties and that including a big energy company is an advantage.[18]

In December 2018, the owners of Gorona del Viento changed the statutes of the company, approved by the Ordinary General Meeting (held in Valverde on December 10, 2018), aiming at expanding Gorona del Viento's social commitment. According to the plant,[19] the objectives of the company are the following: "the promotion of research into clean energy production, the promotion of electric vehicles, the dissemination of information about the Wind-Pumped Hydro Power Station, and the development of training programmes".

Leadership

Regarding the leaders of the project, respondents point to the charismatic leadership of Tomás Padrón, an engineer employed in the newly created renewable energy department at Unelco (today Endesa), the energy company operating on the island in the 80s. Padrón, who is considered the pioneer of the initiative, was later elected the President of El Hierro's island authority and since this political position he dedicated his efforts to this project aiming at to reduce the island's

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[17] According to the promoters interviewed, *"The island government has the capacity to decide how to invest the benefits of the plant and social and environmental goals prevail despite the interest of the private energy company, who is more dedicated to win money"*.

[18] According to the promoters interviewed: *"Transcurridos 50 años, la empresa tiene que ser toda del Cabildo de El Hierro. Así está en los estatutos. Tiene que revertir todo en el Cabildo. Pero no tenemos prisa. Esta gente también aporta. Tener una empresa como Endesa dentro también nos ayuda. A veces tenemos nuestros conflictos de intereses. Para ellos el objetivo es ganar dinero y nosotros tenemos otros objetivos más sociales. Pero tener a Endesa también nos ayuda. Es un gigante de la energía. La mayor aportación de Endesa es su conocimiento. Nosotros, pudimos construir solos la central, pero cuando nos metimos en los mercados, cuando nos metimos a vender energía ahi si q nos ayudaron bastante"* (translation in English: *After 50 years, the company has to be all of the Cabildo de El Hierro. This is in the statutes. It has to revert everything in the Cabildo. But we are not in a hurry. These people also contribute. Having a company like Endesa inside also helps us. Sometimes we have our conflicts of interest. For them the objective is to earn money and we have other more social objectives. But having Endesa also helps us. It is a giant of energy. The greatest contribution of Endesa is its knowledge. We could build the plant alone, but when we got into the markets, when we got to sell energy there, they helped us a lot"*).

[19] http://v2018.goronadelviento.es/en/gorona-del-viento-takes-forward-its-commitment-to-the-population-of-el-hierro/

fossil fuel dependency and to get the necessary economic and technological support for making this project into reality. The current president of the Cabildo (and president of Gorona del Viento El Hierro), Belén Allende, is the person that is currently leading the project and she has been playing an active role in the future development of the plant. She was not one of the pioneers of the project but since four years ago she is the main spokesperson of the plant and responds to the critics that from different sectors have been made regarding the limits and high cost of the island clean energy production.[20]

Strategies for gaining social support

Concerning citizen´s support, the promoters recognize that there have been no citizen consultations about the plant. Citizens' involvement was gained by facilitating information and dissemination among the population. Gorona del Viento offers guided visits to residents, schools and visitors and informative material is also available in the local facilities. According to the Cabildo de El Hierro: *"Inhabitants in El Hierro are very sensitive to environmental issues and from the beginning they were told about the objectives to achieve with this initiative, which included lot of civil work for the wind farm and for the hydroelectric power plant"*.

As already alluded in § 2., the Plant organizes "Open doors days" inviting citizens to visit the plant and see by themselves the dimension of the project. Environmental educational campaigns have been also launched by both the island government and the energy plant encouraging energy-saving behaviours in schools, in public sector and towards general population.

Nowadays, the islanders feel that the energy plant is good for them also because the plant has become a key element in job creation and economic development, and some students from El Hierro and from other islands have been employed by the Gorona plant. Moreover, Gorona del Viento brings visitors to the island, which has been positive for the local economy,[21] and the international reputation gained has become a relevant motivation for people changing their mind on the project.[22] However, the scope of the project appears as not totally well understood by the population of El Hierro because the economic impact of the project, which is not directly observable in the cost of the energy.[23] But this perception of lack of impact has changed in the last

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[20] https://www.eldiario.es/canariasahora/elhierroahora/isla/duplicado-coste-real-electricidad-Isla_0_865114222.html

[21] Adding: "in special after the economic crisis and the *eruption* of a submarine *volcano in the* south of *El Hierro* in October 2011 that have both negative impacts on the economy of the isle".

[22] According to an interviewed promoter, they are proud that El Hierro "*on their own capacity to become energy self-sufficient and making the difference, becoming an international reference for other isolated territories in the world that can learn from El Hierro experience*".

[23] According to an interviewed promoter, *"Tenemos un problema con conseguir que la población comprenda el alcance y el verdadero objetivo de Gorona del Viento . porque no hicimos una buena comunicación del proyecto, la gente piensa que la energía que se produce con el agua y el viento es gratuita, ellos tienen q pagar menos que antes … Los beneficios para la gente que viva aquí no es directamente en el precio de la energía. Los beneficios derivan de tener más participaciones en la compañía. Cuando termina el año tenemos beneficios y el gobierno de la isla reinvierte esos beneficios en otros proyectos. Ese es el verdadero beneficio real".* (translation in English: *"We have a problem with getting the population to understand the scope and true goal of Gorona del Viento ... because we did not make a good communication of the project, people think that the energy that is produced with water and wind is free, they have to pay less than before ... The benefits for the people who live here is not directly in the price of energy. The benefits derive from having more shares in the company. When the year ends we have benefits and the island government reinvests those benefits in other projects. That is the real benefit".*)

half year due to the social measures adopted by the plan (subsidies, mobility improvements, etc. – see § 2.).

4. Milestones

- 1981: Unelco (Endesa) established an alternative energy department for the first time on the Canary Islands. The heads of the department devise a project for El Hierro to sustain itself with renewable energies, with wind and water as a source.
- A decade later (1991): this approach is taken with the collaboration of the Ministry of Industry, which gives a boost through the Technological Institute of the Canary Islands (ITC),[24] initiating the technical studies required to start the project.
- November 1997: the Cabildo de El Hierro approved the Sustainability Plan of El Hierro.
- 2000: the island of El Hierro is declared a Biosphere Reserve by the UNESCO.
- June 17, 2002: approval of the project "Gorona del Viento".
- December 4, 2004: Gorona del Viento El Hierro, SA is constituted.
- 2005: a technical feasibility study is carried out to identify the optimal configuration of the wind turbines, the hydraulic turbines, the volume of the water reserves and the respective water pumping equipment that will be installed in the new plant.
- 2006: budget of 5 million Euros was granted by the Government of Spain for starting the first phase of the works.
- March 20, 2007: the General Director of the Institute for Diversification and Energy Saving (IDAE)[25] and the President of the Council, on behalf of Gorona del Viento El Hierro SA, signed the agreement that regulates the mechanisms for the contribution of public funds and control and monitoring of the actions of this initiative. Availability of a contribution of 35 million Euros.
- July 12, 2007: signature of the agreement with the Ministry of Industry of the Government of the Canary Islands for funding with almost 14,5 M€ the implementation of the project and for the purchase of land where the facilities will be set up).
- July 2008: approval of the Environmental Impact Statement (DIA) of the project.
- August 25, 2009: the Urban Planning license was received for the works of the plant; first earth movements.
- 2015: inauguration of the hydro and wind-power project.
- August 9, 2015: at noon, the Gorona del Viento power plant generated all the island's electricity using renewable energy for four consecutive hours.
- 2017: several works carried out at the plant´s facilities to improve its operation.
- 2018: Gorona del Viento pays off its bank loans. The company was able to cover 100% of its debts valued at 25.6 M€.
- 2018: The Company achieved the milestone of having supplied 97% of the electricity consumed on El Hierro in July 2018, by using renewable sources (apart from 6 brief periods). So far this year, the Wind-Pumped Hydro Power Station has met 100% of the demand for a period of over 560 hours, and has done so for over 2,000 hours in total since it began to operate in June 2015.

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[24] Technological Institute of the Canary Islands [http://www.itccanarias.org/web/]
[25] Institute of Diversification and Energy Saving [http://www.idae.es/]

5. Effects

Main environmental, economic and social effects

- The principal outcome of the project "El Hierro 100% renewable energies" concerns the reduction of CO_2 and contaminant emissions as well as the reduction of costs with respect to diesel generation on El Hierro. The plant estimates that in 2018, the system saved 24,650 tonnes of CO_2 emissions and 7,460 tonnes of diesel fuel that no longer needs to be consumed by the isle. Besides, the website of Gorona del Viento publishes that in 2018 Gorona has remained 2,300 hours generating 100% of the island's electricity.
- The project also guarantees the electricity and water self-sufficiency on the island that reduces the power vulnerability of islanders. The project is very promising as it attempts to solve the problem that renewable energy production is intermittent.
- The energy project has direct impact on the creation of new jobs related to renewable energies.
- The high school of the island "IES GAROE" has implemented new programs training students in electro-technical and automated systems that later enter to work for the plant.
- Gorona del Viento has become a tourist destination for visitors interested in nature as well as for "scientific tourism" in the shape of experts from the fields of energy, students, responsible institutions and the many people who travel to the island due to the interest generated by this project[26,27,28].

New ways of behaving/doing

The implementation of the project encouraged or facilitated the following energy-saving behaviours:

- Reduction of consumption of fossil energies in the island energy production system

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[26] According to the head of the tourism centre of El Hierro: *"The plant itself has already attracted several thousand visitors, people who eat, rent a car, a flat or a room ..."* (https://www.thelocal.es/20160420/el-hierro-spanish-canary-island-100-percent-clean-energy-spain-renewables). It has been even more important seen the economic crisis and the *eruption* of a submarine *volcano in the* south of *El Hierro* in October 2011 that have both negative impacts on the economy of the isle.

[27] In words of the head of the island authority *"Over 70 students have been able to benefit from the training opportunity offered by Gorona del Viento. This is something that we welcome and take pride in from the perspective of supporting the educational community, one of the principal wider social objectives of Gorona del Viento, as well as for the benefits gained by the population of El Hierro by us granting access at both national and international levels. This brings a benefit in the form of a boost to the growing numbers of scientific tourists to the Island, attracted by the Wind-Pumped Hydro Power Station (...) It is not just a matter of the students themselves coming to stay on El Hierro. We can add in the visits by their families, and the fact that they will spread the word about the Island, and thus attract new visitors in the future. These are tangible results that encourage us to keep working along"*. (http://v2018.goronadelviento.es/en/gorona-del-viento-practice-range/).

[28] One video published by the BBC news has been said to have direct impact on the number of European visitors to the island: "El Hierro, the Spanish island towards energy independency" (https://www.sustainableislands.eu/news/videos-smilegov/elhierro-energy-revolution.html).

- Self-sufficient energy production-consumption based on renewable sources[29] (e.g., promotion of self-consumption in farms and wine cellars)
- Energy-saving behaviours in households based on education/awareness measures (e.g. the electric demand fell by 4.11% in the third quarter of 2018, even with an important increase of tourists in that period) and on the social responsibility plan approved by Gorona del Viento, which establishes, among other, that a percentage of the benefits of the plant will be destined to the improvement of the energy efficiency in disadvantaged homes
- Low-carbon mobility (e.g., the acquisition of electric vehicles for residents).

The project encouraged further new behaviours among citizens, also favoured, broadly, by the effects of the approval (1999) and revision (2005) of the Sustainable Development Plan. In particularly:

- A change in the economic activity of the Island in terms of increasing the number of primary sector activities dedicated to organic production (e.g., fishing,[30] cattle and organic agriculture) as well as investments in active tourism and eco-tourism, especially taking advantage of the high value of the marine reserve, that have impulsed visitors interested in diving activities
- Environmental awareness that, according to a couple interviewees, might have influence a more responsible behaviour in waste management. The rate of recycling in El Hierro is about 20% since in the rest of the Canary Islands the rates are below 15% (however, there is not empirical evidence on the level of environmental awareness and the effectiveness of waste management campaigns).

New knowledge

The project "El Hierro 100% renewable energies" is described the result of "three decades of studies, design, engineering development and a complex operation in a location affected by its twofold insularity". The interviewees referred first the technological advance as a result of this Research & Innovation project,[31] that had to sort out a series of problems of design, installation and exploitation of the El Hierro's Wind-Pumped Hydro Power Station "Gorona del Viento". The pioneering project consist of an "innovative system of electricity generation whereby a wind farm and a hydraulic jump in combination supply a constant flow of energy generated by both sources, which then reaches the grid as a single stream."[32]

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[29] *"Many people are currently asking for information about the conditions for receiving the subsidies"* says one of the members of the Cabildo.

[30] For a long time the fishing community depended on factories or intermediaries who monopolized the captures. In the 90s, the artisanal fishers rejected this traditional monopoly and formed the "Fishermen´s Cooperative of la Restinga" aiming at controlling the fisheries development. Other cooperatives in primary sector have been created in the island, and this model of co-governability seems to be normalized in El Hierro (cfr. De la Cruz Modino, R., & Pascual-Fernández, J.J. (2013). Marine protected areas in the Canary Islands–improving their governability. In Governability of Fisheries and Aquaculture (pp. 219-240). Springer, Dordrecht).

[31] https://cordis.europa.eu/project/rcn/70479/factsheet/en

[32] A series of companies contributed to the development of the plant. According to an interviewed promoter: *"Para ellos es un reto. La maquinaria que desarrollaron aquí tuvieron que crearla toda, no es algo que se hubiese desarrollado en otro sitio. Los molinos, los aerogeneradores fueron desarrollados para esta central. Las turbinas igual. Las bombas igual. Su aportación fue fundamental"* (translation in English: *"For them it is a challenge. The machinery*

As stated in the Gorona del Viento website, "The innovative aspect of this Wind-Pumped Hydro Power Station is that it is the first to combine both sources of power generation in such a way that the hydraulic energy, which is controllable, acts to stabilise the wind energy, which can fluctuate within short periods of time and is at the mercy of the meteorological conditions. This characteristic of wind-produced power has always been an obstacle to its large-scale integration into electricity grids, especially where island systems are concerned, as the proportion of power generated in relation to demand is limited according to the safety conditions and the need to guarantee the supply. This is not the case on El Hierro, where the wind-hydro energy leaves the Power Station as a single stream".[33]

6. Some critical issues

Critical voices and reluctance

Some of the interviewees mention that, when the project was launched and they start to fund the main investments, many residents on the island were quite reluctant, claiming that El Hierro had needs that should have been covered before building Gorona del Viento such as several public services like telephone lines, Internet access and mobile connections. Water or resource management were limited and some thought they should have been solved first. Moreover, they were sceptical about the success of the project and they were critical about potentially low performance of the plant or the lack of direct impact on their economies (in special because they are not able to perceive the benefits of the investment in terms of reduction of the energy bill).[34]

Other voices[35] critiqued the large "propaganda and fanfare" of a project that was envisioned in 80s and took almost 33 years in materializing, while others criticize "the euphoric announcements of the Gorona del Viento spokespersons" although the project will not be able to cover 100% of the island's electricity demand with only renewable energy and the infrastructure as currently conceived has reached its maximum energy generation capacity.[36]

A recent study from the University of Las Palmas de Gran Canaria states that Gorona del Viento "has doubled the real cost of electricity on the island compared to what it would have cost with

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that they developed here had to create it all, it is not something that had developed elsewhere. The windmills, the wind turbines were developed for this plant. The turbines equal. The pumps equal. Their contribution was fundamental").

[33] http://v2018.goronadelviento.es/en/el-hierros-dream-of-renewable-energy-has-finally-come-true/

[34] According to an interviewed key informant "*Este proyecto tuvo sus dificultades al el principio. Pero que este proyecto haya tenido el apoyo de todos los partidos políticos en el gobierno a lo largo del tiempo que se pusieran de acuerdo para sacar este proyecto adelante es un aspecto muy positivo, de lo que estamos muy orgullosos, porque conseguimos trasladarlo a la ciudadanía. Pero nos cojea una pata, que es la de la participación ciudadana. Al principio la ciudadanía fue un poco reacia y el impulso político fue muy importante*" (translation in English: "*This project had its difficulties at the beginning. But that this project has had the support of all the political parties in the government over time that they agreed to take this project forward is a very positive aspect, which we are very proud of, because we managed to transfer it to the citizens . But it hobbles a leg, which is that of citizen participation. At first the citizens were a bit reluctant and the political impulse was very important*").

[35] https://www.eldiario.es/ultima-llamada/El_Hierro_renovables_energia_6_541105902.html

[36] http://euanmearns.com/el-hierro-third-quarter-2018-performance-update/

the insular thermal power station."[37] However, the president of the Cabildo, Belén Allende, defends the economic profitability of Gorona del Viento and says that the cost of electricity on El Hierro "is the cheapest in the Canary Islands, in addition to its high environmental benefits" and affirms that the researchers based their study on erroneous information that takes not into account the amortization of the investment.[38]

Finally, it has been remarked by some key-informants that the Gorona del Viento energy plant does not commercialize the electricity generated by itself, so as the free market for electricity, allows that a number of energy companies offer their services in El Hierro. As a result of this circumstance, the population of El Hierro does not have direct evidence about the results of the project, since they have their energy contracts with the traditional energy companies and people do not receive any reward for having the energy plant on the island.

Past and present critical events

- The 2008 financial crisis during the stage of building the installations of the plant. It has been possible to sort this situation out thanks to the support of the national and regional administrations who considered Gorona del Viento a strategic project in terms of renewable energies. Also, when the plant was functioning, they had to ask the banks for a loan in order to cover the regular costs since they were not able to earn money through the energy activity.
- Law 17/2013, on security of supply and increased competition in the Spanish insular and non-peninsular systems, which establishes that Red Eléctrica, in its capacity as operator of these electricity systems, be the owner of all new pumped-storage facilities, provided that it is determined that said facilities have as a main purpose to guarantee electricity supply, the security of the system and the integration of non-manageable renewable energy. This new regulation almost forces the transference of Gorona del Viento to the system operator, with the negative consequence that the Cabildo de El Hierro could have lost the ownership of the project in which they have invested so many efforts. However, after a conflict,[39] an agreement with the Industry Department of the Spanish administration

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[37] Latorre, F.J. G., Quintana, J.J., & de la Nuez, I. (2019). Technical and economic evaluation of the integration of a wind-hydro system in El Hierro island. Renewable Energy, 134, 186-193. This study concludes that: "The wind-hydro plant on El Hierro is an example of how the large-scale incorporation of renewable energy into an island electric system can increase the real costs of electrical energy generation, with the original socio-political goals remaining unattained. This has been shown by the comparative analysis of two electrical energy generation models for the island of El Hierro, for the years 2016 and 2017.Greater renewable energy penetration does not necessarily ensure a significant decrease in CO2 emissions. This will depend on the energy source used and the grid generators. In the case of El Hierro, renewable penetration has had a negative impact on the efficiency of the thermal power plant, increasing fuel consumption per generated MWh.The installation of non-dispatchable renewable energies does not guarantee the supply, with the required availability of additional fossil fuel-based thermal power increasing the cost of the supply in island electric systems" (La Torre et al, 2019, pp. 192-193

[38] http://www.goronadelviento.es/index.php?accion=articulo&IdArticulo=226&IdSeccion=89

[39] According to a promoter interviewed: *"En 2013, hay una ley del sector energético español que dice que este tipo de centrales la tiene que hacer Red Eléctrica Española (REE). La única que escapó fue Gorona del Viento. Y nos costó. Porque querían absorberla. Hoy por hoy este tipo de centrales las tiene que construir REE. Como conseguisteis escaparos de eso?Buah! Fue una guerra! Una guerra dura. Bastante dura. Si, nos costó muchísimo. Ahí teníamos un conocido del ministerio que para bien o para mal ahí nos ayudó, nos ayudó bastante"* (translation in English: *"In 2013, there is a law in the Spanish energy sector that says that this type of power plant has to be done by Red Eléctrica Española (REE). The only one that escaped was Gorona del Viento. And it cost us. Because they wanted to absorb it. Nowadays, this type of power plant has to be built by REE. How did you get away from that? Buah! It was a war! A*

solved this situation and Gorona del Viento is still owned and managed by the Cabildo and the other three partners, under the supervision of Red Electrica.

- Lack of regulation that stimulates citizen's involvement in energy self-production. In the words of one of the current spokespersons of the island government, "Gorona del Viento is only able to supply the 60% of the energy needs in the Island. The rest of the energy should be covered by inhabitants and companies that can install their renewable facilities and receive certain benefits for their contribution to the grid, but for doing (further) this, changes in regulation are still required"[40]. The situation could get worse thanks to the Royal Decree 900/2015 on self-consumption,[41] one of the most controversial laws in Spain that was implemented by the previous government in 2012. It received great contestation from the renewable sector, because it charged Spanish households fitted with solar panels with an additional tax of 7% to remain connected to Spain's electricity grid should the solar panels not produce enough energy. This decree has been recently suspended but, until the moment it impeded the development of self-consumption in Spain and made the transition towards a clean and accessible energy model impossible because it discouraged citizens to be 'prosumers' and install solar panels in their homes.[42]

7. Up-scaling

As already alluded, the island receives thousands of visitors (students and researchers from all over the world and regular tourists) attracted by the achievements obtained in Gorona del Viento that in words of the promoters "have turned El Hierro into a natural laboratory". Tourism linked to science that allows explaining the values of sustainability and respect for the environment. Furthermore, the centre attracts researchers who want to learn about the project and students motivated by learning and experimentation in innovative facilities that have turned El Hierro into a natural laboratory, one of the first isolated territories in the world that covers its demand, with renewable energies.

The project has been presented as "a workable model that can be replicated"[43] by other islands and territories in the world which symbolises the successful management of renewable energy to provide energy self-sufficiency for the island and other, similar territories.[44] An example is the isle of Gran Canaria, also in the Canarian archipelago.[45]

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hard war. Pretty hard. Yes, it cost us a lot. There we had an acquaintance of the ministry who, for better or for worse, helped us, helped us a lot").

[40] According tot he the current spokespersons of the island government.

[41] https://www.iea.org/policiesandmeasures/pams/spain/name-152980-en.php

[42] https://www.pveurope.eu/News/Markets-Money/Spain-Government-suspends-controversial-7-solar-power-tax

[43] https://www.thelocal.es/20160420/el-hierro-spanish-canary-island-100-percent-clean-energy-spain-renewables.

[44] The interviewees stress the replicability of this project, so as new developments can take advantage of the results of the research and innovation developed in the island, although it should be adapted to the conditions of each specific territory.

[45] See: https://www.efe.com/efe/canarias/medio-ambiente-y-ciencia/las-renovables-marcan-un-record-en-canarias-al-cubrir-el-33-de-la-demanda/50001310-3910539. According to an interviewed promoter: "*Gran Canaria está desarrollando el proyecto de Chira-Soria, basada en el modelo de Gorona del Viento. Y Chira-Soria para el sistema energético canario… va a dar estabilidad a la red, no solo a la isla de Gran Canaria, sino a Lanzarote y Fuerteventura…*" (translation in English: "*Gran Canaria is developing the Chira-Soria project, based on the Gorona del Viento model. And*

Some interviewees mention that El Hierro has received the interest from Japan and Indonesia, and the press covered the visits of representatives from the Seychelles, Indonesia, Japan, and Aruba (Caribbean Sea), in specific from countries that are interested in starting an energy transition based on renewable energies.

Chira-Soria for the Canarian energy system ... will give stability to the network, not only to the island of Gran Canaria, but to Lanzarote and Fuerteventura ... ").

ALLIANCE FOR A DISTRICT REGENERATION BASED ON
ENERGY TRANSITIONS
Malmö (Augustenborg)

1. Background

Malmö is located in the south of Sweden and is the country's third-largest city, with a population of 286,000. Malmö has a mild, oceanic climate, despite its northern location. Malmö used to be a successful industrial city. However, the oil crisis in the 1970s caused closures of shipyards and textile industries generating severe unemployment. Since the 1980s, Malmö has reinvented itself as an eco-friendly, multi-cultural and knowledge-based city. In this framework, Malmö invests in renewable energy whilst concentrating on energy efficiency.[1]

The Augustenborg neighbourhood, located in the Fosie district, is about 32 ha in size and contains 1,800 apartments, 1,600 of which are rented from the Malmö Municipal Housing Company (Malmö Kommunala Bostadsbolag – MKB). Most of the multi-family houses are three stories high, some houses are seven stories. The neighbourhood is home to 3,000 residents. It was built in the 1950s as one of the first housing estates delivered under Sweden's social housing policy, and was initially considered to be a highly successful mixture of housing, employment and social facilities. However, by the 1970s, the neighbourhood fell into decline, impacted on by economic difficulties at the city level. The estate suffered a spiral of decline as more people moved out, flats remained unoccupied, and the residual population became marginalised with high levels of unemployment. Most importantly, the neighbourhood suffered from flooding from the sewage and drainage system. Resulting flooding was leading to damage to underground garages and basements, and restricted access to local roads and footpaths. Untreated sewage also often entered watercourses as a result of increasing pressure on the sewage treatment works.

The immigration to Malmö in the 1980s and 1990s brought cultural diversity to the neighbourhood. In Augustenborg, residents with foreign background were in 1997, 51%; and in 2007, 62%.

The Ekostaden Augustenborg was the first project in the district regeneration of Malmö. This project focused on using inhabitant suggestion to improve the district, with a clear focus on eco-sustainability. The regeneration efforts in Augustenborg[2] started in the 1990s, and developed into the Ekostaden Augustenborg project. The key aim of the initiative was to create a more socially, economically, and environmentally sustainable neighbourhood. The City of Malmö and MKB set the initial scope of the Ekostaden Augustenborg project, which focused on combating flooding, waste management and enhancing biodiversity. In order to minimise flood risk, rainwater from roof tops and other impervious surfaces is now collected and channelled through canals, ditches, ponds and wetlands and finally drained into a traditional closed sub-surface storm water system. Measures addressing urban flooding were combined with those aiming at reduction in CO_2 emissions, and at improved waste management. This project also involved initiatives aiming at

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[1] Kazmierczak, A. and Carter, J. (2010) Adaptation to climate change using green and blue infrastructure. A database of case studies – Augustenborg, Malmö: Retrofitting SUDS in an urban regeneration area; available at: https://copenhagenwater.files.wordpress.com/2013/11/adaption-to-climate-change-using-green-and-blue-infrastructure-augustenborg-malmo.pdf

[2] EKOSTADEN AUGUSTENBORG – *on the way towards a sustainable neighbourhood;* available at: https://climate-adapt.eea.europa.eu/metadata/case-studies/urban-storm-water-management-in-augustenborg-malmo/augustenborg-brochure.pdf

improvement of energy efficiency and energy production, electric public transport and car pooling, and recycling so as not to compromise the aesthetics of the area.

2. Implemented actions

The stormwater management system, created in cooperation with MKB, the Water Department, landscape designers, and local residents in Augustenborg interested in water management issues, includes a total of 6 km of canals and water channels and ten retention ponds. Rainfall is collected in natural ditches and reservoirs before being directed it into a conventional sewer system. The rainwater from various roofs, roads and car parks is channelled through visible trenches, ditches, ponds and wetlands. These landscape features are integrated into the townscape within 30 courtyard areas, which also provide recreational green spaces for the area's residents. It is estimated that 90% of the stormwater from roofs and other impervious surfaces is led into the open storm-water system in the housing area. The open stormwater system is now able to handle runoff volumes locally. The volume of stormwater draining into the combined system is now negligible, and this system now drains almost only wastewater.

Whilst green spaces were increased in size and number, the specific style of the 1950's was maintained. In addition, green roofs have been installed on all developments built post 1998. Some buildings existing prior to 1998, such as garages that have been reused as offices, have also been fitted with green roofs. Altogether, there are 30 green roofs in the neighbourhood and 2,100 m^2 of green roofs are provided on MKB houses. In addition, a Botanical Roof Garden, which covers 9,500 m^2 of an old industrial roof, was developed. One of the most recent focuses in Augustenborg is related to local climate adaptation (as Malmö is anticipated to have an increase in rainfall) as well as the production of urban and organic agriculture.

Concerning energy, Augustenborg produces renewable energy and improve energy efficiency as well as environmentally-friendly transports.

More specifically, on energy efficiency, a number of initiatives have been undertaken throughout Augustenborg to increase it by up to 20% compared to 1995 levels. Measures have been undertaken throughout the neighbourhood toward decreasing resource consumption, optimising heating and hot water systems and cutting electricity use. MKB has implemented a pilot project to find the most efficient and equitable system for individual charging for heat and hot water which are both currently included in the rent. Major efforts have among other things re-insulated apartment buildings, worked to raise the awareness of residents concerning energy and water use, and re-organized local water and energy infrastructure. Some residents have taken part in a programme to assess their CO_2 footprint and then work together to find ways of decreasing it.

The inhabitants of Augustenborg have been questioning why they did not have any renewable energy production in their area. That became the start of a new project between the city, Malmö University, E.ON (renewable energy enterprise) and MKB and now Augustenborg produces solar energy, and small-scale wind. It also featured a pilot project to test Malmö's production of biogas from food waste. In 2007, 450 m^2 solar thermal plant and 100 m^2 photovoltaic produced hot water for the district heating system and electricity. The football pitch has been fitted with underground piping to pump solar heat out of the ground all summer and the residual heat from the ground all

winter, producing hot water for the district heating system. As a side effect, when the temperature drops below 5 degrees, an ice rink can be created, offering the kids from the school and neighbourhood a new and exciting experience. A new school building has been equipped with solar collectors (on the roof of the school there is also a solar energy system, which heats the water for the eco-pavilion).

Due to the energy crisis in the 1970s, the buildings from the 1950s were covered with insulation and steel sheeting. This has caused serious problems to the internal environment with damp, bad ventilation and temperature control. Therefore, as a beginning, on five buildings, the outer covering of the walls has been removed and a new insulation layer has been covered with a skimmed painted render. The appearance of the houses is now more like the original and the energy efficiency has increased by about 10% compared with the 1998 status of the buildings or approximately 35% more efficient than the original status of the building. The goal is to renovate all the buildings. Also the building for the elderly got improved accessibility since it lacked direct access from the ground level. Additional improvements were done in the apartments and the staircase. An additional building for the elderly was constructed using sustainable building principles including a green rooftop, to integrate into the new surroundings. A new school building has been erected using natural materials, a high level of natural lighting, ground source heat pump, solar thermal panels, composting toilets and a number of other finesses to create what pupils and teachers alike agree are the most pleasant classrooms in the school. The building is a factory made modular construction which can be removed and relocated in another school.

Local Transportation Initiatives Augustenborg projects have prioritised safety and comfort for pedestrians and cyclists as well as public transport, and worked to decrease local traffic speeds and through traffic in general. While all of Augustenborg will have a 30 km/h speed limit, garden streets are also being developed that have a 15 km/h limit. These efforts and an encouragement of a local use of electric vehicles are also leading to reductions in noise and air pollution (a new form of neighbourhood transport which could cut to the heart of residential communities with no noise and no pollution was developed).

