



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Integrated Solutions for Positive
Energy and Resilient Cities

D1.1

Elicitation of citizens and stakeholder requirements, risk perception and user acceptance determinants



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Glossary

Abbreviation	Full form
ATEX	<i>Appréciation Technique d'Experimentation</i> (Technical Experimentation Autorisation)
BOS	Building Operating System
CERTH	Centre for Research and Technology Hellas (RESPONSE partner)
CIP	City Information Platform
EPBD	Energy performance of buildings directive
EV	Electric vehicle
FC	Fellow cities
GA	Grant Agreement
HVAC	Heating Ventilation and Air-Conditioning
ICT	Information and Communications Technology
IE	Innovative Element
IS	Integrated Solution
LHC	Light House City
NZEB	Nearly Zero Emission Building
PEB	Positive Energy Block
PED	Positive Energy District
POC	Proof-of-concept
POV	Proof-of-value
PV	Photovoltaic
QPV	<i>Quartier Politique de la Ville</i> (Low-income district considered as a political priority in France)
RES	Renewable Energy System
TA	Transformation Axis
TUAS	Turku University of Applied Sciences (RESPONSE partner)

VTT	Technical Research Centre of Finland Ltd (RESPONSE partner)
WP	Work Package

1. Executive Summary

This document presents the work undertaken concerning Task 1.1, “Elicitation of citizens and stakeholder requirements, risk perception and user acceptance determinants”, under Work Package 1 (WP1). The document provides an overview of the needs, drivers and opportunities, as well as the perception of risks of the stakeholders of the RESPONSE project. The analysis is conducted for both Lighthouse Cities (Dijon, France; and Turku, Finland) and all six Fellow Cities (Brussels, Belgium; Gabrovo, Bulgaria; Ptolemaida, Greece; Botosani, Romania; Zaragoza, Spain; and Severodonetsk, Ukraine).

To this end, T1.1 defined a methodology for the elicitation analysis of the requirements of citizens and stakeholders (e.g. smart city operation experts, end-users, business operators), that will inform the deployment strategies of the RESPONSE Integrated Solutions (ISs). This involves data collection of the organizational needs, constraints and perceptions of citizens and stakeholders through interviews and questionnaires. Two questionnaires have been designed, the first for citizens, the second for stakeholders and project partners. Citizens in all eight partner cities have been asked to respond to a common questionnaire, translated into the local language. Similarly, companies, research centres and public administration and services have been approached with the stakeholder questionnaire, which adapted the questions to the stakeholder category (Table 1).

Table 1 - Summary of T1.1 questionnaires distribution to various target populations

RESPONSE stakeholder type		Questionnaire	Disseminated by
	Lighthouse cities citizens	Citizens questionnaire (translated in local language)	LHCs managers
	Fellow cities citizens	Citizens questionnaire (translated in local language)	FC city managers
	RESPONSE partners	Stakeholder questionnaire (English)	T1.1 task leader
	Lighthouse cities local stakeholders	Stakeholder questionnaire (English or translated in local language)	LHCs managers
	Fellow cities local stakeholders	Stakeholder questionnaire (English or translated in local language)	FC city managers

Data gathering focus on designing retrofitting strategies considering aesthetics, structural stability, materials insulation, data routing and automation, power electronics for renewables/storages, citizen

engagement practices and climate adaptation activities. The data gathered during the citizens' surveys enabled the identification of the population characteristics in LHCs and of the opinion of these populations on the issues that the RESPONSE project aims at solving. The main common points between cities are:

- Sensitivity to environmental issues and challenges
- The desire to monitor energy consumption
- Citizens declare that they pay attention to the time of day at which they consume energy
- General agreement with the management of energy savings by automats
- Raising energy bills are a major concern
- Lack of knowledge on the source of energy and the consumption of household appliances
- Fear that personal data may be exposed to the wrong hands

Stakeholders' questionnaires disseminated to RESPONSE partners and local stakeholders in partner cities have provided data for specific analyses for 3 stakeholder categories: industry and private sector service providers, research centres, municipalities and policy-making bodies. The main opportunities brought by the RESPONSE project are:

- The RESPONSE Project enables to build technological and commercial Proofs-of-concept (POC) and Proofs-of-value (POV), which is a major priority for industrial partners
- The development of collective self-consumption in Dijon will bring many tech/business opportunities
- Interactions and data sharing between users, technology providers and energy suppliers
- Interactions between technologies thanks to BOS technologies
- Both municipalities and industries are strongly committed to building relationships with each other
- Research centres are committed to providing guidance to municipalities
- According to the stakeholders, the main needs and risks that should be taken into considerations are:
 - Financing: Need for public support (energy-saving technology development)
 - The need for better communication inside the project

- The obstacle of national regulations on innovative technology deployment (in particular PV panels deployment)
- The communication and relationship quality with citizens
- The involvement of citizens in environmental issues
- Research centres need to be more identified as relevant partners by industrials and municipalities

Most of these points can be addressed in the RESPONSE project.



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 1

Introduction

Chapter 1 – Introduction

2. Introduction

This report is part of task T1.1: *Elicitation of citizens and stakeholder requirements, risk perception and user acceptance determinants*. The task aims to summarise the opinions of the RESPONSE project stakeholders regarding the perceived risks and opportunities of the project. To this end, surveys were conducted in Lighthouse cities (LHCs) and Fellow cities (FCs). The current document will present the surveys that were completed by the citizens and the stakeholders, who were also identified during this task. Based on the information that was collected during this task, it was possible to determine the acceptance of the stakeholders to the Innovative Elements (IE) that are expected to be demonstrated and replicated throughout the project, and the possible risks of developing, demonstrating and replicating the smart city solutions in the LHCs and FCs.

This document will provide a basis to help develop a methodology that creates valid strategies for deploying, rolling out and replicating smart city solutions in the LHCs and FCs, foreseen within T1.3-T1.5, for each city. The current document will also be a benefit to tasks T4.2, T6.1 and T7.1 (see section 2.2).

2.1 Scope, objectives and expected impact

Task T1.1 of the RESPONSE project aims at identifying:

- the needs of the RESPONSE stakeholders
- the opportunities opened by the RESPONSE project
- risks perceived by the stakeholders

The stakeholders considered in this task are RESPONSE partners, citizens and external stakeholders. The perception of the RESPONSE project for each stakeholder category will be considered with specific questionnaires.

The expected impact for the municipalities was primarily that of a better knowledge of the population impacted by RESPONSE. In addition, social landlord partners in the project are interested in knowing their tenants. This knowledge of the neighbourhood's population but also of the local actors allows us to anticipate the risks that RESPONSE could represent. From the companies and research centres point-of-view, the D1.1 deliverable can help better identify opportunities granted by the RESPONSE project. Finally, RESPONSE project management will benefit from a better knowledge of the drivers of the stakeholders.

2.2 Relation to other activities

The results of the citizens' surveys can be disseminated in the form of public communication. The analyses could also help to better design the project's communication strategies towards the general public.

The risks identified during the task will be input for the IS leaders to feed into task T12.2 *Quality and Risk management*. In addition, opportunities can be used as input for the needs of task T12.3 *Technical and Innovation Management*.

WP6 *Dijon LH City Demonstration, Monitoring and replication activities* and WP7 *Turku LH City Demonstration, Monitoring and replication activities* will benefit from results of task T1.1 for preparing their Master City Planning (T6.1/T7.1 respectively). As WP8 *FCs Replication Plans and 2050 Bold City Vision* is focused on the deployment of PEBs in FCs, this work package shares the same interest in the T1.1 task results.

WP2 *Smart Cities Performance Monitoring Framework and Governance* goals are to "define, plan, conduct and coordinate project monitoring activities for TA#1-TA#5 implementation based on WP1 results." Regarding these objectives, task T1.1 will contribute by identifying issues and interests relevant to RESPONSE stakeholders, which could be monitored throughout the project.

WP4: *Mobilizing Collective Intelligence through Citizen and Stakeholder Engagement*, the knowledge of the district's population will help partners to mobilise residents and citizens. Task T1.1 will contribute to the creation of citizen mobilization methods adapted to the reality of the field, in particular:

- T4.2 *Dijon implementation of digital solutions for increased Citizen Empowerment and Climate adaptation*
- T4.3 *Turku implementation of digital solutions for increased Citizen Empowerment and Climate adaptation*
- T4.5 *Citizen and Stakeholders Awareness and Collaborative Development mechanism for citizens and business shaping their cities bottom-up*

In those tasks, citizen questionnaires will be provided. The lessons learned from this experiment will make it possible to adjust the methodology for approaching citizens with issues related to the RESPONSE project.

At the time of finalising of this deliverable, the collection of the citizens' survey results in Brussels and Zaragoza were in progress. Consequently, they will be reported as a part of following deliverables reports, resulted from WP4 and WP8. More specifically,

- T4.5 *Citizen and Stakeholders Awareness and Collaborative Development mechanism for citizens and business shaping their cities bottom-up*
- T8.1 *FCs Replication strategy, activities planning and Sustainability roadmap creation*

- T8.3 *Brussels Smart City Scan and Replication Roadmap and 2050 Bold City Vision*
- T8.4 *Zaragoza Smart City Scan and Replication Roadmap and 2050 Bold City Vision*

2.3 Structure of the deliverable

Deliverable D1.1 is structured as follows:

- Chapter 3 – Methodology defines the approach used to obtain information from the different stakeholders of each city ecosystem, regarding the solutions used in RESPONSE. The stakeholders who will provide the necessary information are identified, and the strategy of disseminating the surveys is described.
- Chapter 4 – Citizen’s requirements and acceptance, presents the collected data that were obtained from partner cities citizens, allowing updating the Master City planning with the data obtained from the surveys. The data obtained identifies the requirements and acceptance level of the Citizens for the solutions that will be deployed and replicated, indicating the risk of implementing a certain solution in each city.
- Chapter 5 – Stakeholders’ risk and opportunities analyses the gathered data that were obtained from RESPONSE project stakeholders. From the answers analysed during this operation, opportunities, drivers and risks for the stakeholders were identified. The opportunities and risks are considered for the technical solutions as well as for the project’s deployment process. These risks are studied to propose adapted solutions.
- Chapter 6 – Conclusions, concluding the report with an overview of the work that was conducted in T1.1 and presented in this deliverable.
- Appendixes - The Appendixes include the English version of the common parts of the questionnaires distributed to the citizens and the stakeholders.



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 2

Methodology

Chapter 2 – Methodology

3. Methodology

3.1 The integrated solutions ecosystem

As described in the RESPONSE project's Grant Agreement (GA), the project's strategy is built around five multidisciplinary and complementary Transformation Axis (TA). These aim to improve the integration of both commercialised and innovative energy systems in current city blocks, to become self-sustainable and more environmentally friendly for their citizens. The term Transformation Axis is used to group Integrated Solutions (IS) in terms of the need they address under a common umbrella:

- **TA#1: Positive Energy Building Systems:** Solutions included in TA#1 focus on: a) achieving significant energy savings on a building level, b) increasing the smart-readiness of buildings in line with the new smart readiness indicator introduced by the new EPBD¹, c) enabling the connection and integration of buildings, d) maximizing self-consumption through building integrated RES, e) achieving faster renovation rates. The end goal of TA#1 is to enable the deployment of NZEB² and even positive energy buildings.
- **TA#2: Local Energy Supply – Low Carbon & High Share of Renewables:** To reach energy positiveness on a district level, building systems must consider their integration in the city's energy networks. Solutions included in TA#2 focus on: a) enabling a high share of locally produced/consumed renewable energy on a district level, b) offering viable solutions for the decarbonization of the electricity grid and district heating/cooling methods, c) facilitating the transformation of the energy networks, further supporting fossil-based regions in transition, d) help consumers to become 'prosumers' by supporting the development of energy communities. The end goal of TA#2 is to enable the deployment of 100% RES power networks.
- **TA#3: Sustainable Energy Storage:** Energy storage enables optimization of supply and demand, helps mitigate grid infrastructure constraints and assists the seamless integration of renewable energy. Solutions included in TA#3 focus on: a) reducing grid stress and avoiding load and generation curtailment, b) supporting self-consumption over grid export, c) enabling the penetration of a higher share of RES without affecting system stability. The end goal of TA#3 is to provide more flexibility to the energy systems.

¹ https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

² https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/nearly-zero-energy-buildings_en

- TA#4: Integrated and Interconnected City Ecosystems:** ICT can be deployed to create new intelligent ways of making urban centres more efficient and interconnected. Solutions included in TA#4 focus on: a) integrating ultra-modern ICT solutions with existing CIPs, b) enabling big data management and monitoring, c) enabling the digitalization for the provision of new services for the citizens and relevant stakeholders, d) reducing the impact of electro-mobility on the energy system, e) promoting decarbonisation of mobility sector. The end goal of TA#4 is to foster innovative systems integration, complementing and optimizing the wider energy system.
- TA#5: Citizen-Centric, Resilient and Safe Cities:** Strong citizen engagement is needed to ensure that demonstrated solutions will be rolled out on a city level. A smart city should be safe for everyone and resilient (especially regarding impacts of climate change). Solutions included in TA#5 focus on: a) incentivizing citizens for co-creating value, b) creating an open innovation ecosystem for citizens to be actively involved in co-creation, c) increasing safety and quality of life, d) facilitating the development and implementation of climate adaptation plans. The end goal of TA#5 is to ensure that demonstrated solutions are co-created by citizens, serving their needs and are socially just.

In short, the RESPONSE project consists of five TAs, which are divided into different Integrated Solutions, which in turn have associated sets of Innovative Elements that will be demonstrated and replicated throughout the project. IEs may belong to more than one IS, however, in the context of T1.1, a redistribution of IEs to only one IS is made, to prevent the respondents from answering the same question more than once. Table 1 shows the associated ISs for each TA and the associated IEs for each ISs that was performed in T1.1 for the cities of Dijon and Turku.

Table 2 - RESPONSE Integrated Solution Matrix.

Transformation Axis (TA)	RESPONSE Integrated Solutions	RESPONSE Innovative Elements	
		Dijon	Turku
#1: Positive Energy Building Systems	IS-1.1: Increased RES on a Building Level	1.1.1 Click&Go façade system coupled with coloured vertical PVs 1.1.2 Pergola with bifacial PVs with albedo boost 1.1.3 BIPV Balustrades 1.1.4 Urban canopies protruding from roofs	1.1.5 DC-coupled smart bifacial PV system with optimized racking system for maximum bifacial yield

	<p>IS-1.2: Energy-Efficient and Smart-Ready Building Construction / Retrofitting</p>	<p>1.2.1 Ready2Services (R2S) Digital architecture</p> <p>1.2.2 Building Operating System (BOS)</p> <p>1.2.3 Artificial Intelligence (AI) enabled dynamic management of energy (ECO-TOUCH tool)</p> <p>1.2.4 Predictive home thermostats</p> <p>1.2.5 Indoors air quality management system using smart probes</p> <p>1.2.6 Intelligent energy management system (PANGA tool)</p> <p>1.2.12 Conventional Retrofitting (incl. insulation, replacement of radiators, repairs, LED lighting, polyurethane sealing, sensors and tracking systems, etc.) (own funding)</p>	<p>1.2.7 Nano coating 4-glazing panels windows</p> <p>1.2.8 Novel high-performance ventilation system</p> <p>1.2.9 Novel human thermal sensation control</p> <p>1.2.10 Self-sufficient IoT thermostats</p> <p>1.2.11 Upcycling of the nearby city district cooling energy flows</p>
<p>#2: Local Energy Supply – Low Carbon & High Share of Renewables</p>	<p>IS-2.1: Decarbonization and Smartification of Electricity Grid Networks</p>	<p>2.1.1 Collective self-consumption</p> <p>2.1.2 “Super EMS”</p> <p>2.1.3 Semi-transparent PV canopies (own funding)</p> <p>2.1.4 Parking PV shades (own funding)</p> <p>2.1.5 District smart public lighting (own funding)</p>	<p>2.1.6 LVDC microgrid</p> <p>2.1.7 DC coupled heat pump</p> <p>2.1.8 Cloud-based Smart Energy Management System</p> <p>2.1.9 Building level RES generation (see IS-1.1)</p> <p>2.1.10 DC coupled Battery Storage System for demand flexibility (IS3.1)</p> <p>2.1.11 Light EV charging hub (IS4.2)</p> <p>2.1.12 Energy meters (own funding)</p>
	<p>IS-2.2: Decarbonization and Smartification of</p>	<p>2.2.1 Heat exchanger substations</p> <p>2.2.2 Biomethane injection produced from sewage sludge</p>	<p>2.2.4 Upcycling of the near-by city district cooling energy flows with high COP (>5) heat pumps</p>

	District Heating / Cooling Networks	2.2.3 Green Certificates Contracts	2.2.5 District heating flexibility optimizing network control and management 2.2.6 Two-way consumer 2.2.7 District heating network control and management with dynamic district heating tariffs 2.2.8 Smart district heating substation for end-user heat demand flexibility 2.2.9 PCM-heat storage for district heating flexibility
#3: Sustainable Energy Storage	IS-3.1: Novel Electricity Storage providing flexibility to the energy system	3.1.1 Zn-Air battery 3.1.2 2nd life Battery Storage System (BESS) 3.1.3 V2G	3.1.3 V2G 3.1.4 DC-coupled Battery Storage System (BESS)
	IS-3.2: Novel Heat Storage providing flexibility to the energy system	3.2.1 PCM tanks 3.2.2 Industrial hot water buffer tanks 3.2.3 Collective hot water tank with dedicated BEMS	3.2.4 Novel PCM Heat storage for DHW 3.2.5 District heating PCM heat storage-as-a-service 3.2.6 Low enthalpy geothermal boreholes
#4: Integrated and Interconnected City Ecosystem	IS-4.1: City Information Platform-enabled Innovations	4.1.1 Control command connections and security layer (GENESYS) 4.1.2 Shared data-lake 4.1.3 PEB Multi-Energy Dashboard 4.1.4 Automatic online energy and climate indicators computation 4.1.5 Energy-Climate Dashboard 4.1.6 Heat Islands Dashboard (environmental quality)	4.1.6 Smart City Knowledge Graph AI 4.1.7 Journey planner (app) for cyclists and pedestrians 4.1.8 District heating, cooling, and flexibility control situational awareness and anomaly detection 4.1.9 Automated driving and Vehicle-to-vehicle communication of robot cars via 5G 4.1.10 5G smart city lighting poles

			4.1.11 Vehicle-to-vehicle communication of robot cars via 5G
	IS-4.2: e-mobility Grid Integration and City Planning	4.2.1 Smart charging 4.2.2 Smartcharging infrastructure deployment planning tool 4.2.3 3D visualization of enhanced decision-making	4.2.4 V2G 4.2.5 LEV Hubs 4.2.6 EV sharing scheme
#5: Citizen-Centric, Resilient and Safe Cities	IS-5.1: Enhanced Citizen Participation, Empowerment and Awareness-Rising	5.1.2 Children energy and environment days 5.1.3 Kids Labs 5.1.4 Replication methodology 5.1.5 Living Fab Lab 5.1.6 Collaborative workshops 5.1.8 Ideathons 5.1.9 Mobility Ones-Stop-Shop 5.1.10 Training modules 5.1.12 Digital participation platform 5.1.13 Serious gaming 5.1.14 VR application 5.1.15 Informative touch screens	5.1.1 Local events meetings workshops 5.1.7 Hackathons 5.1.11 Cascade funding 5.1.16 Co-creation and Capacity building events 5.1.17 Training of peer mentors 5.1.18 Environmental quizzes 5.1.19 Activities implemented by mentors 5.1.20 Training sessions of digital tools 5.1.21 Avatar creation events 5.1.22 Open dialogues with policy level actors
	IS-5.2: Enhanced City Resilience, Air Quality monitoring, Social Justice and Safety	5.2.1 Bike as a Sensor platform (inc. mobile air quality and noise gateway and dedicated app) 5.2.2 Replicability of mitigation solutions assessment (modelling) 5.2.3 Climate scenarios and resilience assessment (modelling)	5.2.4 LES based PALM meteorological flow modelling system utilizing the 4-meter pre-calculated PALM wind fields 5.2.5 5G sensor network for PM monitoring

3.2 General Methodology to gather information from stakeholders and LH/FC cities

Task T1.1 focused on 3 main objectives (see section 2.1). Each of these objectives had to be broken down for different populations covered by the surveys in task T1.1. In order to be able to define a relevant approach

strategy for the different populations concerned by T1.1, it was decided to distinguish citizens from stakeholders. Furthermore, within the stakeholders, three categories of stakeholders have been distinguished:

- private industries and services
- research centres
- municipalities and policymakers

For each of the 8 cities in the RESPONSE project, a questionnaire has been distributed to citizens, and another questionnaire has been distributed to professional stakeholders. The questionnaire for stakeholders asked specific questions, depending on the stakeholder category. In the analysis, it was possible to study the results by stakeholder category. This enabled coherent responses to be gathered and conclusions to be drawn for specific actors.

The first survey had to be answered by the citizens of the cities involved in the project, one for the city of Dijon, and another for Turku and another one for each FC. This survey was intended to understand whether RESPONSE Innovative Elements would meet the needs of the citizens. As the RESPONSE project was not known by the citizens of the participating cities at the time of surveys, questions were written so they relied on issues and technologies already known to the public, and not specifically the IEs of RESPONSE. These results highlighted:

- the level of knowledge citizens have, in a general way, about the innovative elements that will be used by citizens or in which they can participate, as well as,
- their level of acceptance/interest to use or participate in the innovative element.

The indicator provided a qualitative measure and is rated on a five-point Likert scale for the Knowledge/information level: I am very well informed about this solution (1); I have no knowledge/information about this solution (5); and for the interest level: I am very interested in using/participating in this solution (1); I have no interest in using/participating in this solution (5).

The surveys were designed as follows:

- The same survey was proposed to the citizens of Dijon and of Turku, in order to gather comparable results. This enabled to discuss the different strategies in citizen empowerment followed by both LHCs.

One survey has been answered by the internal members of the project, to identify the level of impact and the level of readiness that this set of solutions currently has, from a technological, economic and regulatory perspective.

- **Solutions Impact and Readiness levels:** The aim of this survey at this stage of the project was to have an idea of the impact and the Readiness level (concept/solutions' readiness

level in what concerns the achievement of its impact, from a technological, economic and regulatory perspective). The indicator provided a qualitative measure and has been rated on a five-point Likert scale for the Impact level: Weak impact; Excellent impact; and for the Readiness level: Very low level of Readiness; Very high level of Readiness.

An adaptive survey for different stakeholder groups seeks to understand the views on the opportunities and risks in each set of solutions and in the project as a whole.

- **Stakeholder opportunities and risk levels:** This survey was answered by the external Stakeholders of the cities involved in the project, to identify the perceived level of opportunity and risk that each group of Stakeholders of each city has in the different sets of solutions and in the project as a whole. The indicator provided a qualitative measure and has been rated on a five-point Likert scale.

3.3 Stakeholders' management towards data collection

The inclusion of relevant stakeholders' opinions in decision-making and implementation of the project is critical since no one knows better the needs and other requirements of a problem than the people affected by and affecting it. Considering this, RESPONSE considers as main stakeholders those:

- whose interests are affected by the RESPONSE project,
- whose activities affect the RESPONSE project,
- who possess/control information, resources and expertise needed for the implementation of the RESPONSE project or,
- whose participation and active involvement are necessary for the successful implementation and/or dissemination of results.

Actively engaging stakeholders is a key part of ensuring a successful implementation of a smart city project. Due to the complexity of this kind of project, there are many interdependencies among stakeholders, and there is a need to align the various interests. To resolve this issue and highlight stakeholders' mutual sharing of common interests, all the involved actors with direct influence on smart city development have been identified per stakeholder group. They are identified through the following procedures:

- examination of other Smart City (POCITYF³, IRIS⁴) projects to extract relevant information and identify successful examples

³ POCITYF – a positive city transformation framework, towards smarter and greener cities, <https://cordis.europa.eu/project/id/864400>

⁴ Integrated and Replicable Solutions for Co-Creation in Sustainable Cities, <https://cordis.europa.eu/project/id/774199/results/fr>

- analysis of LHCs special needs and respective integrated solutions so that most of the stakeholders can be actively participating/represented in the implementation/evaluation of solutions
- internal communications of RESPONSE experts

Additionally, the following three categories of actors have been distinguished: Industries and Technology / Service providers, Research centres, Municipalities and public service:

Industry and Technology / Service Providers: This stakeholder group is made up of a large range of different actors who belong to the private sector profit-making companies and will provide solutions, either technological or service-based.

Research centres: This group includes universities, private and public sector research centres and professional organisations that perform research activities leading to scientific publications and patents.

Municipalities and public service: This group consists of local, regional, national authorities and associated regulatory bodies, as well as EU level policymakers. In addition, local schools, administrative and public services are included.

Within the groups indicated in Table 3, it is necessary to identify the location-specific internal and external Stakeholders, with the help of the cities involved in the project, so the relevant bodies have been invited to respond to the surveys described in Appendix B. The different local Stakeholders for each city have been identified in the following sub-sections, noting that the identification of Stakeholders is a work carried out throughout the project, with the information from the tables of section 3.3.1 being updated continuously, in particular during tasks T5.1, T6.1, T7.1 and T8.1.

3.3.1 Stakeholders

Stakeholders are every partner of the RESPONSE consortium. These Stakeholders are gathered in Table 3 into three different groups: Industries and Technology/Service providers, Research centres, Municipalities and public service, which may belong to more than one group depending on the roles they have in the project.

Table 3 - RESPONSE internal stakeholders' group

Stakeholders Group	Relevant RESPONSE Ecosystem Partners
Industries and Technology/Service providers	EDF ENEDIS Coriance Turku Energia Oy HögforsGST Oy Elisa Oyj ELCON Solution OY Solar Finland Ltd Sunamp Ltd EGain InternationalAB Sähkö-Jokinen Ruhkala Oy Ferroamp Elektronik AB EDF UBFC (Université de Bourgogne Franche Comté) Bouygues Construction FAFCO Atmo BFC Onyx Solar OGGA CNet Svenska AB Civocracy NanoSense WITTYM Panga Finnish Meteorological Institute HOGFORS Elisa Oyj ELCON Solutions Oy Solar Finland Ltd Sunamp Ltd

Stakeholders Group	Relevant RESPONSE Ecosystem Partners
	eGain International AB Oilon Technology Oy Turku City Data Ltd Sähkö-Jokinen Oy HR-Ikkunat Ruhkala Oy Ferroamp Elektronik AB Rina Consulting SpA SPI iSolutions LLC
Research centres	EIFER UBFC (Université de Bourgogne Franche Comté) CNet Svenska AB VTT (Technical Research Centre of Finland) TUAS (Turku University of Applied Sciences) Finnish Meteorological Institute University of Turku (UTU) ICPE-CA IEIT (Innovative Energy and Information Technologies) CERTH CIRCE Comillas (UNIVERSIDAD PONTIFICIA COMILLAS) National Technical University of Athens
Municipalities and public service	Dijon Metropole Commune de Dijon City of Turku City of Brussels Ayuntamiento de Zaragoza Botosani Municipality Eordaia Municipality Municipality of Gabrovo

Stakeholders Group	Relevant RESPONSE Ecosystem Partners
	department Of International Technical Assistance, Innovation Development And Foreign Affairs Luhansk Regional State Administration (DITA) Grand Dijon Habitat (GDH) Orvitis TYS

3.3.2 Methodology Implementation Plan

This section aims to explain the choice of stakeholders to respond to each survey and the procedure for disseminating the different surveys. The platforms chosen to carry out the surveys were:

- **Google Forms**, due to the versatility that this tool has to carry out surveys and disseminate them, allowing survey recipients to respond to surveys on both a computer and a mobile device and allowing respondents to remain anonymous, with no need to provide any personal data to respond to inquiries.
- **Civocracy**, which is a partner of the RESPONSE project for the Dijon consortium, is deeply involved in WP4 and task T4.2. It was an opportunity for the Dijon consortium to improve competence on the Civocracy tool. This tool has been used for stakeholder questionnaires for the LHC consortia.

A questionnaire for citizens has been written in English (see Appendix A). The same questionnaire was sent to all eight participating cities. As a consequence, it was necessary to translate the questionnaire into each local language. In addition, it was allowed to add specific questions, depending on the local context.

Due to each city context and population, the questionnaires were not disseminated with the same approach:

- **The perspective of citizens of Dijon:** It was intended that this survey should be answered by the citizens of the city of Dijon, during the months of June-July 2021, to understand the level of awareness that citizens have about the solutions to be demonstrated in Dijon and the level of interest they have in using or participating in them, both in the historic centre of the city and outside. It was necessary to carry out face-to-face interviews to complete the questionnaires directly in the Fontaine d'Ouche district. Respondents were asked to declare the zone they live in (see Figure 1), which enabled to keep track of the proximity of the respondent's residence with the future PED in Dijon.

- **The perspective of citizens of Turku:** It was intended that this survey should be answered by the inhabitants who live in the future PED area in Turku (see Figure 20), during May 2021. This made it possible to understand the level of awareness that those inhabitants have about the solutions to be demonstrated in Turku and the level of interest they have in using or participating in them.
- **The perspective of citizens of FC:** this survey should be answered by the citizens of all FCs during summer 2021, in order to understand the level of awareness that citizens have about the solutions to be replicated in each FC and the level of interest they have in using or participating in them. By that date, it is intended to obtain a greater number of responses to the survey, since the project will be at a stage that will have a greater dissemination impact.
- **Stakeholder opportunities and risk perception:** this survey is designed to be answered by the stakeholders (both partners and external stakeholders) identified in Table 3, during summer 2021. This made it possible to identify the perceived level of power and interest that each group of Stakeholders of each city has in the different sets of solutions and in the project as a whole. In the first phase of T1.1, respondents are asked to classify themselves as one of the following groups: Industries and Technology/Service providers, Research centres, Municipalities and public service. The survey adapted its questions depending on the stakeholder's group, and to whether or not the organisation was a RESPONSE partner or not. The survey was disseminated to the partners by the T1.1 leader. The questionnaire was disseminated to the local stakeholders by each city leader, who have contacted their specific external stakeholders, inviting them to respond to the survey (see Table 1).



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Chapter 3

Citizens' requirement and acceptance

Chapter 3 – Citizens' requirement and acceptance

4. Citizens' requirement and acceptance

In this chapter, the results obtained from the citizens' surveys will be described and analysed. The survey performed in the LHCs and the FCs all have the same base (see Appendix A). The base questionnaire has been translated into each local language and disseminated to the local population. It was allowed to add questions specific to the local context. When relevant for the RESPONSE project, the results for those additional questions will be added in the following analysis, although it will only cover a specific context.

4.1 LHC Dijon

4.1.1 Context

Fontaine d'Ouche is a poor district of Dijon. The RESPONSE project is a vector of innovation and progress. However, its technical complexity may hinder ownership by presenting a high risk of misperception and rejection of the project.

The neighbourhood includes 9000 inhabitants of nearly 80 different nationalities. This ethnic richness highlights an obvious problem of understanding.

25% of the residents are under 14 years old and 18% are over 65. This age group has been growing since the 2010s. The neighbourhood's age pyramid also reveals a deficit of young adults (16-35).

Poverty is a key indicator for this neighbourhood since 37% of the inhabitants live below the poverty line.

Fontaine d'Ouche offers a quality living environment. Indeed, the district stands between the natural elements that mark the Dijon metropolis: the Kir lake (Figure 2), the Burgundy canal, the Cras plateau and the Combe à la Serpent. It is one of the greenest areas of the city.

On the other hand, the offer of services and equipment is a strong point of Fontaine d'Ouche: sports facilities (swimming pool, stadium, gymnasium, etc.), administrative needs (district town hall), education (nursery, primary and secondary schools, leisure centre), shops (shopping centre), and a rich network of associations (*Maison Phare*, sports clubs, etc.). All these elements contribute to the influence of the district, which hosts major festive events such as the *Parade Métilse* every year⁵.

⁵ In french: <https://www.dijon.fr/Agenda/Parade-Metisse>

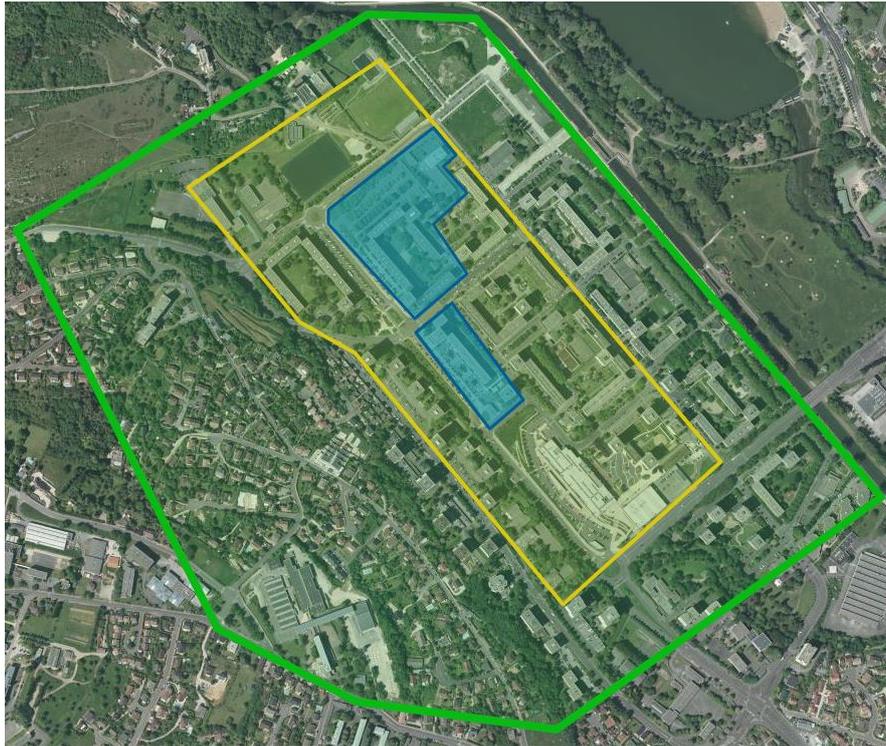


Figure 1 - Map of the district in Dijon. The colouring of the areas makes it possible to identify where the respondents live without asking for their postal addresses. Blue: PEB 1 & 2, Yellow: PED, Green: Fontaine d'Ouche district



Figure 2 - Kir lake in Dijon, viewed from the north-western end of the lake

Residential area of respondents (numbers)

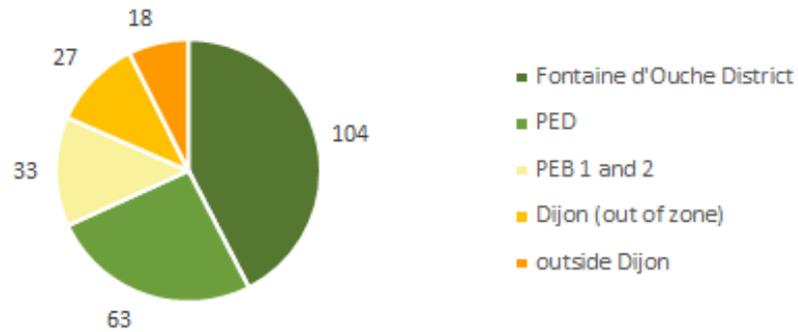


Figure 3 - Count of respondents for citizen survey in Dijon (total 245), by residence zone (see Figure 1)