The first "Electric Carpool" in Sweden has been organized as a form of local car-sharing in Augustenborg. Electric cars can be picked up and returned to the parking lots of a local supermarket (people and business can borrow the cars and also park free of charge thorough the city). Moreover, cars fuelled by ethanol or biogas, are parked close to the square and are used by members in the area and from other parts of Malmö. An Electric Road Train promoted as the "world's first electric road train", Augustenborg's Green Line's zero emission electric street train service has been developed to decrease car dependence and improve the mobility options available to area residents, for example senior citizens and people with health problems and low incomes. Two of these prototype trains, each with space for 28 passengers and capable of going 30 km/h, are in service, having been built by the new local company Street Train Sweden AB. The trains powered by renewable energy sources (electric cars are charged with eco-labelled power or a rapid charge station by the main square in the neighbourhood) and riding on rubber wheels, offer an ecological transport alternative. The train was terminated, however, because the economy in the project was not as good as hoped mostly because they had a separate ticketing system.

In 2014 following up what was already done in Augustenborg, NCC Sweden (a construction company) launched the Greenhouse Augustenborg a high-rise building with a passive-house energy standard. The project was developed with a holistic approach with the aims to reduce the residents' ecological footprint. The building is equipped with greenhouses on the roof and large balconies with special cultivation areas.

The new greenhouse Augustenborg was not just a technical / architectural intervention. A series of initiatives were undertaken for fostering sustainable behaviours and social cohesion. The Greenhouse Augustenborg is connected with an agreement that requires residents to try to plant their own food on their terrace. If they do not agree on this, they cannot move in. The same agreement requires the inhabitants to take part in research activities about sustainable behaviours. This measure is also mentioned to unintentionally significantly improve the social dynamics of the building, as all residents now have a common "hobby", and something to talk to each other about. The establishment of an "Independent daycare project" allows parents, especially single parents to pursue career interests and/or education. Furthermore a bee-keeping project is developed in the Greenhouse Augustenborg.

Residents in Augustenborg are encouraged by the process of change in their city-district and hope new residents move into Augustenborg because they are attracted to the area's eco- and social profile. In addition to the mentality and behaviour change of local residents, a variety of projects were initiated by community members. Some resident programmes include: the recycling and composting as well as energy metering and growing organic food.

The total sum invested in the physical improvements in Augustenborg and related projects was around SEK[3] 200 millions.[4] Around half of the sum was invested by MKB. Remaining funding mainly came from the local authorities, principally the City of Malmö, in addition to several other sources which included:

- The Swedish government's Local Investments Programme for Ecological Conversion and Eco-Cycle Programme (SEK 24M)
- The Swedish Department of the Environment (SEK 4M)
- EU program LIFE (SEK 6M) provided funds for the creation of the Botanical Roof Garden
- The European Union URBAN program, and
- A number of other sources both public and private.

3. Stakeholders analysis

The key actors involved in the regeneration of Augustenborg were the MKB housing company, the City of Malmö, represented by the Fosie district and the Service Department, the University of Malmö, the Swedish energy company Sydkraft, other private companies, local business, school managers, and the residents (as a whole, but also specific groups such as the school parents or school pupils or larger groups, such as the older residents and the newcomers). Several individuals

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[3] 1 Swedish Krona (SEK) equals 0.095 Euro.
[4] NBS case study: Malmö. Available at: https://www.think-nature.eu/wp-content/uploads/2018/08/15a-Case-studies-Malm%C3%B6-NBS-MS-workshop.pdf

were particularly important to the success of the project.[5] It was reported how the project was generated on the basis of a sense of urgency and that "something needs to be done".

One of the main objectives of Ekostaden Augustenborg was to enable residents to play a significant role in the planning and implementation of the initiative. The Augustenborg project incorporated extensive public consultation. This included regular meetings, community workshops, and informal gatherings at sports and cultural events. The approach became increasingly open and consultative. While some claim that involvement of local residents was low for a variety of reasons ranging from apathy to language barriers, approximately one fifth of the tenants in the area have participated in dialogue meetings about the project, and some have become very active in the development of the area. Residents and people working in Augustenborg were involved in the design of the outdoor environment. A special needs advisor and local access and mobility group worked with the design team throughout the project. Constant communication and in-depth community involvement enabled the project to accommodate residents' concerns and preferences regarding the design of the storm-water system. Consequently, the project encountered little opposition. Augustenborg school pupils were involved in a number of local developments, for example with the planning of a new community/school garden, rainwater collection pond/ice rink, a musical playground, and sustainable building projects incorporating green roofs and solar energy panels. The participatory character of the project sparked interest in renewable energy and in sustainable transport among residents, after they heard about similar plans for other areas.

For the involvement of citizens in the project, a crucial role was played by "high standing people" like professors and other representatives of the project that worked as mediators and facilitators with citizens. About two months were spent on contacting the various associations in the area to organize them and ask for their input prior to the project.

Another important aspect of the citizen involvement was the printing of flyers in foreign languages and the use of translators to communicate with foreign speaking residents that did not speak or understand Swedish in the area. These measures were applied as the district was characterised by a high presence of foreigners and immigrants. In this respect, some government employees were against such measures since a "here in Sweden we talk Swedish" attitude was present. These measures in favour of foreign speakers were considered a symbolical action, as most foreign speakers brought their grandkids to translate anyway.

The greatest challenge in involving the public was maintaining continuity, which involved keeping a steady focus on the environmental awareness of the residents and informing the newcomers to the area about what had been done. It has been considered that in order for people to become involved people need to have more control over the project outcomes, and the authorities therefore have to accept that things do not always happen exactly as they were planned.

The residents in the area have been considered as the experts. Dialogue with the residents also creates a good breeding ground for local community groups. Several strategies for gaining social support in Augustenborg took place. Regular meetings, community workshops, and informal gathering at sports and cultural events were all employed to gain input and support. The most

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[5] E.g., Peter Lindhqvist from The Service Department, City of Malmö; Bertil Nilsson, former headmaster at the school in Augustenborg, Christer Sandgren at MKB; Trevor Graham, project leader since 1998.

important thing learned from Augustenborg is how crucial participation is at any level (e.g., in order to have sustainable city development the children need to understand how everything is connected, for instance by planting trees). Some details can be found in the box below.

Citizen consultation process in Augustenborg

"During the meetings with the residents in Augustenborg we asked them what they thought was good with the area and what they thought needed to be changed. We asked: What can you do and what can we do? The most important for the residents was to lower the costs of living. We then focused on lowering the energy consumption, partly by behavioural changes, partly by technical solutions. The flooding of the area was a problem; we then started to build green roofs and open storm water systems. The residents were involved in the process and that gave them the inspiration and the patience to wait. But it was also important that some things happened very quickly so that they felt that their input meant something. All actions, such as facade renovations and recycling houses, were agreed on together with the residents. We are now moving on in the area and are working with a plan for the old central heating plant, where we are building new houses. We want to make the city more compact and build larger apartments in the area so that Augustenborg again can become the family area it used to be. It is indeed a very child friendly district with nice playgrounds and plenty of greenery. We are also moving on with individual monitoring of hot water consumption in order to decrease the energy consumption even more. The parents are also involved in the process. Based on their opinions the Parks and Highways Department has provides new traffic solutions outside the school where cars, bicycles and pedestrians are separated.

Many questions arose from residents during work around energy issues in Augustenborg. For example: why are there no wind turbines in our eco-neighbourhood and why would I save energy if it is just the landlord that saves money?"[6] The electric trains have stimulated other local debate on transport which has resulted in a number of resident concerns.

An Ekostaden day has been established in order to highlight the issues of sustainable development in a positive way and to raise awareness and as a good forum to interact with the residents and to get in touch with their views and opinions and for the local companies and groups to make themselves known; as well as a Café Summer which functions both as a café and a meeting place for residents to exchange, interact and share ideas. Communication had a huge role in overcoming possible problems in the district. This is exemplified by local stories like the one reported in the box below.

Dealing with local resistances through communication

The promoters of the project report the story about a local man that was opposed to the project by consistently throwing glass in the biological waste recycling as conscious sabotage. The project leaders somehow got a tip of who it was. It turned out one of the project team members came from the same home town as the man, so she arranged to "randomly" bump into him and strike up a casual conversation. As they got to know each other better, the man said he recently got diagnosed with cancer, and that his life was falling apart at the moment. After their conversation, he stopped throwing glass in the biological waste can. Even though this topic of glass in the biological waste bin never was brought up, this stopped the damage. The project leader mentions that "maybe he got to see that we are just people". This incidence could point towards how well the project handled local resistance, and could be a pointer on why major local resistance never really occurred

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[6] EKOSTADEN AUGUSTENBORG – On the way towards a sustainable neighbourhood; cit.

In summary, even though the project management often had a clear vision of what needed to be done, such as the improvement of the drainage system in Augustenborg, the inhabitants were heavily involved in the how, what, where and when of the improvement. Viable suggestion that served the main overarching goal of the projects, a sustainable area, impacted the final product, making the district regeneration have a very holistic character.

4. Milestones

- 1997: beginning of process of creation of Ekostaden Augustenborg; several key municipal and related actors began to discuss how to transform Augustenborg into a local eco-neighbourhood.
- 1998: start of the project when it was granted funding from the government's Local Investment Programme to make Augustenborg a more socially, economically and environmentally sustainable neighbourhood.
- 1998: Trevor Graham with experience from Groundwork in England was hired as project leader.
- 1998-2002: implementation of the project.
- 2001: the world's first botanical roof garden was opened in Augustenborg.
- 2001: residents started a car pool, later a part of regional not-for profit Skånes car pool.
- 2002: completion of the project.
- 2007: around 200 new families and tenants moved into the area.
- Summer 2007: important floods with large parts of Malmö flooded; Augustenborg even managed well.
- Spring 2009: a wind power plant was installed at the local school.
- 2010-13: following the example of Augustenborg similar significant project developed in Rosengård (neighborhood of Malmö).
- 2014-16: following the example of Augustenborg similar significant project developed in Lindängen (neighborhood of Malmö).
- 2014-16: Greenhous Augustenborg was successfully developed by NCC Sweden.

5. Effects

The project had a lot of impacts on many different dimensions (environment, energy, social and economic). They are listed below.

- Biodiversity in the area has increased by 50% (The green roofs, predominantly the Botanical Roof Garden, have attracted birds and insects, and the open storm water system provides better environments for local plants and wildlife. In addition, flowering perennials, native trees and fruit trees were planted, and bat and bird boxes were installed).
- The implementation of an open storm-water system at Augustenborg has improved not only storm-water management in the area, but also the performance of the combined sewer system that serves the surrounding area.

- There have not been any floods in the area since the open storm-water system was installed.
- The environmental impact of the area (measured as carbon emissions and waste generation) decreased by 20%.
- The heat and hot water consumption has decreased by 25%.
- Between 1998 and 2002 the following social changes have occurred:
  - Turnover of tenancies decreased by 50%
  - Unemployment fell from 30% to 6% (to Malmö's average)
  - Participation in elections increased from 54 % in 1998 to 79% in 2002.
- Reconfiguration of public spaces between housing blocks has given residents opportunities to grow their own food in small allotments, and has created places for leisure and attractive areas for children to play.
- An "independent day-care" project where parents can deliver their child, so that they can pursue career interests and/or education has also been established by a local person that identified the need for such a thing.
- A small scale wind power generation in the area was installed in the local school as follow up project.
- The Augustenborg solar project was the starting point for Solar City Malmö which operates all over Malmö.
- As a direct result of the project, three new local companies have started: Watreco AB (set up by local resident and amateur water enthusiast), the Green Roof Institute, and the car pool established in 2000, which uses ethanol hybrid cars to further reduce environmental impacts.
- A new café (Café summer) has been established as a gathering place for residents in Augustenborg. The establishment of a new café motivates the socialization of inhabitants. The café has a partially subsidized breakfast/lunch for 25 SEK (2.4 Euros), which further facilitates the socialization of low-income residents.
- Media coverage from the outside world was changed from negative to somewhat positive. The green house institute and the green roof generate a lot of visitors from around the world.
- Overall, the area of Augustenborg has received some international recognition for its work.
- Each year an Ekostaden day is organised in Malmö, which further imbeds the districts eco-image.
- The by far largest unintended positive effect of the project were the absolute "imprintation" of a eco-image for the entire district, which resulted in a continuous innovation in both the district itself, and other districts, which continues to this day.

Overall, there has been a clear evolution from a top-down initiative to a bottom-up culture. The "Ekostaden Augustenborg" project started in 1997 and ended in 2002. Since then, many bottom up and spontaneous project emerged in the area.

6. Some critical issues

- The Green Line Two electric-powered trains built as prototypes during two years transported around 300,000 passengers to and from Augustenborg and surrounding

neighbourhoods. The line was closed down when Skånetrafken could not make it profitable and the trains had some technical problems. In spite of this, there was interest from other parties to buy a similar train system, but unfortunately there was no preparation in the company formed for the pilot project to launch a larger production.

- A local survey indicated a difficult traffic situation in the area. The survey, carried out by the residents themselves, eventually resulted in an overview of the traffic situation. Restructuring of Augustenborgsgatan has diminished through traffic substantially and a number of measures have been taken to increase safety by the school. A new exit to the industrial area is the next step, so that heavy vehicles no longer will be passing the school entrance.

- In relation to the use of residents in the planning process, some of the contractors architects were against this, as they "did not see the point".

7. Up-scaling

Augustenborg is now seen in a positive light by most residents in Malmö and the Ekostaden project is considered to be one of the most far reaching sustainable urban regeneration initiatives in Sweden and provides learning and inspiration for other areas. As already stated, following the example of Augustenborg other significant projects were developed in Malmö, for example Rosengård (about 2010-13) and Lindängen (2014-2016). Moreover, the redevelopment of a hospital site in Malmö is building on lessons learned and is designing a 100% 'storm water neutral' system, which will manage all storm water within the site's boundaries. Finally, the Augustenborg solar project was the starting point for Solar City Malmö which operates all over Malmö.

Around 15,000 visitors have come to the area, including Augustenborg´s Botanical Roof Garden, from all over the world since the start of the project. There is a constant interest, both local and international; to learn from the example of Augustenborg and global media interest is still strong.

Some scaling up events were registered both inside and outside Malmö. The district refurbishment model of Augustenborg was applied in other districts in Malmö and in other Sweden city (see Sustainable Järva case study). As far as it regards Malmö, the prominent case of up-scaling was related to Rosengard district. In this district, the sustainable Hilda was partially part of the EC Life project CLICC. The housing cooperative HSB Brf Hilda implemented a renovation programme with very high sustainability targets for its 767 apartments. One of these targets is to reduce carbon dioxide emissions by 50 per cent by 2014. Climate coaches inspire residents to a sustainable lifestyle and new technology is combined with proven technology to achieve economic sustainability. Notwithstanding the good result of this project, a set of problems and resistances have been recorded that question the efficacy of the social innovation up-scaling mechanism. The problems recorded in Rosengard district are reported in the box below.

Problems recorded in the Rosengard district

Technical problems: Technical difficulties due to poor planning is mentioned in the case of sustainable Hilda. The solar water heaters are too heavy for the roof, and a pipe could not be laid because heavy vehicles could not go there.
Bureaucratic problems: The same project manager also mentions that there were several issues related to the involvement of the EU project Life CLICC, in that it was too technical and bureaucratic.

Citizen engagement problems: A weakness of the project could be said that it seems like not all inhabitants feel included in or ownership of the process. Although one of the project leaders see it as an advantage, it seems like some of the "just get it done" attitude circumvented a lot of routines that were in place to secure good decisions. For the Ekostaden Augustenborg project this seemed to work out fine, but in the Sustainable Hilda project, they suffered technical issues due to this attitude. This is exemplified by that Sustainable Hilda mostly informed its inhabitants through information screens in the staircases, and no signs of workshops/ regular inhabitant meetings can be identified.

Behavioural oppositions: From the Sustainable Hilda project, resistance was met in relation to the implementation of a heating and ventilation system that required air to flow in to the apartments from outside. From the very beginning, and still, some residents block these intakes with objects, causing this measure to have no effect. One of the leaders of the project had tried to "confront" the people doing this, but summarize the confrontations "as talking to a brick wall".

Planning problems: In the case of Sustainable Hilda, poor planning of the measures is mentioned as barrier. Where several of the measures they applied for funding for, and received funding for was essentially impossible to complete, such as the installation of solar panels for heating warm-water on the roof, but after further inspections, the roofs could not hold the weight of these panels. In the same area, there was also established an heating and ventilation system that required air to flow in to the apartments from outside.

ALLIANCE FOR A DISTRICT REGENERATION BASED ON ENERGY
TRANSITIONS
Stockholm (Järva)[1]

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[1] In §7, the Skærholmen "umbrella" project is also shortly presented, representing a more recent initiative inspired by the Sustainable Järva project.

1. Background

Stockholm is the capital of Sweden and has close to 1 million of inhabitants. Järva, located northwest of central Stockholm, can be considered a peripheral neighbourhood with a high concentration of socio-economic disadvantage. Järva was built between 1965 and 1980 as part of the "million homes program"[2] to meet the housing shortage. While these homes are of various types, the most contested are the apartment "superblocks" – 10-15 storey apartments with upwards of 250 units per building. Inhabitants are 60,000 (of whom 80% are of immigrant background, many of which are of African or Asian origin) living in about 25,400 apartments (700 private houses + 221 row houses). The areas were built as band towns, with shops and services along a long stretch of streets through the districts. At the same time, Kista's (one of the neighbourhoods in Järva) work area was developed, which was developed into Kista Science City, one of the world's premier IT clusters. In fact, all the neighbourhoods that are part of Järva – i.e., Akalla, Hjulsta, Husby, Kista, Rinkeby and Tensta – suffer from poor maintenance and the buildings are generally in need of renovations. In addition, these neighbourhoods have major social and economic challenges: unemployment (the unemployment rate of neighbourhoods in the Sustainable Järva area exceeds 30%) and segregation. A racialized labour market, institutional discrimination, and police repression have been highlighted in this neighbourhood.

The Stockholm City project "Vision Järva 2030" (Järvalyftet) was initiated in 2007 and had four main focus areas: 1) improved housing and neighbourhood variation, 2) education (including language), 3) more job opportunities and entrepreneurship, and also 4) improving the safety of the neighbourhood. However, in the "Vision Järva", one important cornerstone was missing, environmental sustainability and energy efficiency, which is why in 2009 the Delegation for Sustainable Cities[3] granted investment support to the City of Stockholm for its Sustainable Järva project – Re-building the Suburbs Vision for Järva – initiated in 2010 to promote social and economic development in the districts bordering to the culture reserve program Järvafältet. Then, the whole project has been included in "Vision Järva 2030".

The politicians in the city of Stockholm have decided that the city should become fossil fuel free in 2050. Sustainable Järva is a pilot project to reach those targets. With new technology, information and education and by focusing on improving safety and security, Järva should become a model of sustainability, promoting environmental responsibility and energy efficiency while still preserving the area's unique cultural and historical values.

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[2] One third of the homes in Sweden were built as part of the Million Homes Programme in the 1960s and '70s. The Million Homes program was a national initiative from the 1960's to provide Swedish citizens with improved housing conditions. Under the socialist government, marked by the rise of the Swedish welfare state, 1,000,000 homes of various types were constructed in approximately ten years during the 1960's, adding over 600,000 homes to the national housing stock. More than 200 million Europeans live in similar properties. Many of these buildings are shabby and in need of renovation, and their energy consumption needs to be at least halved to meet today's demands.

[3] The Delegation for Sustainable Cities was appointed by the Swedish Government in the autumn of 2008. This took place in light of the climate threat, rapid global urbanization and the realization that it is our cities that hold the key to solving the climate issue. The Delegation has been active from September 2008 to December 2012 and has implemented different measures that help to improve the conditions for the development of sustainable cities. The Delegation has adopted a financial support package to stimulate sustainable urban development projects.

Ten steps were identified for reaching a "Sustainable Järva":

  i)   Energy-efficiency renovations
  ii)   50% reduction in energy consumption
  iii)   Energy from renewable sources
  iv)   Sustainable transport solutions
  v)   Measures to promote the use of bicycles
  vi)   Informing and involving residents
  vii)   Environmental education
  viii) Cultural-historical walk
  ix)   Monitoring and evaluation
  x)   Contribution to national and international environmental and climate targets.[4]
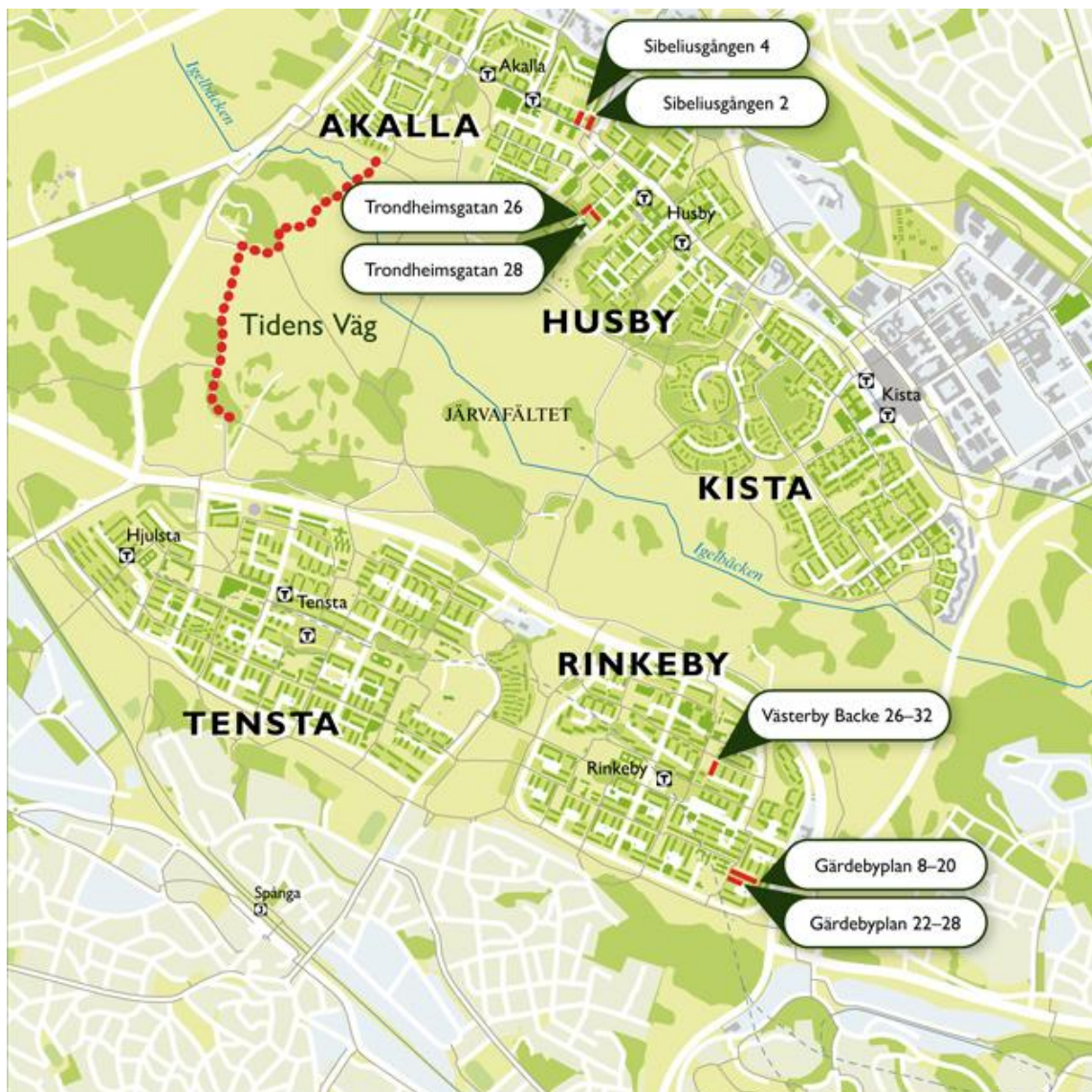
Järva's five districts and seven houses that were renewed energy efficiently in the project
Source: http://www.latea.lv/userfiles/news/Sustainable%20J%C3%A4rva.pdf

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[4] Sustainable Järva – http://www.latea.lv/userfiles/news/Sustainable%20J%C3%A4rva.pdf

The Sustainable Järva project was established as a pilot project for a planned sustainability profiling of all of Stockholm million homes program areas. Sustainable Järva fits into the Järva-Lift Initiative, and other investments made by the City of Stockholm in eco-profiled areas. They strengthen Stockholm's position as a leading city in climate policy; contribute to the marketing of Swedish environmental technology; act as a model and developer of new technology that can benefit subsequent building projects in Stockholm. Stockholm has now progressed with the GrowSmarter project which as part of an EU Lighthouse project focuses on securing sustainable population growth in selected city quarters.

2. *Implemented actions*

As already stated, the Sustainable Järva project has been implemented from 2010. The neighbourhoods around Järvafältet developed into one of Stockholm's environmental profile areas. Seven residential buildings in Husby, Akalla and Rinkeby (350 apartments) were being retrofitted in this pilot project with new energy efficient technology including new facades, solar PV, and lighting, together with interior and exterior upgrades. The goal was that energy demand decreases from 180 kWh/m^2 to 88 kWh/m^2.

The housing company "Svenska Bostäder" has planned to refurbish 5,200 apartments until 2022 using the experiences from the pilot project (ended in 2014). In addition the project entailed 10,000 m^2 photovoltaic (1.4 MWp[5]) to be installed on approximately 40 roofs in the area. The effort on renewable energy and solar cells made Järva one of Sweden's most densely equipped areas at this regard.

Complementary issues on energy efficiency are:

- Reduced household energy use by 10% in the seven renovated houses
- Reduced energy consumption at construction site by 30% compared to a conventional construction site in 2009
- Obtain a calculation model for greenhouse gas emissions (measurements have been carried out in 14 existing multi-family houses to evaluate different installations of heat recovery units)
- Test and compare site-built and prefabricated technology for additional insulation of facades (the units have been tested for efficiency, flow ratios, tightness, and noise in fan rooms, space requirements and defrosting).

Different types of housings have become energy-efficient:[6] in Akalla and Husby Centrum, in Husby, in Tensta, and Rinkeby.

Moreover, efforts on sustainable transport and cycling measures were made throughout the Järva area, several upgraded (e.g., new asphalt coating in a total of nine different locations on walking

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[5] *MWp* or *MWP* may refer to: Mega Watt peak, a solar power measure in photo-voltaic (PV) industry to describe a unit is nominal power.

[6] If the method proves to be a cost effective way of energy efficiency, these methods will then be used in large parts of Svenska Bostäder's environmental program house. When the project will be completed, the experience of the renovation of the seven houses included in Hållbara Järva can be used in 1500 by Svenska Bostäder's apartments.

and cycling routes where cracks or bumps had formed; 16 accessibility barriers on bicycle shuttles have been removed; improved drainage and adjustment of tidal wells) and/or new cycle paths improve links between the northern and southern parts of Järva. The Bicycling project was an important part of the application, and – already from the start – connected energy, bicycle, and environment.

The city's commitment to facilitate and promote the use of cycles included also:

- A loan-a-bike facility in Akalla
- Signposting (for bikes) improvement (e.g., LED lighting)
- An annual cycle week
- Free cycling courses for adult residents.

This last measure was aimed at getting people to cycle more, both in order to do something about the status of cycling, but also, to train people to cycle. Between 2011 and 2014, with 140 participants in total, this measure became especially important for non-Swedish women and their integration in the local society. As their mobility increased, they could move as Swedish women did. Therefore, the bicycle courses, started to get people to bike because it is good for the climate, turned out as an incredibly important integration measure, due to mobility, amount of freedom, and that one could move in the public space like Swedish women could.

Further actions included in Sustainable Järva are listed below.

- Residence hosts – a man and a woman from each building. They have oversight responsibilities between the tenant and the city; people have this position for one year at the time – from different households as well, to ensure further mingling.[7]
- Establishment of a climate week (it was originally planned as a one-off-event, but it was decided to make it a yearly event, at different spots in Järva).
- A women's swimming course.
- Cleaning projects, where residents began contributing in the public space and so did the local community cleaner and nicer, which, amongst other things, have lead to very low vandalism figures.
- Collaborations with the library/school to ensure an environmental emphasis in education (e.g., in preschools, the Lekoprick business has circulated which is an exhibition where the children learned in a playful way about eco-labelled goods; moreover, in the frame of the "climate week", kids can get a bicycling licence, and there are other fun and educational activities).
- Arrangements with sports organisations for delivering/fetching kids.

Finally, the project preserves cultural historical values in connection with the implementation of climate change. Stockholm City Museum seeks to raise awareness of and pride in living in Järva

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[7] As specified during the interviews with key-informants, this measure had profound consequences, not least to know each other across dividing lines such as gender, ethnicity and age (as an example, it was told how Swedes thought one shouldn't knock on Somali doors, but came to learn that this wasn't the case by very of previously silent Somali women. This led to these two to educate each other).

through initiatives that include Tidens Väg (The Path of Time), a new, signposted walk around Järvafältet with information about the area past and present.

Beyond participation, dialogue and democracy (see § 3.), another pillar of the Sustainable Järva project has been the awareness of gender differences that entailed the adoption of a feminist perspective in city planning (see some of the actions listed above, and later § 3. and § 6.) also for contributing to overcome social inequalities (albeit sustainability was fronted more so than social inequality).

The total cost is 200 M SEK. The governmental funding for the Sustainable Järva project is 55 M SEK.[8]

The project also included investments in dialogue, information and environmental education and conservation of the area's unique cultural historical values (see § 3.).

3. Stakeholders analysis

Involved actors

The Sustainable Järva project was led by Svenska Bostäder (a local public housing company which is owned by the City of Stockholm) that cooperated with partners in the City of Stockholm; such as the Royal Institute of Science and Technology (KTH), various City management offices (the Building and city planning department most central, as well as the Traffic office), the State Museum and Stockholm water and waste management (Stockholm Vatten). It involves also business associations, the police and last but not least – local residents (see below). Among them, with the progress of the project, non-Swedish women have especially become active and clear voices.

Strategies for gaining social support/ negotiation process

Building on the early experiences from Vision Järva, initially major plans for renovation and building plans were presented to the residents of Husby without establishing the plans and ambitions with them in advance. The tenants received letters from the town that simply stated that they had to move in order for the upgrading to happen. These letters provoked strong reactions from the residents of the area. The top-down and distant way of communicating, the dramatic consequence of people losing their home and perhaps an area with affordable housing prices created the situation known as "The egg and tomato war" – as the residents threw eggs and tomatoes at official representatives. This initial approach considerably harmed the trust and relationship with the residents.

It was thought that the protests were only about a singular case – namely these to-be-renovated apartments. But eventually, because of the demonstrations, the developers realised that there was a much broader and more heterogeneous picture to consider. The local authority eventually understood that all of these provoked residents were very committed individuals and groups who could be engaged

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[8] 1 Swedish Krona (SEK) equals 0.095 Euro.

participants if they could change the direction of the energy that was displayed. The local authority succeeded in addresses this energy toward the project which was later named Järvadialogen (Järva Dialog) which thus focused on dialogue and to engage representatives from all groups and segments in a democratic process. The Sustainable Järva project was determined to continue building on the ongoing recreation of the residents` trust and relation to the City. Part of the project's success depended on involving local residents through an extensive investment in information and dialogue (people became confident in the project and they became motivated to participate).

Järvadialogen's concept was developed by Svenska Bostäder in cooperation with the Swedish Union of Tenants and the City of Stockholm. Järvadialogen came about through individuals trying to turn their negative energy into positive energy. Further people in central positions (such as in the city planning units) have later also pushed the process forward. The concept involves three dialogue steps:

i)   Collecting residents` views and suggestions
ii) Present the collected views
iii) Present what has been made based on these suggestions and views and what is being planned for the future.

Before each renovation, every household was invited to meet the architects and building mangers to ensure there is a collaborative agreement on the changes to come. This concept gives to the residents an opportunity to comment on and participate in decisions about the renovation, to help improve the well-being of the seven selected houses and inspire a sustainable lifestyle. A process chart was made with the tenant association, with formal plans, meeting documents, etc. The Housing Company started the "Järva Dialog" by inviting the inhabitants to open meetings. 10,000 participated and gathered 30,000 opinions about what is good and bad in the area.

Sustainable Järva has participated in four of Svenska Bostäders Järva dialoger with information on waste management and efficient use of household water and hot water. Järvadialogen is an expanded consultation process where residents gather per houses to address shortcomings that need to be addressed and then an agreement on the housing standard to be built.

New suggestions have been gathered and voted on. In the media, there was e.g. a lot of focus on the dedication to windmills. The project had to go for solar panels rather than wind power, because of political negotiations. When this was carried out, it leads to positive mention of the area, in contrast to what was usually focussed on when the area was featured in the media. This lead to a great positive commitment, with outsiders visiting. The residents were allowed to visit, and came up to the roof with lifts to see the photovoltaic. To this regard, clear positive measures to uphold the citizens' engagement have eventually become important.[9]

Women's networks were also established as it became clear that the women's voice had not been clear enough.

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[9] According to interviewed key-informants: "Wind power plants was one measure with symbolic value – and when it did not come about, it became important to find another visibly sustainable measure that the citizens could be proud about. This was achieved through solar panel projects. This lead to a lot of positive media attention for an area that was accustomed to negative media attention".

Established study groups, and cleaning and maintenance courses can be also highlighted as an action for gaining social support. Around 150 local organisations were invited, which eventually started study groups in the organisations. Among others, an ecologist was invited to talk about the nature reserve, and a lot of similar talks made this a diverse offer.

Järvadialogen has eventually become formalised. Thanks to this change of paradigm in the implementation of the project (from a top-down approach to a continuous process of negotiation), however, it did not lead to the complete disappearance of opposition (like when various measures did not happen due to political negotiations – such as the wind power project).

Communication

The project's efforts on information and communication with associations, schools and housing have also strengthened social work in the area. Property managers and service personnel are trained to spread knowledge about sustainable lifestyles. Residents are informed about how to save energy and how to sort out waste at source. More than 150 leaders from Järva associations have been educated in environmental issues during the project. They have since had study circles where different environmental issues are discussed. In the study circle, participants learned how to save resources, how to save energy, waste disposal, transport and environmental labelling, but also about the Järva Cultural Reserve.

Through new channels of communication, 30,000 suggestions and points of view were gathered, only 20% of which were about residences. The main emphasis turned out to be concerning schools, outside areas, traffic, and other conditions.

Complying with Järvadialogen one could no longer work with communication in traditional ways, but had to (1) learn ways of enticing people in the beginning (free detergent if you show up), and (2) send personalised invitations. Furthermore, there was a very good collaboration with the residence hosts, who knew different languages, and are in touch with the tenants.

A lot of media attention, entailed in few cases, the stop of an action (following contrary or problematic opinions). However, there was generally a broad agreement.

4. Milestones

- 60'-70': Million Homes programme.
- 2007: initiation of the Stockholm City project "Vision Järva 2030".
- 2009: granted investment support to the City of Stockholm for the Sustainable Järva project from the Delegation for Sustainable Cities.
- 2010: initiation of the Sustainable Järva project – Re-building the Suburbs Vision for Järva.
- 2010: workshop on "Climate neutral energy system".
- 2011: workshop on "Solar panels & cultural historical values".
- June 24, 2014: Sustainable Järva' was revealed as one of the finalists in the 2014 ManagEnergy awards.
- December 2014: completion of the pilot project.
- 2022: completion of the program.

5. Effects

Impact has been assessed through standards and ways of calculating with a focus also on dialogue, democratic inclusion, and feminist city planning, in addition to sustainable development and saving energy.

Quality of life and environmental benefits

The main impact has been an upgrading of all areas in every way (e.g., sense of safety in the area, better results concerning environment and climate). Measurements show that heat recovery systems work relatively well and that good heat recovery facilities can be implemented in existing multi-family houses. Ten of the units have annual heat savings of more than 35 kWh per square meter, and the best aggregates have heat savings of about 42 kWh per square meter, but they are also relatively space-intensive. The unit with the worst heat saving (25 kWh per square meter) has relatively small heat exchangers which have been chosen for space reasons. Of course, environmental effects at the level of Järva will be significant only in the coming years when the planned 5,200 apartments will be refurbished.

New ways of organizing/doing things

On the societal (socio-economic) perspective, an highly participatory procedure has been consolidated, reaching an high level of consensus among the residents involved. Voices that were previously mute have now been enabled to appear and matter,[10] inter-citizen relations improved as well as gender balance. Järvadialogen established an entirely new way for city and citizen to communicate, and is especially pushing the development in this area.

The citizens became active through organising (the different kinds of citizens have been involved). Early on, it was apparent that gender, ethnicity, and age, were determining factors for the effectiveness of measures for improving dialogue and process. As an example, every residency were given a vote for what upgrade measures were going to be carried out, in order to strengthen local democratic processes. This was eventually made anonymous in order to promote the women's voice, which was shown to be very effective. To this regard, the establishment of women's networks – see § 3. – should be also considered. New positions and functions were also established. One such function, which was very effective, was that of residence hosts – i.e. a person mediating between tenants and the city, who fixed things for tenants when it came to the building that they lived in, who participated actively during arrangements, passed on information, etc. One man and one woman were the hosts for each entrance/apartment building gate, and had this position for one year at the time.

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[10] As stated by an interviewed key informant "it became apparent that there were a lot of resources and previously muted voices that could contribute positively to the development of the area".

The residents were eventually included as experts,[11] e.g. for the solar panels. It turned out that there was an incredible amount of highly competent people, with experiences from other countries that engaged themselves in the project.

It turned out also to be relevant to operate with an "international" calendar – i.e. a calendar which is not limited to Swedish holidays, but which also include the entire spectrum of holidays, and other global calendar considerations.

Finally, it is also important how events and breakthroughs were marked and celebrated (e.g., "the climate week"), and how residents were invited, in order to raise commitment. Such measures contributed eventually to uphold the energy and positivity. The events and markings became important symbols that resulted in more engagement, and further energy for the project.

New knowledge

Through the participation, city representatives were able to get a deeper understanding of what is really going on locally, rather than merely looking at the surface through the media picture. Their knowledge was also determining, as a counterweight to responses to the enormous media pressure concerning negative episodes. New knowledge has been produced also on how energy and environmental measures can and should be a part of this type of upgrading project; additionally, how one should calculate energy and climate measures differently for different buildings and building functions, and, most importantly, for different social situations.

Cultural sensitivity in the development of the district, e.g. how to empower women in the process (talking in public) was both developed, and has proven very relevant. Non-Swedish women talked about how this became like a school, where language and societal insight was created through participation. The same women experienced how voting and participation became valuable.

6. Some critical issues

On the basis of the implementation of the pilot project, some reflections have been proposed by its project manager:[12]

- Involving residents in the development is a good idea but needs to be well planned
- In regeneration projects the social part of sustainability is always an issue
- In new built areas the environmental part of sustainability is always an issue.

Another reflection "Local contracting, biking courses and study circles contributes to integration", however, does not seem shared by everybody. The framing of valued social practices like cycling as routes to cultural integration can generate resistance against the meanings carried by these practices (as shown by the very little participation in the free cycling courses promoted for adult

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[11] As stated by an interviewed key-informant: "We eventually understood that there was an incredible wealth of competence there was in the area, which became the starting point for new development projects. This went all the down to the technical, like e.g. solar panels, where experiences from other countries considerably lifted the project".

[12] Lisa Ernasson (2009). Sustainable Järva 2010-2014.

residents between 2011 and 2014). Beyond the positive aspects already underlined (see § 2.), it has been also stated that "here cycling emerged as a deeply political practice where ecological citizenship and 'Swedishness' overlapped" and that "More generally, it seems, that, in 'Sustainable Järva', the practices of ecological citizenship promoted have overlapped with norms and values linked to a 'Swedish' identity associated with environmental responsibility, familiarity with nature, and active outdoor mobility".[13]

Despite the implementation of a regeneration project characterized by an high citizens participation, Järva is still a problematic area. Järva[14] has seen a recent surge of crime and the tragic death of 23 young people in the past two years. The rising insecurity has led to a new protest movement in the suburb, translated as the Suburb against Violence. The pursuit of a social mix policy (adopted in Järva and elsewhere) is at the crux of the current tension of urban planning between intra-urban inequalities and urban growth. Moreover, in the context of urban growth, this social mix policy privileges the middle class's right to space and some residents identified the disjuncture of planning for a future, middle class population and a group of residents effectively mobilised against the plans in 2007 thus shedding light on a routinely muted planning contradiction. The previous "Swedish model" responsible for the country's polished national identity has been considerably dismantled: housing once the pillar of the system has been the main alteration. In 2017, the country advocated home ownership with tax breaks and subsidies for homeowners, whilst social housing subsidies have been removed. Meanwhile, housing associations have changed function and now perform as a private company, diminishing the amount of social housing. In Järva, along with other suburban neighbourhoods, residents have protested but the issues in Järva remained unanswered. The question of what the municipality will do with this and the subsequent response from residents remains to be seen.

Towards the end of the project, there was some critique on the evaluation and audit process. Svenska Bostäder presented some numbers, but then KTH came into the process to give a more neutral picture. They had different numbers, and there were discussions about calculations, effects, etc. How goal achievements were evaluated was also critical: Which goals were critical, and what one should have achieved to be considered successful.

7. Up-scaling

Sustainable Järva is a good example of how relatively small amounts of policy funds can be used to initiate much greater actions toward green building.[15] It also reflects the fact that these modernist apartments' blocks are part of a stock of literally millions of apartments of the same type which must be renovated for Europe to reach it long term goals for energy efficiency. 200 million Europeans are currently living in similar 60s and 70s building stock. This will be a great inspiration, in particular, to other cities in the northern climate zone.

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[13] Contested Suburban Mobilities – Towards a Sustainable Urbanism of Justice and Difference. Graduate thesis submitted on 28th August 2015 as part of the requirements for the degree of M.Sc. in Nature, Society, and Environmental Policy at the University of Oxford.

[14] Behind the protests in Järva, Stockholm, June 9, 2017 By Katie Brown, available at: http://theprotocity.com/behind-protests-periphery-stockholm/

[15] http://www.re-green.eu/en/go/green-building-leading-cases1

In the City of Stockholm, one important project inspired by Sustainable Järva is the Skærholmen "umbrella" initiative (integrating all projects improving the area within a project umbrella, starting, here too, from buildings upgrade). As in Järva, in Skærholmen:

- The focus is on inclusion, fight against social inequality, and gender differences emphasising the inclusion of different ethnic groups, youth, and women
- Sustainable city development is emphasised
- It happens through participation and a strengthened democratic process[16]
- Dialogues provided a deeper understanding (there has been a development towards more dialogue and more concrete requirements for the builders on social sustainability; moreover, discourse with different stakeholders will enable the project to incorporate the needs of the people who already live there)
- An adult bicycling course (especially aimed at women, increasing mobility, and participation in the city space) is included (as well as a swimming course with the same ideals as the bicycling course)
- Cultural and educative initiatives are included (clubs and workshops that could be about music, or park development, or art development).

This initiative is still in the planning stage (upgrades have not yet physically started yet). In autumn 2015, 4,000 new residences were planned and started out defining building locations based on the preconditions. The City of Stockholm owns most of it, and it found lots of car parks and similar areas on which it could build in order to densify. The most important environmental aspect was precisely identifying where to build. Ecological concerns were very central here, as were logistic and infrastructural concerns. Subsequently, concrete projects that went into the overreaching plan came about. E.g., it went into some natural areas, and found that it could be possible to compensate for drought leading water there. Questions concerning street layout, and similar issues, were posed for the area as a whole, and useful to the individual projects.

Skærholmen could be also considered (albeit still in a planning stage) an up-scale of Sustainable Järva. More outreach has been done to develop citizen participation, and the dialogue development comes through outreach activity (e.g., an interactive map where people can mark their favourite spots; a large degree of freedom, empowering the participants, who can implement important measures based on their own evaluations; there is also room for creativity and experimentation). Moreover, the integration of all activities is more formalized through the conception of an "umbrella project". Additionally, the concept "flexible detail plans" – which entails that the builder receives a building right, from which the builder designs the detailing (plans the structure, but the city designs) – has been introduced.

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[16] An interviewed key-informant emphasises that this is not an attempt at rescuing a bad area, but of strengthening the good aspects, and changing the narrative about the area, the people here, and how it is to live here.

URBAN MOBILITY WITH SUPERBLOCKS
Vitoria Gasteiz

1. Background

Vitoria-Gasteiz is the administrative capital of the Basque country. Vitoria-Gasteiz has around 245,000 inhabitants, in an area of 276 km² with ~50 m² green space per capita.

Before the recent phase of urban growth and development that started at the beginning of the 21st century, Vitoria-Gasteiz was characterised by a strong pedestrian mobility culture. The relatively small, compact and flat urban fabric (together with adequate geographic conditions) offered an ideal setting for non-motorised transport.

At the beginning of the 21st century,[1] Vitoria-Gasteiz's reputation for balanced growth, careful urban planning and concern for environmental and social aspects was threatened by new challenges. The accelerated expansion of the city was altering its scale and structure, and therefore putting pressure on the way people moved, at that time mainly on foot (but with an increasing number of private cars ratio per inhabitant which expected to rise even more in the next years, according to the studies conducted by the city council). The urban mobility and accessibility system of Vitoria-Gasteiz was facing a situation which triggered growing concern regarding its status and future developments in both the society and public management bodies. Because of this, a process of reflection and action regarding the system was initiated by the Council (from the department of environment, in specific the CEA) with the aim of providing a framework of coherent objectives, strategies and actions in order to face the detected and foreseen issues.

In response to these issues, Vitoria-Gasteiz started thanks also to an initial support from the Agencia de Ecología de Barcelona, to work on a "Sustainable Mobility and Public Space Plan (SUMP or SUMpsP)", in March 2006 (approved in 2008).

Three main problems have been mentioned by the key-informants and by the available documents that motivated the elaboration of the Sustainability Mobility and Urban Space Plan and the involvement of a large number of entities and people in their design and development.

- Transformation of urban configuration with the creation of two new residential neighbourhoods in the surroundings of the city. It has been reported that between 2000 and the 2008, Vitoria-Gasteiz's population has grown by 7% as well as the rate of urban space dedicated to residential areas.
- CO_2 emission from all transport in the city. The changes on the city scale increased the length of daily commuting despite the majority of the residents working in the municipality area. According to the rates reported by the city council, car emissions per capita varied from 2.25 t CO_2 in 2000 to 2.81 t CO_2 in 2006.
- Third, the documents of the Plan also describe factors influencing the dominance of car mobility related to social, cultural and economic reasons which maintain climate-change relevant behaviours with impact on air and noise pollution, as well as soil and

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[1] Aitor Albaina and Juan Carlos Escudero. Civitas prosperity – The Sustainable Urban Mobility Plan of Vitoria Gasteiz – Summary (EN); available at: http://sump-network.eu/fileadmin/user_upload/SUMPs/PROSPERITY_Vitoria_Gasteiz_SUMP_summary__EN.pdf

water contamination. Furthermore, other social issues gain social and political attention such as the reduction of fossil fuel reserves and global warming effects.

According to the Council of Vitoria-Gasteiz, the Sustainability, Mobility and Urban Space Plan is integrated in the long-term vision for Vitoria-Gasteiz to become a carbon emission neutral city and achieve the goal of 50% reduction in emissions in the first half of the 21st century. Thus, according the documentation about the Plan published by the City Council, the aim of SUMP is "to provide a holistic solution to urban planning needs, traffic planning and other citizens' needs and deals with issues relating to the availability and quality of transport, emissions and quality of air, the use of public spaces, noise pollution and energy consumption." In doing so, a transformation of the transport networks is needed which should include both the development and improvement of the public transport options (bus and the new tramway) and the expansion of a wide network of bike lines that favour this mean of transportation as the fastest and most comfortable way of mobility in the city. The objectives of the Sustainability, Mobility and Urban Space Plan are listed as follow:

- To restructure and strengthen the urban bus network in coordination with the tram
- To channel the traffic of private vehicles
- To expand pedestrian areas and promote pedestrian mobility
- To release for public use part of the public space intended for traffic *(pedestrian islands or superblocks)*
- To respond to the problem of the parking of motorized vehicles
- To promote cycling.

The Plan established three main areas: sustainability, sustainable mobility and a new city model.[2] The values that guide the Plan are briefly explained in the Citizens' Pact for Sustainable Mobility[3] which hast the ambitions of "a safe and accessible city free of noise and contamination" and demands public space for citizens "putting citizens before the private vehicle". Aligned with the values that guide the Plan is the decision of the City Council to sign the "Covenant of Mayors", committing the City to go beyond the European target of curbing their CO_2 emissions by at least 20% by 2020, through enhanced energy efficiency and cleaner energy production as well as the approval of the "Vitoria-Gasteiz's Climate Change Prevention Strategy 2006-2012" and the "Plan to Fight Against Climate Change 2010-2020".

2. Implemented actions

The Sustainable Mobility Plan of Vitoria-Gasteiz proposes also a new design of the city, reorganizing it into 77 superblocks. Superblock is an urban innovation that introduces low-carbon mobility practices through the organization of urban space, which minimizes the use of motorized modes of transportation. The city is reorganised into superblocks, (400m X 400m) car-free areas

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[2] According to the SUMP: "Sustainable mobility establishes a new hierarchy in the use of the city "in which the pedestrian is the main character, followed by the non-motorised methods of transport and public transport and, finally, the private vehicle (...). In order to ensure a public space which welcomes social and economic life and integrates businesses and spaces for leisure and services. Strategies include: Circulation of vehicles, Bicycles, Urban Transport, Parking, Urban paths and Urban green spaces".

[3] Citizens' Pact for Sustainable Mobility, 2007.

designed to maximize public space and keep private cars and public transport outside of the neighbourhoods, redesigning the inner streets for use by pedestrians. Private cars and public transport are kept outside the superblock while the inner streets are redesigned to be mainly used by pedestrians and bikes. With the scheme of the superblock, it is possible to create different and efficient networks for pedestrians, cyclists and motorized modes. It gives back the public space to the people and fosters social interactions at street-level. Superblocks with limited parking space furthermore reduce the incentives for owning cars in the city. The theoretical development of the superblock model presents a holistic vision of the urban system.[4]

The superblock model represents the master piece of the SUMP of Vitoria-Gasteiz, developed in 2009. Following this scheme, Vitoria-Gasteiz identified a new mobility and urban space framework composed of 77 superblocks to be progressively implemented. The superblock implementation (started in 2008[5]) is supposed to end in 2023.
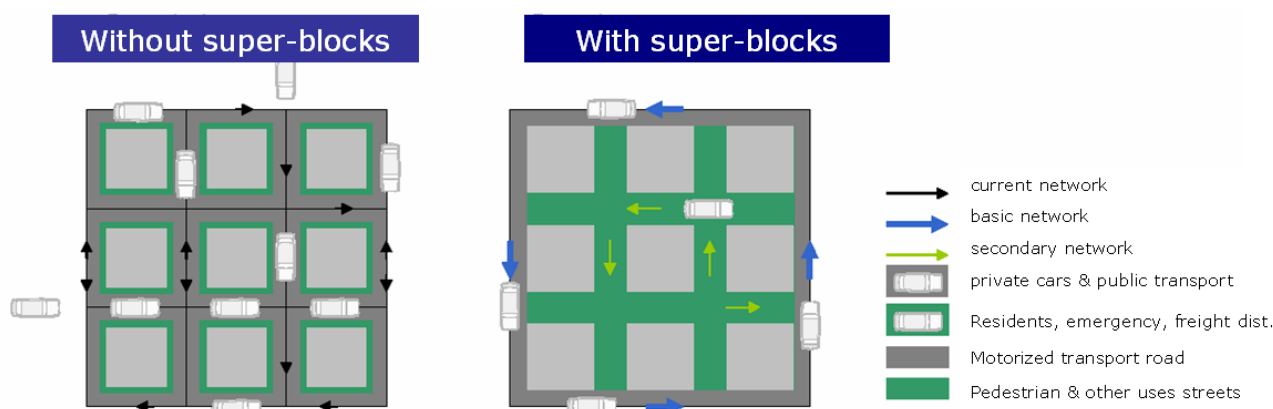
The superblock concept (source: Agencia de Ecología Urbana de Barcelona)[6]

In a first stage in Vitoria-Gasteiz, the mobility network was reorganized, restricting the access to the block for motorized traffic. In a second stage, citizens were empowered to use the freed area for other social and economic purposes and prioritizing non-motorized mobility. The car free area started in 1976 and in 1993 reached up to 40,000 square meters and up to more than 20 streets. Nowadays, the pedestrian zones reach up to 500,000 square meters.

As already stated, in 2008 the city adopted its SUMP, which included measures related to public transport, urban planning, cycling and vehicle efficiency. The improvement of the public transport network consisted of the introduction of two tram lines and the restructuring of the network of public transport buses in 2009 (17 new buses, reduction of lines, changes in the location of bus

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[4] Rueda S. (2016), La Supermanzana, nueva celula urbana para la construccion de unnuevo modelo funcional y urbanistico de Barcelona. www.bcnecologia.net. Salvador Rueda, director of the *Agencia de Ecologia Urbana* and renowned scholar in urban ecology, has been involved in the last decades in the development of several environmental projects in Barcelona and the *Agencia de Ecologia Urbana* is one of the institutions that provides supports and counselling to the Barcelona superblock promoting team (see: "Superblocks are Cerdà's Plan of the twenty-first century" interview with Salvador Rueda in Metrópoli Abierta: https://www.metropoliabierta.com/el-pulso-de-la-ciudad/movilidad/las-superilles-son-el-plan-cerda-del-siglo-xxi_729_102.html).

[5] The plan was not to start in all the city but choosing strategic boroughs in which interventions were more needed or easy to be implemented.

[6] Available at: http://sump-network.eu/fileadmin/user_upload/SUMPs/PROSPERITY_Vitoria_Gasteiz_SUMP_summary__EN.pdf

stops, possibility for transferring between lines, etc.), with an increase in frequencies of up to 10 minutes on all lines and an increase in the speed of public transport.[7]

Second, the plan implemented the pedestrianisation of streets and measures to limit traffic in the City Centre and in the so-called "Sancho el Grande Superblock".

Picture: Superblocks Vitoria-Gasteiz. © Isabel Lema Blanco

The promoters stress that the development of the superblock scheme is a long-term effort and implementation will last until, at least, year 2023. They argue that superblocks costs are very high because the actions planned affect the entire city (in specific the public transport network), streets must be entirely refurbished, and underground parking lots must be created, etc. Thus, despite the Plan distributed Vitoria-Gasteiz in 77 superblocks, the degree of development has been uneven, and several voices regret that actions. "To take the cars out of the superblocks and to reformate the street by creating single-section streets only have been carried out in a few streets in the city centre, while other popular neighbourhoods suffer from high levels of traffic" says one of the members of the Mobility Forum.

A new on-street parking policy (which aimed to limit and reduce number of cars on the streets and incentivize the use of underground parking areas) through higher prices (nearly tripled parking tariffs in the city centre, plus increased by ~30% the regulated area extension in the city centre).

This Plan was supplemented in 2010 with a Master Plan for Cyclist Mobility[8] (PDMC) 2010-2015, which, in line with the Charter of Brussels, signed by Vitoria-Gasteiz the same year, makes bicycle

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[7] According to one of the persons who supported the Plan: *"Due to its strong commitment towards sustainable mobility Vitoria-Gasteiz was the first Spanish municipality to be awarded the title of European Green Capital in 2012. According to the evaluation of the European Institutions, the sustainable mobility plan and the improvement of the public transport system were the main reasons for being awarded"*.

[8] "This Master Plan draws on previous studies such as the Study of Everyday Mobility and Lifestyle (Vitoria-Gasteiz, 2006) which fully describes the use of the bicycle at that time, and especially the PMSEP, which tackles a first analysis

promotion an integral part of the city's transport policy and set the ambitious goal of 15% cycling mode share by 2020, while maintaining the city's high level of walking (54.4%). Vitoria-Gasteiz participated also in the European Biking Cities project that brings together six European cities with ambitious cycling policies.

Globally, cycle lanes have been extended by 40 km and the pedestrian network by 17.6 km (pedestrian surface in the pilot superblock – Sancho el Sabio – increased from 45% of the total surface before the action to 74% after it).

The main financial data concerning the SUMP are presented below:[9]

- 1.2M€ Education campaigns, awareness, communication
- 3.7M€ bus (3M for bus-lanes, 0.7M for stops)
- ~35M€ Superblocks central and Sancho el Sabio (completed)
- 0.7M€ traffic calming measures
- 0.6M€ pedestrian accessibility (lower pavements)
- 1.2M€ surface parking
- 8.2M€ cycling infrastructure (bike-lanes & parking)
- 2.3M€ pedestrian infrastructure.

Vitoria-Gasteiz is currently elaborating the document "Revised Sustainable Mobility and Public Space Plan", also with the contribution of the *Agencia de Ecologia Urbana*, aiming at adapting the strategy to the Paris Agreements and the upcoming needs of the city, after 10 years.[10] The transport sector will be also targeted in the new strategy.

3. Stakeholders analysis

Actors involved and negotiation process

The Sustainability Mobility and Urban Space Plan is a public initiative run by the City Council of Vitoria-Gasteiz, which has originated and been agreed upon in a deliberative process with social actors and with the commitment of all local political parties. The origin of the Plan is related to the work carried out in the Agenda 21 of Vitoria-Gasteiz, the "Environmental Forum" participated by both institutional and social actors, as well as the study "GEO Vitoria-Gasteiz: Diagnostic report regarding the status of the sustainability and the environment in the town of Vitoria Gasteiz". Aiming at elaborating the Sustainability Mobility and Urban Space Plan, the city council created a permanent working group composed by technical staff from the various departments affecting the

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of the status of the cycling infrastructures and the potential of the bicycle in Vitoria-Gasteiz, and primarily proposes the materialisation of a new network of cycle lanes based on the consolidation of the existing sections, by means of their connection and continuity (Source: CEA, 2014 Vitoria-Gasteiz Mobility Survey).

[9] Aitor Albaina. Civitas prosperity presentation 21.11.2017, Kaunas.

[10] In words of one of the promoters of the Plan, *"The overall objective is to make a safe and comfortable city for the bicycle. We will continue pursuing a change in the modal split, developing an attractive, efficient and decarbonised public transport alternative while reducing the rate of vehicles circulating in the city"*. The promoters also are aware of the new mobility options available for the people, such as the electric bike that might become a sustainable alternative for commuters.

city's mobility. The working group is coordinated by the Environmental Studies Centre (CEA), which is a local public autonomous entity whose mission is to look out for the sustainability in Vitoria-Gasteiz.

Participants in the working group are: The Urban Planning Department, the Environment Department, the Traffic Service, the local police and the local public transport company (TUVISA). Political representatives of those municipal structures also take part in the meetings. As an external advisor, the "Agencia de Ecologia Urbana de Barcelona", a public agency, was commissioned by Vitoria-Gasteiz City Council to conduct the diagnosis of the mobility system in the city[11] and structuring the phases and strategic lines of the Plan.

The Environmental department of the council of Vitoria-Gasteiz, and in specific the Environmental Studies Centre (CEA), articulated a participatory process to deliberate and reach a city-wide agreement concerning the ambition and objectives of the Plan. Such participatory process served to inform and receive feedback from a hundred of entities, citizens and well-informed voices in the city that joined the "Citizens' Forum for Sustainable Mobility" and contributed to the Plan. Among the entities forming part of the Forum for sustainable mobility, politicians, cyclist associations (e.g., Gasteizko Bizikleteroak), environmental associations (e.g., Ecologistasen Acción), retail associations (e.g., Gasteiz On) and bus drivers are actively engaged in the discussions.

The CEA organized a series of workshops on mobility, environmental protection, etc. and the outcomes of these participatory processes paved the way for the drafting and signing of the Citizens' Pact for Sustainable Mobility (2007). Such Citizens' Pact reflects the commitment of the Vitoria-Gasteiz to sustainability and was signed by representatives of 54 associations, institutions and private companies and endorsed by the Plenary Session of the City Council and the Social Council.[12] The Pact was signed by different social agents of the city of Vitoria-Gasteiz integrated in the Citizens' Forum on Sustainable Mobility. The document defined a common framework for a model city "in which urban travels do not threaten health or quality of life, urban environment or local economy development" (supporters of the Pact were: the government of the city council, local parties in the city, technical departments of the city council – environment, mobility, urbanism, etc. – Ombudsman or People Defender, the taxi association, the residents association, the cyclists and rollers association, the ecologist association, the students and educational Association, and transport and technological companies).

The participants in this study mentioned local politicians – including the former mayors of the city – as people with strong commitment to the elaboration and implementation of the SUMpsP and who leaded the project, despite pertaining to different political parties.[13]

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[11] Source: https://www.vitoria-gasteiz.org/docs/wb021/contenidosEstaticos/adjuntos/es/54/29/5429.pdf

[12] http://www.udalsarea21.net/BuenasPracticas/Ficha.aspx?IdMenu=381395ad-9baa-4408-809e-a73e0a2ec092&Cod=99dcd66a-b15b-4d79-abc8-02252db57202&Idioma=es-ES

[13] Alfonso Alonso (mayor of Vitoria-Gasteiz in 1999-2007) was the mayor under whose leadership the SUMpsP was designed and the "Citizens' Forum for Sustainable Mobility" worked out. Next mayor, Patxi Lazcoz, and, in special, the city counsellor for mobility, Joaquín Esteban, were mentioned by several interviewees as the politicians more committed to the Plan. In the period 2007-2011, Esteban leaded the participatory process that presented to the citizens the main changes contained in the Plan. Public presentations were conducted in all the neighbourhoods of the city and Esteban, together with the CEA members, who discussed with citizens the concrete measures of each neighbourhood, taken into consideration those proposals that improved the plan. Since 2011 to the current period two different parties run the city but they maintained the Plan.