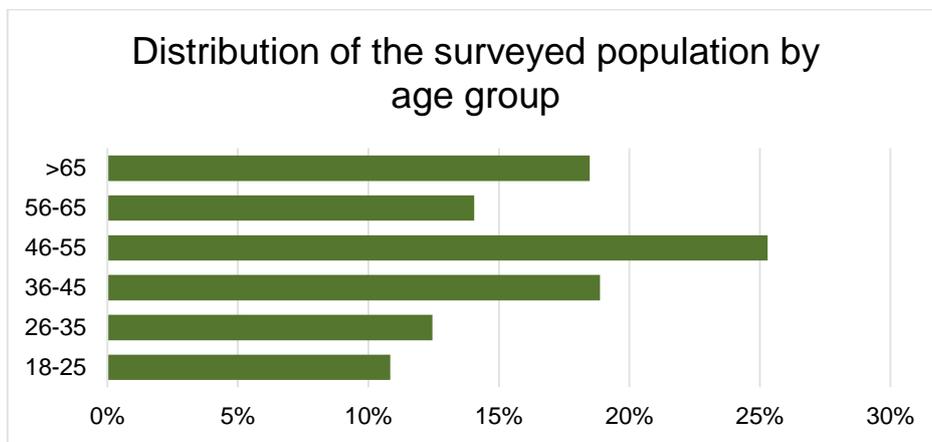


Figure 4 - Distribution of respondents for citizen survey in Dijon by age group

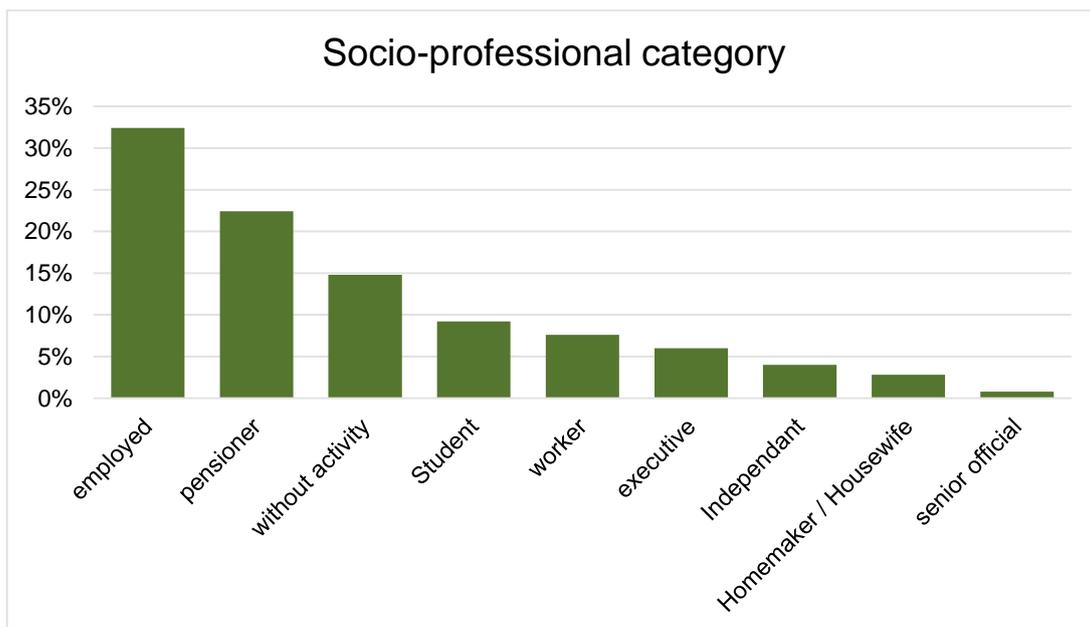


Figure 5 - Distribution of respondents for citizen survey in Dijon by socio-professional category

According to the results in Figure 3, Figure 4 and Figure 5, the representative profile of respondents is a 46-55 years old employee, living in the green area of the Fontaine d’Ouche district.

4.1.2 General attitude, comprehension, issues and aesthetic report

In this section, the main questions that are addressed are:

- Do citizens understand the RESPONSE project?
- Do citizens feel involved in the RESPONSE issues?

As the citizens may not be aware of the RESPONSE project and the technologies that would be implemented, questions focus on opinion on climate change and environmental issues, then on the political priorities of these issues in comparison with other issues. Finally, respondents have been asked about their behaviour, on a daily basis, on energy consumption and saving.

4.1.2.1 General attitude

Figure 6 lists the opinions of inhabitants on four statements dealing with climate change.

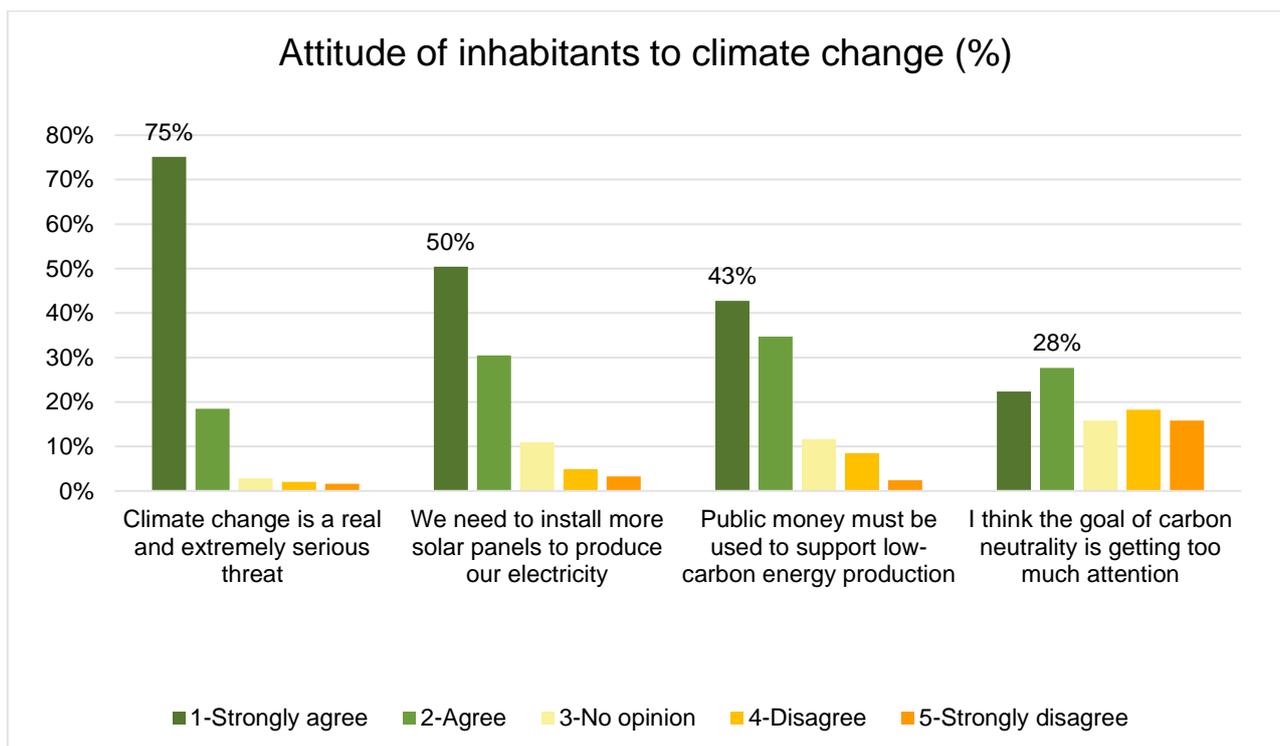


Figure 6 - Opinion of Dijon citizen survey respondents concerning climate change and energetic transition policies (percentage states for the share of the most frequent answer for each statement)

The respondents “agree” or “strongly agree” with the first three statements which are that “climate change is a real and extremely serious threat”, “we need to install more solar panels to produce our electricity” and “public money must be used to support low-carbon energy production”. The answers are more distributed

over the 5 choices (strongly agree to strongly disagree) for the last statement of this section “I think the goal of carbon neutrality is getting too much attention”.

Figure 7 displays the relation between the opinion on the attention given to the Carbon Neutrality objective according to the opinion on the fact that climate change is a real threat.

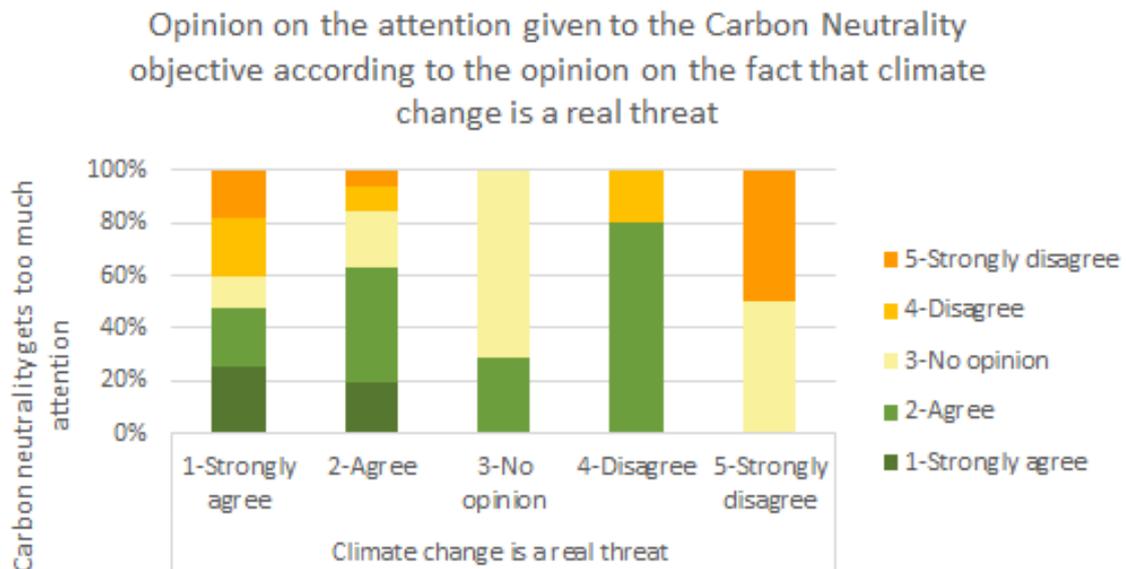


Figure 7 - Comparison between declared importance of climate change issue and the priority of carbon neutrality

If respondents were fully aware of the concepts of climate change and carbon neutrality, we should have a reversal. Those who say they completely agree that climate change is a real and extremely serious threat should completely disagree that the goal of carbon neutrality attracts too much attention that could be used for other issues.

However, the graph shows that about 20% of respondents who completely agree with the first statement strongly disagree with the second, and 20% disagree.

Nearly 50% of the strongly agree respondents agree or strongly agree that the carbon neutrality goal is getting too much attention.

However, the two statements are not similar, so it is not fair to say that all of these seemingly contradictory responses stem from a lack of knowledge.

Only seven respondents (2.8% of the surveyed population) had "no opinion".

Discussion: This section presents the inhabitants' attitude towards environmental issues. The population seems sensitive to current climate change issues. It can be inferred that the carbon neutrality objective is not well known or understood by the local population. There may be a lack of awareness of the carbon neutrality

goal. It has been observed a limited effect of the political/collective nature of the issues, in comparison to what was observed in Turku (in particular on the issue of public money) (see section 4.3).

To identify the preference of citizens regarding political issues, respondents have been asked to choose two statements between six propositions. Results are presented in Figure 8.

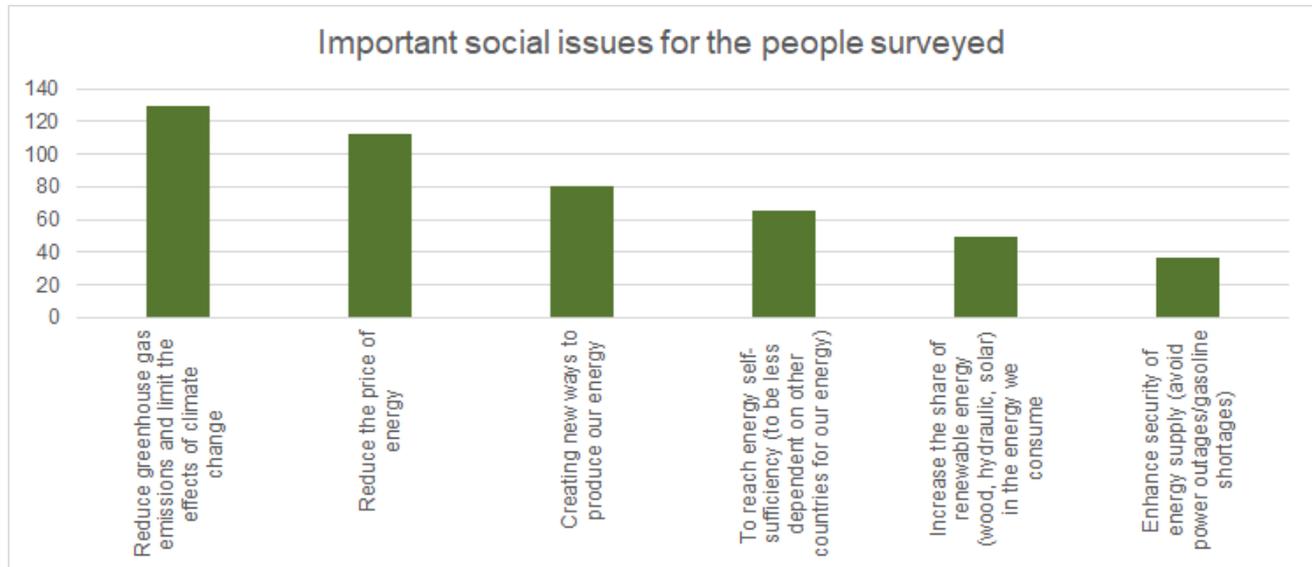


Figure 8 - Dijon citizen survey respondents' political priorities regarding energy and environmental issues

For the people surveyed, the first important social issue is to “reduce greenhouse gas emissions and limit the effects of climate change”. Then we find “Reduce the price of energy” and “creating new ways to produce our energy”.

Discussion: There is an awareness of climate change and its global consequences. However, an important issue for Fontaine d’Ouche inhabitants is their energy bill. Indeed, we are dealing with a poor population that pays attention to the price of energy but who wants to use new ways to produce energy. There is a contradiction between the will to change things (innovation is often expensive) and the fear that their bills will increase.

4.1.2.2 Housing and lifestyle

The second part of the questionnaire was about the housing and lifestyle of the people surveyed. Respondents were asked to rate their agreement with sentences. To improve results readability, questions in the negative form have been reversed in the positive form, so that the negation "I don't know how to make my lifestyle more frugal" became an affirmation. The results now respond to "I know how to make my lifestyle more frugal". This manipulation allows for a simpler analysis of the data. The results of the questionnaire are summarised in Figure 9.

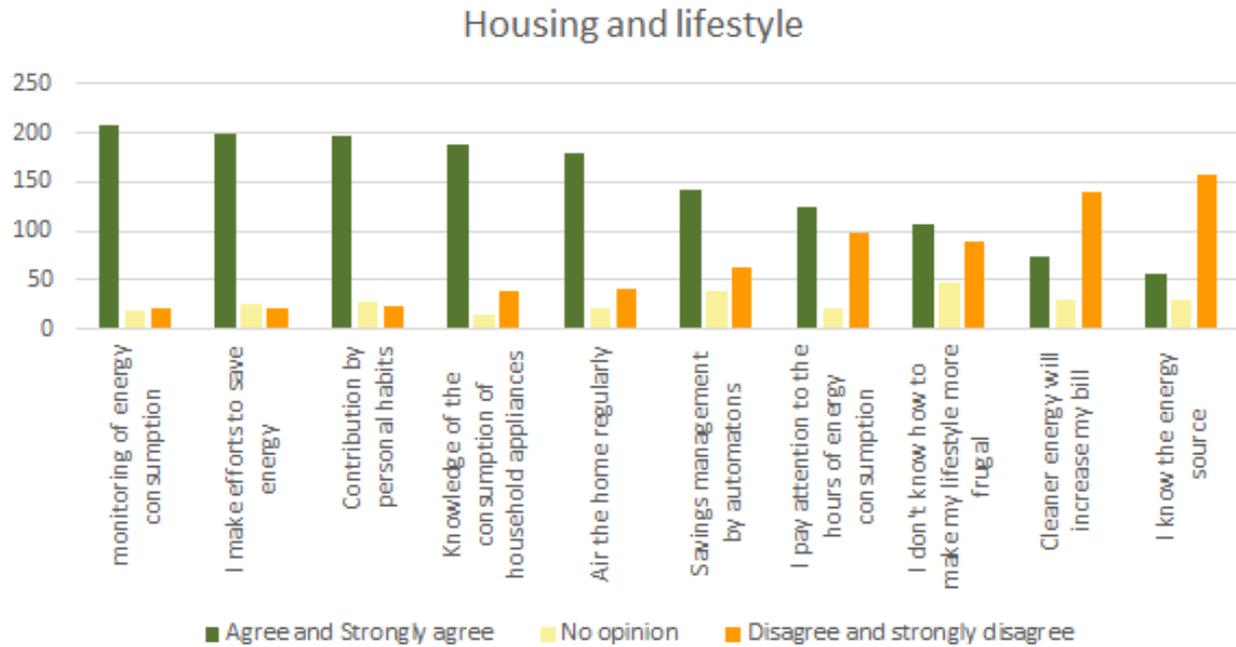


Figure 9 - Dijon citizen survey respondents' answers for housing and lifestyle relative questions

The statement "I pay attention to the hours at which I consume energy" offers a balanced graph, with 125 agreeing and 98 disagreeing.

For the five first statements, the agreement of respondents is overwhelming. Overall, people are in favour of managing energy savings through automated systems and they would like to monitor their consumption more precisely.

The respondents claim to know the consumption of their various household appliances. This statement is quite surprising but plausible.

A large majority of the respondents have to ventilate their dwelling because they feel that the ventilation system is insufficient. This confirms the need to thermally retrofit buildings to bring additional comfort to the occupants.

More than half of the respondents do not know the source of energy that heats their dwelling, which is all the more understandable for residents in buildings where the heating is fully managed by the building owner.

Discussion: Adding a negation in the middle of the statements probably got some people confused, as they had trouble reversing the scale in their heads. This explains the homogeneous results for the statement "I don't know how to make my lifestyle more frugal" between those who agree (107 respondents) and those who disagree (89 respondents).

The consumption of various household appliances is a point that can be further explored during a workshop with the inhabitants.

The question about the household energy sources shows the benefits of self-consumption. This system would enable residents to know where their energy comes from.

It should be noted that most inhabitants of social housing in Fontaine d'Ouche district get heating from district heating. When considering this observation, it seems less surprising that half of the respondents do not know the source of energy for heating their housing.

The respondents estimate that they are already making efforts to save energy and claim that everyone can contribute to the objective by their own habits. Figure 10 represents the declared level of effort distributed by socio-professional category.