Since 2018, a revision of the Plan has been made. The draft of the updated version of the Plan has been presented in the Citizens' Forum for Sustainable Mobility with different reactions from their members.

Due to the complex power distribution of the Basque Country, there are some aspects that must be agreed with other administrations. Specifically, road infrastructures outside of the city are managed by provincial and regional administrations while train and tramway facilities are managed by regional government public companies. Train intercity lines and infrastructures are owned by the Spanish administrations.[14]

Since September 2008, several permanent working groups were strategically created to provide deliberative spaces with technicians and politicians in order to assure a strong consensus regarding the mobility measures to be implemented. These working groups are presented below.

- Citizen Forum on Sustainable Mobility:[15] An open call was held in which representatives of all the political parties of Vitoria-Gasteiz, representatives of the Sectoral Environment Council, economic agents, federations of taxi drivers, merchants, and public transport sector participated. Having created this specific Forum was mentioned as one of the key elements that explain the success of the initiative so as many people could understand the objectives of the Plan, discuss and make proposals, as well as disseminate the object of these discussions among their associates and media.[16]
- Mobility Technical Committee: interdepartmental working group that integrated all the departments of the City Council involved in the mobility plan, as finances, traffic, environment, transport, etc.
- Technical-political Mobility Committee: a technical-political working group aiming at analysing and following-up of the mobility plan process. This committee engaged the representatives of all the political parties.[17]

These groups were characterized by flexibility, encouraging people to discuss the Plan and make proposals for the improvement of the measures.[18] In this frame, many proposals were received,

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[14] According to one of the interviewees, *"The regional government decision of creating two tramway lines was one of the main motivations to change the urban transport system that, at that moment, was inefficient and didn´t cover the needs of mobility of most of the population. However, the new tram was perceived as a risk so as this new infrastructure could dramatically reduce the rate of bus users in Vitoria"*.

[15] The Sustainable Mobility Agreement was written and signed in 2007 by different social agents of the city of Vitoria-Gasteiz integrated in the Citizens' Forum on Sustainable Mobility (platform of citizen participation in mobility). This consensus document aims to define the framework for new patterns of mobility, and therefore, for a model city in which urban travels do not threaten to health or quality of life, urban environment or local economy development.

[16] As a key-informant interviewed explain, *"The fact that the cyclist association joined the Forum was very positive, because they play a key role in the city, they receive much media coverage and they manifested openly their support to the plan, it was very useful"*.

[17] As one of the promoters explains: *"Se anticipaban las propuestas a los partidos políticos para afianzar su compromiso con el plan y que se sintiesen partícipes del proceso, que su opinión también fuese recogida y que tuvieran conocimiento de las actuaciones directamente por los técnicos, y no por la prensa"* (translation in English: *"The proposals were anticipated to political parties to strengthen their commitment to the plan and to feel part of the process, that their opinion was also collected and that they were aware of the actions directly by the technicians, and not by the press"*).

which were taken into consideration, making participants "feel part of the project". In the case of citizens engaging in the designing of the new public transport system, an important number of proposals were received which were answered one by one by the Council.

The development of a whole new public transport network following the superblock model raised concerns among the citizens directly affected by the change. A permanent contact with citizens' associations (and individuals) was kept by the municipality. The effective reorganization of the urban bus network was preceded by extensive work before the entry into force of the new system. In the first place, the proposers counted on the contributions of the neighbourhood associations (there were 25 meetings during a year), which were later transferred to the technical proposal. In the second place, two communication campaigns were launched. Around 150 volunteers served as communicators among their fellow citizens. Weeks before the entry into force of the change, these volunteers offered information on this in different stands distributed throughout the city, and the week before some buses already made tours of the new network for free in which volunteers travelled to inform the new users. Thanks to all this, the effective reorganization of the urban bus network was executed in a single day.[19]

The reduction of the number of on-street parking places and the expansion of the regulated paid parking space in the city centre (on the same day that the new bus network was implemented, the parking fee for the private car in the city centre was multiplied by three) was another source of concern. Citizens and some shopkeeper associations criticised such actions (on the same day that the Municipal Plan was going to approve parking regulations, 22 associations handed out 13,000 signatures against the change of the parking time and the restriction policy for surface parking).

A communication and awareness campaign for the SUMP was designed and launched to create a favourable perception of a new culture of sustainable mobility. The campaign included advertising in newspapers, bus shelters, outdoor advertising, radio and internet, etc.

There was some reluctance and resistance from other areas/departments of the City Council and from political stakeholders (concern about the implementation of the measures and how citizens could react). However, after intensive working sessions, most of the agents involved in the urban mobility of Vitoria-Gasteiz agreed the superblocks model and signed a pact to reinforce and support it.

The press in some occasions published alarming articles about the "restrictive or coercive" measures that the SUMP could suppose. However, in the initial stage, the press transmitted a

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[18] As a key-informant interviewed explain: **"*Eran sesiones participativas, no era solamente explicativas. Se recogían aportaciones, de los vecinos que te decían que esto debería ser de tal manera. Tanto allí, in situ, como luego en instancias. Esas instancias se revisaban, los técnicos de transporte público, o nosotros, o de seguridad ciudadana, hacían un cribado de lo que podía ser viable de las peticiones. Pero si que se admitieron muchas aportaciones*"** (translation in English: "*They were participatory sessions, it was not only explanatory. Contributions were collected from neighbors who told you that this should be in such a way. Both there, in situ, and then in instances. Those instances were reviewed, public transport technicians, or us, or citizen security, made a screening of what could be viable requests. But many contributions were really admitted*").

[19] Aitor Albaina and Juan Carlos Escudero. Civitas prosperity – The Sustainable Urban Mobility Plan of Vitoria Gasteiz – Summary (EN); available at:
http://sump-network.eu/fileadmin/user_upload/SUMPs/PROSPERITY_Vitoria_Gasteiz_SUMP_summary__EN.pdf

positive image of the plan and generated high and positive expectations that were transferred to the citizens.

Strategies for gaining social support

The main strategies to gain citizen support for the SUMP [20] are listed below.

1. The process of public deliberation on the mobility plan was facilitated by a consultancy specialized in citizen participation,[21] through participatory meetings that contributed to the definition of a first vision of the superblock plan, which was discussed and approved in the Forum. This process culminates with the "citizen pact for sustainable mobility", a public act of commitment of all political groups, stakeholders, social actors and individual persons, who will subsequently also have positions of political responsibility.

2. A communication and behavioural change marketing campaign was launched to create a favourable perception among citizens towards a new culture of sustainable mobility. Under the claim "I join. It is worth it!", the campaign was played by five citizens of Vitoria-Gasteiz, of different ages and neighbourhoods, inviting the whole town to join the Plan. Five messages were designed, focused on public transport, urban pedestrian paths and the use of private vehicles and bicycles, in order to achieve a positive culture for sustainable mobility.

3. A series of Public consultation about the measures of the Plan in each neighbourhood through participatory meetings with neighbourhoods groups in the city were held in order to give the chance to develop new proposals and suggestions regarding the application of the SUMP.[22]

4. An "ambassador group" was formed, consisting of representatives from the municipal bus company, Vitoria-Gasteiz City Council and the Environmental Studies Centre.[23]

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[20] https://www.polisnetwork.eu/uploads/Modules/PublicDocuments/endurance_fs_16_cooperation _spain_vitoriagasteiz_en_web.pdf

[21] Which was remarked by one of the interviewees *"As a very enriching learning experience about participatory methodologies such as the world-cafes".*

[22] As a key-informant interviewed explain: *"Durante año y medio se fue trabajando barrio por barrio, comunicando y estableciendo un diálogo directo con los vecinos, que participaron en el diseño de las nuevas rutas de autobús. Íbamos representantes del gobierno local, y miembros del equipo técnico, barrio por barrio"* (translation in English: "*For a year and a half, neighborhood by neighborhood was working, communicating and establishing a direct dialogue with the neighbors, who participated in the design of the new bus routes. We were representatives of the local government, and members of the technical team, neighborhood by neighborhood"*).

[23] According to an informal interview with a member of the CEA: *"Se diseñó una campaña de comunicación horizontal sobre el plan de movilidad que captó la atención de la prensa y contó con la participación de 150 voluntarios. Recibió el reconocimiento del "Premio Civitas" al mejor proceso de participación ciudadana en materia de movilidad urbana sostenible. Se informó a la ciudanía a través de diferentes estrategias comunicativas, a través de medios de comunicación, cartas a los residentes sobre el nuevo régimen sancionador ante las infracciones por no respetar las señales prohibición de circulación, 150 voluntarios que acompañaban a los vecinos a las nuevas paradas del transporte público; información sobre las nuevas líneas de transporte, etc."* (translation in English: "*A horizontal communication campaign was designed on the mobility plan that caught the attention of the press and had the participation of 150 volunteers. He received the "Civitas Award" recognition for the best citizen participation process in terms of sustainable urban mobility. Citizens were informed through different communication strategies, through the media, letters to the residents about the new sanctioning system for infractions for not respecting the traffic prohibition signs, 150 volunteers who accompanied the neighbors to the new ones public transport stops; information about the new transport lines, etc."*).

5. A media campaign was launched including advertising in newspapers, bus shelters, outdoor advertising (540 bus shelters, street modules and street-lamp banners), radio (234 20-second-spots) and Internet (340,000 banner ads).

6. Environmental education activities to raise-awareness on mobility and the sustainable use of transport are implemented, as the "European Car Free Day" (since 2000) or the "European Mobility Week". The city celebrates this event yearly in and around public open spaces. The idea is based on "recovering the city for the citizens", showing the city's capacity for acting and exchanging information in an environmentally-friendly atmosphere. Some of the events will be celebrated using the new public areas provided by the first "superblocks" implemented due to the SUMP, demonstrating a different way of understanding the relationship between citizens and open spaces.

7. Bike driving courses were organized with schools with a focus on increasing youth population competences for cycling on streets and interurban roads. Concerning bikes, there was also social influence effect when several social groups started to use them.[24]

4. Milestones

- 1992: Participation of Vitoria-Gasteiz representatives in the UN Rio de Janeiro Earth Summit (adoption of the Agenda 21).
- 1995: Vitoria-Gasteiz signs the 'Aalborg Charter', the declaration "European Cities & Towns Towards Sustainability".
- 1998: Specific Agenda 21 for Vitoria-Gasteiz. Integrated vision of mobility set up by the Sectoral Council of the Environment (a participation body created within the fold of the process of Vitoria-Gasteiz's Agenda 21).
- 2000s: Significant urban growth process. Existing hyper-motorisation (428 cars for each 1,000 inhabitants in 2004 and 448 in 2007[25]). Growing rate of motorisation was associated with the development of a mobility model which highlighted a gradual increase of the importance of the car in the modal split, in detriment to public transport and movement on foot, even though, despite the decrease observed over the last decades, a significant participation in pedestrian movement was maintained.
- 2001: General Urban Development Plan including the development of the new districts of Salburua and Zabalgana, programming of urbanisation in the two following four-year periods of up to 9 million metres squared of new residential areas, with a total of approximately 16,000 homes.
- 2003: New urban plan: urban sprawl.
- 2006: The City Council approved the "Vitoria-Gasteiz's Climate Change Prevention Strategy 2006-2012".
- 2006: Mobility Survey, agreement among the municipality and the Environmental Studies Centre (CEA), citizens forum, tram works begin.

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[24] For example, according to an interviewed, "Some of the representatives of all the political groups in the city travel by bike, others use the public bus and tramway, even the mayor travels by bike". The journalists are mentioned as well as one of the social groups that move across the city by bike "because is faster and they do not need to spend time and money in parking". Such examples are mentioned by the promoters "as one of the keys to the success of the bike in the city, which have influenced for sure on the behaviours of the other citizens".

[25] GEO VITORIA-GASTEIZ: Diagnostic report regarding the status of the sustainability and the environment in the town of Vitoria Gasteiz, 2009.

- 2007: Plan de Movilidad Sostenible y Espacio Público de Vitoria-Gasteiz (SUMP) and city model design (not yet approved). Conception of the Civitas MODERN project. The city adopted its Sustainable Mobility and Public Space Plan (with a time horizon from 2008 – 2023). The Sustainable Mobility and Public Space Plan (PMSEP) outlined the development of a new mobility paradigm in the city, taking into account a series of actions covering the period from 2008 to 2023 such as Superblocks.
- 2007: Citizens' Pact for Sustainable Mobility. Preceded by a consultation process began, which was initiated with the constitution of the Citizens' Forum for Sustainable Mobility of Vitoria-Gasteiz[26], integrating a group of social actors, politicians and technicians who would work firstly on defining a consensual scenario regarding the sustainable mobility model and desirable public space for Vitoria-Gasteiz.
- 2008: Civitas MODERN project approved 2008-2012 (2M€: planning/design/M&E).
- 2008: Spanish financial crisis.
- December 23, 2008: Tram in operation.
- October 30, 2009: new public transport network and new parking policy in the city centre.
- 2009: Vitoria-Gasteiz signed the "Covenant of Mayors", committing the City to go beyond the European target of curbing their CO_2 emissions by at least 20% by 2020.
- October 30, 2009: new public transport network and new Parking policy city centre.
- 2009: Plan E for superblocks development around 30M€.
- 2009: two first superblocks fully completed.
- 2010: Plan E around 4M€ + Plan Director de Movilidad Ciclista 10-15M€.
- 2010: The Master Plan for Cyclist Mobility (PDMC) 2010-2015, specifically aimed at mobility by bicycle. The Master Plan makes bicycle promotion an integral part of the city's transport policy and set the ambitious goal of 15% cycling mode share by 2020 while maintaining the city's high level of walking (54.4%).
- 2011: Mobility survey.
- 2012: European Green Capital award.
- 2012: tram extension.
- 2013: Traffic calming (47 streets).
- 2014: Mobility Survey.
- 2015: 10th Bus line.
- 2017: SUMP Evaluation.
- September 2018: exhibition 'Yo me subo +10' which shows the transformation of mobility through several images of before and after different streets of the city and also provides the data of the modal shift that has occurred in the city; and pilot tests of mobility change within the Mobility Week of Vitoria Gasteiz.
- December 18, 2018. Presentation of the revised version of the Sustainability Mobility Plan in the Sustainable Mobility Forum by the City Mayor and Salvador Rueda.[27]

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[26] This platform for citizen participation brought together almost 100 people with different profiles and opinions and developed 3 workshops, the conclusions of which paved the way for the drafting and signing of the Citizens' Pact for Sustainable Mobility, in April of 2007. This Citizens' Pact reflects the commitment of the society of Vitoria to the main challenges identified and the commitment of the Forum in monitoring and controlling the development of the PMSEP (in order to verify that its implementation meets the objectives defined in the Citizens' Pact).

[27] https://www.youtube.com/watch?v=kSyya3oo7-U

- February 18, 2019: Three associations (Gasteizko Bizikleteroak, Ecologistasen Acción Araba, and the resident association Hegoaldekoak) resign as members of the Sustainable Mobility Forum due to their disagreements with the city council about the Mobility Plan.[28]

5. Effects

Main environmental, economic and quality of life effects

Vitoria-Gasteiz is known as "a pedestrian-scale compact city" with large experience in developing and implementing environmental policies for achieving a sustainable city (e.g., greenbelt) and it is ranked as the Spanish city with the highest quality of life. The following environmental outcomes can be highlighted.

- Evident positive impact of mobility policies on the environmental quality of the city (studies report evidence on increasing air quality and lower noise pollution, reduction of traffic intensity and fuel consumption). The City Council reports a reduction of total of CO_2 emissions (saving of 421.5 tons / year in CO_2 emissions) due to the reduction of motorized traffic in favour of the bicycle. The environmental quality is related to "a greater well-being of the citizens" (in terms of health, habitability of the city, etc.). 42% reduction in CO_2; 42% reduction in NO_X; 38% reduction in particles (in the pilot superblock).
- The reduced vehicle speed on the superblocks (target roads) produces a slightly higher modal split of walking and cycling.
- Noise measured in the pilot superblock before the action: 66.50 dBA, and after the action: 61.00 dBA. The result is directly related to the reduction of motorised vehicles in the zone.
- Pedestrian accidents lowered by 18% in 2 years.

New ways of behaving/doing

Superblocks are said to represent "an innovative urban planning scheme to restore the public space taken by private cars in the streets and give it back to the people". Ideally, Superblocks foster neighbourhoods´ social life "by allowing different uses, other than mobility, of the public space". The example of the two pilot superblocks fully implemented has increased the social acceptance of this type of measures in Vitoria-Gasteiz.[29]

The study "2006-2016 Evaluation of the Sustainable Mobility and Public Space Plan and the Cyclist Mobility Master Plan of Vitoria-Gasteiz"[30] reports a detailed assessment of the Sustainable Mobility and Public Space Plan and demonstrate that the Plan has enhanced a change in patterns of mobility in residents. According to the evaluation reports as well as to the opinion of several interviewees, the main changes are related to the following aspects.

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[28] Source http://www.bizikleteroak.org/adjuntos/bizikleteroak2010Noticias/167_adjunto.pdf

[29] According to a key-informant interviewed: *"Now the neighbours ask us for more public spaces, reducing the speed of traffic in their streets. Etc. The neighbours want to have a superblock in their area, because they see that they have more space for social interaction".* This is also confirmed by the surveys conducted within residents, which report high levels of public acceptance ("400 citizens' were interviewed after the implementation carried out (2011). The survey showed that awareness level of the measure was 83% and acceptance level was 6 (0 to 10)".

[30] Published by the Centre for Environmental Studies-CEA in 2016 (authored by Begoña Muñoz & Gianni Rondinella).

- Increase in the use of bicycles and public transport that is sustained over time (e.g., during the period 2006-2012 there was an 80% increase in the number of travellers / month (tram and bus). There was an increase in number of cyclists by 18.4%; and a decrease in modal split of cars by 6%; the bicycle is used by the youngest people in the city, students, university students, etc. It does not extend to the working class (exception: commuting to work) where the automobile is still the most widely used means of transport (51%) The displacements due to work account for 23% of the total daily trips.
- The 2006-2016 Evaluation report of the Sustainable Mobility and Public Space Plan and the Cyclist Mobility Master Plan of Vitoria-Gasteiz outlined the development of a new mobility paradigm in the city that is manifested in a change in modes of transportation in everyday journeys.[31]
- Several interviewees mention as well as a change in the uses of the public space and how pedestrianisation measures facilitate socialization within residents living in the superblocks. However, the main intervention has been developed in the city centre and the area has become a shopping and spare space for all citizens.

The unity of political action is unanimously recognised as the most important key of success of the planning process which was carried out. It has enabled the implementation of potentially unpopular actions, such as the price of regulated parking tripling and the first extension of the corresponding area, and has allowed for the communication "of a very clear message of a change of direction", promoting modifications in conduct between citizens. It seems to exist in Vitoria-Gasteiz a vision, shared by most political parties, social actors and residents, of being an environmental committed city.

Finally, the citizens of Vitoria-Gasteiz are said to experience "a change in mentality", adopting a common new frame in the way they understand mobility in the city. People understand the impact that motorized transportation has in terms of air pollution, traffic noise, climate-change emissions and occupation of public spaces and endorse policies and urban measures oriented to reduce or calm traffic. People argue that actions which received much opposition in the past, such as the pedestrianisation of a street or removing surface parking spaces are now suggested or demanded by the residents. According to interviewed key-informants, „nowadays, the paradigm is different, and it seems to be a result which has arisen from the Plan and the work which has been carried out over the last few years".

New ways of organizing/doing things

It has been pointed out by the promoters interviewed in this study, that Superblocks Model and the Sustainability Mobility Plan have involved the development of new governance strategies based on the participation and commitment of political actors, of different areas of the municipality and the public administrations involved in the mobility sectors, and of citizens participating in the "Citizens' Forum for Sustainable Mobility": a coalition between city-governers,

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[31] According to the results of this study: "The improvement of the public transport, together with the communication campaigns and, above all, the great difficulties for parking and circulating by car have triggered seated changes in conduct, both in those interviewed themselves and, in their relatives, and social environment. Decrease in car journeys, boost of the use of the bicycle and increase in pedestrian journeys. It is worth remembering that the decrease in the number of journeys on foot was the most alarming indicator in 2006".

political parties and key stakeholders (representatives of social groups, neighbourhood associations, municipal technicians and political representatives). The Citizens' Pact for Sustainable Mobility (mentioned above) is an example of a social innovative strategy to provide the best environment to ease the development of the measure. These representatives were later also consulted for the preparation of sectoral plans (such as the Master Plan for Cycling Mobility 2010-2015) and for the drafting and/or adaptation of various municipal ordinances.

Moreover, the hierarchical scheme of "superblocks" puts the mobility policies before another type of interventions, avoiding unnecessary works in the modification of the urban road, with the cost savings that this supposes.

Finally, Vitoria-Gasteiz gained a very strong support from politicians and key stakeholders. This resulted in tailor made regulations and legislation. It was clear that proper planning, sufficient involvement and good organization all acted as drivers in the measures adopted.

New Knowledge

Instances of policy knowledge were reported by the promoters interviewed, mainly referred to the best forms of gaining social support to the Plan. Thus, the members of the CEA and the policy-makers involved in the participatory processes draw the following main lessons from the experience.

- Need of providing sufficient information and documented data about the proposals and the changes that the Plan involved in each neighbourhood. Breaking misperceptions and demonstrating that the plan had more benefits than inconveniences was stressed as fundamental for convincing citizens. The city council working group used all the resources they can, also GIS data, to demonstrate the potential impact of the Plan.
- Need of contextualization of the plan, explaining the overall ambition and thinking at the city-level scale.
- Need of political commitment that support the technical decisions and face contestation.

6. Some critical issues

19 superblocks have been at least partially realized by now. However, budget constraints (after the financial crisis of 2008, and due to the local economy crisis) prevent completing the desired superblocks scheme and just 2 superblocks are fully completed: central and Sancho el Sabio, the so-called "pilot superblock" aimed to serve as example for all citizens about the benefits and strengths of changing urban design and mobility patterns.

Therefore, a "transitional" (low-cost, without having to spend a great amount of money to make public works and face big changes in the structure of streets) strategy has been adopted at that time: a traffic calming campaign in 47 streets (another 17 superblocks) of downtown with 3 objectives:[32]

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[32] The city council explains the changes on the philosophy of the superblock schemes as follows: *"After the implementation of the pilot project, the superblock model has been applied in all the street refurbishments carried out in the city in the last years. However, from 2011 there has been an important change in the philosophy of the*

- Improving road safety for pedestrian and cyclists
- Reduce emissions of pollutants
- Reclaim the space for pedestrians.

Citizen participation, after a few years, has weakened.[33] The execution of the mobility plan has led to a certain fracture of the consensus and participatory methodologies, since the municipal government adopted political decisions without having first taken them to the Mobility Forum, which did not receive a good acceptance by its members. Therefore, the forum casted in sterile debates that cause people to stop attending.

A few other limits can be identified.

- Infrastructural changes, on their own, do not solve the pedestrian-cyclist conflict,[34] and both regulatory (police) and educational measures are needed.
- Instances of contestation and resistance (managed as explained in § 3.) were reported by several interviewees occurring at the beginning of the project on the new public transport network resulting from the superblock scheme (optimised reducing the number of lines whilst, at the same time, offering both more frequent and direct lines; as a consequence, the number of passengers is still increasing). However, currently, it does not solve the mobility to some of the industrial estates located in the urban periphery (where the private car remains the preferred mode).
- As the city extends its size and average trip distances become longer, it is a challenge to solve how to apply the superblock model in the new neighbourhoods located in the periphery.

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superblock model. Due to the economic crisis context, the Environment and Public Space Department of the Municipality adapted the plans to develop all the superblocks of the city centre, trying to apply the philosophy of the superblock scheme without spending a great amount of money to make public works and big changes in the structure of streets. To achieve the desired effect of superblocks model, the work performing was basically signalling, painting and rearranging furniture in the street" (https://civitas.eu/sites/default/files/modern_vg_m05.01_0.pdf).

[33] Recently, three citizens association's members of the Sustainable Mobility Forum (Gasteizko Bizikleteroak, Ecologistasen Acción Araba, and the resident association Hegoaldekoak) resigned as members of the Sustainable Mobility Forum due to their disagreements with the city council about the Mobility Plan. This can be observed as an instance of that the social consensus existing about the Sustainable Mobility and Public Space Plan is over and that might compromise the commitment of other voices with the Plan. These associations have made a public statement denouncing the lack of transparency and information with the Forum, *"while the city council reaches agreements with the regional government about mobility infrastructures without informing or consulting the Forum, in special when some of the new measures included in the revised version of the Plan have received much contestation from different sectors of the city".* However, as one of the interviewees mentions, *"this event seems to relate to political differences between these associations and the political party leading the city council and after May local elections these associations might join the Forum again".* The same participant regrets that "sometimes, the discussions occurring in the sessions of the Forum are sterile and people abandon the Forum because they think this is not useful anymore".

[34] There are some issues in terms of conviviality among cyclists and pedestrians that the city council had to regulate in order to make sure to walk in the city centre. Several accidents involving cyclists and pedestrians (children, elder people) and the lack of reaction from the city council motivated the creation of one new association "Camina Gasteiz" committed to denounce that traffic norms are not respected by cyclists and demand more policy control. This new association has joined the Sustainability mobility forum and they get agreements with cyclist's associations and they launched public actions asking improvements in pedestrian and cycling facilities while more control and prosecution of traffic infractions.

- The City Council had to deal with the strong resistance of the city centre retail sector against the new parking policy that (see § 2.) increasing twice or three times the prize of parking on the street (which was almost for-free until then). Some of the interviewees remember that the retail sector and residents in the centre were able to gather about 13,000 signatures against the measure. However, now people are happy with the measure due to the social activity has increased in the superblocks and these areas have become spaces for people spare time and shopping.

7. Up-scaling

Vitoria-Gasteiz has received the prize for citizen participation in sustainable urban mobility within the framework of the European initiative CIVITAS, increasing its international reputation. Vitoria-Gasteiz has been also awarded the European Green Capital 2012. The European Green Capital nomination in reinforced such environmental identity and increased citizens pride of living in a city acknowledged worldwide for being a green city with high rates of wellbeing.

Based on the good experiences in Vitoria-Gasteiz, the idea of superblocks is already spreading to other typologically diverse cities in Spain, such as Barcelona (where the concept has been first designed), La Coruña, Ferrol, Viladecans and El Prat as well as in Buenos Aires and Quito. Its possible application is being studied in the case of New York and Melbourne.

URBAN MOBILITY WITH SUPERBLOCKS
Barcelona

1. Background

Barcelona is the Administrative Capital of the Catalonia. Barcelona has around 1.63 million inhabitants (city)/4.73 million inhabitants (the metropolitan area). Barcelona is situated on the southeast coast of the Iberian Peninsula, in an area of 102 km² (city). The city is developed on a plain surrounded by the mountain of Collserola to the northwest, the Llobregat River to the southwest and Besos River to the east. Barcelona is characterized by a high population density (15,802 h/km² the city; 5,095 h/km² the metropolitan area).

The Council of Barcelona states that, according to various environmental, social and health indicators, the city is approaching "the limit of its capacity in terms of quality of life for citizens". Thus, the Superblocks Programme addresses the following urban issues.[1]

- Environmental problems. Barcelona city council reports high levels of air pollution, which sometimes exceeds the maximum legal limits and leads to lower life expectancy.[2] Specifically, the transport sector has a significant impact on greenhouse-gas emissions as well as on noise pollution. Traffic is the first cause for noise pollution in Barcelona, and 61% of the residents deal with noise levels higher than those deemed healthy by legislation.[3]
- Healthy and wellbeing problems. The Barcelona Public Health Agency[4] stresses the current unhealthy sedentary lifestyles in a population affected by an unbalanced diet and a lack of physical activity. Besides, Barcelona suffers of high rates of traffic accidents with greater incidence in motorcycle riders and pedestrians.[5] Also, according to the local Environmental Epidemiology Agency around 1,200 deaths could be prevented yearly "just by reaching EU-mandated levels for nitrogen dioxide levels" due to the impact of environmental pollution on asthma issues, acute bronchitis and cardiovascular problems.
- Lack of green areas spanning both environmental and health problems. According to the Barcelona Green Area and Biodiversity Plan for 2020 (2013) Barcelona is one of the European cities with the lowest number of green areas, with rates below the WHO recommendations in several areas (Barcelona in 101.4 km² and has 6.64 m² of green space per inhabitant). Besides, the loss of biodiversity causes a "heat-island effect" with temperatures increasing up to 4° in the centre of Barcelona in summertime.[6]

Many experiments have been carried out in Barcelona since the 1980s, to provide more areas for pedestrians, such as the urban redevelopment projects implemented in the city's old quarter, to turn it into a pedestrian zone and the subsequent extension of that model to practically all the old centres of the towns and villages that were annexed by the city in the 19th and 20th centuries. Moreover, as a result of implementing global ´Agenda 21´ agreed at the Rio Summit in 1992,

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[1] Barcelona (2016). Government measure: Let's fill streets with life. Establishing Superblocks in Barcelona. Commission for Ecology, Urban Planning and Mobility, Council of Barcelona.

[2] CREAL-Research Centre for Environmental Epidemiology (2007). The public health benefits of reducing atmospheric pollution in Barcelona's Metropolitan Area (cited in Barcelona, 2016).

[3] Barcelona City Council (2013). Barcelona, a city committed to the environment. Environmental report (cited in Barcelona, 2016).

[4] Barcelona Public Health Agency (2014). Health in Barcelona (cited in Barcelona, 2016).

[5] Barcelona Public Health Agency (2014). Health in Barcelona (cited in Barcelona, 2016).

[6] Barcelona (2016), cit.

Barcelona has managed to establish a collective document named ´Citizen Commitment to Sustainability´. In 2002, it was signed by more than 800 organisations (small and large enterprises, community groups, professional associations, political parties and educational institutions, etc.) ready to contribute actively to the achievement of the common set goals. In 2012, the commitment was evaluated and revised for the next 10 years. One of the main targets of Barcelona´s ´Citizen Commitment for Sustainability 2012-2022´ is to improve the city at the people level, including participation and focusing on small-scale interventions.

In complying with these targets several actions were defined in the document, among them the creation of superblocks. The idea of superblocks has already existed for decades in urban planning. However, in the case of Barcelona it was a novelty to introduce retroactively the superblocks concept as a way to rethink and regenerate existing city neighbourhoods. The concept of superblocks is also positioned in the Urban Mobility Plan (PMU) of Barcelona 2013-2018 (which organises the city's mobility on the basis of these structures) as well as in the cities Green Infrastructure and Biodiversity Plan.

2. Implemented actions

Superblock features have been already described in the case of Vitoria-Gasteiz (see above). As we have seen, the superblock model pursues a more equal distribution of urban space between private/public motorized transportation and other social uses (commercial exchange, pedestrian/cycle mobility, sports, festivals, social interactions, etc) and biodiversity functions (e.g. green corridors, community gardens, etc).[7]

The theoretical development of the superblock model presents a holistic vision of the urban system,[8] although such holistic approach was first envisioned by the *Agencia de Ecologia Urbana*, and some local plans were required to be developed in the past years, as the following: *The Barcelona Commitment to Climate; The Barcelona Urban Mobility Plan (PMU) for 2013-2018; The Barcelona Green and Biodiversity Plan for 2020; The Municipal Action Plan 2016-2019.*[9]

As explicitly stated for the case of Barcelona, the Superblock Programme, firstly, pursues "a healthier, more egalitarian and more sustainable city that is full of life."[10] It claims for a need of transforming public spaces as habitable places that served for citizens to develop a series of social and community activities (e.g., games, greenery) recovering traditional ways of living in neighbourhood and local communities, which used to foster interaction and social cohesion:

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[7] Barcelona (2016). Government measure: Let's fill streets with life. Establishing Superblocks in Barcelona. Commission for Ecology, Urban Planning and Mobility, Council of Barcelona.

[8] Rueda S. (2016), La Supermanzana, nueva celula urbana para la construccion de un nuevo modelo funcional y urbanistico de Barcelona. www.bcnecologia.net. Salvador Rueda, director of the *Agencia de Ecologia Urbana* and renowned scholar in urban ecology, has been involved in the last decades in the development of several environmental projects in Barcelona and the *Agencia de Ecologia Urbana* is one of the institutions that provides supports and counselling to the Barcelona superblock promoting team (see: "Superblocks are Cerdà's Plan of the twenty-first century" interview with Salvador Rueda in Metrópoli Abierta: https://www.metropoliabierta.com/el-pulso-de-la-ciudad/movilidad/las-superilles-son-el-plan-cerda-del-siglo-xxi_729_102.html).

[9] Barcelona (2016), cit.

[10] Barcelona's Commission for Ecology, Urban Planning and Mobility, (2016). Government measure: "Establishing Superblocks in Barcelona"

"Superblocks are becoming a new concept of urban order, made up of an integrated network of relationships that highlights today's neighbourhoods, streets, buildings and activities; and which promotes the reclaiming of public space and a sustainable mobility system for connecting all these. Citizens' lives are also changing, through better access and the promotion of local social relations"[11]
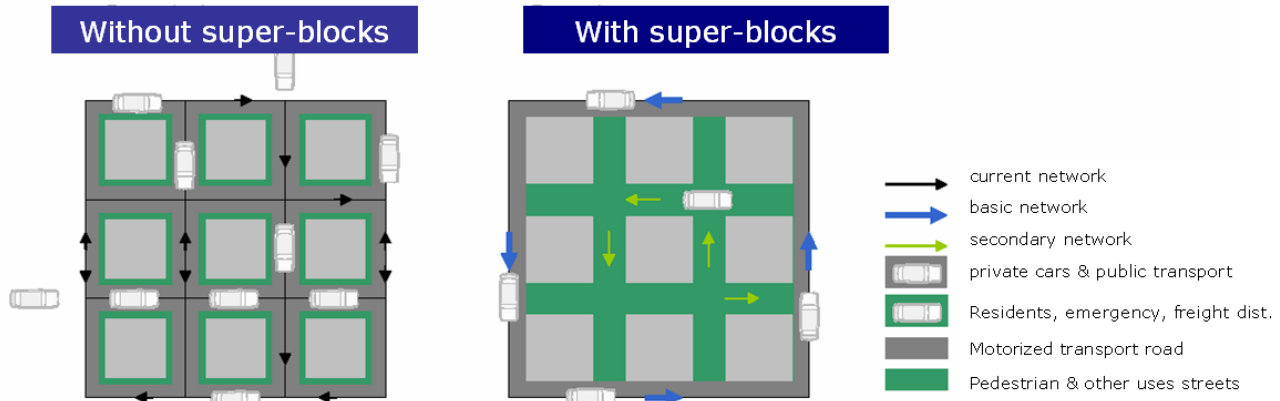
The superblock concept (source: Agencia de Ecología Urbana de Barcelona)[12]

There is some evidence that such values seem to be also endorsed by other type of promoters and social actors involved in the design of the superblocks in different boroughs of the city.[13]

Secondly, ecological values and environmental awareness are remarkable motivations to launch the Superblocks Programme so as citizens are more and more preoccupied about the effects of environmental pollution on their health and quality of life. Promoters and several local actors interviewed in this study reflected on the relation between high quality environments and life expectancy, physical and psychological wellbeing or even cognitive development in childhood. The initiatives implemented in Superblocks focus on increasing traffic-calmed spaces, as well as improving habitability (gaining attraction and comfort of public spaces through the design of new green areas in the neighbourhood).[14]

So, the transformative ambition of the Superblock Model in Barcelona, according to the "let's fill streets with life" Programme established in Barcelona since 2016, is to re-design city´s neighbourhoods in order to foster a re-appropriation of urban space by residents by reorganizing

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[11] Barcelona (2016), cit.

[12] Available at: http://sump-network.eu/fileadmin/user_upload/SUMPs/PROSPERITY_Vitoria_Gasteiz_SUMP_summary__EN.pdf

[13] Several members of the promoter group of the Sant Gervasi superblock in the interviewees conducted stress that superblocks *"encourage people to visit neighbourhood´s park and public spaces, walk on the streets and shopping in traditional local markets and small shops, which contribute to maintain public spaces safe and well maintained"*

[14] As stated by an interviewed superblock promoter: *"Normalmente las supermanzanas han surgido, en la mayoría de los casos, de una voluntad popular de que, de que se cambiase las condiciones ambientales de la zona en concreto. En Sant Antoni, había una gran demanda de regenerar Sant Antoni, un barrio que prácticamente no tiene espacios verdes. Cuando se habla de Horta, también había un interés por eh…, consolidar la humanización de su propio casco antiguo. En Sants también había unas demandas sociales" (*translation in English: *"Normally superblocks have emerged, in most cases, from a popular will to change the environmental conditions of the area in particular. In Sant Antoni, there was a great demand to regenerate Sant Antoni, a neighborhood that has practically no green spaces. When talking about Horta, there was also an interest for uh ... consolidating the humanization of your own old town. In Sants there were also some social demands"*).

mobility patterns in neighbourhoods and restricting private car use inside them:[15] a new urban paradigm claimed by the pioneers and promoters of the project and supported by an increasing number of citizens summarized in: "regaining the street" by reducing the space occupied by private vehicles, substituting individual motorised transportation by more sustainable modes of transport and increasing the city's biodiversity, by establishing more green areas and corridors.

The first Superblock was established in 1993 in Ciutat Vella (Born) and then in 2003, in Vila de Gràcia (Mobility Plan for "Vila de Gràcia", which served later as pilot for the city council, as well as previous well-known experiences in the city planning happening in the last two centuries in Barcelona, which inspired the pioneers of the superblocks model,[16] such as the "Cerdà Plan-1859" and, more recently, the urban transformation implemented in the historical borough "El Born" and enlarged to El Raval, El Gotic and La Barceloneta.

Later, the superblock pilot program started to be implemented in five different neighbourhoods of Barcelona: Les Corts, Plaça de les Glories, Sant Martí, Eixample and Hostafrancs. The Les Corts superblock is the one where the implementation has proceeded the furthest. Within this area the first smart crossroad (using sensor systems for traffic lights regulation) has been installed since 2014 and several interventions concerning the usage of public spaces have been undertaken, e.g. a provisional parking space has been turned into a temporary green zone.

Later on, has been formulated the theoretical development of a superblock model that distributes the city in 503 blocks, which increases the environmental quality as well as encourage non-motorized modes of mobility.[17] After the local elections in 2015, the new local government published the text of the program, in May 2016, "Let's fill streets with life. The establishment of the Superblock Model in Barcelona"[18] and Superblocks implementations start in Poblenou (2016) and Sant Antoni (2017).[19]

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[15] Barcelona (2016). Government measure: Let's fill streets with life. Establishing Superblocks in Barcelona. Commission for Ecology, Urban Planning and Mobility, Council of Barcelona – the Barcelona City Council aims to promote "new ways of organising the city which reverses the current distribution of public areas between vehicles and people, giving priority to city residents and aiming to improve the city's environmental conditions and quality of life".

[16] Donada, J.T., & Riu, A. S. (2018). La ciudad como ecosistema. Entrevista a Salvador Rueda. Biblio3W, 23(1.233).

[17] Rueda S. (2016), La Supermanzana, nueva celula urbana para la construccion de unnuevo modelo funcional y urbanistico de Barcelona. www.bcnecologia.net. Rueda's 'Ecosystemic Urbanism' strategy (2016) has been adopted by the municipality of Barcelona as basis to implement the first Superblock program at the city scale "ProgramaSuperilles 2012-2015" (*The Superblock Programme for 2012–2015*), stablishing the guidelines to start out 5 pilot Superblocksin the city (La Maternitati Sant Ramón, in Les Corts; Sants-Hostrafrancs, in Sants-Montjuïc; Plaça de les Glories and Diagonal-Poblenou, in Sant Martí, and Esquerra de l'Eixample, in Eixample).

[18] One of the promoters of the superblock programme explained its origin, six years ago, as follows: *"Esto comenzó hace seis años. Fue cuando se tomó la decisión a nivel político de hacer una mesura de govern, una medida de gobierno. Barcelona necesitaba hacer un cambio, es lo que explicamos siempre en nuestro discurso, para cambiar el modelo medioambiental y de sostenibilidad de la ciudad. Había habido unas propuestas teóricas de Salvador Rueda, de la Agencia de Ecología Urbana, que también es una entidad participada por el ayuntamiento de Barcelona… ya hacía bastante tiempo. De hecho, en la muestra que se hizo en el Fórum de las Culturas que se hizo aquí en Barcelona en el 2002 o 2004, ya se expuso la teoría de organizar la ciudad en piezas como más grandes, con una malla de calles peatonales…, esto quedó en teoría y en la legislatura pasada se consideró oportuno volver a mirar este modelo y empezar a verlo desde la visión de la aplicación ¿No?, de pasar de la teoría a la práctica. Por eso le llamamos un programa, más que plan, porque tiene un componente ejecutivo. También he de decir que paralelamente se elaboró el plan de movilidad urbana del 2015-2019 que ahora ya se está revisando. En el plan de movilidad ya se recogía también este tema de organizar la ciudad en bloques, en piezas más grandes y en una cierta clasificación de las vías de,*

The beneficiaries of this social innovation were and are the inhabitants living inside the superblocks as well as other citizens which visit the area and find a quiet place,[20] or where they can move by biking.

Superblock in Barcelona © Isabel Lema Blanco

The Superblocks Programme[21] defined three types of territorial areas: (1) Cerdà Area, which covers all the Eixample district, part of Sant Martí and the Camp del Grassot neighbourhood in Gràcia; (2) areas already started under the previous Superblock Programme for 2012–2015, which would be the areas from La Maternitat Sant Ramon in Les Corts, and Sants-Hostafranchs, in Sants:

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dependiendo de su capacidad de asumir tránsito rodado. Superillas iba a desarrollar la parte más del peatón que ya el propio plan de movilidad urbana también defendía" (translation in English: *"This started six years ago. It was when the decision was made at the political level to make a measure of government, a measure of government. Barcelona classification of the routes of, depending on its ability to assume road traffic was also included. Superillas was going to develop needed to make a change, it is what we always explain in our speech, to change the environmental and sustainability model of the city. There had been some theoretical proposals from Salvador Rueda, from the Urban Ecology Agency, which is also an entity participated by the city council of Barcelona ... it had been for quite some time. In fact, in the exhibition that was held at the Forum of Cultures that was held here in Barcelona in 2002 or 2004, the theory of organizing the city in pieces as larger, with a mesh of pedestrian streets ... this was in theory and in the last legislature it was considered opportune to return to look at this model and to begin to see it from the vision of the application No, of passing from theory to practice. That's why we call it a program, rather than a plan, because it has an executive component. I must also say that at the same time the urban mobility plan for 2015-2019 was drawn up and is now being revised. In the mobility plan, this topic of organizing the city in blocks, in larger pieces and in a certain the most part of the pedestrian that the urban mobility plan itself also defended"*).

[19] Ajuntament de Barcelona (2016) – LET'S FILL STREETS WITH LIFE – Establishing Superblocks in Barcelona (PPT); Ajuntament de Barcelona – Government measure – LET'S FILL STREETS WITH LIFE – Establishing Superblocks in Barcelona, Commission for Ecology, Urban Planning and Mobility, May 2016.

[20] In which: *"Their children can play safety, they can walk in the streets without traffic noise"*, as one member of the Poblenou citizens´ association ensures. Other interviewee points to benefits in terms of health so as *"people with asthma can better handle their health issues in the Superblocks thanks to the decrease of air pollution in comparison to other areas of the city"*.

[21] Barcelona (2016). Government measure: Let's fill streets with life. Establishing Superblocks in Barcelona. Commission for Ecology, Urban Planning and Mobility, Council of Barcelona.

(3) new superblocks to be implemented in period 2016-2019 (part of the Sant Gervasi neighbourhood, in Sarrià–Sant Gervasi; the old quarter of Horta, in Horta Guinardó; the La Prosperitat neighbourhood in Nou Barris and the Sant Andreu neighbourhood in Sant Andreu).

The project (well advanced in Sant Antoni and Poblenou is still ongoing not only there (e.g., in Sant Antoni, in May 2018, the crossing between the streets of Comte Borrell and Tamarit has become a pacified square with spaces for leisure, meeting and more green and since August 12th 2018, the tent on Urgell Street has been dismantled, between Tamarit and Floridablanca, where the Sunday market was located).
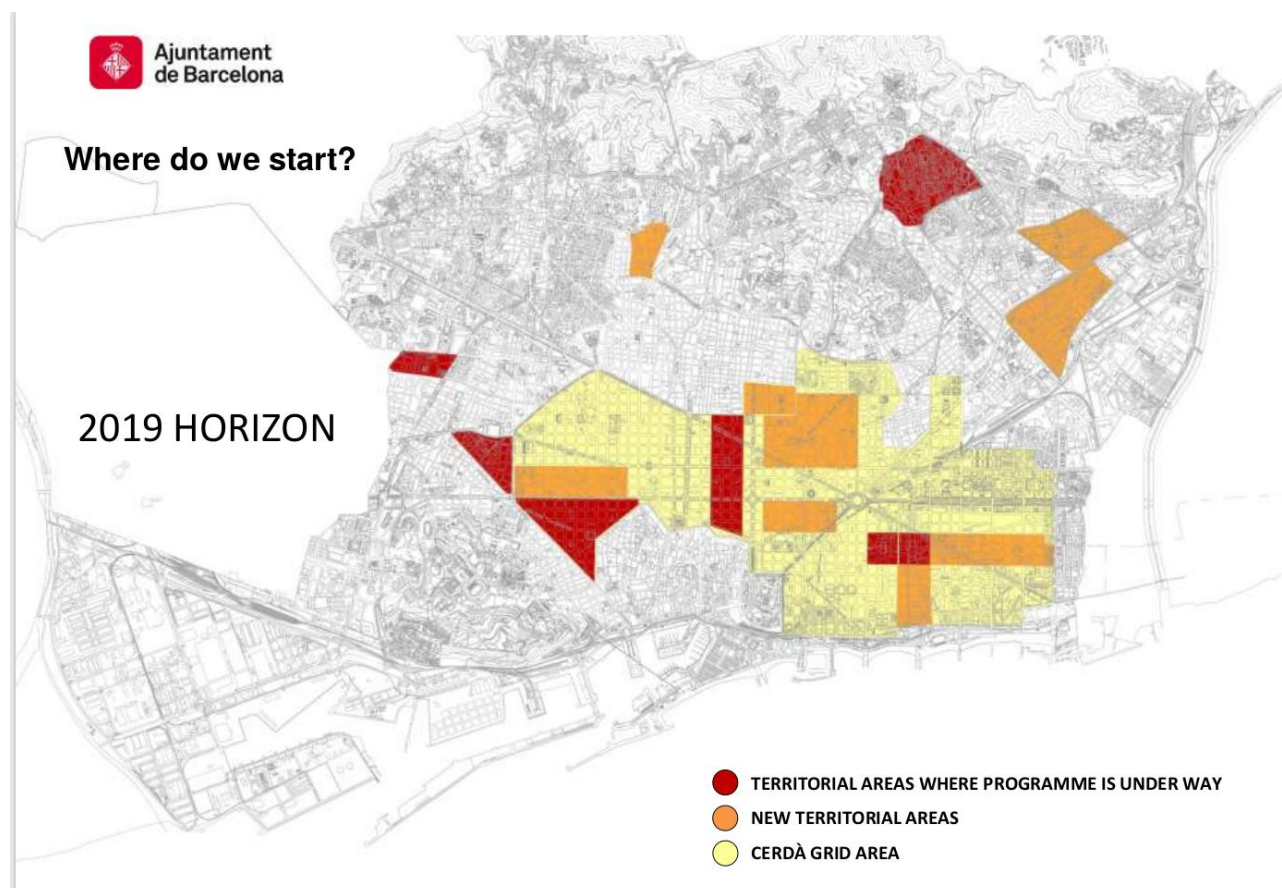
Superblocks in Barcelona - Source : Área de Ecología Urbana, Ayuntamiento de Barcelona

The Superblock Programme is (therefore) not closed and intends for promoting the continuous development of its goals throughout the territory (e.g., part of the Sant Gervasi neighbourhood, in Sarrià – Sant Gervasi; the old quarter of Horta, in Horta Guinardó; the La Prosperitat neighbourhood in Nou Barris and the Sant Andreu neighbourhood in Sant Andreu). The current PMU foresees that the Barcelona of the future, with an undetermined date, will be ordered, as already stated, in a total of 503 superblocks of different dimensions, which would release 70% of public space and free of traffic an area equivalent to 700 football fields and will decrease about 13% the use of car.

In 2019, five superblocks will be fully or partially implemented in Barcelona (source: El Periódico, 2018[22]). In this way, the programme establishes sufficiently flexible functional criteria that can be

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[22] https://www.elperiodico.com/es/barcelona/20181004/balance-dos-anos-superilla-poblenou-7069749

adapted to the characteristics of each city district, while also ensuring the uses and functions foreseen for all types of the streets.

At the end of the project an evaluation process should be started, considering indicators designed to measure the impacts of the actions taken in the course of the project.

The cost of the superblock project in Sant Antoni is 7 million Euros. The budget of "Let's fill streets with life. The establishment of the Superblock Model in Barcelona" is 11 million Euros. One estimate is that with less than 100 million Euros all superblocks planned can be deployed.

3. Stakeholders analysis

Involved actors and negotiation processes

The superblock project is being implemented by the Municipality of Barcelona (it has gained the support of different political parties in both government and opposition[23]). It integrates and coordinates several city council departments.[24] The principal sectors involved are the mobility and urban design departments of the local administration together with the local transport system and the superblock program was formulated in parallel with the elaboration of the Urban Mobility Plan (2013-2018), in order to present a comprehensive view of the city and urban and environmental policies. The local government formed a technical secretariat in charge of the Superblock programme that provides professional support. Also, this technical secretariat counts on the assistance of different consultancies that provide support in the definition of the different measures to be implemented in each superblock as well as assistance to the development of the participatory and communication process to be developed in each superblock area.

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[23] The mobility plan and the pilot programme of superblocks was launched by the conservative party "Convergència i Unió" under the leadership of Xavier Trias but after 2015 local election, the new left party "Barcelona en Comú" is running the city in coalition with some others left parties. Mayor Ada Colau has endorsed the superblock program giving continuity to the idea presented by Salvador Rueda while other parties like Partido Popular manifest a position against superblocks, who promises to reduce the number of bike lines and defends the priority of private car use. However, during the last four years the position of some politics has changed overtime depending on the level of controversy in each superblock (La Vanguardia, 2019; EuropaPress, 2019).

[24] According to a Barcelona superblock promoter *"Los departamentos más de planificación están muy a favor (de las supermanzanas) y apoyan mucho. Los departamentos del día a día, de la gestión del día a día, del mantenimiento. Bueno estos les cuesta muchísimo más. Tú piensa que una calle de las que hacemos peatonales tiene mucha más presencia por ejemplo de, de parterres verdes. Eso significa que necesitas muchos más jardineros para mantenerlo. Eh…, eso significa que si en tu planificación no lo has tenido en cuenta y has pensado que las calles solo tienen árboles, pues habrás de hacer un cambio y has de planificar gente que te cuide estos parterres. Bueno, esos son recursos también eh, económicos. Esto por ponerte el ejemplo de los parterres (…) Has de demonstrar siempre que…, lo nuevo se puede hacer de esta manera, convencer a gente, ayudar mucho eh, a los departamentos a que…, o sea, darles el problema y darles la solución, no solo el problema"* (translation in English: *"The more planning departments are very supportive (of the superblocks) and support a lot. The departments of the day to day, of the day-to-day management, of the maintenance. Well these costs a lot more. You think that a street of which we make pedestrian has much more presence, for example, of green parterres. That means you need many more gardeners to maintain it. Eh …, that means that if in your planning you have not taken it into account and you have thought that the streets only have trees, then you have to make a change and you have to plan people to take care of these beds. Well, those are also eh, economic resources. This to give you the example of the flowerbeds (...) You have to always show that ..., the new can be done in this way, convince people, help a lot eh, the departments to ..., that is, give them the problem and give them the solution, not just the problem"*).

A key support on the superblock programme is from the Urban Ecology Agency, a public consortium consisting of the City Council of Barcelona, the Municipal Council and Metropolitan Area of Barcelona and the Barcelona Provincial Council. Its multidisciplinary team has been commissioned to make the diagnosis of each neighbourhood in which superblocks are to be implemented and suggest the technical alternative and solutions to increase the neighbourhood´s sustainability.

A second-level local administration involved in the programme is the level of different district administrations in which Barcelona territory is organized. Every district counts on an administrative office, a specific budget approved at this level as well as a district council in which political parties and neighbourhood social actors and groups of interest are organized. The districts usually play a counselling role and some of their members can form part of the superblock working group that defines the action plan, providing expertise and knowledge on the needs of each borough.

Moreover, there are some other institutional actors like the Catalan government, and the *Metropolitan Area of Barcelona* and the *Metropolitan Transport Authority* that are involved in the formulation of the superblocks programme at the city level (however, several residents in Poblenou and Sant Gervasi interviewed in this study manifested that, so far, the regional transport system, which integrates regional train infrastructures and one metro line under construction, does not seem to be acting towards the improvement of the sustainable mobility plan in an efficient and integrated way).[25]

Other involved actors are: District organisations, non-governmental organisations and associations signing (see § 1.) the 'Citizen Commitment to Sustainability 2012-2022' (e.g., several citizens´ initiatives and third-sector entities, such as Biciclot SCCL or the NGO TaulaEix Pere IV that have supported the superblock model in Poblenou and joined in the working group[26] for the evaluation of the implementation of the superblock), universities and other expert institutions, private companies, and inhabitants of city blocks.[27]

About the latter, in most of the superblocks so far a series of neighbourhood stakeholders, residents' associations, specific groups of interests (e.g., supermarkets, retail sector, etc.) and

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[25] This has been discussed in a recent participatory session in Sant Gervasi where the representatives of the neighbourhood residents asked the promoters to rise this claim to the city council and the existing supramunicipal working groups. The UDC researcher attended this session as non-participant observed. As example, respondents complain of the lack of well-planned infrastructure network that permits sustainable mobility for people living in peripheral towns and cities and working in Barcelona as well as the combination of different modes of transportation for commuters. A representative of the *Barcelona Bike Hub* states that "the metropolitan train is always late, one of our associates travels from a city nearby to Barcelona and he never get to work on time because of the train".

[26] Such Monitoring Commission is formed by the Col·lectiu Superilla Poblenou, Plataforma d'Afectats per la Superilla, Associacions de veïns i veïnes, 22@ Network, Taula Eix Pere IV, Universitats, Escoles, Forum District, Eix commercial, Sindicats. Source:

http://ajuntament.barcelona.cat/superilles/sites/default/files/original%20fullet%20superilles%20final2.pdf

[27] The council of Barcelona states that an "open and inclusive participation process" will be promoted for the design of each superblock, encouraging the involvement of associations and local actors, stakeholders as well as people on an individual level, "facilitating the involvement in decision making of various groups involved in each of the territories: the elderly; children and youth; retailers". However, in each superblock the level of community engagement has different and even confronting positions, and critical voices have manifested their discontent with the development of the participatory processes.

members of the political parties have been invited to form the working group promoting the superblock in the different districts.[28] They are considered to be expert voices that provide a well-informed vision about the needs, problems and demands of the people living in the area of the superblocks and with interest in participating in the co-design of the Action Plan and interventions responding to actual needs.

Opponents are grouped in the *Plataforma d'Afectats of the Superilla de Poblenou-PASP9* and, according to Jordi Campins,[29] president of the PASP9, other platforms have been also created in different neighbourhoods affected by the programme (e.g., Grassot, sant Andreu). PASP9 was created by more than a hundred neighbours of Poblenou "to defend their rights and the dignity of the neighbourhood" (as stated on their webpage), including residents, workers (employees or self-employed) and business sectors. This platform has been very active in Poblenou, launching a "manifesto" in which they complain that the implementation of this superblocks suffered from several issues, such as "deficiencies of democratic procedure; incoherence between the motivations of the measure and its effects; as well as problems of connection between the neighbourhood with the rest of the city and the metropolitan area of Barcelona".[30]

The process of stakeholder participation is intended to ensure that all the solutions are implemented according to the needs of inhabitants, through a negotiation process. Each superblock project is being implemented with collaboration of local residents, different organisations and the city council. Meetings are held at different project levels, and interested citizens can participate directly in the vision creating process and decision-makings or contribute by taking specific actions. The same procedure of involving citizens in the implementation process is followed for each superblock, but the outcomes are different as each neighbourhood has its own distinctiveness (e.g., dynamic economic activity, higher density, less educated inhabitants, etc.). In particular, decision groups consisting of different stakeholder representatives were set up in each superblock. Moreover, many workshops have been organised in each district.[31] The entire

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[28] E.g. it has been observed (by UdC researchers) that the promoter group in Sant Antoni engaged representatives of the neighbourhood residents' associations, the neighbourhood retail association and the director of a supermarket affected by the superblock, representatives from several schools and educative institutions located in the area as well as parent´s associations among others.

[29] Source: https://www.metropoliabierta.com/quien-hace-barcelona/entidades/entrevista-superilla-poblenou-matrix_660_102.html

[30] Source: https://pasp9.wordpress.com/qui-som/

[31] According to an interviewed superblock promoter: *"A nivel ciudad no se ha planteado un debate sobre el tema. Se ha ido desde abajo, desde los pequeños ámbitos de la ciudad que estamos estudiando para al final acabar de consolidar un discurso general que era muy técnico (…) Evidentemente nosotros cuando hacemos este estudio más pormenorizado y ponemos el foco en estos ámbitos más pequeños, tenemos la imagen total de Barcelona y tenemos el plan total de hacia dónde queremos ir con toda Barcelona para que vayan sumando. Pero las entidades que han participado, han sido mucho más locales que generales. El plan de movilidad ya tiene rango de plan, como el tema del plan del espacio verde. Esto sí que son planes con rango superior y en estos se ha participado a nivel ciudad. Como nosotros lo que hacemos es desarrollarlo, no teníamos la obligación legal de participarlo a nivel ciudad y en cambio hemos ido a una participación mucho más del vecino y de la calle. Mucho más directa" (*translation in English: *"At the city level, there has not been a debate on the subject. It has gone from below, from the small areas of the city we are studying to in the end to consolidate a general discourse that was very technical (...) Obviously when we make this study more detailed and we focus on these smaller areas, we have the total image of Barcelona and we have the total plan of where we want to go with all of Barcelona so that they can add up. But the entities that have participated have been much more local than general. The mobility plan already has a plan range, such as the theme of the green space plan. These are plans with higher rank and they have participated at the city level. Because what we do is to develop it,*

process can be formalised in the following steps: 1. Definition and analysis of the area; 2. Internal work by the Technical Secretariat; 3. Technical work with the district; 4. Work with the Promotional Group; 5. Participation of specific groups; 6. Participation of local residents; 7. Approval of Action Plan; 8. Drafting projects with suitable protocol and participation according to type of initiative; 9. Implementing the initiatives.

In Poblenou, where many problems with citizens have been met (see §6), the Technical Secretariat has become a facilitator of the participatory process, which presents the draft technical proposal for the superblock but encouraging the different voices of the neighbourhood to have a voice and engage in co-designing the Action Plan to be implemented in the superblock. The promoters ensure that although a general structure has been established, *"the process is adapted to the reality of each territory, to the work carried out up to now, to the demands of its social fabric and at the pace they which to go at"*. More generally considering also critical issues that emerged (see § 6), the negotiation process in Superblocks met (and meet) some problems.

Nevertheless, according to the promoters interviewed in this study, most of the superblocks launched in Barcelona are featured by high level citizen's participatory processes in decision-making. The following has been highlighted.

- High levels of consensus: citizens, urban planners, public servants and policy-makers taking decisions together lead to higher level of consensus, while in the Poblenou pilot experience, conflict and resistance arise due to the lack of information and participation (as explained in the previous section).
- Openness and inclusion: participation is being promoted by the city council, which encourages the involvement of associations, stakeholders and people on an individual level.
- Monitoring and accountability: A multistakeholder promoter group is set up in each territory, constituted by the neighbourhood's political representatives and associations. This promoter group will be engaged in the co-design of the measures and plays an intermediary role between the city council technical group and the residents, monitoring the superblock program in its various stages.

Local actors and members of the neighbourhood associations, interviewed manifest their interest in improving the neighbourhood quality of life, establishing a link between environmental conditions and perceived well-being. Quality of life is also associated to have access to peaceful spaces where to walk around and spare free time, purchase in small shops around their homes and establish social relations within citizens, which eventually enhance social cohesion within the neighbourhood.