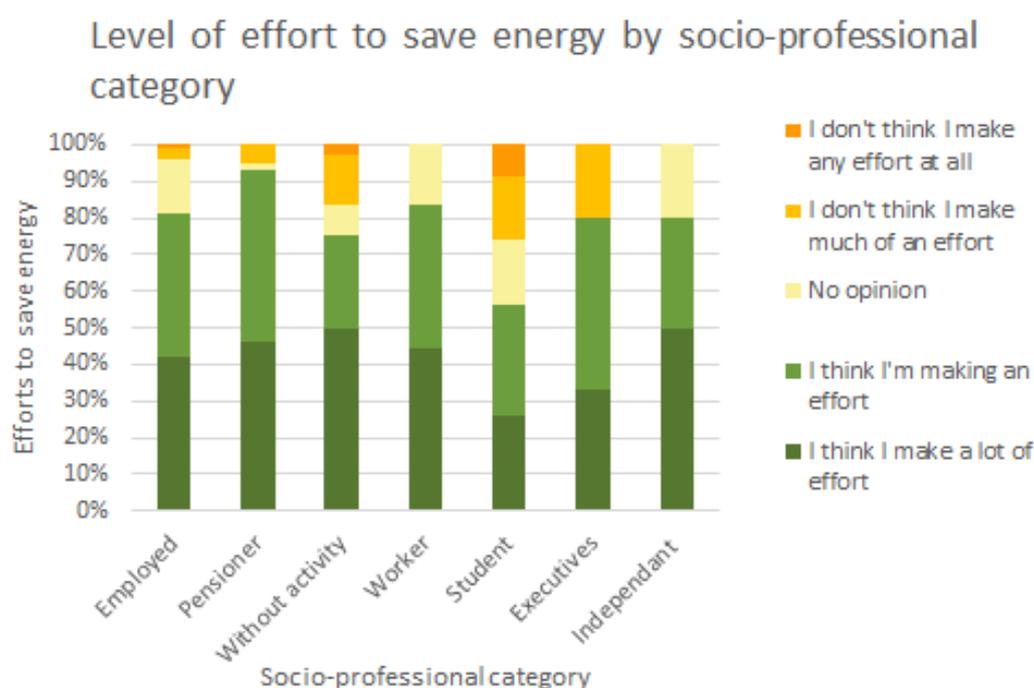


Figure 10 - Declared level of effort of Dijon citizen survey respondents, distributed by socio-professional category

The only socio-professional category (= occupation) which admits not to make any effort to save energy are students (10% at 5 and 15% at 4) and people without activity (5% and 10% respectively).

The classes that think they make the most effort are:

- retired (more than 90% agree and completely agree)
- executives (more than 80% agree and completely agree) and employees (80%)

In all categories, at least 50% of the respondents claim to be already making efforts to save energy.

Discussion: Retired people have a culturally more frugal lifestyle due to their education, whereas students were raised in a society with lower real energy costs.

According to the previous results, the population is already involved in energy saving and will therefore be easier to mobilize in this area. However, the declared efforts should be identified more precisely: What are they actually doing? Are their actions "efficient" / "useful"?

Figure 11 represents the concern of respondents about a possible increase in their energy bill according to their socio-professional category. Considering our first analysis (see Figure 8, Figure 9), we hypothesized that the possible increase in the bill would be problematic and that the inhabitants would give a higher priority to lower energy costs rather than using cleaner energy.

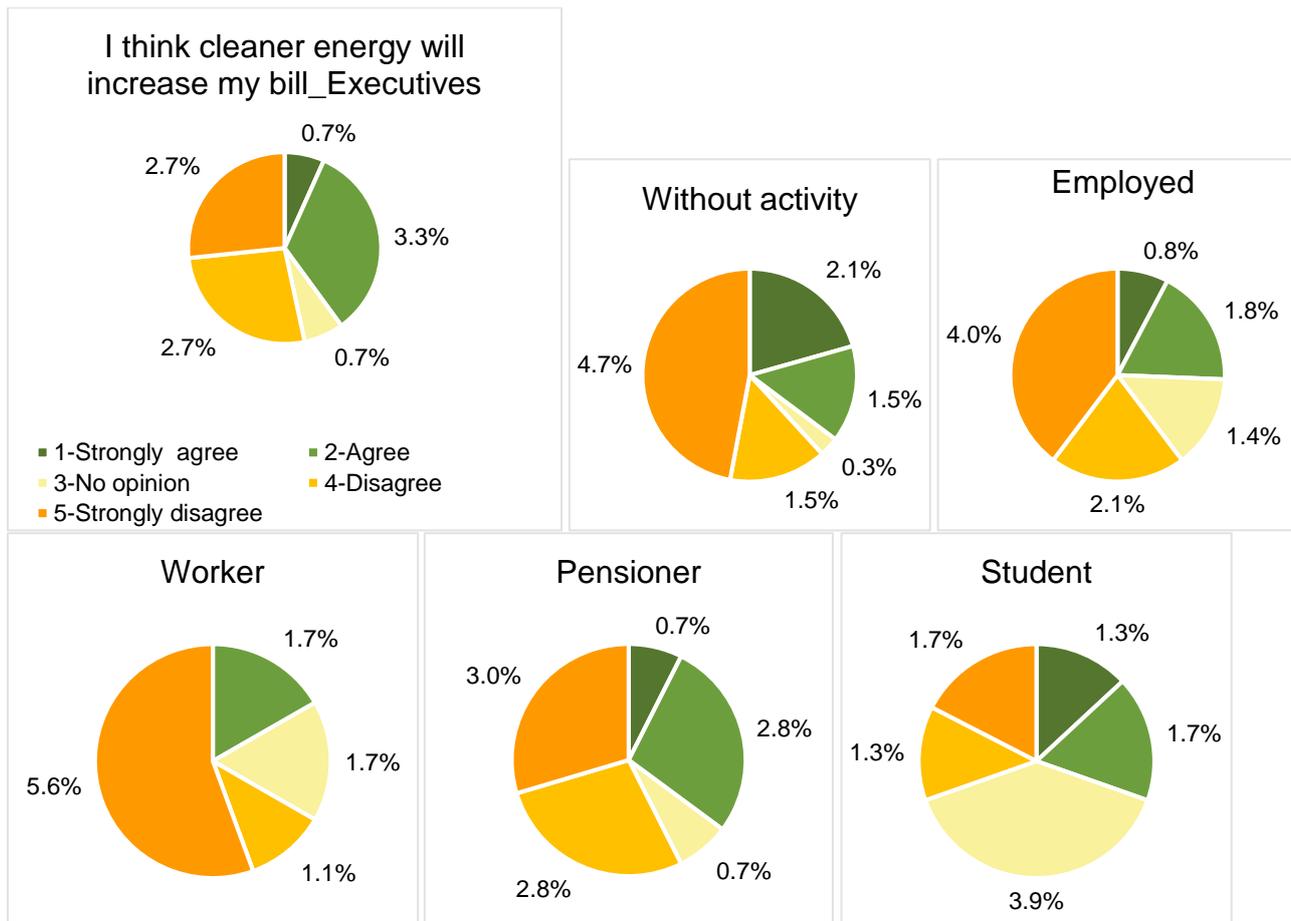


Figure 11 - Agreement of Dijon citizen survey respondents with the statement. Each disk stands for a specific socio-professional category.

In every, socio-professional class, more than 50% of respondents are not worried about their bill increase. Only students did not meet this criterion but said they had no opinion. Most probably, they often still live with their parents or get help to pay their rent. Therefore, they are largely unconcerned with this question. A minority of respondents is worried about the possible increase of bills whatever the socio-professional category. In addition, it has already been observed that respondents do not necessarily consider that cleaner energy means more expensive energy (Figure 9). In comparison with our initial hypothesis, respondents seem not to give an overwhelming priority to energy cost in comparison to cleaner energy.

4.1.2.3 Mobility

Questions about mobility were specific to Dijon to prepare the work on EV charging stations. Moreover, the mobility in popular districts is often different from the rest of the agglomeration and therefore interesting to study in order to work on the development of the territory.

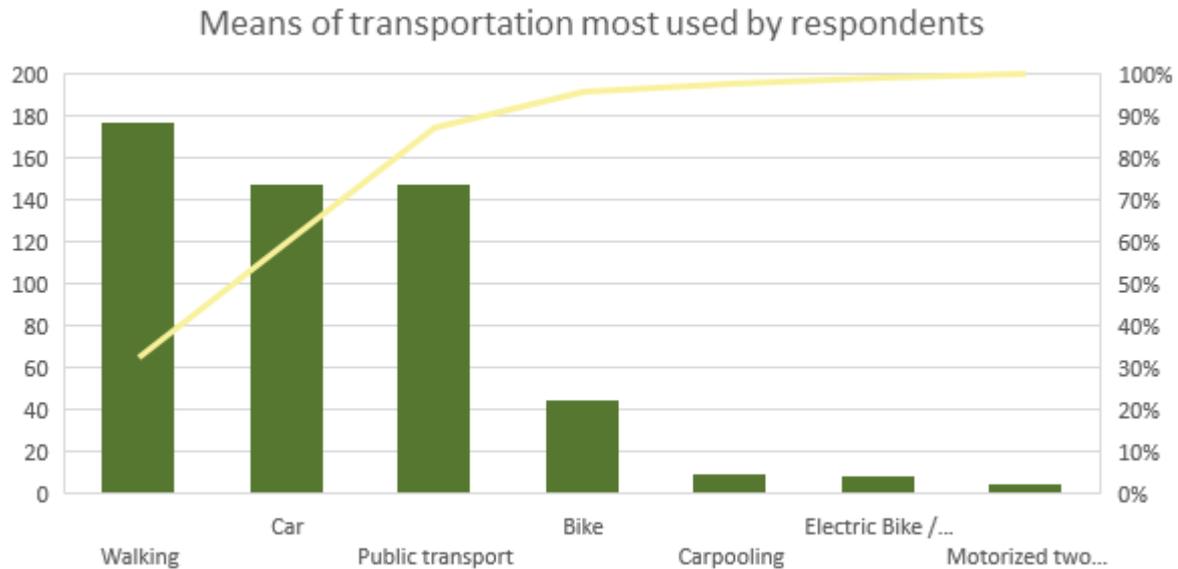


Figure 12 - Dijon citizen survey respondents most used modes of transportation. The yellow line represents the total cumulative percentage (scale on the right). For example, 87% of responses belong in categories "Walking", "Car" or "Public transport".

The analysis of the modes of transportation used by the respondents reveals a predominance of walking (Figure 12). Indeed, 177 respondents checked off walking among the three possible choices. This observation can be explained by the concentration of services in the neighbourhood. The inhabitants have at their disposal amenities such as supermarkets, pharmacies, post offices, cafés, tobacco shops, etc. in a relatively concentrated space (the main square). On the other hand, the district is located close to Kir lake (Figure 2), a place of leisure, a symbolic walk in Dijon. Walking is the number one means of transport in the political priority districts, often due to the lack of other means of transportation⁶. To maintain walking as a major transportation mean, the objective is to ensure continuity (safe crosswalks, pedestrian zones, wide sidewalks) of pedestrian routes.

Public transportation and private cars are tied with 148 responses and complete the top 3 of the respondents' main modes of transport. In the political priority districts of the city, the car is a marker of social belonging. It seems to enable people not to be "pigeonholed" as inhabitants of an urban district. Acquiring a car is a kind of social assent that enables one to "get out of it". Combined, walking, driving and public transport represents almost 90% of the responses.

⁶ <https://www.adcf.org/files/THEME-Transports/etude-mobilites-WEB.pdf>

The Fontaine d'Ouche district is served by a Divia line (L3, see Figure 13) whose terminus is located in the district and which crosses Dijon through the city centre (*Place Darcy, Place de la République*) to the Cap Nord area (Ikea). A second line, less frequent, enables users to go to the university campus (Corol). This service is essential for the integration of the QPV⁷ into the city, which is provided for in the public mobility policies.

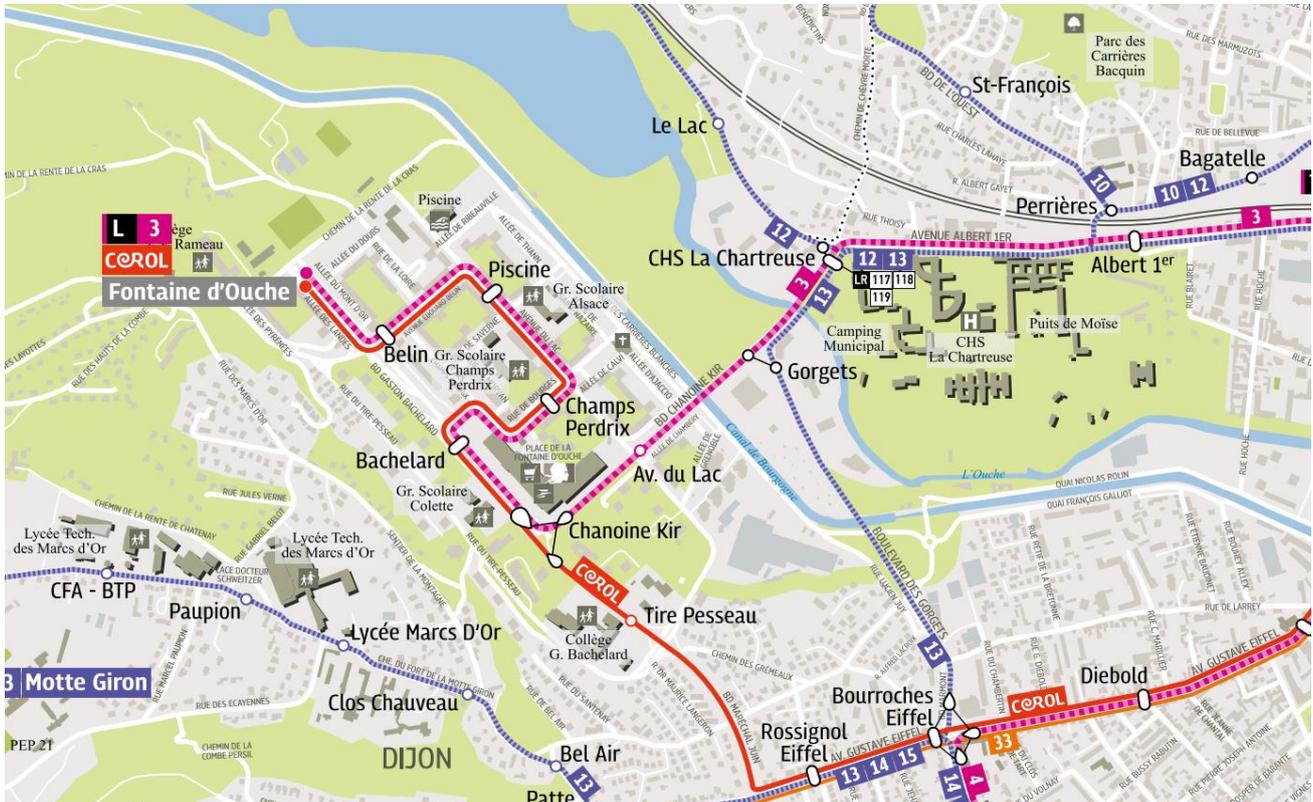


Figure 13 - Sample of the public transport plan⁸ for Fontaine d'Ouche district

Bicycles come in 4th place with some 45 responses, which represent 8.8% of our respondent population. In the entire Dijon Metropole perimeter, only 3% of the population choose the cycle as a personal means of transportation. In theory, this mode of transportation has difficulty in becoming more widespread in the urban policy districts because it is associated with "city centre" practices. The LOM law⁹ provides for the reinforcement and development of active mobility by, for example, introducing a "bicycle culture" (art. 57), or by financially encouraging the use of bicycles (art. 82). However, in Fontaine d'Ouche, there is an upward trend in this mode of transport, which is very positive.

The reasons for travelling are related to the activity programs of individuals. Figure 14 displays the places of convergence and the mobility obligations of the people.

⁷ QPV : Urban policy is a policy of urban cohesion and solidarity with the most disadvantaged neighbourhoods

⁸ <https://media.divia.fr/kcfinder/upload/files/Kiosque/Plans/WEB%20Geographique%202021-2022.pdf>

⁹ <https://www.ecologie.gouv.fr/loi-dorientation-des-mobilites>

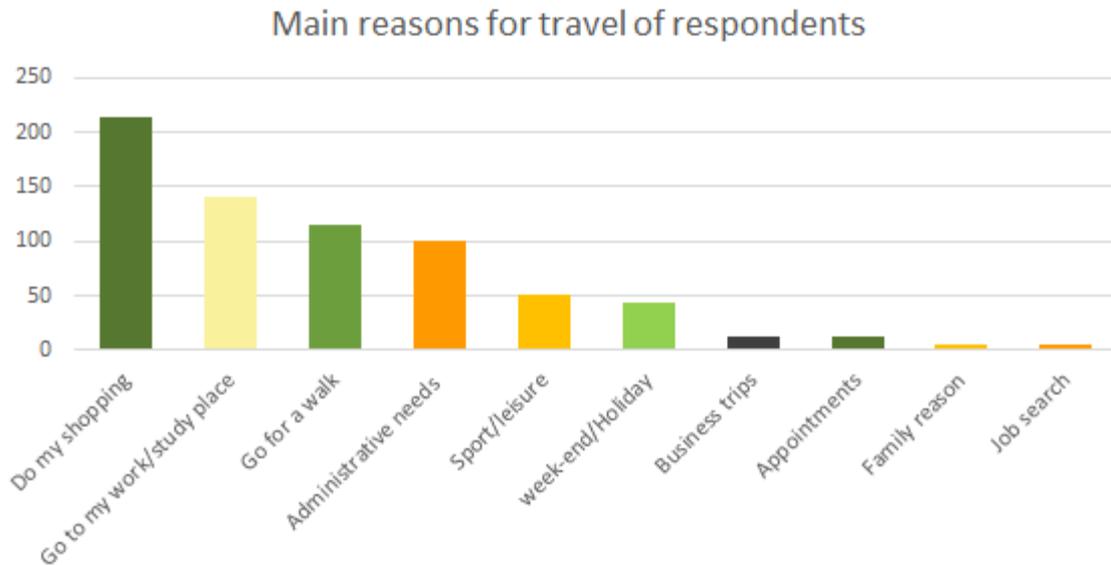


Figure 14 - Dijon citizen survey respondents main reasons for moving. Each respondent could choose up to 3 answers.