Respondents outline that citizen support has increased over the time.[32] Building trust, gaining people's confidence and engaging citizens in deliberative processes which involves the actors' commitment over time requires almost one year working in small groups – combined with forums

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we did not have the legal obligation to participate at the city level and instead we have gone to a much more participation of the neighbour and the street. Much more direct ")

[32] According to a member of a neighbourhood association in Poblenou interviewed: *"when they (citizens) are able to experience the direct benefits of the intervention, in specific calm, reduction n traffic noise and the capability to use public space for leisure and interaction"*.

opened to the entire neighbourhood. These deliberative processes serve for discussing the different existing alternatives; evaluate consequences of the changes in real life and gaining consensus among the participants.[33] Participants, local actors, policy-makers and stakeholders become co-responsible of the outcomes of the process and present together as a working group the Action Plan to the citizenship and receive citizen's feedback. Some local actors interviewed highlight the methods and tools for facilitating discussions (e.g., world café) as well as the quality of the information and contrasted data provided, that facilitate the decision making process. Also, strategies to create egalitarian environments and establish confidence among participants have been stressed.[34]

Several citizen platforms supporting superblocks have been created in different neighbourhoods. The pioneer is the *Col·lectiu Superilla Poblenou* (https://superillap9.wordpress.com) but similar associations have been created in Camp d´en Grassot (https://superillagrassot.wordpress.com) and Sant Antoni (@SuperillaStAnt). Such associations have argued in favour of superblocks as measures for reducing private vehicle circulation in the *neighbourhoods*

Citizen empowerment is one of the two major lines of work of "Let's fill streets with life. The establishment of the Superblock Model in Barcelona".

Presently, participatory processes for the co-design of new superblocks have started in the following districts: Sarrià – Sant Gervasi; the old quarter of Horta, in Horta Guinardó; La Prosperitat neighbourhood, in Nou Barris; Sant Andreu neighbourhood in Sant Andreu; Eixamble-Consell de Cent-Germanetes; and Eixamble-Girona.

Partnership

Multistakeholders decision-making processes have been formalized in several neighbourhoods, constituting formal and regular working groups for the design of the ongoing superblocks. Such working groups, so-called "promotional groups", engage a district's local residents, associations and specific groups that deliberate together, analyse and define the new superblock, gaining agreement between different voices and interests of the inhabitants, economic sector, education institutions and other sectors of the population living and working in the area.

Moreover, since 1998 the Barcelona City Council together with 30 organisations formalised and adopted the "Barcelona Mobility Pact[35] (in the context presented in §1) to boost initiatives and

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[33] "If a wide consensus has not been gained in the neighbourhood, the action plan will not be approved" ensures one of the promoters.

[34] According to a Barcelona superblock promoter: *"Una de las cosas fundamentales es que empezamos haciendo presentaciones subidos en un estrado y con un auditorio y hemos visto que lo imprescindible es que bajemos del estrado, que pongamos las sillas en círculo y que estemos todos en la misma altura a la hora de hablar. Te parecerá que te digo una tontería pero ha sido fundamental en que el diálogo fuera mucho mejor"* (translation in English: "*One of the fundamental things is that we started making presentations on a stand and with an audience and we saw that the essential thing is that we get off the stand, that we put the chairs in a circle and that we are all at the same height when talking. It will seem like I'm telling you something foolish but it has been fundamental in making the dialogue much better*").

[35] The Mobility Pact has the following goals: 1) To reduce atmospheric and noise pollution, as well as the effects of mobility on the climate; 2) To encourage a change to quieter, safer and more sustainable means of transport; 3) To increase and regenerate public spaces intended for pedestrians, urban quality and accessibility; 4) To integrate the use of bicycles into the city; 5) To achieve an efficient, accessible, public transport system that is integrated on a

reaching consensus on improving the sustainable and safety mobility. Around 100 of mobility-linked associations, companies, institutions and public bodies have signed the Mobility Pact.[36]

Leadership

The City of Barcelona had always (and has still today) the leadership of this project. Moreover, under the charismatic leadership of Salvador Rueda, the Urban Ecology Agency (Agencia de Ecologia Urbana de Barcelona) has a key role in the Superblocks programme.

Strategies for gaining social support

As stated above, neighbourhood stakeholders, local actors and citizens are involved in the deliberative process launched by the City Council for the co-design and definition of the Action Plan to be implemented in each superblock. A process of negotiation is launched in each district to gain social support at the neighbourhood level, and the Action Plan should be also approved by the "Conseill de Barri" (the district political body) before being implemented.

Support is gained when citizens comprehend the features of each territory and the systemic interactions and relationships between certain patterns of behaviour and the consequences – based on scientific evidence – on their health, quality of life, life expectancy, etc. Promoters talk about "doing pedagogy" when they refer to the need of informing and stimulating people's curiosity.[37]

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metropolitan scale; 6) To improve road safety and harmony between users of the various means of transport; 7) To improve the efficiency of logistics and the urban distribution of goods; 8) To promote the use of renewable energies and reduce vehicle energy consumption; 9) To manage the provision of parking places for all means of transport on an integrated basis; 10) To incorporate new technologies into mobility management: training, information and signage.

[36] The "Barcelona Mobility Pact" is the body through which public and private institutions deliberate and formulate solutions to enhance sustainable mobility in the city (e.g. the elaboration of the Urban Mobility Plan). the Pact gathers together the different departments of the City Council and public institutions such as the Agència Salut Pública de Barcelona and the Barcelona Metropolitan Area, transport entities (e.g. Transports Metropolitans de Barcelona) and a number of associationsrelated to mobility (e.g. Associació per a la Promoció del Transport Públic, STOP Accidents, Sindicat del Taxi de Catalunya, FederacióCatalana de Transports de Barcelona, VanAPEDAL). According to the City of Barcelona Website "The Barcelona's Mobility Pact is a space of participation and dialogue made up of city associations and entities and local and supra-municipal administrations and institutions, which acts as a participatory forum and space for consensus around Barcelona's mobility model and for good quality public space and a healthy city. The common aim that brings these organisations together is to progress towards sustainable and safe mobility, with the commitment and joint responsibility of everyone". See: https://www.barcelona.cat/mobilitat/en/about-us/participatory-bodies/mobility-pact. One interviewee mentioned that the Pact have facilitates their participation in several working groups (e.g. Bicycle Working Group) that engaged city associations, such as the social economy entities forming the Barcelona Bike Hub or the NGO "Amics de la Bici" (a non-profit associations of volunteers which defend the bike as a mode of transportation), the Association for the Promotion of Public Transport, the RACC Foundation as well as different trade unions, private transport associations and other for-profit and non-profit actors.

[37] According to a Barcelona superblock promoter interviewed:*"Nosotros hemos hablado siempre de la salud. De lo que repercutía en la salud la mala gestión de la ciudad. Y la mala gestión del espacio, con una serie de indicadores negativos que hemos podido enseñar y demostrar: contaminación acústica, contaminación atmosférica, nivel de sedentarismo, nivel de accidentes. O sea, todos los indicadores que eran negativos y como podíamos incidir en cambiarlos, lo que quería decir incidir en la salud de las personas, en la vida de las personas. Esto es lo que ha hecho también a hacer un cambio de chip. Cuando hacíamos el discurso al principio más técnico, más teórico, la mitad de la gente no lo entendía, la otra mitad se aburría. Y la tercera parte eh…, lo veía como algo subversivo (risas) y, y aparecía esto, el miedo ¿No?, y, y el quererse proteger. Ha sido laborioso en cada sitio"* (translation in English: "*We have always talked about health. The bad management of the city had repercussions on health. And the bad management of space,*

Promoters and local actors have drawn some lessons from success and mistakes occurring in the last 6 years (e.g., in Poblenou – see § 6. and the box below), including best practices for engaging people in deliberative processes, information and communication strategies and channels, as well as the use of ICT technologies (e.g., GIS maps) for illustrating the main changes proposed in the project at the neighbourhood level. Transparency is supported by publishing the minutes of the deliberative processes and public meetings on the municipality website. Therefore, building trust and maintaining a coherent discourse and practice, accomplish objectives and time-lines while being flexible and open to people's proposals and suggestions are stressed as key elements for conducting successful participatory processes.

Search of consensus after resistances in Poblenou

The pilot experience of Poblenou which generated large contestation from residents (see §6) forced the City Council to search points of consensus in order to reduce conflict and resistance. In doing so, the Technical Secretariat of the Superblocks Programme: (i) **Improved communication and public participation**, for example, explaining better the changes implemented in the superblocks and the expected benefits of this intervention. Janet Sanz, City Councillor, admitted that the city council "could have improved the communication and participation" while "listening to the neighbourhood has been the main learning of this project" (El Periódico, 2016[38]). Thus, the City Council organized four different workshops with city technicians responsible for the project and politicians in order to discuss different issues related to mobility, energy in which residents could express their concerns to the local managers. (ii) **Improved participatory process** and **create new channels of communication with citizens.** The City Council has recognized that participatory process was not well delivered in superblock Poblenou, so they tried to solve the main problems adapting the temporary intervention to a permanent objective. They did so by a participatory process through which residents and local actors were invited to formulate improvements in the design of the superblock. (iii) The city council and representatives of the neighbourhood (including both pro and against platforms) enter into a **negotiation process** and some changes were implemented, including permitting public transport and private cars to enter across the superblock. Also, neighbourhood associations are part of the permanent commission for the evaluation of the superblock Poblenou and all the information about the process is published on the city council Website.

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4. Milestones

- 1992: Participation of Vitoria-Gasteiz representatives in the UN Rio de Janeiro Earth Summit (adoption of the Agenda 21).
- 1993: Superblock antecedent established in Ciutat Vella.
- 2002: collective document ´Citizen Commitment to Sustainability´ signed by more than 800 organisations.
- 2003: First superblock established in Vila de Gràcia.
- 2010: Vila de Gràcia recognized as a sustainable best practice by the UN-Habitat.
- 2012: ´Citizen Commitment to Sustainability´ recise for the period 2012-2022.

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with a series of negative indicators that we have been able to show and demonstrate: noise pollution, air pollution, level of sedentarism, level of accidents. That is, all the indicators that were negative and how we could influence them, which meant influencing the health of people, in people's lives. This is what he has also done to make a chip change. When we made the speech at the most technical, most theoretical, half of the people did not understand it, the other half got bored. And the third part eh ..., I saw it as something subversive (laughs) and, and this appeared, fear, right? And, and wanting to protect. It has been laborious in every place").

[38] Source: https://www.elperiodico.com/es/barcelona/20161004/vecinos-lamentan-precipitacion-superamanzana-poblenou-5454245

- 2013: Urban Mobility Plan of Barcelona 2013-2018.
- 2014: Superblock pilot program implementation start in five different neighbourhoods: Les Corts, Plaça de les Glories, Sant Martí, Eixample and Hostafrancs. Meetings with citizens and other stakeholders held in these neighbourhoods (decision groups, workshops, etc.).
- 2015: Change in local government after local elections. Ada Colau, the new mayor of the city, endorses the superblock model.
- May 2016: Launch of "Let's fill streets with life. The establishment of the Superblock Model in Barcelona".
- September 2016: Pilot superblock is implemented in Poblenou with high levels of contestation and social protest. Two platforms were created by citizens supporting and criticizing the initiative.
- 2017: A new participatory process is launched in Sant Antoni[39] with local citizens' associations involved in the co-designing process of the superblock. Interventions in infrastructure started with satisfaction from promoters and neighbours.
- June 2018: The superblock of Poblenou receives a special mention of the European Prize for Urban Public Space 2018.
- October 2018: Barcelona presents the results of the evaluation of the Superblock in Poblenou, demonstrating positive impact in terms of the increase of green areas, reducing air pollution and increase of economic activity in the area.
- 2018-2019: In 2019, five superblocks will be fully or partially implemented in BCN.

5. Effects

Main environmental, economic and quality of life effects

The superblocks project provides many benefits in terms of sustainability ranging from sustainable urban mobility through an increase of public spaces, social inclusion and biodiversity to the optimization and intelligent management of the use of resources, etc. The Urban Ecology Agency has already developed a whole set of indicators to measure outcomes, however an evaluation of results is not expected before the end of the project (2019). Despite this, the program will certainly significantly reduce energy consumption, environmental impacts of vehicles (also their noise pollution) and hence reduce GHG emissions in the area. Moreover the creation of new common leisure spaces seems to improve commercial activities.

According to the City Council (2018[40]), the main impacts the Superblocks programme has on citizens of the city are: "Empowering people, particularly children and the elderly, given the fear that traffic generates; Fostering intergenerational relationships through public areas where people can meet and carry out leisure activities; Strengthening people's emotional bonds with their environment while participating in decision making; increasing public safety by increasing vitality in the streets; making more space available for physical exercise; and so on."

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[39] http://ajuntament.barcelona.cat/superilles/ca/superilla/sant-antoni
[40] https://www.c40.org/case_studies/barcelona-superblocks

Moreover, It has been stated that removing cars from streets often boosts property values in neighbourhoods.[41]

The Council conducted in 2018[42] an internal evaluation in Poblenou, in the period 2016-2018 that measures the outcomes of the intervention as follows.

- Habitability. The sidewalks have been widened and new living spaces have been incorporated in which new activities can be organized. In total, 25,129 m^2 of new public space without cars have been gained, reaching a total of 56,665 m^2. In addition, 349 new seats (benches and chairs) have been installed, and 2,483 m^2 of playgrounds for children, concentrated in three large spaces of coexistence games, with traditional games and an athletics track painted on the floor.
- Mobility. Drastic reduction of the vehicles that daily access the pacified streets of the Superblock which have gone from 2,218 to 932 vehicles / day. The area destined for pedestrians has also been increased by 80% and the number occupied by cars has been reduced by 48%. At the cyclist level, 1,026 new cycle linear meters have been gained. In the field of motor vehicle parking, during this period of implementation there has been a reduction in unregulated free spaces, which have gone from 401 to 74. The green area squares of priority for neighbours have increased (from 104 to 147) and the blue area for visitors (from 9 to 24). The loading and unloading squares have also increased (from 44 to 46), a new taxi stop has been created, and the entire population still has access to the public transport network (less than 300 meters).
- Green spaces and biodiversity. The green area has increased 91%, which has increased from 9,722 m^2 to 18,632 m^2. 176 additional units of large trees have been placed in the area, from 500 to 676. Of these, 64 have been planted in the ground while 112 are in pots placed on public roads. Thus, the percentage of trees allocated to the streets has increased by almost 90% in the whole area.
- Economic activity. The number of economic activities at the ground floor of the buildings has gone from 65 to 85, which represents an increase of 30.7%, which contributes to the revitalization of the area.
- Public housing: a public housing building of the Municipal Housing Trust, located in the central area of the superblock, is under construction.
- Cultural activities and prizes. During the last year, the superblock has hosted many cultural activities, the Vila Casa Foundation has given three sculptures. In 2018, the Poblenou Superblock won a mention of the European Prize for Urban Public Space 2018, awarded by the Centre for Contemporary Culture of Barcelona.

Several residents in Superblock Poblenou have described the main impact of superblocks in terms of social interaction as well as in improvement of environmental conditions.

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[41] According to the director of the "*Barcelona office for consultancy*", "*We have seen in the past that when streets are pedestrianised, more retailers want to take on leases. Real estate becomes a more interesting activity, while superblocks lead to a more sustainable, greener environment with greater productivity within these communities*" (cited in *Redesigning the Grid: Barcelona's Experiment with Superblocks: https://urbanland.uli.org/planning-design/barcelonas-experiment-superblocks/#*

[42] https://ajuntament.barcelona.cat/santmarti/ca/noticia/amb-la-superilla-el-poblenou-ha-guanyat-mes-de-25-000-metres-quadrats-despai-per-al-ciutada_714967

The promoters report a positive impact of the interventions already implemented in the ongoing superblock in Sant Antoni such as the reduction of noise, the improvement of the living conditions in the areas as well as the number of green areas created. Residents interviewed also refer to the improvement in environmental conditions, although they realize that interventions in just one superblock are not enough to reduce air pollution and more actions are needed at the city level. However, they perceive reductions of traffic noise levels.

New ways of behaving/doing

In terms of the new behaviours that superblocks encourage or facilitate, most of the interviewees refer to changes in modes of transportation, but also facilitate changes in the use of public space. Changes in mobility patterns and decrease in the use of the private vehicle (some estimations talk about a decrease of 8.1% in car use from 2004 to 2015) have been reported, due to measures already implemented in recent years: Bike lanes, 30 km/h zones, pedestrian zones, new bus network, extension of the metro network. Based on previous experience in the Gràcia neighbourhood (where cars were eliminated in 2006), the city council estimate that cycling trips increase by 30 percent and car driving decrease by 26 percent when superblocks are implemented.[43] However, according to several participants in this study, the car continues to have the priority in urban design and infrastructures have not been planned to encourage the use of the bicycle.[44]

New ways of behaviour have also been reported by participants living in the area of the Superblock Poblenou. Several interviewees have pointed to the increased use of the bike (instead of private car/motorbike) that has been observed in the Poblenou neighbourhood, especially among people who work in other areas of the city. Children and young people usually move using bikes and scooters and elderly people like to walk around free-car streets. Respondents outline that biking is a city trend now, but superblocks facilitate this form of transport because they feel safer, specifically for children and young people, when no cars are around.

Also, Barcelona being a Mediterranean city, people like to spend a long time on the streets – which become "second homes or extensions of one's residence" (Janet Sainz, 2016[45]). Due to the reduction of velocity in internal streets, the prohibition of circulation in others and creation of new public infrastructures (e.g., new gardens, ping-pong tables) in several areas of the Poblenou superblock, neighbours are said to spend more time on the street, and spaces used before for circulating or parking are used now to have lunch, children playground, ping-pong competitions and even dinners and parties.[46]

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[43] Brass (2017) Redesigning the Grid: Barcelona's Experiment with Superblocks: https://urbanland.uli.org/planning-design/barcelonas-experiment-superblocks/#

[44] One of the municipal technicians, who usually travels by bike, insists that: *"With superblocks or without them, the mentality of the political decision-makers is conservative in terms of traffic and that the superblock plan has not gone perfectly linked and in sync with a change in the design of public transport (and other means of sustainable travel) that truly reduces the use of the car.... All the infrastructures favour the mobility by car, while there is a ratio km/inhabitant of bike lane below that of other European or Spanish cities such as Seville or Vitoria".*

[45] https://www.theguardian.com/cities/2016/may/17/superblocks-rescue-barcelona-spain-plan-give-streets-back-residents?CMP=fb_a-cities_b-gdncities

[46] As example, the last 31st October, the Mexican community celebrated the *"Dia de los Muertos"* organizing a big party on the centre of the superblock and inviting the entire neighbourhood to participate. "Birthday parties and dinners are being self-organized by citizens and one of the streets, the one close to the kindergarten, is so popular

New ways of organizing/doing things

The city of Barcelona has a long tradition of social participation at the city and neighbourhood scale, and different formal structures already existed to allow for public participation. For instance, the *Conseills de Barri*, which function as small council which involve participation of the neighbourhood associations, are formal structures in which to present and discuss the different projects and changes to be conducted in the neighbourhood. However, the Superblocks Programme develops a new model of organizing the general public's participation, pursuing as one of the strategic objectives of the programme the co-responsibility: "involving the neighbourhood associations and local residents in determining and applying the criteria in each Superblock area, throughout its various work stages and temporary phases, from examination to the implementation of the initiatives".[47]

A number of participants interviewed in this study have manifested a change in their form of relating and working as a result of their involvement in this project. For example, one of the interviewees representing a supermarket ensures that being a member of a promoter group enhances empathy and comprehension for the other's points of view as well as feeling co-responsible of the result of the process. Also, city council technical officers can experiment with changes through relating with citizens, being more aware of the need of listening and taking people's opinion and expertise as authorized voices that deserve to be listened and taken into account.

6. Some critical issues

Despite numerous acquisitions and numerous positive effects, some critical issues have been identified.

- The superblock project proceeds slower than planned and it still involves a very limited area of Barcelona (in 2014, it was supposed to end in late 2017). Along with Sant Antoni and Poblenou, only few more superblocks have been started in four years, without having yet completed their participatory processes and approved the Action Plan, so the works will not be implemented until 2019-2020.[48] Present superblocks are perceived as pilots conducted in "outstanding" neighbourhoods (as was Gracia or El Born at the time) but will not reach the most peripheral or popular neighbourhoods.
- Superblocks have been defined as "low cost" solutions, which eliminate traffic without involving a large investment by the municipality (in Poblenou, where a series of elements and street furniture, together with paintings on the pavement of affected streets, change the neighbourhood at a very low price; in Sant Antoni, the investment is more substantial,

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that we called it the Celebration Street", states one of the interviewees who lives close to this area who feels very proud of his involvement in this social innovation.

[47] Barcelona (2016), cit.

[48] This is criticized by some of the technicians, pointing *"That exist in Barcelona about 100 areas already pacified, where superblocks could be created quickly and without social contestation. The three or four already created are not enough for citizens to know the benefits and positive impacts of superblocks"*.

as some pavements have been eliminated and streets and sidewalks are being built again to create unique platforms for the pedestrian use).

- The neighbourhood movements emerged in 2016 against the superblocks see the project as a very unrealistic proposal (they call it "pharaonic")., unrealizable in a large city like Barcelona, and even warn of a possible widespread collapse in the city if they spread, with the consequent damage in pollution levels (the levels of acoustic and environmental pollution in the periphery of the superblocks have increased because the traffic has been diverted to the perimeter streets).

- In San Marti, complaints have focused on the "desert aspect" (lack of the people in the streets, mainly in the evening). Moreover, many have criticized that the urban configuration has not been changed (everything has a provisional aspect).[49]

- In Poblenou (neighbourhood where the commercial fabric is very scarce), results have been controversial. 87% of the 1,739 residents who voted in May 2017 in the consultation promoted by the Plataforma d'Afectats of the Superilla de Poblenou rejected the project. Citizens and their associations denounce the lack of security in the nocturnal hours (it becomes a desert area only frequented by young people who drink on the streets) and mobility problems, as well as a hasty and little consensual application of the pilot test. Moreover, the project has caused a sharp drop in merchants' turnover. Finally, the resistance is due to the concentration of traffic, unchanged in quantity and nature by the unchanged habits of people who continue to use the car (using now the perimeter streets) and the lack of places for the sacred rite of parking. Urban planners and city technicians responsible for the project report the difficulty of adaptation of a theoretical model (designed by the biologist Salvador Rueda 30 years ago) to the reality of the territory and of the selected neighbourhoods. The technicians also reflect on their responsibility when evaluating where the economic (and other) municipal resources are allocated.[50] What happened in Poblenou informed the approach adopted in Sant Antoni where the imbalances would have a greater impact, given that it has a greater specific weight at the commercial, mobility and affluence levels.[51]

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[49] This observation is quite controversial due to the fact that one of the expected outcomes of superblocks is to "give back streets to people" and permit different uses of public areas, e.g. playgrounds for children, safety spaces for sports, free space that increase social interaction and social cohesion. If the outcomes of the superblock plans are the inverse, we can find here with a disempowering effect which have negative side effects in people wellbeing or safety perception.

[50] According to a Barcelona urban planner (informal conversation), "The original design of Salvador Rueda had to be adapted to the needs of the neighbourhoods, to the requests and needs of the neighbours, but also to the resources that are available. Rueda is very referenced and admired, but also "demystified": his work does not have knowledge of planning and planning that are necessary to implement the superblock plan in Barcelona".

[51] The local newspaper *"El Periodico"* published a report in which Janet Sanz, the political responsible of the Superblock Plan explains lessons draw from the experience in Poblenou and how social support has been gained in Sant Antoni (Fuente: Colau acabará el mandato impulsando dos 'superilles' más https://www.elperiodico.com/es/barcelona/20181004/balance-dos-anos-superilla-poblenou-7069749): *"La primera conclusión de la experiencia de Poblenou es que ha habido flexibilidad para reaccionar ante lo que no funcionaba o lo que podía funcionar mejor. La segunda, que esta apertura a los resultados de una amplia participación ciudadana en el diseño, planificación, propuesta y ejecución ha acabado teniendo frutos positivos a lo largo de dos años en Poblenou pero debe plantearse en los nuevos casos de forma más intensa en el proceso previo a su puesta en marcha. También una mayor adaptación a las características de los tejidos urbanos de casco antiguo y limitar el uso de las intervenciones tácticas (macetas, pintura en el suelo, elementos provisionales) en el tiempo y en el espacio por el recelo, cuando no rechazo, que despiertan entre los vecinos; Se debe pasar más rápidamente a un proyecto definitivo (...) En Sant Antoni la superilla se ha aplicado con mucho éxito, no ha habido ni una resistencia por la aplicación de criterios como la participación del colectivo de vecinos, la suspensión de licencias para evitar la instalación de*

- In few occasions (e.g., Superblock of Poblenou), the district council has acted in opposition to the implementation of the superblocks, supporting those critical voices that were reluctant to the urban innovation and voted to eliminate the urban interventions and permit road traffic to enter again in the area.

Two further reasons are frequently alleged by the critical voices. The first relates to the insufficient public transport for commuters that might become a barrier for a real transformation on people's patterns of mobility towards low carbon transportation.[52] The second concern relates to the "gentrification process" which might transform the neighbourhood in a "trending place", that attracts people from other parts of the city, increasing renting prizes.[53] Specifically, the association "Taula Eix Pere IV" puts an emphasis on the expulsion of local and proximity economy occurring in district @22 (in which the Pobelenou superblock is placed) and the existing inequalities, fragmentation and discontinuity within a neighbourhood that is losing their industrial heritage. Other types of retail and restaurants have opened and stimulate an area with not much commercial activity but large hotels and technological centers with hundreds employees that do not reside in the area.

Conflict and resistance in Poblenou

Poblenou superblock is placed in the "*22@ district*", a technological area created in 2000 in which innovation and technological companies have stablished their headquarters, but with low rate of inhabitants.

Poblenou intervention was conceived as a "Pop-Up project", since its use was temporary. The *Agencia de Ecologia Urbana* implemented this action in collaboration with 200 architecture students from the Universidad Internacional de Catalunia (UIC). The students were encouraged to occupy the space, create temporary street furniture using recycling material and imagine possible uses for the public space. Although this temporary intervention had no opposition, when the administration decided to extend the pilot period until the end of the year, critical voices arised and problems with neighbours started out (Scudellari, 2017), especially from the business community, which feared that traffic restrictions would close restaurants and other stores (e.g. car stores). Other voices criticized also that the intervention was very dogmatic: "The big mistake done with the test was to build without a budget and without discourse with the citizens...The approach to Poblenou was too

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determinados comercios o incluir proyecto de viviendas y tener flexibilidad para facilitar el paso del autobús; Por no citar su aplicación paulatina iniciándola por los dos ejes de Borrell y Tamarit y dejando para una segunda fase el resto del perímetro. Criterios algunos derivados de las lecciones de Poblenou, otro de las peculiaridades del caso de Sant Antoni" (translation in English: *"The first conclusion of Poblenou's experience is that there has been flexibility to react to what was not working or what could work better. The second, that this opening to the results of a broad citizen participation in the design, planning, proposal and execution has ended up having positive results over two years in Poblenou but should be considered in the new cases more intensely in the process prior to its implementation. Also a greater adaptation to the characteristics of the urban fabric of the old town and limit the use of tactical interventions (flowerpots, painting on the ground, provisional elements) in time and space by suspicion, when not rejection, that wake up among the neighbors; We must move more quickly to a definitive project (...) In Sant Antoni the superlative has been applied with great success, there has not been a resistance by the application of criteria such as the participation of the neighborhood collective, the suspension of licenses to avoid the installation of certain businesses or to include housing projects and have flexibility to facilitate the passage of the bus; Not to mention its gradual application initiating it by the two axes of Borrell and Tamarit and leaving for a second phase the rest of the perimeter. Criteria some derived from the lessons of Poblenou, another of the peculiarities of the case of Sant Antoni"*).

[52] According to an interviewed member of the promoting group in the superblock Sant Gervasi, People's behaviour depends on the time of travel, the price and their comfort, but *"a large amount of people work in other parts of the city or in peri-urban municipalities and urban transport is not good enough for attending people's demand of mobility, in specific metropolitan transport system"*.

[53] Or even *"losing the spirit of the area, its identity"* according to a Poblenou Superblocks, social actor, beneficiary interviewed.

dogmatic…Planners need to make adjustments for each neighbourhood, perhaps allowing traffic on some streets and not others."[54]

The economic restrictions of this intervention were also subject of contestation, so as superblocks have been presented as a "low-cost measure" to tackle mobility issues in cities: "Between ideas and practice is quite a gap". Not enough money was spent to develop the public spaces, a respondent argues. "You can't do it so cheap," he says. "You need to be a little more ambitious and spend more."[55]

The *Col.lectiu Superilla Poblenou* emerged as a citizen response to the critical voices that claimed the elimination of the superblock in Poblenou*:"you could participate more or less in the decision making because it was always raised like this, this is a pilot project, but the uses are going to be decided, I found it interesting to participate in that decision making. And then it is true that many of us saw that there were people who were organizing to throw this back to us, it seemed like a good idea, and of course, those were the reasons, to participate in pro and also to stop the contra"* (according to a beneficiary interviewed, member of the collective superilleP9).

The *Col.lectiu Superilla Poblenou* has becoming an interlocutor to the local authorities and making suggestions about how to improve the new open areas with public facilities, street furniture and children playgrounds. It is still active after two years, maintaining an intense activity on the streets and organizing different art festivals, parties and diverse activities in the superblock open areas to vindicate their right to use public spaces for social aims instead of parking areas.

According to several interviewees, the main causes of the resistance of the neighbours to the superblock in Poblenou are related to the well-established "culture of the automobile" in the mobility of citizens as well as the insufficient feeling of ownership of the project by the people who inhabit the place, due to insufficient participation in its genesis and realization. The experimental dimension of this pilot superblock was also criticized by several respondents involved in different local initiatives, which consider that in Poblenou the participatory process was insufficient, information was not available and the main changes in the urban design and traffic limitations *"were introduced in the worst period of the year, just during the weekend people came back from summer leave and during the celebration of the neighbourhood annual festival, with car traffic restricted in many streets"* (quotation: representative of neighbourhood association).

7. Up-scaling

In the district Vila de Gràcia, where the superblock program was initially developed, the project achieved the first prize for their innovation from BMW, a German automobile manufacturing company, in 2011 and was recognized as a sustainable best practice by the UN-Habitat in 2010. In addition, it has been found that the proportion of space occupied by vehicles was significantly reversed due to an increasing number of journeys in the area undertaken by foot and bicycles. At the same time, a higher level of commercial activities was noticed.

The superblock project proves that it is not necessary to implement major changes in urban planning or invest in huge infrastructure solutions to improve the lives of citizens. Sometimes small-scale or low-cost actions can induce the same or even better effects. The superblocks model is a great tool to rethink and change existing urban mobility patterns. At the same time, it has become a model for the total transformation of urban neighbourhoods, and superblocks can easily be replicated and modified to suit any other location. Citizens' involvement in the whole process is crucial because it is the best way to ensure social acceptance of new lifestyles.

Based on the experiences in Barcelona, the idea of superblocks is already spreading to other typologically diverse cities in Spain, such as Vitoria-Gasteiz (probably the most advanced in such kind of social innovation) and A Coruña y Ferrol. Moreover, the experience of Barcelona has been presented and described internationally as a revolutionary urban innovation and a number of

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[54] Bras (2017), cit.