"Shopping" appears to be the primary reason for travel (3 choices combined) with 214 responses. It is largely represented before "going to my place of work/study" with 132 responses and "walking" with 115 responses. These three choices account for 70% of the trips made by the surveyed population. These motives are not surprising and correspond to a classic activity program for the French. For example, in the Dijon metropolitan area, 22% of trips are made to go to their workplace, 13% to study, 18% to shop¹⁰. We note that the respondents travel primarily to do their shopping, whereas the average Dijon resident travels primarily to go to work/study. This may be due to the low level of activity in the neighbourhood (pensioners, stay-at-home mothers/fathers, unemployed).

Some respondents checked "other" and added "job search". This modality is crucial for working-class neighbourhoods because job search can be hindered by the need to be mobile (for training or interviews) outside the neighbourhood.

As the RESPONSE project includes the implementation of car sharing in the PED (IS 4.2), it is then important to assess how willing would residents be to switch transportation modes. Figure 15 is a crossing proposal that would encourage respondents to use the car-sharing system in the neighbourhood based on their current mode of transportation.

¹⁰ <https://www.metropole-dijon.fr/Services-et-missions/Deplacements-et-mobilites/Enquete-deplacements-dans-la-metropole>

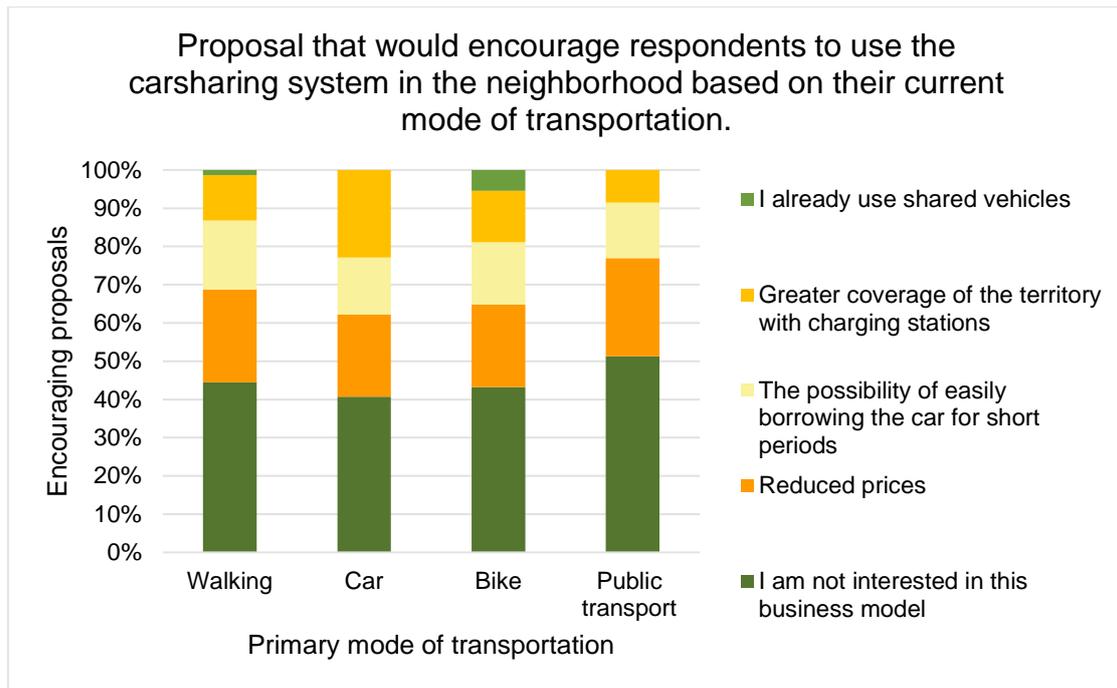


Figure 15 - Dijon citizen survey respondents expectations in the quality of service of carsharing

At over 40%, and regardless of the respondent's primary mode of transportation, this operating model does not interest users. In a second stage, respondents would be interested in lower prices for this mode of operation. The comparison with the socio-demographic profile of the population of the FO district is obvious: it is a district marked by poverty, and the inhabitants opt for the least expensive mode of transport.

More than 20% of motorists would be encouraged by greater coverage of the area with charging stations. These users are used to door-to-door trips and they would like to keep this comfort unchanged. The network of charging stations in the district and the metropolis must be very dense to meet this need.

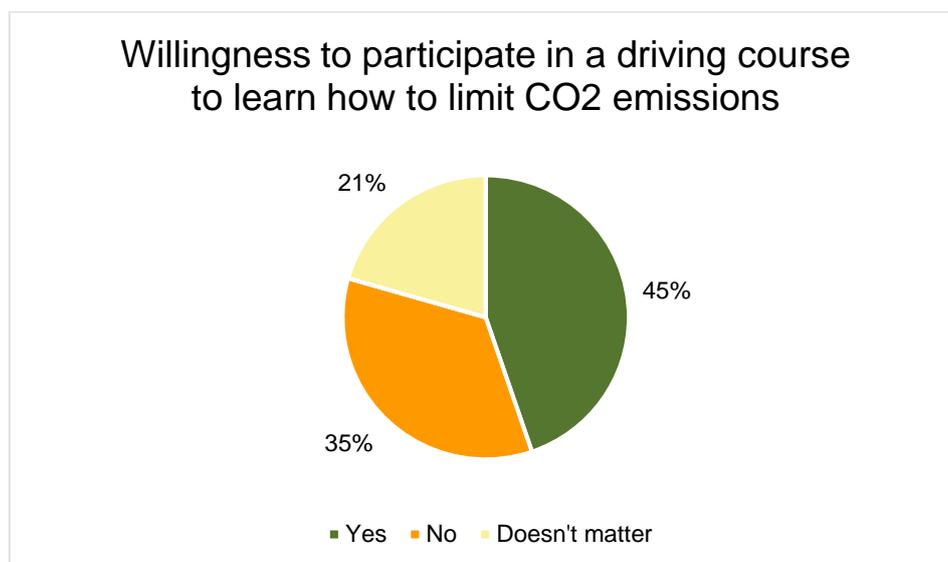


Figure 16 - Willingness to participate in a driving course to learn how to limit CO₂ emissions

A driving training workshop to inform how to limit car emissions may be provided to the public. In order to anticipate the interest of Dijon inhabitants in such training, respondents have been asked for their willingness to participate (Figure 16). 44% of the population surveyed said they were interested in eco-driving training to limit their fuel consumption and CO₂ emissions. 34% do not wish to participate and 20% are indifferent.

Likely, most of the "indifferent" respondents are actually "No" participants who did not dare to say so. On the other hand, in the "no" category we must consider all the users who do not own a car or even a driving license, which is an expensive training. It should be noted that the proportion of people with a driver's license is lower in priority neighbourhoods than in other neighbourhoods (-22 to -25 points)¹¹.

4.1.3 Risk perception, anxieties and apprehensions

This section aims to better identify the main risks, according to the citizens' point-of-view. The questions addressed to the respondents have been written to select the main anxieties of Dijon's inhabitants about district transformation (cost of living, fire, accident, batteries and innovative technologies, aesthetic).

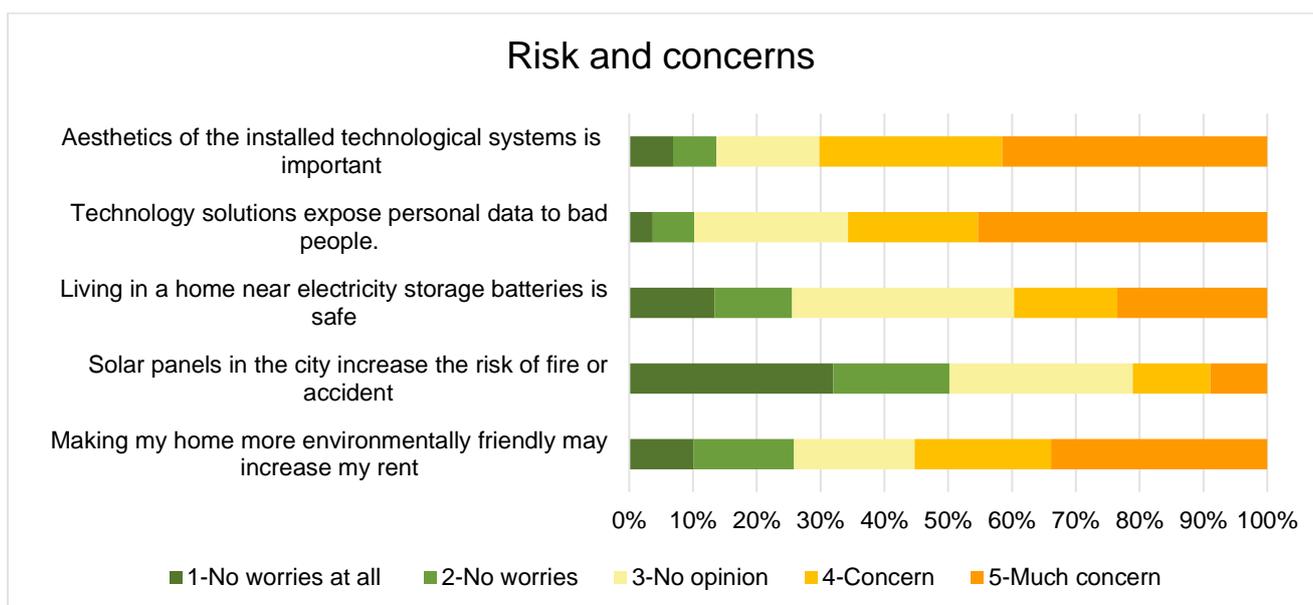


Figure 17 - Dijon citizen survey respondents rating of various statements about concerns relative to the RESPONSE project.

According to the results gathered in Figure 17, the aesthetics of technological systems is essential for 70% of interviewees. Respondents think, at a large majority, that technology solutions expose personal data to people with bad intentions. They are afraid of a possible increase in their rent if their home becomes more environmentally friendly.

¹¹ Source: National Observatory for Urban Policy (ONPV) Annual Report 2017

In Figure 9, we noted the significant number of respondents who were in favour of managing energy savings through automatic devices (boxes, sensors, etc.). This question is linked to the one about the fear of exposing personal data. It is expected that the more the respondent agrees with using automation to manage energy in his housing, the more he will be confident with the security of his data.

40% of respondents think that living next to storage batteries is dangerous. This gives us a major challenge for the development of WP4, especially for the work with schools that will be close to the batteries. Awareness and communication on this subject seem important.

Figure 18 crosses, in line, the willingness to hand over the energy management to automation and, in colour, the intensity of the threat that personal data are exposed.

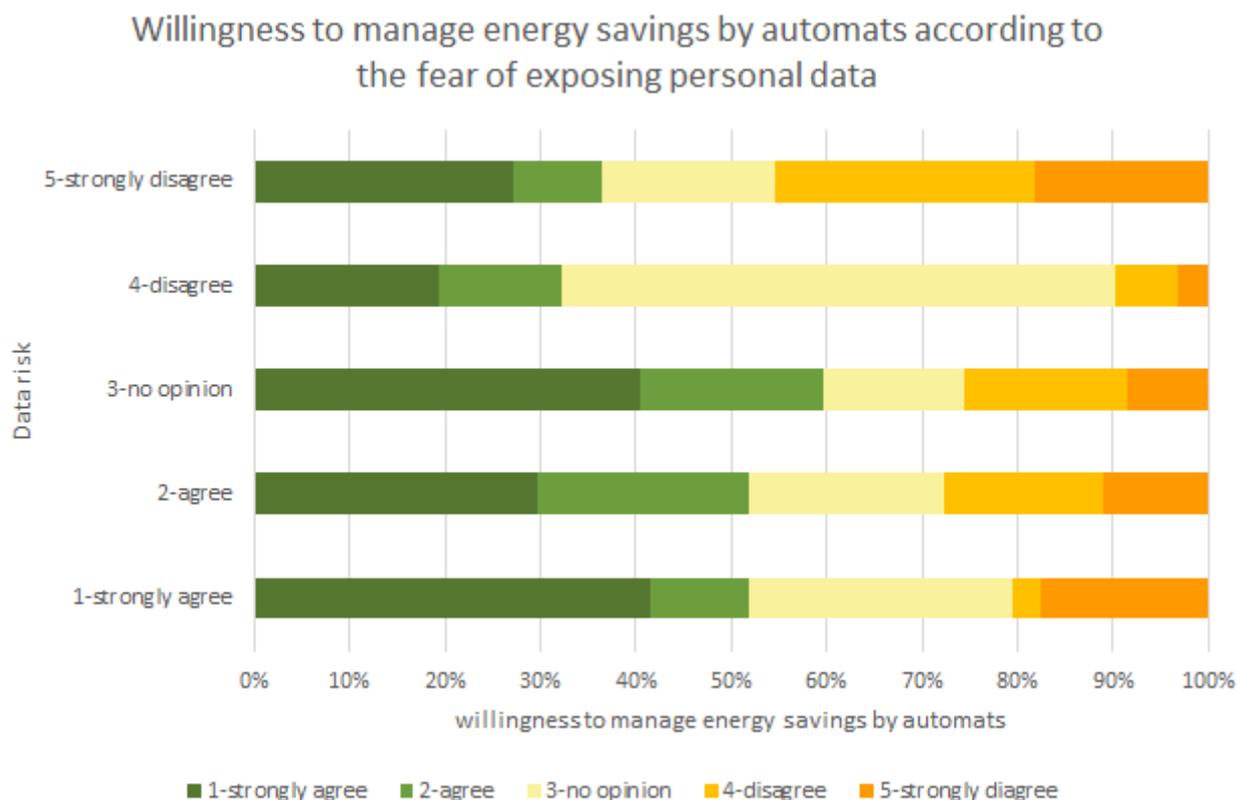


Figure 18 - Comparison between the willingness to manage energy savings by automat (colour) and the fear that personal data is at risk (line). Reading guide: the top line gathers all respondents who strongly disagree with the risk that technological solutions will expose personal data to ill-intentioned people; among these respondents, 27% also strongly agree with letting energy management to automatic solutions. In comparison, in the last line, more than 40% of the respondents who strongly agree with the risk to the confidentiality of personal data also strongly agree with leaving energy management to automatons.

More than 50% of the 101 people who answered that they completely agree with the fact that automation should manage energy savings declare that they also think that technological solutions expose their personal data to ill-intentioned people. This seems like a contradictory answer since energy management automation will rely on personal data collecting and analysis. The 40 respondents who agree with the principle of

automated energy management systems but are afraid of exposing their data to technological solutions (50%) also have the same opinion.

This observation is less pronounced for the 37 respondents who did not agree with the automatons and who, at almost 40%, are afraid of exposing their personal data.

This analysis highlights the need to communicate about RESPONSE's technological solutions to residents. It is not only about installing sensors, automatons, boxes or other digital devices but also about seducing people by selling the positive aspects of the innovations. Trying to reassure residents may amplify the negative aspects in their eyes.

4.1.4 COVID- and Climate Change/Energy Transition

The next statement was, "I think it is more important to use our resources to revive the economy after the COVID crisis than to fight climate change." Results are gathered in Figure 19.

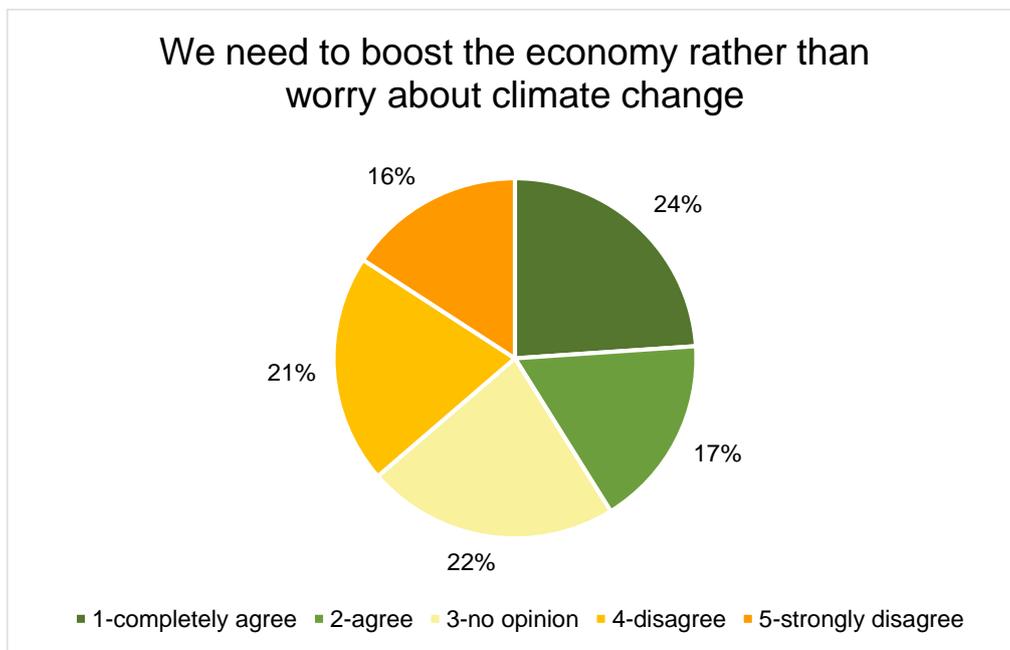


Figure 19 - Dijon citizen survey respondents opinions about the need to boost the economy rather than worry about climate change

There is no trend in this graph. There is an almost perfect distribution between the five levels of the scale. It seems then that misunderstanding has taken over. The statement addresses in turn the topics of economic recovery after the pandemic and climate change. As this question comes at the end of the questionnaire, the respondents may be somewhat confused between affirmation and negation. To affirm that the priority is to relaunch the economy they had to answer "completely agree" or "agree" and to be concerned above all about climate change they had to answer "disagree" or "not at all agree".

When we asked this question face to face, we quickly realized that the wording was ambiguous and a bit long. The answers did not provide us with any striking elements other than a questioning of the formulation.

4.1.5 Conclusion: needs analysis and deduction

This questionnaire highlights the need to inform and raise the level of knowledge of the inhabitants on environmental issues. They are already sensitive to this cause but lack technical elements, particularly on carbon neutrality.

The concern about bills is great and understandable since the Fontaine d'Ouche district is a working-class neighbourhood.

The way of life of the inhabitants of the district is rather thrifty. The challenge of the RESPONSE project and particularly for the WP4 (empowerment) is to value good practices and to encourage them to make citizens proud.

4.2 LHC Turku

4.2.1 Context

The PED implementation of Turku will take place in the Student Village. The approximate size of the area is 0.75 km² and includes 3650/3721 inhabitants. Student Village is located in the north-eastern part of Turku and the University of Turku campus in the southwest as presented in Figure 20.

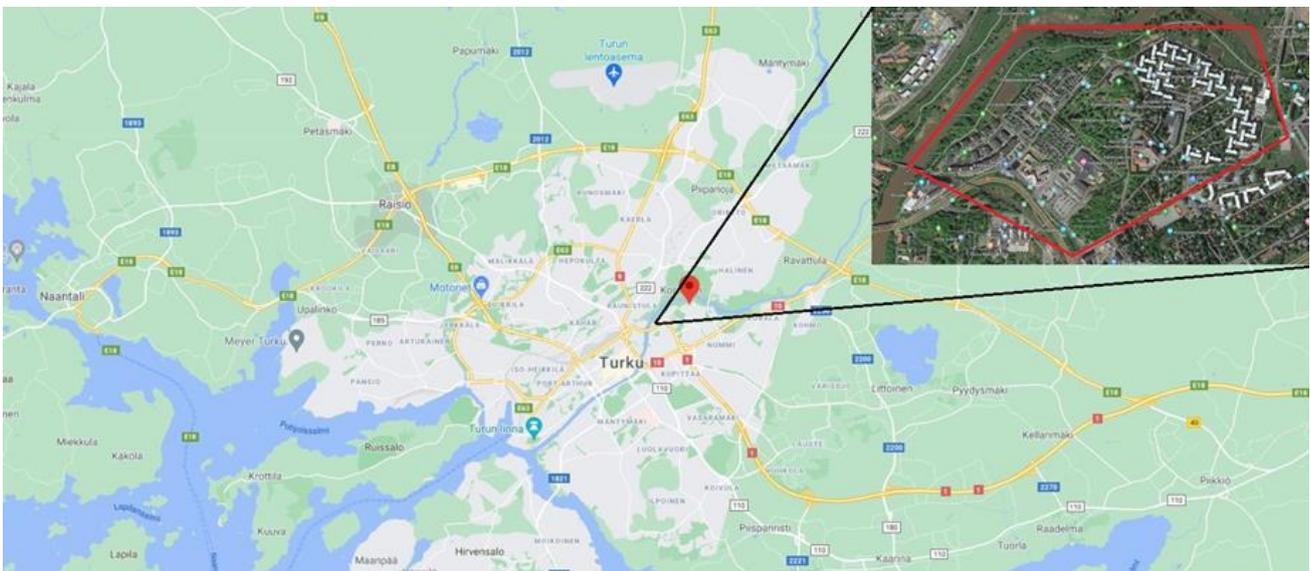


Figure 20 - PED location on the greater map of Turku

The area mainly includes housing for students and families provided by the Turku Student Village Foundation (TYS) but also residential buildings and private detached houses. There is also a shop, a spa-hotel, several day-care centres, schools, a cemetery and a Lutheran church. There are hiking trails and facilities for

activities such as swimming, tennis, volleyball and basketball. Due to its size (being the largest single student housing complex in Finland) and proximity to the University of Turku and Åbo Akademi campuses, Student Village can be considered TYS main housing area. Most buildings have been constructed during the 70-80s, some of the most recent ones – in 2011 and 2019. The Innovative Solutions and Integrated Elements to be deployed in the area are described in detail in deliverables D1.3 - D1.5. The engagement of citizens in the design and implementation activities of RESPONSE is a key towards the successful implementation of planned technologies in Turku.

The key participatory approaches that will be leveraged in the RESPONSE-Turku to involve citizens and raise awareness about energy technology include: a) Pre-workshops with active students living in Turku university village, ensuring user insight in RESPONSE; b) Capacity building events and knowledge transfer meetings with experts using Living Lab methods; c) Training of peer mentors, who will act as the main actors in motivating the community; d) Community events i.e. social and technical hackathons, and environmental quizzes including cascade funding; e) Activities implemented by mentors in order to support and motivate other students; f) Training sessions of digital tools; g) Avatar creation events. These events are a series of innovative workshops (three sessions for each building, in order to create the information substance for avatars designed individually for each building). The workshops are led by trained mentors, who use the Innoveda principles; h) Deliberative open dialogues with policy level actors to form a common understanding and commitment of long-term solutions. The aim is to engage citizens as early as possible in the development of RESPONSE technology and into the contributing of the City Master Plans, thus while WP4 is the main working forum for such activities, already in WP1 the interaction and involvement of mentors and students were set up. Furthermore, the workshop to explain RESPONSE technologies to citizens was organised by TUAS and VTT in April 2021.

In addition, the survey has been designed to collect and assess the attitude and awareness of citizens about the aspects of technologies to be implemented. This allows developers to make changes and adapt their design and development effort according to the perceptions, requirements and needs of citizens living in the PED deployment area. Overall, 498 persons have answered the survey. The main demographic characteristics of respondents, education, gender and occupation are presented in the following. The Likert Scale (1-2-3-4-5, Disagree – Somehow disagree – Neutral – Somehow agree – Agree) have been used to obtain the quantitative results. The questionnaire can be found in Appendix A. Citizen questionnaire (English version).

The following social data about respondents have been gathered and summarised:

- Age: respondents are mostly young (55% under 26) (see Figure 21 and Table 4)
- Localisation: 69% of respondents reside in the student village (see Figure 22 and Table 5)

- Occupation: students represent an overwhelming majority of respondents (83%) (see Figure 23 and Table 6)
- Educational level: most respondents have a secondary or undergraduate education level, but it must be kept in mind that most of the respondents will move to a higher level of qualification soon (see Figure 24 and Table 7)
- Gender: the respondents are composed of a slight majority of females (see Figure 25 and Table 8)

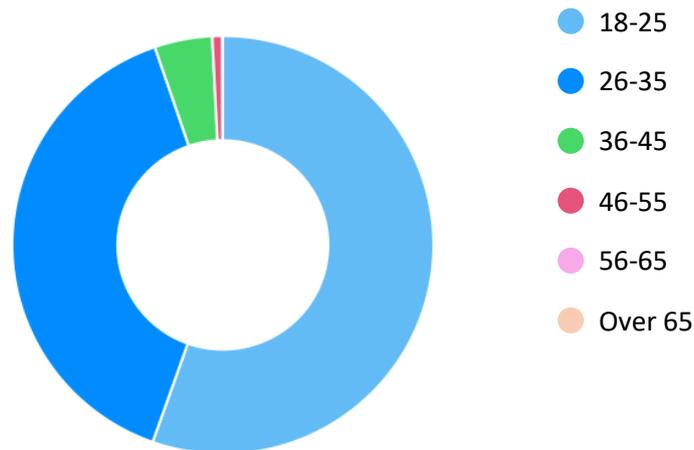


Figure 21 - Age distribution of Turku citizen survey respondents

Table 4 - Age distribution of Turku citizen survey respondents

AGE	ANSWERS	RATIO
18-25	276	55.4%
26-35	196	39.4%
36-45	22	4.4%
46-55	4	0.8%
56-65	0	0.0%
Over 65	0	0.0%

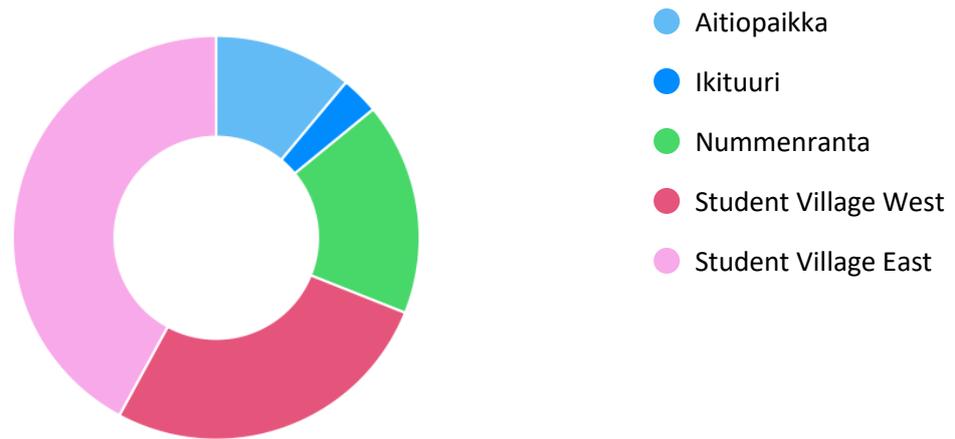


Figure 22 - The area of living in the Turku Student Village

Table 5 - The area of living in the Turku Student Village

AREA	ANSWERS	RATIO
Aitiopaikka	55	11.0%
Ikituuri	15	3.0%
Nummenranta	85	17.0%
Student Village West	134	26.9%
Student Village East	210	42.1%

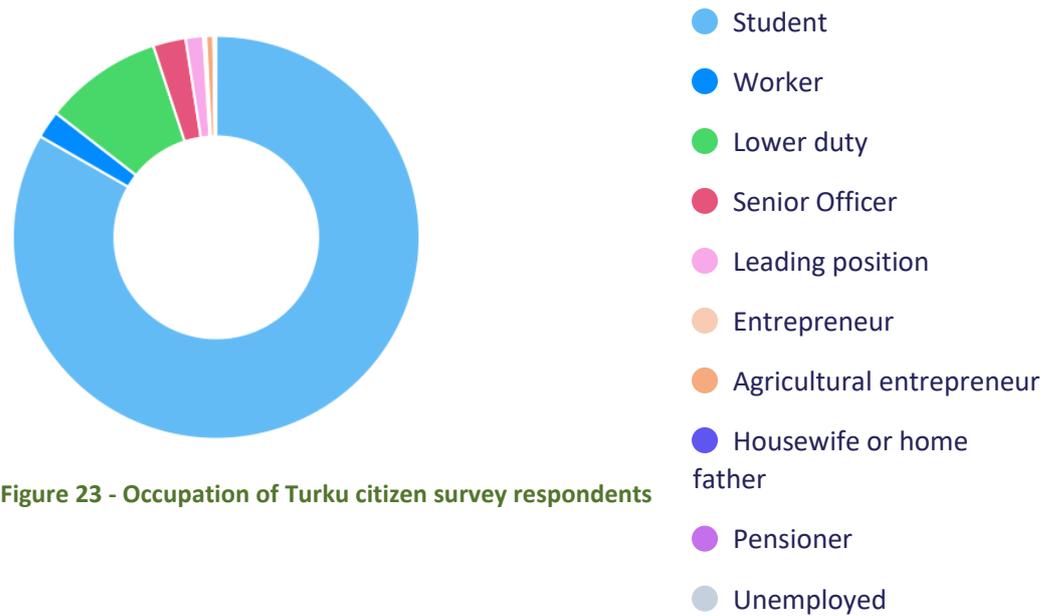


Figure 23 - Occupation of Turku citizen survey respondents

Table 6 - Occupation of Turku citizen survey respondents

OCCUPATION	ANSWERS	RATIO
Student	416	83.4%
Workers	47	9.4%
Lower duty	13	2.6%
Senior Officer	7	1.4%
Leading position	1	0.2%
Entrepreneur	3	0.6%
Agricultural entrepreneur	0	0.0%
Housewife or home father	1	0.2%
Pensioner	0	0.0%
Unemployed	11	2.2%

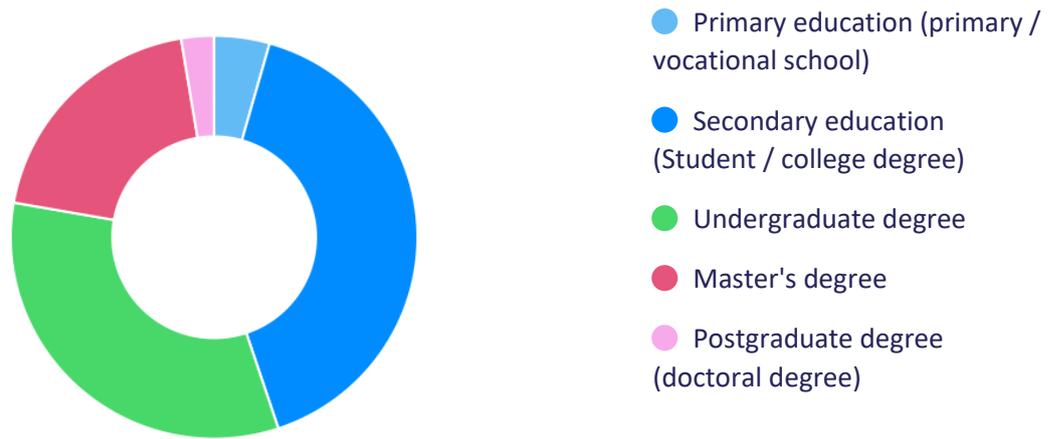


Figure 24 - Education level distribution of Turku citizen survey respondents

Table 7 - Education level distribution of Turku citizen survey respondents

EDUCATION	ANSWERS	RATIO
Primary education (primary / vocational school)	22	4.4%
Secondary education (Student / college degree)	202	40.5%
Undergraduate degree	164	32.9%
Master's degree	98	19.6%
Postgraduate degree (doctoral degree)	13	2.6%

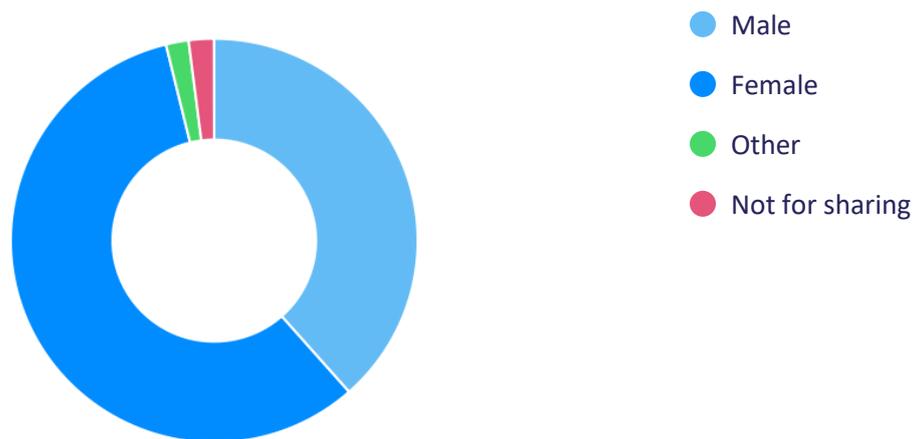


Figure 25 - Gender distribution of Turku citizen survey respondents

Table 8 - Gender distribution of Turku citizen survey respondents

GENDER	ANSWERS	RATIO
Male	192	38.5%
Female	288	57.7%
Other	9	1.8%
Not for sharing	10	2.0%

4.2.2 General attitude

The survey has started with the questions to aim to understand the general attitude of citizens (Q1-Q5) to such aspects as climate change progress, carbon neutrality, the use of renewable technologies, cleaner methods to energy production. Answers have demonstrated that 89.3% of respondents agree that climate change is a real and serious threat (Q1, see Figure 26), that solar electricity production should be increased (87%, Q2, see Figure 27) and it's seen as fair that tax funds should support the development of cleaner methods of energy production (87.2%, Q3, see Figure 28). On the other hand, the survey indicated that there is no clear majority (52.5%) willing to pay a higher energy price to reduce environmental damage (Q4, see Figure 29). Further, about half of respondents feel that carbon neutrality goals get too much attention, taking resources away from the more important priorities, such as the economy and employment (21%), while 26.1% declared a neutral position and 59.2% are rather disagree with this statement (Q5, see Figure 30). Regarding Q6, which aimed to assess the position of citizens towards the priorities to where the political decisions are most needed, this was the only question on which more than a half of respondents (257) were not able to formulate the opinion and left the question unanswered. It will be interesting to clarify the reason for this through the face-to-face interviews in the RESPONSE project.