[55] Bras (2017), cit.

municipalities are already in contact to the city council in order to learn about the Superblocks experience and adapt it to their social and physical context. An example of this is the city of Zaragoza (Spain), which invited the members of the Collectiu Superilla Poblenou to present their experience and inform Zaragoza citizens about the positive impact of superblocks, as some of the interviewees mentioned. The members of the city council also reported that the city of New York and the city of Copenhagen are already learning from this experience. Representatives of both cities have visited Barcelona and the Technical Secretariat of the Superblocks Programme give advice and support to both cities. Other cities in the world (Melbourne, Toronto, Lisbon, Quito, Buenos Aires) have showed their interest in implementing the superblock model in their territories and the *Agencia de Ecologia Urbana* is becoming the agency that usually provides technical support while the Technical Secretariat of the Superblocks Programme shares its experience on the field.

Barcelona has also received large media attention, such as well-known articles published in *The Guardian* (2016[56]) and *The New York Times* (2016[57]), El Pais (2018[58]), P*olis Network – Thinking Cities magazine* (2016[59]) or *Metropoli Abierta* (2017[60]). International online media like *The Cities of the Future (*2016[61]) or *Vox (*2017[62]*)* have also published large reports about the potential benefits of this urban innovation.

Finally, information on the superblocks to the Agència d'Ecologia Urbana has been requested from cities from Japan, China, India, South Korea, Canada, Ecuador, Mexico and Moscow.

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[56] http://www.theguardian.com/cities/2016/may/17/superblocks-rescue-barcelona-spain-plan-give-streets-back-residents?CMP=fb_a-cities_b-gdncities

[57] http://www.nytimes.com/2016/10/02/nyregion/what-new-york-can-learn-from-barcelonas-superblocks.html?_r=1

[58] https://elpais.com/ccaa/2018/09/29/catalunya/1538246791_684437.html

[59] http://www.polisnetwork.eu/uploads/Modules/PublicDocuments/tc7c.pdf

[60] HTTPS://WWW.METROPOLIABIERTA.COM/EL-PULSO-DE-LA-CIUDAD/MOVILIDAD/LAS-SUPERILLES-SON-EL-PLAN-CERDA-DEL-SIGLO-XXI_729_102.HTML

[61] http://citiesofthefuture.eu/superblocks-barcelona-answer-to-car-centric-city/

[62] https://www.vox.com/2016/8/4/12342806/barcelona-superblocks

COORDINATED, TAILORED AND INCLUSIVE ENERGY EFFICIENCY SCHEMES FOR FIGHTING FUEL POVERTY
Aberdeen

1. Background

The City of Aberdeen is located in North East Scotland, UK. It is Scotland's third largest city, with an estimated population in 2016 of 214,610.[1] Aberdeen's economic prosperity is founded on its position as the 'Oil Capital of Europe'; the oil and gas industry has been central to the regional economy since the discovery of oil and gas in the North Sea in the 1970s. With the decline of North Sea oil in recent years the city has sought to diversify its energy sector to include renewable energy (including large scale offshore wind installations) and thus make transition to a 'Global Energy City'.

Whilst overall Aberdeen is an affluent city thanks to its energy industry employment, it contains pockets of marked social deprivation.

Compared to Scotland as a whole, Aberdeen has a relatively large private rental market. The housing tenure profile is shown in Table 1.

Table 1: Housing tenure profile in Aberdeen and Scotland

Tenure	Aberdeen City Council	Scotland
% homes owned with mortgage (2016)	30.1%	33.0%
% homes owned outright (2016)	27.2%	31.0%
% homes private rented (2016)	20.4%	15.2%
% homes social rented (2016)	21.5%	20.4%

(Source: Statistics.gov.scot)

The neighbourhood of Torry lies to the south of the River Dee, at the eastern side of the city. Torry has an estimated population of around 10,500,[3] and is one of the more deprived areas of the city. In 2016, the average annual income of Torry residents was £ 10,000 lower than the average for the city as a whole.[2] There are concentrations of social housing particularly in the south and east of the neighbourhood. It is estimated that 23% of children in Torry are living in poverty, compared to 18% in the city overall.[3] Torry has a strong (particularly Eastern European) migrant community; 18% of Torry residents do not speak English as a first language at home, compared to 14% in the city as a whole.[3]

Of the 5,620 homes in Torry, the vast majority (82.5%) are flats. The housing stock also features terraced houses (9.6%), semi-detached houses (7.4%) and a small number of detached homes (0.5%).[4] The majority of the flats in Torry are located in 3-4 storey granite-built Victorian/ Edwardian era tenements (Figure 3). The majority of these buildings are mixed in terms of tenure (e.g., containing social rented, private rented, and/or owner-occupied properties). The poor

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[1] National Records of Scotland Mid-2016 Population Estimates for Settlements and Localities in Scotland https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/settlements-and-localities/mid-2016-population-estimates-for-settlements-and-localities-in-scotlan
[2] Torry Strategic Assessment. https://communityplanningaberdeen.org.uk/wp-content/uploads/2016/05/Locality-1-Full-Strategic-Assessment.pdf
[3] Torry Locality Plan 2017-27 https://communityplanningaberdeen.org.uk/our-communities/torry-draft-locality-plan-2017-27/
[4] Statistics.gov.uk – Torry East and West 2011 intermediate zones.

energy efficiency of these older stone-built buildings, along with the economic profile of the neighbourhood, has led to Torry being identified by Aberdeen City Council as a key priority area for action to ameliorate fuel poverty. In Scotland, a fuel poor household is currently defined as one which needs to spend more than 10% of its income on fuel to heat the home to an adequate standard of warmth. In 2012-2014, 29% of households in Aberdeen City were fuel poor, with 9% living in extreme fuel poverty (spending >20% of income on fuel). The definition of fuel poverty has recently been reviewed by the Scottish Government (June 2018).[5], with a modified (more restrictive, proposing a new target to reduce the proportion of Scottish households living in fuel poverty to no more than 5% by 2040).

Example showing granite-built tenements in the case study area.

This case focuses on the development of the Aberdeen Heat Network and associated household energy efficiency schemes in the city. This is a 'live' case in that the case study research is taking place at the same time as the planning of a new phase of heat network development in the neighbourhood of Torry. The Aberdeen case study explores the development of district heating at a city-scale, within a context in the UK where heat networks are not a common domestic energy source. Only 2% of the overall heat demand in the UK is met by heat networks (ADE, 2018). As such, growing the capacity for heat network development in the UK requires not only the uptake of existing technical solutions, but also significant social and political innovation to create supportive social, political and economic environments in which district heating infrastructure can be developed at the local level in line with national-level policy ambitions. Previous research on the Aberdeen case study has argued that 'in Aberdeen, the indeterminate interaction of local, Scottish and UK political processes created an a-typical willingness to innovate through improvised means' (Webb, 2015, 268).

The primary driving ambition behind the inception of the Aberdeen Heat Network was to reduce fuel poverty in the city. District heating in Aberdeen was originally conceived as a response to concerns about fuel poverty amongst tenants in high rise social housing blocks relying on

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[5] http://www.parliament.scot/parliamentarybusiness/Bills/108916.aspx

inefficient electric heating systems (Hawkey & Webb, 2014; Scottish Futures Trust, 2015). Energy advisors working for Scarf, an Aberdeen-based social enterprise that had been founded in 1985 to eradicate fuel poverty and was one of the Council's key partner organisations, regularly found that many of the council-owned flats and houses they visited were cold, they were damp, and they had mould growing in them.[6] Aberdeen City Council recognised that providing affordable warmth in these properties would help to ameliorate not only the economic deprivation of social housing tenants but also the deterioration of the housing stock due to damp, and the health problems of tenants exacerbated by a cold and damp living environment (Scottish Futures Trust, 2015).

The continued development of the heat network and associated energy efficiency schemes over the past 15+ years has also occurred within a political context where not only have issues around fuel poverty gained in prominence (see above), but also within a context of increasing policy ambitions at the local, national and international levels towards carbon reduction as part of a wider energy transition.

City-level policy driving the development of the Aberdeen Heat Network, while initially focusing on social drivers for the reduction of energy use and provision of affordable warmth (as in the 1999 Affordable Warmth Strategy), later evolved to explicitly encompass wider environmental objectives (in the 2002 *Fuel Poverty Strategy*). As such, the initiative has been driven by the complementary objectives of addressing fuel poverty and improving the energy efficiency of the city's housing stock (Webb, 2015; Hawkey & Webb, 2014). These dual ambitions have been important in terms of unlocking finance for the development to take place (see § 2.).

The development of Aberdeen's heat network can also be viewed in the context of wider city energy transition. Moreover, it integrates existing regional (and national) programmes aiming to improve the energy efficiency of homes through improvements to the building fabric with a neighbourhood-scale heat network retrofit, providing a common platform for engaging householders and securing maximum benefit in terms of fuel poverty reduction.

Action on energy management in the city is currently driven by ACC's Sustainable Energy Action Plan 'Powering Aberdeen', which was published in 2016. The Action Plan responds to Aberdeen City Council's commitments as a signatory to Covenant of Mayors. It sets out targets for carbon emissions reductions (from a 2005 baseline) of 31% by 2020 and 50% by 2030. The Vision set out also includes the elimination of fuel poverty by 2030. The installation of Combined Heat and Power (CHP) systems, development of an Energy from Waste (EfW) facility, expansion of the district heat network in association with these technologies, and improving energy efficiency in priority housing areas through insulation measures feature strongly amongst the actions identified in the plan. At present 33 multi-storey blocks, 2 sheltered housing blocks and 15 public buildings are served by 4 CHP schemes in different areas of Aberdeen.

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[6] As one of our interviewees at Aberdeen City Council put it, "The council ha[d] … about 59 multi-storey buildings that [we] are electrically heated, and that equates to a high percentage of fuel poverty in Aberdeen, because people were not heating their … homes, because they can't afford it, because they have to choose between food or heat, and that became a social issue, and as a council, we're the landlords and we need to have that social responsibility to our tenants … So it becomes a social economy issue, and we needed a solution" – Research interview with Aberdeen City Council staff member, February 13, 2019.

2. Implemented actions

In 1995, Aberdeen City Council began a process of identifying solutions to tackle fuel poverty for tenants in electrically-heated high rise council housing blocks in the city. This action was a response to the UK Home Conservation Act (HECA)[7] 1995 (Scottish Futures Trust, 2015). A technical appraisal of options was commissioned, with gas combined heat and power (CHP) district heating accompanied by external cladding (external wall insulation) the most desirable option to deliver lower cost heating and achieve energy savings (Hawkey & Webb, 2014; Scottish Futures Trust, 2015). This recommendation was not adopted initially by the council due to a view that the external cladding component would be too expensive in terms of the capital costs, which would not be justified by the extent of the energy saving it would deliver as compared to installing district heating alone (Scottish Futures Trust, 2015). Whilst the recommendation to develop CHP systems was accepted, it was not initially taken forward due to financial concerns; the project was not seen to be viable unless external funding towards the capital costs of installing district heating was procured (Hawkey & Webb, 2014).

Aberdeen City Council set up Aberdeen Heat and Power (AHP) in March 2002 to deliver the proposed district heating developments in the council's high-rise housing stock. AHP was established as a not-for-profit ESCo (Energy Services Company) and is often referred to in the Council as an 'arms-length organisation'. Initial loans to AHP for the construction of the first phase of heat network development were underwritten by ACC, which is reported to be an unusual occurrence for district heating financing in the UK context (Hawkey & Webb, 2014), but which helped secure a favourable interest rate (Scottish Futures Trust, 2015).

In 1999, Aberdeen City Council adopted an Affordable Warmth Strategy that was informed by a survey of its housing stock. The survey indicated that up to 70% of resident households could be classed as living in fuel poverty (defined at the time as a spend of above 10% of household income on energy costs) and could not afford to heat their homes adequately (Community Power Scotland, 2015; Scottish Futures Trust, 2015). The Affordable Warmth Strategy prioritised the channelling of housing capital expenditure into addressing energy use in Aberdeen's inefficient high-rise blocks, setting a target of reducing energy consumption by 30% in these properties. The Affordable Warmth Strategy was succeeded in 2002 by ACC's Fuel Poverty Strategy, which integrated environmental objectives of reducing CO_2 emissions into the council's fuel poverty alleviation efforts (Scottish Futures Trust, 2015).

Both the Council Chief Executive and Housing Directors at the time have been described as 'fuel poverty and environmental activists' and these factors led to the above-mentioned appointment of a Home Energy Coordinator in 1998 (Webb, 2015). This officer has been described as acting as an intermediary between different council departments/specialisms, creating opportunities for developing improvised policy (reportedly drafted in the pub) and subsequent responses to this policy by explicitly orientating these political agendas around fuel poverty and climate change (Webb, 2015). Part of this policy development involved prioritising the regeneration of energy inefficient high-rise council housing stock (already an issue being looked at by the council) as a

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[7] The UK Home Conservation Act (HECA) 1995 required local authorities to reduce domestic energy consumption and carbon emissions by 30% between 1997 and 2007 (Scottish Futures Trust, 2015). Although these targets were not strongly enforced, they converged with existing local political agendas around tackling fuel poverty, in which Scarf was a leading voice (Webb, 2015).

means to deliver to these goals. It was predominantly the council tenants living in these flats, but also a proportion of owner-occupiers, who had bought their homes through the UK's 'Right to Buy' policy, who were to be the beneficiaries of this work.

The first phase of development (2003-2005) delivered a CHP system serving four high rise blocks of flats at Stockethill, connected 268 households to district heating (Community Power Scotland, 2015). Stockethill was reportedly selected for the initial phase on the basis of the condition of the building fabric, the technical feasibility of installing the infrastructure, and considerations of political and social acceptability. The Stockethill flats were deemed to have a stable resident population that could be expected to buy in to the potential benefits of the scheme and thereby become ambassadors for the fledgling heat network initiative (Scottish Futures Trust, 2015). The total cost of this initial development was £ 1.6 million (~2 million Euros), £ 730,000 of which was funded through the CEP – Community Energy Programme (Community Energy Scotland, 2015).

Subsequent phases of the Aberdeen Heat Network continued to develop CHP systems for council housing blocks at Hazelhead (209 properties) in 2005-2006, and more than 1000 properties within 14 blocks at Seaton across two phases (2007-2008 and 2011-2012). In 2013-15, a further CHP system was installed to supply 7 blocks (450 flats) at Tillydrone. Like the original Stockethill development, the Hazelhead heat network and phase 1 of the Seaton network were also partly funded by the CEP. However, because of the short-lived nature of the Community Energy Programme, other sources of funding had to be secured to take forward subsequent phases of heat network development. These have included grants through schemes such as the Carbon Emissions Reduction Target (CERT), Community Energy Saving Programme (CESP) and Energy Companies Obligation (ECO) (Scottish Futures Trust, 2015; Community Power Scotland, 2015). Various community buildings have also been connected to the heat networks in these areas, and expansions have included the connection of public buildings including sports and leisure facilities, schools, and the Aberdeen City Council headquarters in the city centre (Community Power Scotland, 2015). However, some of these sites – including the Council buildings – were not connected to the segments of heat network that are already established. Instead, because of their location, they were fitted with standalone boilers.[8]

The initial recommendations for external cladding to form part of the energy efficiency improvements in the high-rise blocks were also taken forward in many of the blocks, with the costs of the work either partially or entirely covered through UK government energy efficiency obligations on energy suppliers such as CESP and ECO (Webb, 2015), thereby reducing the burden on council housing capital budgets which had been the root of the initial concerns about this element of the work proposed in the early feasibility study.

In 2013, AHP established a commercial subsidiary company District Energy Aberdeen Ltd. (DEAL) which is focusing on connecting commercial businesses to the expanding Aberdeen Heat Network and feeding profits from this venture back into AHP to help fund the continued connection of domestic properties and public buildings to the heat network.

The current phase of heat network development in Aberdeen centres on the Torry area, in which plans for an Energy from Waste (EfW) facility with associated district heat network serving

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[8] As one of the AHP board members put it: "The plan would be that at some point in time these actually will be able to link into a city-wide network" (Research interview, 12th March 2019).

neighbouring housing and public buildings are currently in development.[9] Feasibility studies for Phase 1 of the Torry heat network were completed in 2016 (Ramboll, 2016), and initial planning permission for the EfW plant granted. The feasibility study set out the case for a heat network to supply local authority and housing association properties with waste heat from the planned EfW facility. As part of local community planning action Aberdeen's Community Planning Partnership, in consultation with the local community, developed a Locality Plan 2017-2027 for the Torry area (Aberdeen Community Planning, 2017), following a strategic assessment of the neighbourhood in 2016. One of the actions identified in the Locality Plan is to reduce fuel poverty by delivering a heat network, with the aim of at least 800 households having benefited in a reduction in heating costs by at least 10% by 2021

The intention to reduce fuel poverty through the delivery of a heat network is set out in the plan amongst other objectives for public service delivery in the area. The delivery of the objectives of the Locality Plan are to be overseen by a Local Partnership, whose membership is intended to consist of at least 50% community representatives with the remainder representing local public services. In March 2019 councillors approved plans for the EfW facility and the Torry Heat Network.

There are a number of area-based initiatives currently available to households in Aberdeen to increase their energy efficiency through building fabric improvements.

The Warmer Homes Aberdeen Insulation Scheme offers free loft, underfloor and cavity wall insulation (where appropriate) to eligible households. Eligible households must meet criteria such as: they are located in specific priority postcode areas; the household includes a pensioner or children under the age of 5; householder is a registered food bank user; or property is owned by a Registered Private Landlord.[10]

The Aberdeen Affordable Warmth Scheme offers assistance and loans to owner occupiers paying 10% or more of their income on heating their home. The support available includes carrying out home visits and energy performance assessment, assisting with paperwork to access grants, offering loans for improvements, and leasing with contractors to provide quotes.[11]

The Aberdeen Victorian Tenements project targets owner-occupiers, tenants of private landlords, private landlords and local authority tenants living in Aberdeen's granite tenement properties constructed in the Victorian/Edwardian era (prior to 1910). The project offers low-cost communal loft insulation, free draught-proofing of communal doors, information on energy efficiency and repairs, support in the co-ordination of householders within the tenement to agree communal insulation works.

In addition to these local schemes, Scarf currently operates Home Energy Scotland in the north east of Scotland, as a contractor of the Energy Saving Trust. Home Energy Scotland is a Scottish

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[9] From 2021, the disposal of biodegradable municipal waste into landfill will be prohibited in Scotland. The EfW plant will provide a solution for waste disposal, and at the same time generate a source of heat to power a local district heat network.

[10] https://www.aberdeencity.gov.uk/services/housing/home-energy-efficiency/warmer-homes-aberdeen-insulation-scheme

[11] https://www.aberdeencity.gov.uk/services/housing/home-energy-efficiency/aberdeen-affordable-warmth-scheme

Government initiative, delivered by the Energy Saving Trust, which provides free energy advice and support to access Scottish/UK Government grants and loans for energy efficiency measures.

Such local and Scotland-wide supports for energy efficiency improvement focus largely on private housing, for which there are currently no mandatory efficiency standards. Energy efficiency in social housing, however, is regulated by the Scottish Government, with social landlords required to ensure their properties meet minimum energy efficiency standards. In May 2018, the Scottish Government launched a consultation on proposals to create new mandatory energy efficiency standards for private rented and owner-occupied properties.[12]

Previous research on district heating in Aberdeen reports that the UK government's Community Energy Programme (2002-2007) played an instrumental role in garnering political support for the idea of developing district heating in the city (Hawkey et al, 2014). The Community Energy Programme offered a grant to finance up to 40% of the capital costs of district heating projects. Since the feasibility of heat network development had already been established in the previous decade, ACC was able to successfully secure funding for the initial phase of heat network development through this programme, with the remainder of the costs covered by the council housing capital budget and income from the Energy Efficiency Commitment government-mandated obligations on energy companies to deliver carbon savings (Hawkey & Webb, 2014; Scottish Futures Trust, 2015).

3. Stakeholders analysis

This case lies on a partnership approach, bringing together key regional players from public, private and third sectors in the delivery of an integrated programme of measures which will require uptake by households on a voluntary basis

There are three core organisations in the implementation of this case study: Aberdeen City Council, Scarf and Aberdeen Heat & Power.

The local authority, Aberdeen City Council (ACC), is responsible for the development of the city's strategic approach to energy and sustainability and is driving Aberdeen's low carbon transition. ACC is a founder member of the North East Scotland Climate Change Partnership (NESCCP), a regional partnership of public and private sector organisations working to raise awareness of climate change, share good practice and promote carbon emission reductions in the region. The City Council also play a lead role in the Aberdeen Renewable Energy Group (AREG), a partnership supporting investment in renewable energy sector in the Aberdeen region. Prominent energy efficiency and fuel poverty champions within the city council have included former Councillor Jean Morrison (founder of Scarf, see below, and former NESCCP, current chair of AREG and champion of the City CHP Network) and Iain Todd (formerly Aberdeen City Council 'Renewables Champion' and founder of the AREG). Aberdeen City Council was a partner in the Interreg MUSIC (Mitigation in Urban areas and the creation of Solutions for Innovative Cities) project 2011-2013.This project brought together a forward thinking group of local stakeholders in a participatory process of

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[12] https://www.gov.scot/Publications/2018/05/8637

transition management for the city.[13] One of the key guiding principles was framed around the idea of Aberdeen as an "Energy Efficient and Resilient City", and the project acted as a useful catalyst for collaborative thinking and working on solutions to sustainability challenges within the city. In recognition of having adopted an innovative approach to environmental sustainability, Aberdeen was awarded a bronze sustainable development "Scottish Green Apple award" in 2014. In 2016, ACC launched its Sustainable Energy Action Plan, which sets out the city's vision for the transition to becoming a smart, low carbon city and the measures and activities proposed to achieve this vision. ACC is the lead partner in the Torry fuel poverty project.

Within the council, initial proposals to establish district heating in these housing blocks were contested in some quarters by diverse actors (e.g., by politicians, and by housing, finance and legal officers) largely on the basis of cost/value for money, the risks associated with the council having to take on liability for tenants' non-payment of fuel bills (discussed further later) and general concerns about risks associated with doing something new and out with the council's existing portfolio of work (Webb, 2015).

Scarf is a social enterprise whose purpose is to deliver a range of sustainability and energy-related services to householders, businesses and communities. Scarf was founded by Jean Morrison in 1985 as an Urban Aid project with the specific objective of alleviating fuel poverty in particular areas of Aberdeen. Scarf delivers energy efficiency projects on behalf of the Scottish Government, local authorities and the Energy Saving Trust (a UK-wide agency which administers energy efficiency grants and support).

Aberdeen Heat & Power Ltd. is a not-for-profit company set up by Aberdeen City Council in 2002 with the objective of alleviating fuel poverty and reducing the City's carbon footprint. Aberdeen Heat & Power have been responsible for the development and operation of the City's district heating and CHP schemes, under the direction of founder and CEO from 2002-2018 Ian Booth. Aberdeen Heat & Power has developed 4 CHP schemes providing more affordable energy in Aberdeen City Council's high-rise social housing stock, further developed the city heat network to connect public buildings in the city centre, and established a subsidiary company District Energy Aberdeen Ltd. to develop private sector connections in the expansion of the heat network. In 2013, AHP won the Global District Energy Climate Award, representing the first British city to do so. AHP charges Aberdeen City Council a connection fee for each household, with the council charging households at a fixed rate (set annually by AHP).[14] AHP has a volunteer Board of Directors, consisting of ACC representatives, tenant representatives and up to 6 independent members with relevant experience.

The fact that the planned network constituted an integrated response to concerns over housing quality, energy efficiency, public health and social care is reflected in the range of bodies that currently work closely with Aberdeen Heat and Power, which include Scarf, and Aberdeen Care and Repair (which was established in 1998 to promote independent living in older people, people with disabilities and people with long-term health conditions, and is run by Castlehill housing association, which operates across north-east Scotland).

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[13] The vision developed by this project is summarised in the "Aberdeen in Transition: Journey towards 2050" document (http://www.energy-cities.eu/db/Aberdeen-in-transition_Journey-towards-2050_2013_en.pdf).
[14] http://www.communitypower.scot/case-studies/projects/aberdeen-heat-power-ltd/

A number of key figures who were involved with the development of the heat network from the beginning continue to support Aberdeen Heat and Power and its partner organisations, including Scarf, as board members. In particular, the officer who was employed by Aberdeen City Council to formulate Aberdeen's strategy in fulfilment of 1995's Home Energy Conservation Act, and who introduced the idea of building a heat network in the city into the strategy document, now serves as treasurer on AHP's board. Our interviewees noted that she had played a critical role in the initiation and expansion of the heat network. The long-standing chief executive of Aberdeen Heat and Power, who is often credited for a dedication to the company that often saw him personally dealing with problems arising in the heat network on weekends, retired within the last few months. The new incumbent has worked for Scotland's largest energy provider, SSE, and is thought to bring a commercial dimension to the work of Aberdeen Heat and Power. His arrival coincides with discussions about AHP's future as a company and the mooted possibility of its expansion beyond its work on the heat network, to manage all energy-related activity undertaken by Aberdeen City Council and build a broader, more commercial base as an energy provider.

As part of the development of the Sustainable Energy Action Plan, stakeholder engagement activities and statutory consultations have been carried out. A steering group consisting of external stakeholders from both the public and private sectors has been set up to guide the implementation of the Action Plan, providing input from civil society actors. The Action Plan also sits within the wider policy landscape governing low carbon transition at the national level,[15] notably the Scottish Government's statutory carbon emissions targets under the (Scotland) *Climate Change* Act 2009, its current *Climate Change Plan* for 2018-2032 (Scottish Government, 2019), and sectoral policies including the *Scottish Energy Strategy* (Scottish Government, 2017) and *Heat Policy Statement* (Scottish Government, 2015), draft *Energy Efficient Scotland* programme (Scottish Government, 2018a), draft *Fuel Poverty Strategy* (Scottish Government, 2018b) and current Fuel Poverty (Target, Definition and Strategy) (Scotland) Bill, and the *National Planning Framework 3* (Scottish Government, 2014).

Partners in the Torry fuel poverty project have identified community engagement as a critical element in the success of the project.

4. Milestones

- 1985: Launch of Scarf, Jean Morrison appointed Chief Executive.
- 1995: Passing of the UK Home Energy Conservation Act (HECA).
- 1999: Launch of Aberdeen City Council's *Affordable Warmth Strategy.*
- 1999: City-wide survey of council housing to identify opportunities for affordable heating solutions.
- 2002: Publication of ACC's Fuel Poverty Strategy.
- 2002: Aberdeen Heat and Power set up.
- 2003: Aberdeen Renewable Energy Group founded.
- 2003-2005: Aberdeen's first large-scale domestic heat network developed at multi-storey blocks at Stockethill.

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[15] Environment, housing and land use planning are 'devolved matters', which means that legislative authority in these areas is devolved to the Scottish Parliament by the UK Parliament under the Scotland Act 1998.

- 2008: North East Scotland Climate Change Partnership formed.
- 2011-13: Participatory transition management workshops held with key stakeholders in Aberdeen as part of MUSIC project.
- 2016: Torry District Heating Network Feasibility Study completed.
- 2016: Planning permission granted for EfW plant.[16]
- 2016: Publication of Powering Aberdeen – Aberdeen's Sustainable Energy Action Plan.
- 2018: Fuel Poverty (Scotland) Bill brought before Scottish Parliament.
- 2018: Consultants for ACC develop business case for Torry heat network residential phase.
- March 2019: Council committee approval for EfW project and Torry heat network phase.

5. Effects

Reports of the fuel cost savings achieved vary; some sources report 25-40% savings (Community Power Scotland, 2015), while others point to 25-45% (Webb, 2015) or up to 50% savings (ACC, 2019 website; Scottish Futures Trust, 2015) for individual households. In 2015, social tenants were charged a flat rate heat tariff of £ 10.45 per week (Webb, 2015). Aberdeen City Council report that the buildings served by the four schemes currently in operation have reduced their CO_2 emissions by approximately 56%, with residents fuel bills reduced by up to 50%.[17]

Improvements in housing standards have been reported. The average National Home Energy Rating (NHER) in the multi-storey blocks increased from 3.3/10 in 1999 to 7.19/10 by 2009. This is reported to have led to reduced turnover in tenancies, a reduction in complaints by tenants, improved council housing revenue, and anecdotal evidence of improvements to health (Scottish Futures Trust, 2015).

The replacement of electric heating with CHP district heating in homes is estimated to have delivered a 40% (Scottish Futures Trust, 2015) or 45% (Webb, 2015) reduction in carbon emissions from domestic heating, in comparison to the former electric heating systems in place.

Cost and carbon savings should also be considered in light of the fact that due to the high cost and inefficiency of the previous electric heating systems, it is likely that many homes would have been under-heated. In fact, it was clear when speaking to AHP board members that the key outcome as far as they were concerned was that when the heat network infrastructure was installed, "it meant people were heating their houses". The electric storage units that had previously heated Aberdeen's high-rise blocks had not only been inefficient; residents had also been known to limit their use in order to save money, leading to the generalised under-heating of homes.[18]

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[16] https://news.aberdeencity.gov.uk/site-investigations-starting-at-ness-energy-from-waste-plant/

[17] Aberdeen City Council website https://www.aberdeencity.gov.uk/services/housing/home-energy-efficiency/home-energy-savings/energy-efficiency-council-tenants/district-heating

[18] With the installation of heat network, then, and the integration of residents' heating bills with their rental payments, one interviewed board member noted that "the incidents of cold-related illnesses started to go down". Furthermore, "in terms of the fabric of the building, it actually started to get better and [in terms of] affordability, we were able to keep the prices down". She also pointed out that, by negotiating long term gas contracts they had not increased in their prices for the past seven years.

New forms of organizing or doing things

The key issues surrounding the evolution of Aberdeen's heat network relate to local energy production, household energy efficiency, fuel poverty and housing quality. These sectors were closely linked – if not formally integrated – in the rolling out of the heat network. Thus, for example, the energy manager in post at Aberdeen City Council in 2002, when Aberdeen Heat and Power was established, came from a housing background. She had originally been employed by the Council as an officer in the late 1990s to work on Aberdeen's strategy in response to the Home Energy Consultation Act of 1995, which supported the delivery of energy efficiency improvements to residential properties. The aspiration was to establish a heat network emerged through the work of formulating Aberdeen's HECA strategy. Thus, both as an infrastructure and as a policy process, the planned network constituted an integrated response to concerns over housing quality, energy efficiency, public health and social care.

Moreover, the local-level response in Aberdeen led to the development of a new model of organisation whereby the council established AHP as a not-for-profit company which remains its close partner and leads in taking forward the infrastructural development and operational aspects of the Aberdeen Heat Network. The Council considered that this organisational structuring was more likely to enable rapid progress towards their targets than if the project had been taken forward by ACC itself under its own internal governance systems. It also felt that it would reduce the Council's financial risk (Scottish Futures Trust, 2015).