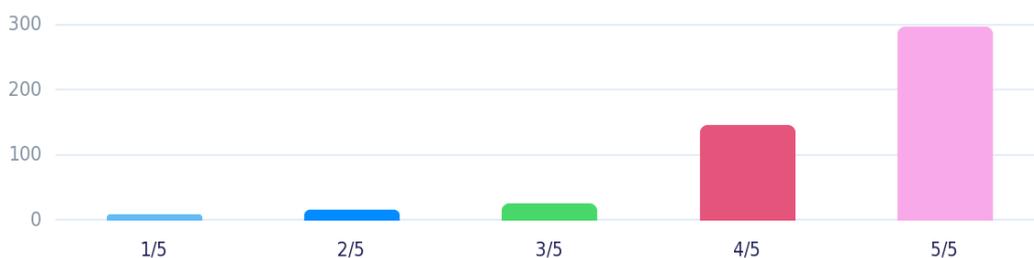


Figure 26 - Q1. Climate change is a real and extremely serious threat that the whole world should tackle immediately and by all possible means (1- 2% | 2- 3.4% | 3- 5.4% | 4- 29.5% | 5- 59.7%)

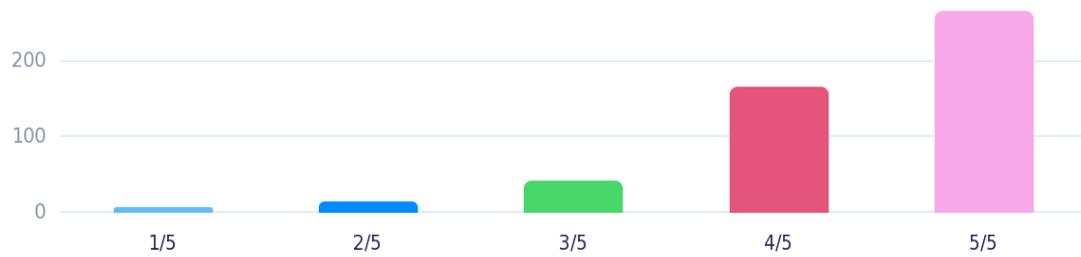


Figure 27 - Q2. The share of solar electricity in our electricity production should be increased (1- 1.4% | 2- 3% | 3- 8.6% | 4-33.5% | 5- 53.5%)

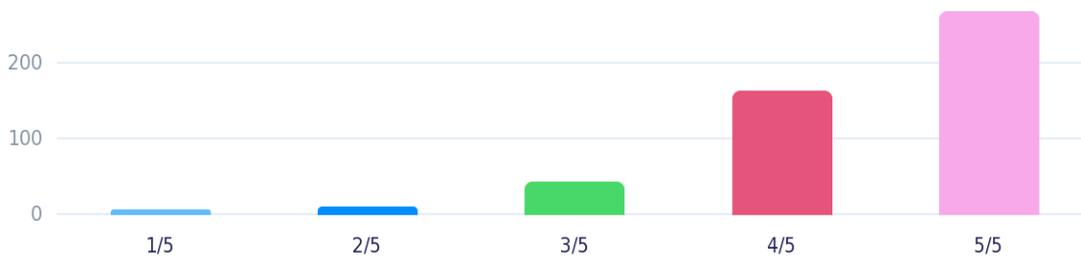


Figure 28 - Q3. It is right that tax funds support the development of cleaner methods of energy production (1- 1.6% | 2-2.4% | 3- 8.8% | 4- 33% | 5- 54.1%)

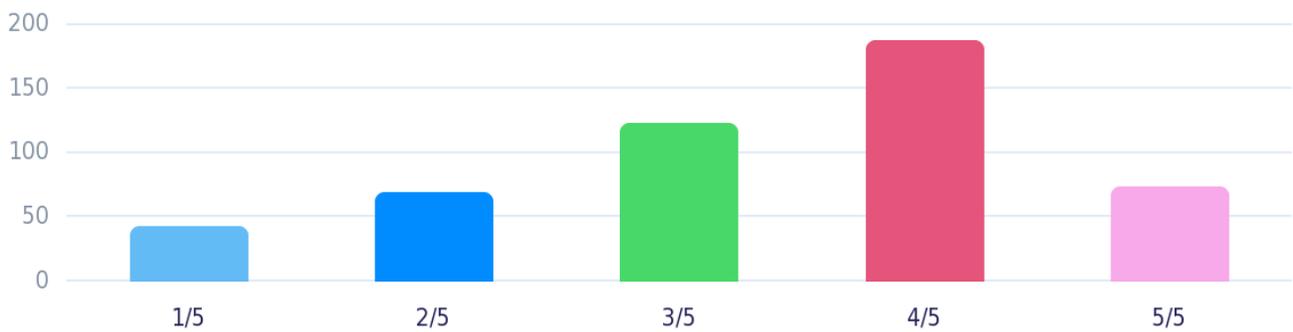


Figure 29 - Q4. I'm willing to pay a higher price for energy to reduce environmental damage (1-8.6% | 2-14% | 3- 24.8% | 4- 37.7% | 5- 14.8%)

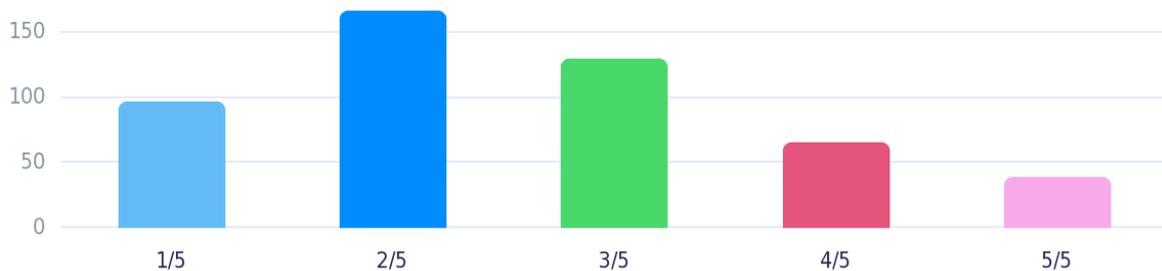


Figure 30 - Q5. I feel that carbon neutrality goals get too much attention, taking resources away from the most important things (1- 19.4% | 2- 33.5% | 3- 26.1% | 4- 13.2% | 5- 7.8%)

Q6. What should political decisions primarily aim for? (Only about a half (242 from 499 respondents) were able to formulate an opinion and the priority has been given to the employability of energy system and the securing of energy supply). The main results are presented in Table 9.

Table 9 - Relative importance of social concerns, for Turku citizen survey respondents. Lower values of importance mean a higher priority level in respondents' opinions.

ANSWERS	IMPORTANCE
Reasonable energy price	3.8
Increasing the share of renewable energy	2.5
Emission reductions and climate change mitigation	2.0
Increasing energy self-sufficiency	4.1
Development and commercialization of new energy innovations	4.0
Improving the security of energy supply	5.7
Employability of the energy system	6.1

4.2.3 Awareness and personal behaviour

The majority (75%) of respondents has acknowledged, that it is important to monitor own energy use. On the other hand, responses on Q1 show (Figure 31), that for 61.9% of respondents, it's not that important to know the energy source that is used to generate electricity and heating in the house and 65.5% are not aware of the energy source of their house's electricity and heating are produced (Q2, Figure 32). In line with previous, many respondents (30.6%) are not aware (or not sure, yet another 21.2%) about how different household appliances and appliances differ in terms of energy consumption (Q3, Figure 33). Other questions revealed that 37.3% were not sure if their lifestyle is already energy efficient enough. In addition, 63.5% pay attention to the water use (e.g. laundry, shower), however only 23.2% pay attention to the time of energy use. Furthermore, 68.4% of respondents acknowledged that they would pay more attention to the energy consumption of their home if they could get more detailed information about it. This is something that RESPONSE can help improve by educating citizens on respective topics.

Question Q4 about if energy savings should happen automatically through technology, that residents shouldn't need to pay attention to it themselves, receives heterogeneous opinions, from 41.5% of rather agree with this statement to 31.4% of rather disagree and with 27.1% that couldn't decide (Figure 34). These are very interesting results, taking into account the young age of respondents.

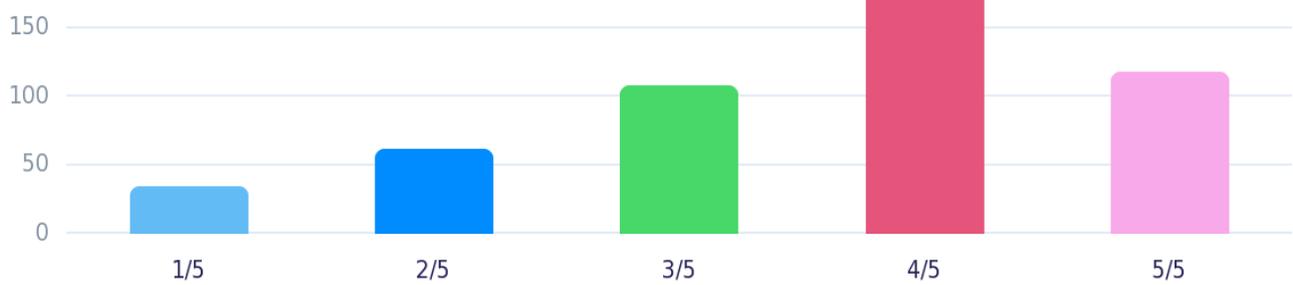


Figure 31 - Q1. It does matter to me which energy source is used to generate electricity and heating for my house (1-7% | 2- 12.4% | 3- 21.6% | 4- 35.3% | 5- 23.6%)

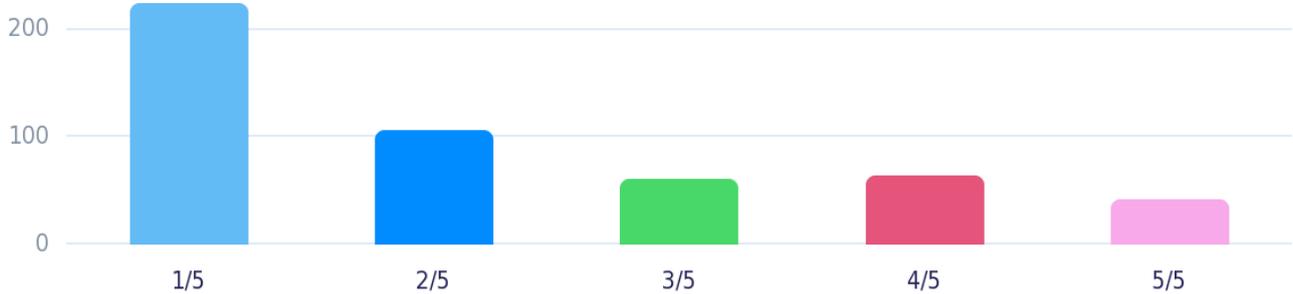


Figure 32 - Q2. I know with which energy source my house's electricity and heating are produced (1-45.1% | 2- 21.4% | 3- 12.2% | 4- 12.8% | 5- 8.4%)

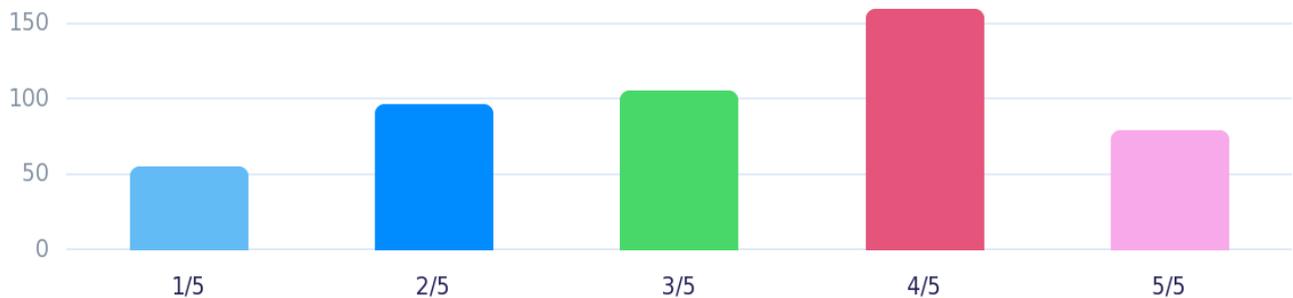


Figure 33 - Q3. I know how different household appliances and appliances differ in terms of energy consumption (1- 11.2% | 2- 19.4% | 3- 21.2% | 4- 32.1% | 5- 16%)

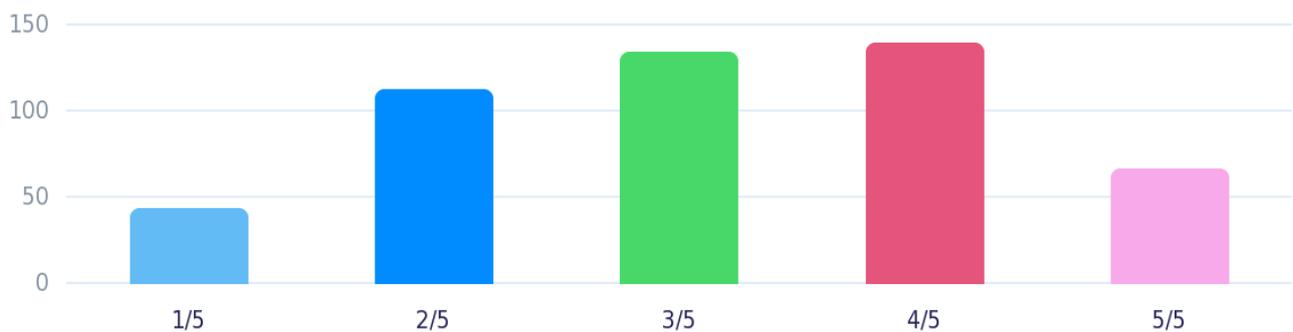


Figure 34 - Q4. I think that energy savings should happen automatically through technology, and I should not have to pay attention to it myself (1-8.8% | 2- 22.6% | 3- 27.1% | 4- 28.1% | 5- 13.4%)

4.2.4 Aesthetics, relatedness and particular insights on the technology for Turku PED.

The group of questions here aimed to assess the initial attitude to the envisioned PED developments in Turku. For example, the city of Turku is developing an application in the RESPONSE project (“Journey planner”) that pedestrians and cyclists can use to plan their routes. The respondents were asked to rank the qualities below in order of preference (1-5) according to their opinion (Table 10).

Table 10 - Relative importance of various features for Turku citizen survey respondents. Lower values of importance mean a higher priority level in respondents’ opinions.

QUALITIES AND FEATURES	IMPORTANCE/RANK
Tips for a route where air quality is good	3.0
Tips for a route that is safe for schoolchildren	2.4
Tips for a route that can be used to avoid traffic congestion	1.9
Tips on free parking spaces	3.2
A treasure hunt route	4.4

Other numerous suggestions are related to such qualities as wide bike paths, traffic lights, underpasses, bike parking spaces, green areas and parks, museums and restaurants, road works, nature-friendly routes, no-hills (another way around)- and car(less) routes and route avoiding construction sites. It was suggested also of adding routes suitable for roller skaters (good bike path, no dirt road/cobblestones/paving, road works or steep hills), as they are difficult to find even for long-time residents and roller skaters.

Table 11 presents a ranking of the following shared electric vehicle services according to respondents’ preferences in order of importance (1-3).

Table 11 - Relative importance of e-vehicle solutions for Turku citizen survey respondents. Lower values of importance mean a higher priority level in respondents’ opinions

ALTERNATIVE SOLUTIONS	IMPORTANCE/RANK
e-Scooters	1.8
e-bikes	1.8
e-cargo bikes	2.4

Finally, the following visualization presents the envisioned frequency of shared e-vehicles use. It can be observed that the preference is given to rather rare use of e-vehicles - a few times a month (Figure 35).

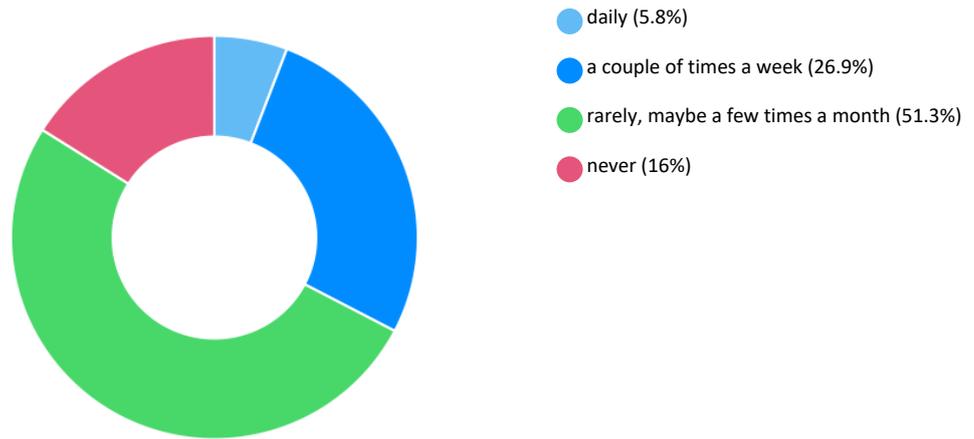


Figure 35 - Turku survey respondents frequency of use of e-vehicles

In addition, several questions have been defined to evaluate the extent to which citizens are involved and interested to be involved in the design and the selection of urban solutions. For example, it appeared that the majority (66.2%) of respondents perceives that they cannot influence the traffic options (Q1, Figure 36) either on the planning of residential areas such as parks, security and services (Q2, 54.1%, Figure 37). Moreover, 48.7% are not perceiving themselves as part of their neighbourhood community and 28.9% were not able to decide (Q3, Figure 38). In addition, residents didn't show great interest in participating in the design of the city information portal (Q4, Figure 39), either have expressed general interest in influencing environmental issues in their immediate neighbourhood (Q5, Figure 40). This is something (reasons) to be discussed further and addressed in the RESPONSE.