As a not-for-profit company, AHP's services are procured by the council via a 50-year framework agreement; because they are an arms-length organisation of the council, exemptions from EU requirements for public contracts to be put out to tender apply (Scottish Futures Trust, 2015). Since these exemptions only apply to the supply of council buildings, the establishment of the subsidiary company District Energy Aberdeen Ltd. was required to extend opportunities for heat network connection to private sector businesses and thus open up new revenue streams for AHP to channel into further expansion of the network.

Together ACC and AHP have formed a partnership with Scarf (a third sector/charity organisation) which was described by one of our interview participants as acting as a 'critical friend' in the process.

This new model of institutional organisation for local-level energy provision also carried with it new opportunities to explore different ways of pricing domestic energy which could be more sensitive to the needs of the recipients. Previously, being served by electric storage heating systems, residents paid large-scale energy providers on a price-per-unit basis. Since the electric heating systems were inefficient in their conversion of electricity to heat, this resulted in many being unable to heat their homes to a comfortable standard because of the prohibitive costs. With district heating in place, AHP replaced the profit-generating energy company as the direct energy provider. In the existing domestic schemes, AHP charges ACC a connection fee for each household, and the council (as the landlord) charges households a fixed cost for their heating energy, which is reviewed annually. This effectively means that the partnership of the not-for-profit AHP and ACC is able to provide residents with energy on a cost-rather than market-based heat tariff (Scottish Futures Trust, 2015). While this can mean more affordable heat to the consumer, it also means

that households (no longer being part of the wider energy market) can no longer exercise choice over their energy provider. Furthermore, under a fixed rate tariff there is no economic incentive for householders to reduce their energy use or limit wastage. For the council, this pricing structure transferred to them the burden of risk of non-payment of energy bills. However, this is offset against improvements in revenues from their housing stock and reduced costs of heating other public buildings (Scottish Futures Trust, 2015).

New Knowledge

To facilitate the development of the Aberdeen Heat Network it was necessary for ACC and its partners to develop a great deal of knowledge about delivering local energy systems, given the existing energy landscape in the UK which has been focused on centralised energy production. Previous case study research on the Aberdeen Heat Network has identified intermediary action, involving bringing together various local government sectorial areas (housing, environment, finance, planning and transport) as well as external networks and community energy agencies, as being central to the development of this knowledge base (Webb, 2015).

The selection of Stockethill as the location for the first phase of heat network development was in part informed by a view that this development would offer a useful first step in developing shared learning about putting standardised procedure in place that could reduce future financial and time costs and therefore support a long-term strategy of future heat network development in the city (Scottish Futures Trust, 2015).

6. Some critical issues

The organisational structuring that characterises the development of the Aberdeen Heat Network initiative is seen as a successful model and has resulted in a number of national and international awards for AHP and ACC.[19] There are, however, some disadvantages of this structuring for ACC in that significant responsibility has been placed upon council officers, councillors and AHP board members, which in the absence of input from the established energy industry, has meant that a great deal of new knowledge and institutional capacity for local-level energy provision has had to be developed to take the initiative forward (Scottish Futures Trust, 2015). This may, however, be viewed as a consequence of the UK energy market context, rather than of the organisational model developed in the Aberdeen case. Hawkey has argued that the UK energy market is designed for large-scale centralised provision, which has 'undermined the economics of small-scale CHP' and resulted in the limiting of local authorities' role in the energy industry by comparison to Scandinavian countries, where energy supply has been governed at a more local, municipal level and district heating has become widespread (Hawkey et al., 2013). This history of limited autonomy over energy provision at the local government scale inevitably impacts on the institutional capacity of local authorities to progress 'meso-level' or urban-scale responses such as district heating (Hawkey et al., 2013).

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[19] www.aberdeenheatandpower.co.uk.

7. Up-scaling

Previous comparative analysis of the development of district heating systems in Aberdeen, the Netherlands and Norway suggests that the Aberdeen case differs significantly because the development of such initiatives in the UK has necessarily been driven at a local/city scale as a way to find solutions to local social, economic and environmental problems (Hawkey & Webb, 2014). This contrasts with the what has unfolded in a number of European countries, where widespread district heating development was supported by greater government control and regulation of services such as waste incineration (producing surplus heat) (Hawkey & Webb, 2014) and, more broadly, less liberalised and centralised energy production systems in comparison to the UK (Hawkey et al, 2013; Webb, 2015).

A report by the Scottish Futures Trust (2015) proposed a set of circumstances in which the approach to district heating in the Aberdeen case could be replicated by public bodies elsewhere:

1. A proposed project is not financially viable without a component of grant funding and/or low-cost, long-term loans
2. The public sector body is able and willing to provide a significant level of financial resource in the form of loans or guarantees
3. Availability of resource and willingness within the public sector body to develop energy projects
4. Prioritisations of social benefits, and reduction of CO_2 emissions, over other objectives such as income generation
5. A high degree of local control over cost structures and revenues is desired in order to control energy tariffs and future expansion
6. The public sector body has a desire for clarify in relation to ring-fencing business finances and project management and ensuring accountability through an independent no-profit company (Scottish Futures Trust, 2015).

The Aberdeen case has been promoted as a model for heat network development in the UK, and has received several awards in recognition of its achievements.

COORDINATED, TAILORED AND INCLUSIVE ENERGY EFFICIENCY SCHEMES FOR FIGHTING FUEL POVERTY
Timisoara

1. Background

Located at 571 km from the capital city of Bucharest, Timişoara is the largest city in Western Romania. The city is the capital of Timiş County, being the second largest in the country. According to the 2011 Census, Timişoara has 319,279 inhabitants. Timişoara is the main economic, social and cultural centre in Western part of Romania. The city's location near the border with Hungary and Serbia enabled Timişoara to become a multicultural and economic hub among the three neighbouring countries. Timişoara's position, between West and East, at the interference of the most important tourist flows, creates great opportunities, towards some of the most attractive destinations in Europe (Budapest, 270 km; Vienna, 478 km).

Trade holds an important share of local economy, in addition to industry, with production sites that cover several sectors from electronics, chemical, automotive to telecommunication, which brings 30% of the overall revenues in the region. From an economical point of view, Timişoara is now an important pole of Romania, occupying the second place – after Bucharest – in economic results.

Timişoara is well recognised as a main higher level education area, with very good reputation Universities, cultural facilities, but also for its beautiful historical buildings in the old part of the city. With a rich heritage and diversity, Timişoara is a strong cultural hot spot of Romania.

Romania is the country in Europe with the highest risk of energy poverty, around 42% in 2015[1]. Romanian laws defines, in a general sense, a "vulnerable customer" as a final customer belonging to a category of household customers who, because of their age, health or low income, are at risk of social exclusion.

At the national level, there have been some bottom-up initiatives to improve this situation, without a scientific framework to address this problem, but rather as reactions to alarm signals in the field of energy poverty. Moreover, these sporadic actions are not well coordinated. The energy poverty phenomenon rather increases in intensity despite the fact that one of the five objectives of the Romanian Energy Strategy was "to reduce energy poverty and protect vulnerable customers".

Researchers (Rademaekers et al., 2015) show that energy poverty is a multidimensional concept with an objective and a subjective component. The objective component refers to the fact that for a household, energy poverty is when net income after deducting energy costs is below the national poverty line and energy costs are above the national average. The qualitative component of this phenomenon captures the perceived level of subjective thermal comfort of people during the cold season.

Unfortunately, Romania faces several failures in terms of national regulations and solutions associated with this issue. Actions such as reducing pollution and greenhouse gas emissions,

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[1] Around 42 percent of the Romanian population cannot pay their utility bills. 25 percent of the households are unable to keep their homes adequately warm. See:
http://www.eurasia.undp.org/content/rbec/en/home/blog/2016/11/7/Energy-poverty-is-a-big-deal-in-Romania-here-s-how-we-re-helping.html

reducing energy costs for low-income people, and financial support for vulnerable consumers have not lead to an increase in people's well-being related to energy issues. After the 1989 Romanian revolution, the gradual liberalization of the natural gas market in Romania did either not solve the problem of energy poverty due to difficulties such as massive energy losses.

In this context of negative impacts of energy poverty on public health and social exclusion, finding the causes of this phenomenon and drivers for sustainable energy behaviour as a potential measure against it and barriers in adopting such behaviour is vital.

Social policy concerning energy consumption depends largely on the available political support rather than being based on specific needs. In Romania, energy poverty, generally defined as a question of affordability (fuel poverty), but also of households' poor access to modern means of energy,[2] is established when one of the following conditions is met:

a) Lack of physical access to energy carriers
b) Lack of commercial access: inexistence of a functional and fair market
c) Lack of financial means to pay for energy services (f.i. in 2013, 30.5% of Romania's population had difficulties paying for their housing and energy bills, three times more than the European average – 11.7%).[3]

According to the Romanian Energy Regulatory Authority (ANRE)[4] "there seems to be a particular issue in Romania regarding households with arrears on utility bills. The roadmap for phasing out regulated electricity and gas prices includes social measures for vulnerable consumers by providing direct subsidies, informing consumers about the process of market liberalization, reviewing the process for changing suppliers and detailing electricity and gas bills. Financial aid for social protection during the cold season is in place". Moreover, "the effects of market liberalization, in particular the cost of investments needed for decarburization and their impact on utility bills, need to be carefully looked at. Due to the overall low income in Romania, an important segment of the population might be considered as vulnerable consumers".

In Romania and more specifically in Timisoara, most residential buildings were constructed in the latter half of the 20th Century, with the 1961-1980 period standing out as the most significant construction time. The vast majority of Romanian dwellings were constructed at a time when no specific thermal requirements were set, or when such requirements were not demanding. In this context, we can say that energy vulnerability and poverty has various driving forces, such as:

- Inefficient housing and heating systems, a heritage from the communist period, and insufficient degree of thermal insulation in homes due to inadequate building standards
- Inadequate energy efficiency or poor construction materials of private homes/buildings
- Low or insecure household incomes

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[2] Centrul Pentru Studiul Democratiei (Center for the Study of Democracy) (2017) -energy poverty and the vulnerable consumer in Romania and Europe.
[3] V. Musatescu (WEC Romanian National Member), C. Zamfir and Adina Mihailescu (Romanian Academy). 2017 – On the residential energy consumers' vulnerability in Romania.
[4] Romanian Energy Regulatory Authority (ANRE) – E[n]R regular meeting (M61) hosted by ANRE EnR President, 14-15 Junr 2017.

- Increasing energy bills, due to the high and continuously rising energy prices (the energy price has continued to increase since the liberalisation of the energy market)
- Household needs and/or practices increasing energy requirements and consumption.

In Romania, energy poverty is attempted to be dealt by:

a) Using the energy markets forces (low prices through competition)
b) Specific energy efficiency programs
c) Social aid (for vulnerable consumers).

All these means have to be combined. More specifically, in 2015 and 2016, the Romanian Energy Regulatory Authority (ANRE) adopted some measures geared towards fighting the population's vulnerability in the energy sector.[5] Moreover, Law n°. 196/2016[6] (regarding the minimum inclusion income) which came into force as of April 2016 defines:

- Energy poverty, as "the inability of the vulnerable consumer to meet the minimum energy needs for optimal warming of the household during the cold season"
- Vulnerable consumer, as "household client, single person or family who cannot afford from their own budget the full coverage of the expenses related to the heating of the dwelling and whose income is within the limits provided by the present law".

This Law (Art. 26), establishes that "In order to support vulnerable consumers who use district heating for the heating of the dwelling during the cold season, local public administration authorities have the obligation to establish, by decision of the local council, one or more social protection measures supported from local budgets, as follows: (i) Monthly subsidies to cover the difference between the production, transport, distribution and supply price of the heat supplied to the population and the local price of the thermal energy invoiced to the population; (ii) Monthly aid for home heating, in addition to that provided from the state budget. The quantum of the social protection measures provided above should be at least 10% of the total amount of heating aid granted from the state budget. Moreover, depending on their own resources, the local public administration authorities may approve, by local council decision, monthly allowances for household heating in addition to the income instalments and the amounts used to calculate the heating supplement granted from the state budget. Finally, some customers benefit from social tariffs. In 2016, there were around 1,014,000 (according to ANRE)[7] households benefiting from social tariffs in Romania.

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[5] Procedure for granting the social tariff to household electricity consumers (ANRE Order no. 38/2005 and ANRE Order no. 176/2015); Regulations for electricity supply to final customers (ANRE Order no. 64/2014) and gas supply to final customers (ANRE Order no. 29/2016).

[6] Reference can be done also to the Law 123/2012, as the primary law, and by the ANRE regulations, as secondary legislation. The primary law does not define energy poverty as a distinct term, but explicitly defines the vulnerable customer as a limited category, being "the final customers belonging to a category of household customers who, due to age, health or low income, are at risk of social marginalization and who, in order to prevent this risk, benefit from social protection measures, including financial measures".

[7] Centrul Pentru Studiul Democratiei -energy poverty and the vulnerable consumer in Romania and Europe.

However, energy vulnerability appears difficult to assess. According to a recent UNDP project,[8] the following criteria should be taken into account: (i) Building type (individual, condominium with ground floor + number of levels, etc.); (ii) Geometrical characteristics and types of building materials; (iii) Thermal characteristics; (iv) Climate regions of Romania.

Energy poverty is a core question of political discussions in Romania. below some of the points under discussion are listed.

- Does a Bill of Energy Rights need to be introduced?
- Energy poverty has to be better understood as a concept and the ways of assessing it have to be improved. They have to be more connected to the actual needs of the population rather than solely based on political will.
- Energy supply regulations should be changed so that vulnerable customers with low income may also benefit from non-financial aid (for example: avoiding disconnection during the cold season, giving vulnerable customers the option of playing in instalments based on their individual ability to pay, etc.).[9]
- Local authorities need to take a bigger role. They need to face this new challenge and integrate it within the larger concept of sustainable development.

The main objectives proposed in the initiatives were the reduction of energy consumption and greenhouse gas emissions, the use of renewable energy sources in the field of construction or the use of renewable resources without medium and long-term storage.

Generally, what guided and initially stimulated local action in the field of energy poverty was the need to rapidly restore people's comfort, the solutions found being largely associated with the social support, postponing in fact the real problem, treating only the symptom.[10]

Over time, however, the idea has been discussed to install a central heating system in buildings associated with higher energy efficiency, proposing the idea of including this type of heating in national strategies. However, it was found that although the efficiency was higher, the costs remained high, and a certain percentage of the population continued to remain in the same state.

So, afterwards, projects and initiatives that were trying to reduce energy poverty were primarily focusing on ensuring the fast comfort of people or developing social support measures (lower prices for vulnerable consumer), and the promotion of renewable energy sources and the implementation of innovative solutions have remained secondary.

Regarding the question of how to address the problem in the initiatives aimed at redressing energy poverty, according to key informants interviewed, the approach should be holistic and integrated. A first observation was that there was a difference in approaching the problem and implicitly a difference in the design of solutions for the energy poverty problem between urban and rural consumers. For urban consumers, the law provides in some cases even a total

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[8] V. Musatescu (WEC Romanian National Member), C. Zamfir and Adina Mihailescu (Romanian Academy). 2017 – On the residential energy consumers vulnerability in Romania.
[9] Centrul Pentru Studiul Democratiei -energy poverty and the vulnerable consumer in Romania and Europe.
[10] As one of the respondents said, these social support measures serve as political tools rather than as solutions ensuring the energy sustainability and helping people to learn a rational behaviour in energy domain.

compensation of heating costs, while heating of rural dwellings entails additional costs of purchasing and transporting woods, which are mostly covered / compensated.

Turning to the question of an integrated approach to the problem, some initiatives can be named. Firstly, in order to implement an innovative solution, clusters of actors have been established at a local level including a wide range of organizations, institutions and experts interested in developing renewable energy sources in the housing sector. At the same time, in order to facilitate the implementation of building renovation measures, roadmaps have been developed that include an analysis of the inhibitors. This analysis is based on the actual situation of the renovation of residential buildings in Romania from the point of view of main stakeholders (government, local authorities, energy suppliers, construction firms, proprietary / engineering / consulting organizations etc). Thus, an overview of the existing situation has been developed which has enabled effective collaboration among stakeholders.

2. Implemented actions

This SMARTEES case focuses on a live project (being led by the Municipality of Timișoara) which aims to alleviate fuel poverty in the area of Timisoara through an integrated program offering individualized household support to access energy efficiency improvements.

As a signatory of the Covenant of Mayors, the Municipality of Timișoara is committed to providing citizens' access to secure, sustainable and affordable energy. The municipality of Timișoara ensures all citizens with the basic energy services, such as public lighting, heating through the Local District Heating Company, public transport and mobility, access to the energy grid, etc), in order to guarantee a decent standard of living for residents.

In 2014, the Municipality of Timisoara approved the Sustainable Energy Action Plan 2014-2020 for Timisoara (Planul de Acţiune pentru Energia Durabilă a Municipiului Timişoara).[11] Its aims were mainly to:

- Increase energy efficiency (of public buildings, buildings in the tertiary sector, private buildings, transportation – including the expansion of the network of cycling lanes, etc.)
- Increase the use of renewable energy
- Rehabilitate public spaces and green areas in the downtown area, urban agriculture, etc.

However, from all the actions proposed in the Plan, none is specifically designed towards the topic of the fuel poverty. In fact, the Plan was drafted before Law 196/2016 came into force and the subsequent debate on fuel poverty in Romania started.

Timișoara has a significant number of buildings, built mainly from 1960 to 1990, with low thermal insulation due to the fact that, before the energy crisis of 1973, there were no regulations on the thermal protection of buildings and enclosure elements, and they are no longer suitable for the

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[11] Conventia Primarilor – Municipiul Timisoara (2014) – Planul De Acţiune pentru Energia Durabilă a Municipiului Timişoara (Sustainable Energy Action Plan 2014-2020 for Timisoara).

purpose for which they were built. The final energy consumption in these buildings varies between 150 and 400 kWh/m^2/year.

Energy efficiency improvements in existing buildings is essential not only for achieving national energy efficiency objectives in the medium term, but also for achieving the long-term objectives of the strategy on climate change and transition to a competitive low-carbon economy by 2050.

Through the Romanian National Program for increasing the energy efficiency for the blocks of apartments, in the last years, the Municipality of Timișoara has undertaken energy renovation works in privately owned buildings, consisting in the construction of the thermal envelopes (especially for the buildings constructed in the communism period). These works have reduced the energy consumption by 65-70%, the thermal comfort increased significantly and the indoor climate was improved.

Among the actions put forward by the Sustainable Energy Action Plan, a couple that could be highlighted are:

- Promoting the installation of solar panels in order to provide domestic hot water to south-facing homes/residential buildings, at a rate of 2% / year of all buildings with southern exposure in Timisoara Municipality;
- Promoting the installation of off-grid photovoltaic panels with power between 1 and 3 kW for electricity production, at a rate of 2.5% / year of buildings with southern exposure in Timisoara Municipality.

Energy retrofit of the existing buildings from municipal territory is considered an efficient action to decrease energy consumption and emissions of GHG, but it is also important to identify the optimal retrofit strategies for groups of buildings because the energy consumption is influenced by very different building-related factors (building envelope, building services and the house systems). Another important aspect is closely related to the users: building maintenance, environmental quality of the indoor, owner/occupant behaviour. Each factor provides a substantial contribution to the energy consumption and is important to identify the common aspects in order to form groups of buildings with similarities and to design effective retrofit strategies.

In the frame of the implementation of this initiative, educating the population on optimal temperature is a necessity[12] as well as population awareness of the benefits of using the renewable energy and early education, through promoting responsible energy behaviors among young people.

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[12] Looking for a support for this statement in the literature, a study reached out by Romanian economists who underlined that: "for Romanians, for example, it is common to heat their apartments up to 25-26 ° C in the cold season (less common in WE households) and to cool them to 20-21 ° C in the warm season". At this regard, according to some key-informants interviewed, the phenomenon of energy poverty should be put in correlation with the people subjective perception and with their expectations regarding the meaning of the notion of thermal comfort. Some respondents linked this pattern of unhealthy energy consumption behaviour with the communist period in which energy was restricted, and heat was reduced not because the energy poverty, but because the obsession of the country's leaders in those times to save natural resources. Thus, the behaviour of the energy waste from the present times, to the Romanians, could also be explained by the feeling of freedom, which is not associated with a responsibility, as a compensatory mechanism for the difficult times they have lived.

The category of beneficiaries' is formed mainly from the population representing vulnerable consumers from the perspective of energy consumption.

Starting with October 2018, the Municipality has decided to couple the already scheduled activities concerning the improvement of energy efficiency in residential buildings included in the SEAP 2014-2020 with actions fighting energy/fuel poverty/vulnerability in buildings inhabited by the citizens in need. These actions will be implemented by two departments from the Timisoara City Hall (the Environmental Protection Directorate and the Social Service Department of the Local Council) with the cooperation of the West University of Timisoara.

It must be underlined that in Timisoara, energy poverty is not mainly a problem related to the adequate physical access to clean and modern energy; it is rather an issue of affordability and energy efficiency. Energy poverty/vulnerability therefore describes a condition wherein households cannot get or afford an adequate level of energy services.

Further studies must be conducted to reveal the internal structure of energy consumption. This structure can generate the necessary knowledge about energy retrofit of the built environment in our municipality, especially for those residents which are more susceptible to suffer the negative effects of energy poverty and climate change.[13]

We must underline also that after an investigation among households, the Environmental Directorate has identified problems and vulnerabilities among citizens, especially residents/owners of large sized dwellings with lower income, and poor energy efficient heating systems, in building without thermal envelopes. All these factors are considered a prime cause in urban energy poverty/vulnerability. Also, households vary in terms of their energy needs, practices, with groups of citizens, based on factors such as age, gender, ethnic or sensitive health status, and difficult family situation (single parent, large families with children) facing particular disadvantages due to increased energy requirements, low income and other social issues.

3. Stakeholders analysis

This case study will benefit from many citizen-oriented actions already included in the Plan, such as:

- Organizing information workshops and encouraging stakeholder involvement (at least once a year)

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[13] According to interviewed key-informants, any new energy consumption policy must be based on a rigorous empirical study on the factors associated with the phenomenon of energy poverty, as well as a very clear vision of the targets. Informants have shown that this phenomenon is the result of cumulative factors, such as low wage income, high energy bills and reduced energy efficiency. In addition to complex measures to be implemented at national level, there are also bottom-up solutions, one of which is the adoption of non-traditional solutions for building renovation. Also, some of the answers show the need to find those solutions that can be funded on the private market and that are characterized by high profitability, simplicity, efficiency and durability.

- Carrying out information and awareness raising activities among citizens regarding the benefits of projects for improving the energy efficiency of residential buildings (at least once a year)
- Organizing awareness campaigns on the advantages of centralized heating compared to other alternative heating sources
- Informative and awareness raising actions for the owners/residents living in single family households.

Involved actors

The following local key partners could be directly involved in the project:
- The Romanian Sustainable Energy Cluster ROSENC
- COLTERM SA, the local district heating company
- FALT – the Federation of Owner's Associations in Timisoara
- AMET – the Agency for Energy Management within Timiş County.

The following national authorities have been identified with a possible key role in developing and implementing the project activities:

- Ministry of Regional Development and Public Administration (MDRAP) – responsible for transposing and implementing EPBD, developer of the first version of the long-term strategy for mobilising investments in the renovation of residential and commercial buildings, both public and private, required by EED, managing the registration of energy performance certificates
- Department of Energy – a specialised body with legal personality, established within the Ministry for Economy, Trade, Industry and the Business Environment, responsible for the co-ordination of the energy and energy resources fields at the national level, and for the implementation of renewable energy sources in buildings
- ANRE – implications for energy services providers, including the role of energy efficiency obligations, energy vulnerability, energy poverty
- Asociaţia Oraşe Energie din România – Romanian Energy Cities Association (OER) – supporter of Covenant of Mayors for Climate and Energy in Romania.

The aim is to create a strong partnership between the public sector, the private sector and citizens, and to support energy poverty projects and initiatives,[14] bringing also together specialists from several fields: agriculture, engineering, policy makers, etc.[15]

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[14] At this regard, all the key-informants interviewed state that this partnership has not only the advantage of the diversity of competences and skills stimulating a flexible approach and also an out of the box thinking, but the partnership also creates the premises for commitment (In designing and implementing innovative energy poverty projects, there have been voluntary associations of experts with various organizations (consulting companies, central heat supply system operators, entrepreneurs, real estate agencies, professional associations, universities and local public authorities, NGOs, SMEs, consulting companies, financial institutions etc). They shared the interest in implementing social innovation in the field of energy poverty and in developing the use of renewable energy sources in the housing sector). Key informants interviewed suggested also the involvement of further kind of partners: a research centre, environmental research institutes, and energy design institutes, architects, energy providers, and municipalities, companies from various fields, such as metal processing, seed and plant marketing, biomass.

[15] There were no interviewed that highlighted the idea of a partnership made up of experts in only one field, but this partnership involved a variety of people, with complementary skills and different backgrounds. Moreover, to work in

This initiative is still at a conception stage. Therefore, until now, there are no opponents.[16] Conversely, it has been underlined by many key informants interviewed that prior to the start of this project collaboration relationships among the above mentioned actors existed, because people knew each other being part of the same group of experts who had previous experiences of collaboration on different activities. This is a plus for the implementation of this initiative, which should, moreover, improve the relations between institutions and representatives of citizens (e.g. the observed effect was a relational closeness explained by increased confidence of the individuals from the group to each other, confidence in their good intentions, in their competencies and skills).[17]

Strategies for gaining social support

According to the interviewed key-informants, it is absolutely necessary that a strategy to gain the support of citizens is included from the start of the project. An action that some have taken to provide this support has been to involve beneficiaries from the start in project implementation, not just to use them as a means of validation, measuring different variables, such as their satisfaction after the implementation phase. The organization of seminars / information workshops to which different representatives of beneficiaries were invited is another way to maximize the gain of citizens' support. Attracting groups of influencers, even potential opponents of the solutions offered by the respective initiative, is another successful strategy. The idea that was repeatedly highlighted was that, in order to gain social support, the social innovation should not be presented as a finished product or as a final result because people need a period of accommodation with the degree of novelty of the product, they need to understand the entire process, not just the functionality of the product.[18]

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multidisciplinary teams and to expand the network of experts motivates people to get involved and participate in social innovation projects.

[16] In perspective, regarding opponents, the key informants interviewed generally state that precisely because of the partnership with various groups of interest and groups of influence, they did not feel the opposition or at least it was not explicitly expressed. However, according to them, resistances could be manifested by suspicion and distrust in the capacity of social innovation solutions to solve the problem of energy poverty and thermal discomfort rather than by effective barriers to the implementation of local initiatives. Moreover, resisting changing should come according to an interviewed key-informant, considering, for example, that it is known that the cost of investing in "zero energy" renovation of buildings is higher than the cost of traditional renovation, but reduced energy consumption and increased renewable energy will be beneficial in time. People do not know to wait for the further benefits; they wish miraculous effects in short time, going on "maximum profit / comfort with minimal effort".

[17] One interviewed key-informant asserted that different language used by academics, researchers and people employed in different NGOs, and also the different speed of information processing marked some disruptions in communication at the start of the project. Over time, however, the concepts used have been clarified, the meaning of the terms and the clarity of the tasks increased, so that the obstacles to communication have been removed. From this answer, however, we, as researchers, have learned that social innovation projects, especially in social difficult areas, need a kind of index of terms, a glossary that provides semantic orientation. Another idea associated with the respondent's answers is that in the case of partnerships between academia and industry (these partnerships are relatively common in the development of social innovation solutions), the existence of a common language, beyond common experience and shared competences, is very important.

[18] For example, very active key informant interviewees on the sustainable energy market said that they had participated in many trade fairs in which they had the opportunity to change some of people's preconceptions about the efficiency of the solution and its potential to increase well-being and reduce energy poverty. The same respondent said that it is very interesting to observe some people beliefs that a product incorporating, for instance, photovoltaic panels cannot be profitable unless it is funded by EU funds or other non-reimbursable funds. One of the conclusions

4. Milestones

2010: First version of the Climate Change Strategy for Municipality of Timisoara 2010-2020 and Strategic Action for mitigation and adaptation to the negative effects of Climate Change.

2014: The approval of the Sustainable Energy Action Plan 2014-2020 for Timisoara (Planul de Acţiune Pentru Energia Durabilă a Municipiului Timişoara).

2016: Law 196/2016 comes into force.

2018: The proposal for inclusion of fuel poverty issues in the actions of the Plan for energy efficiency in residential building.

11/2018: Municipality of Timişoara signed the Adhesion form to the Covenant of Mayor for Climate and Energy.

5. Effects

Main environmental, economic and quality of life effects

It is too soon to record any environmental and economic effects of the project being investigated within the case study, but at a wider level, the social context within which the project sits is the essential aspect of the social innovation itself. Any effects related to social cohesion, social integration, everyday life and social behaviours (or similar) will be attributable at the level of the social context within which the project sits.

New ways of behaving/doing

Due to its early stage, of course, the project has not generated any new behaviors yet.[19]

New ways of organizing/doing things

Due to its early stage, of course, no new organizational models can be identified in this case yet.[20] However, the project has already improved the propensity towards a better community

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reached was that there was a relatively high degree of mistrust in the local solutions simultaneously with overestimating the quality and sustainability of imported solutions.

[19] Regarding new behaviours that would be desirable to develop in order to address the problem of energy poverty, most key-informants interviewed have highlighted the importance of educating the population so that people are able to make informed decisions about energy consumption. Much of the problem is maintained by the limits of information on existing alternative solutions and people's fear of trying out something new, resisting to change. Another desirable behaviour that should be promoted in the energy field, in the opinion of the respondents, is that of the efficient use of renewable energy. People have to learn what this type of energy means and what is the significance of energy efficiency.

[20] At this regard, most key-informants interviewed have highlighted the need of top-down initiatives considered as most effective, while others believe that genuine and sustainable change is associated with bottom-up initiatives. There was consensus that the success of energy consumption policies depends partially to the extent to which the Romanian government is designing a policy based on social protection and energy efficiency. The risk of an exclusive social protection policy will lead to collapse, as they will burden energy suppliers, widening discrimination and

engagement and a real partnership working approach, building on existing relationships established through prior actions included in the Plan. The number of participants that remained relatively high in the meetings already implemented led to conclude that local stakeholders are interested in implementing the proposed solutions.

6. Some critical issues

The project is currently going through a 'change control process' – which essentially means that the exact specification of the project and related partnership is still under discussion. The council is actively involving the relevant stakeholders in this process though, so that at a later time we will be in a much clearer position to talk about the case in concrete terms.

7. Up-scaling

The ongoing and developing nature of this project already offers the opportunity to track the social innovation from a point close to its inception, through its planning and delivery to examine the critical factors influencing relationships between project partners, between the project and other stakeholders (e.g., householders, landlords) and crucially, uptake of measures by individual households.

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differences over time. The development of economic models to be tested in advance and containing the projection of medium and long term measures is considered by respondents being mandatory. Some of the respondents once again highlighted the issue of energy poverty in rural areas, emphasizing the need to develop programs and mechanisms to stimulate the energy efficiency.