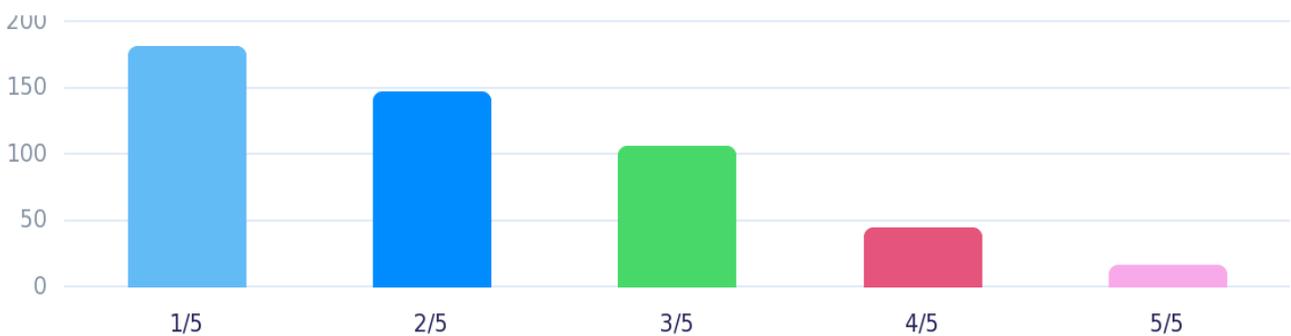


Figure 36 - Q1. I feel I can influence the traffic options/conditions in my area (bike paths, stops, parking, electric car charging stations) (1- 36.5% | 2- 29.7% | 3- 21.4% | 4- 9% | 5- 3.4%)

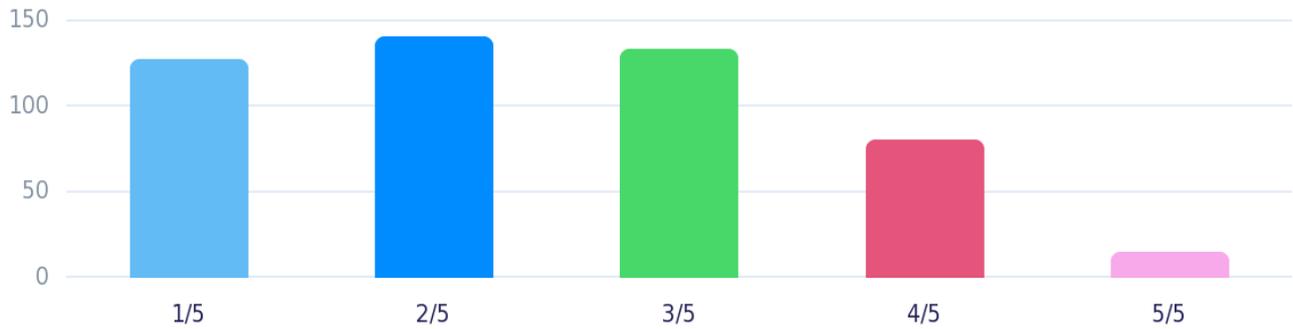


Figure 37 - Q2. I feel I can influence the affairs of my house or residential area such as parks, security, services (1- 25.7% | 2- 28.3% | 3- 26.9% | 4- 16.2% | 5- 3%)

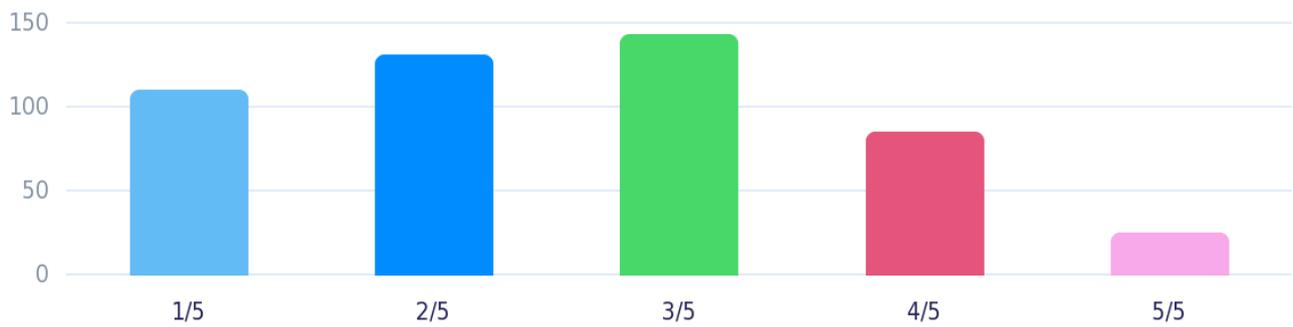


Figure 38 - Q3. I feel like I'm part of my neighbourhood community (1-22.2% | 2-26.5% | 3- 28.9% | 4- 17.2% | 5- 5.2%)

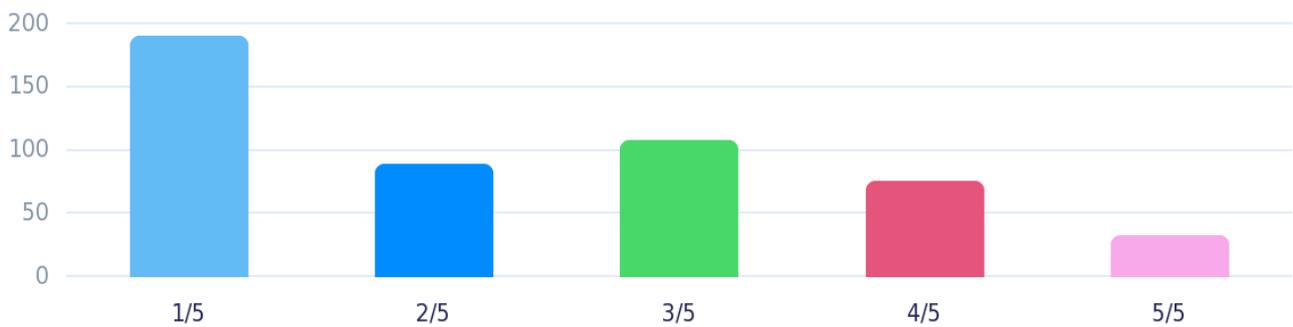


Figure 39 - Q4. I would like to influence the contents of the "City Information portal", which inhabitants can use to be involved in the city's work towards carbon neutrality (1- 38.3% | 2- 18% | 3- 21.8% | 4- 15.2% | 5- 6.6%)

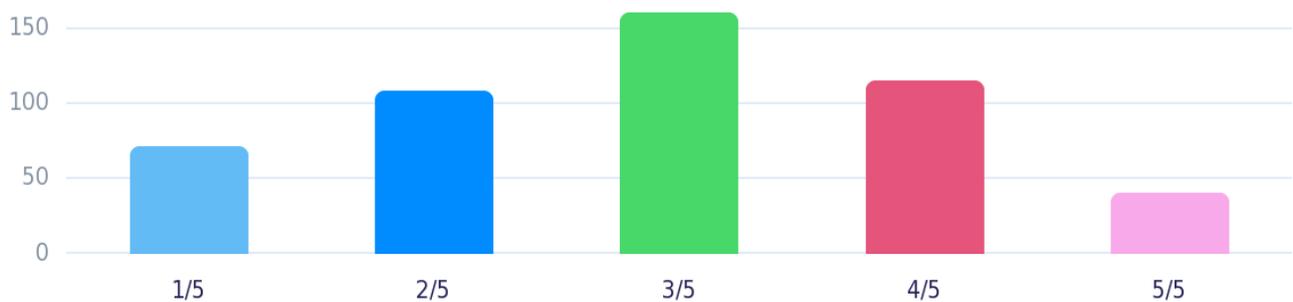


Figure 40 - Q5. I have a general interest in influencing environmental issues in my immediate neighbourhood (1-14.4% | 2- 21.8% | 3- 32.3% | 4- 23.2% | 5-8.2%)

Last but not least, the question below maps the importance of aesthetic features for residents (Q6, Figure 41), which appeared to be important for 47.5% however not ultimately decisive for all as 28.1% rather disagree with this statement.

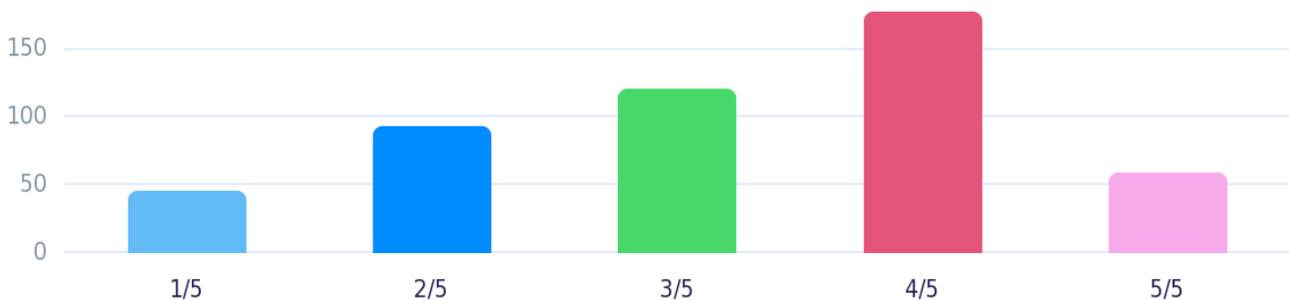


Figure 41 - Q6. The aesthetics of technical solutions implemented in the city is very important for me (1- 9.2% | 2- 18.9% | 3- 24.3% | 4- 35.7% | 5-11.8%)

4.2.5 Risk perception, anxieties and apprehensions to RESPONSE technology

Several questions in the survey have been dedicated to the perception of risks associated with the energy technology, such as solar panels, lighting storage technology and energy storage solutions (Q1-Q3, summarised in Figure 42, Figure 43 and Figure 44 respectively) to be developed in the RESPONSE as well as general attitude to the role of technology in everyday life (Q4-Q6, summarised in Figure 45, Figure 46 and Figure 47, respectively). Overall, respondents see very low risks associated with the deployment of technologies and the prominent role of technology and the need for technical expertise to handle it. Though as a comment, concerns related to the lower availability of information and guidance on new technology as well as the deprecation of technology taken in use are still present. In addition, respondents consider that there might be an increasing need for continuous repair in homes and residential properties as increasingly complex technology breaks down.

Furthermore, there is a concern related to that personal data could be exposed to the wrong hands (24.2%). It is perceived as a risk the potential lack of privacy, - the "transparent citizen" through badly designed modern technology.

In addition, more than 60% of respondents feel cautious about reducing the light in the street. This perceives as a threat to safety. It was suggested that street lighting should be functional with motion sensors so that not so much energy is wasted (light pollution is harmful to animals and people).

Another important aspect to highlight is that in many answers regarding technical skills needed to manage technology, about 20-25% was not able to decide if this is a risk or not. The reason for this observation will be clarified in the face-to-face interviews later in the RESPONSE.

More specifically the questions and main results are presented in Figure 42, Figure 43, Figure 44, Figure 45, Figure 46 and Figure 47.

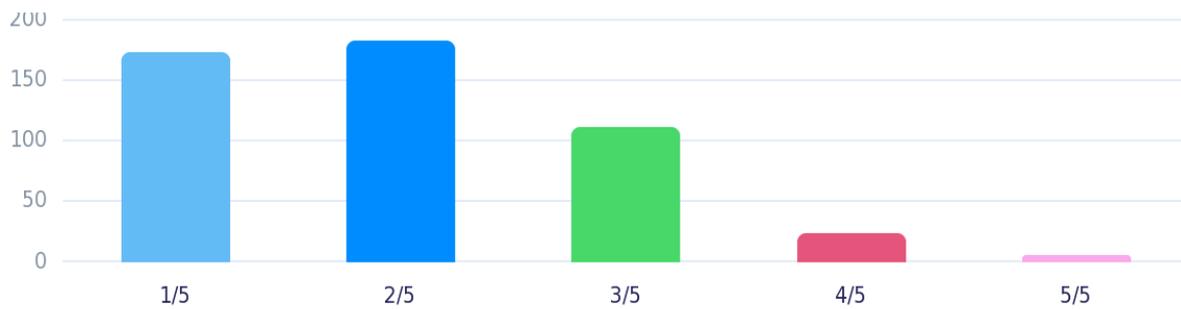


Figure 42 - Q1. There are fire safety risks or other risks associated with the use of solar panels e.g., electric shock or damage to home electrical appliances (1- 34.9% | 2- 36.7% | 3- 22.4% | 4- 4.8% | 5- 1.2%)

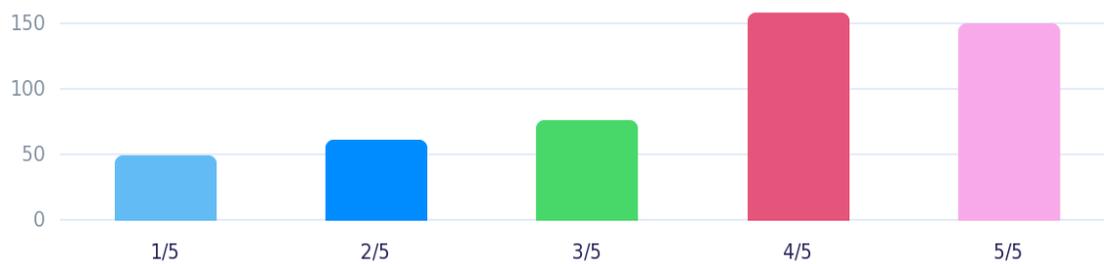


Figure 43 - Q2. Reducing street lighting in my residential area reduces traffic safety (1- 10% | 2- 12.4% | 3- 15.4% | 4- 31.9% | 5- 30.3%)

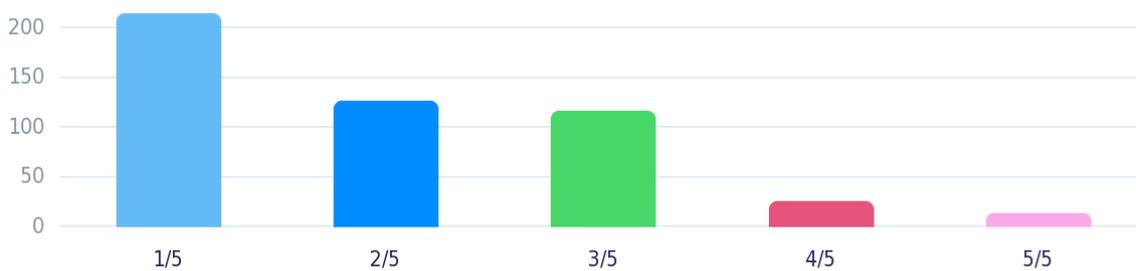


Figure 44 - Q3. It is harmful to health to live in a house with energy storage facilities / batteries nearby (1- 43.1% | 2- 25.5% | 3- 23.4% | 4- 5.2% | 5- 2.8%)

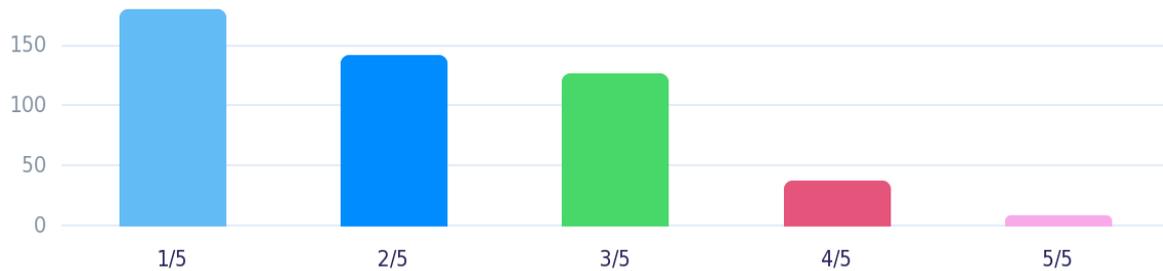


Figure 45 - Q4. The rapid technological development associated with my housing means that I always need expert help in problem situations (1- 36.3% | 2- 28.7% | 3- 25.7% | 4-7.6% | 5-1.8%)

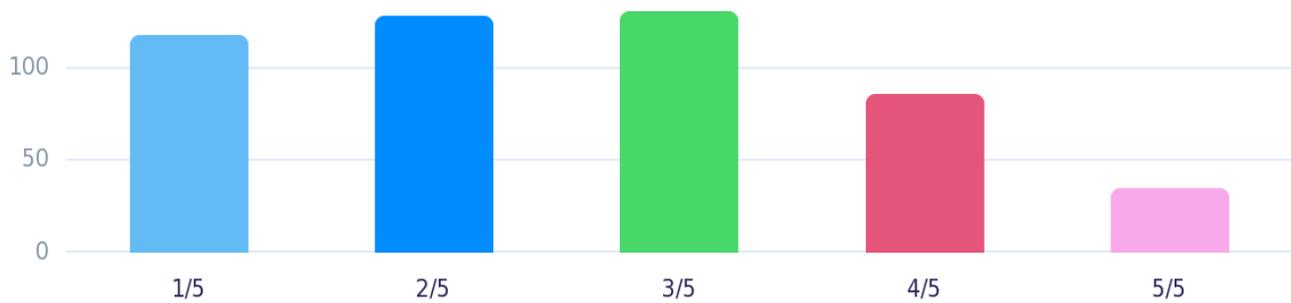


Figure 46 - Q5. Technological solutions expose my personal data to the wrong hands (1- 23.6% | 2- 25.9% | 3- 26.3% | 4- 17.2% | 5- 7%)

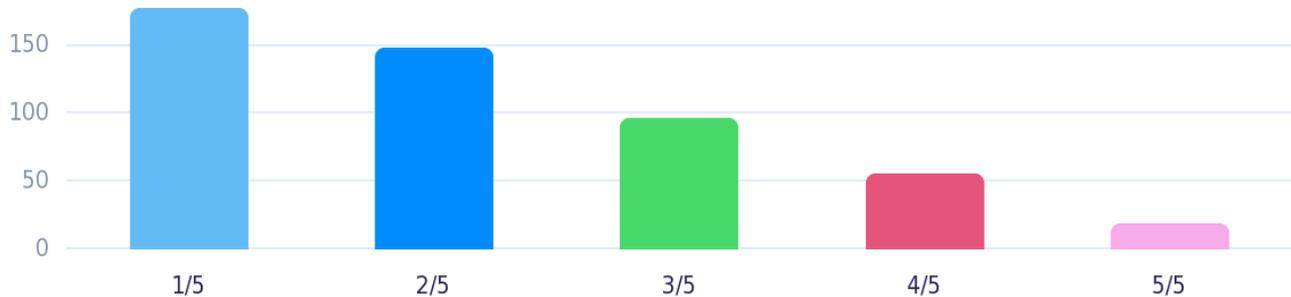


Figure 47 - Q6. New solutions for my housing make me too dependent on technology (1- 35.7% | 2- 29.9% | 3- 19.4% | 4- 11.2% | 5- 3.8%)

Other perceived risks have been reported as related to the following aspects:

- Replacement of coal / domestic peat with foreign wood chips/peat.
- Cost: Changing to energy-efficient newer technologies may come with a significant price tag.
- A possible renewal of the electricity network can lead to long interruptions or even temporary homelessness if something new is kept in my apartment.
- Not accommodating for disabilities.
- Urban air pollution.
- Radiation.

- Policy and dependence: Dependence on imported electricity, oil and gas, precious metals required by technology, and foreign solar panels exposes the country's political leadership to varying degrees of influence, allowing foreign states to dictate domestic daily policies and, if they wish, censor the press.
- Risks that charging electric cars will start a fire and difficulties in extinguishing them.
- Risky operation of as well as electric cars in unheated conditions during severe frosts.
- Ignoring/avoiding wind power usage as one of the sources of clean energy.
- Unsafe water.
- Use of polyethylene.
- Risks of accidents as nuclear power and batteries become more widespread.
- Biological waste left on street.
- Sustainability - in energy matters, it should be remembered that there is no single silver bullet that solves all problems. In particular, energy storage requires several different technologies to be sustainable. At present, battery technology (electric batteries) will not meet the energy storage needs of humanity. In addition, the battery catalysts currently in use cause a burden on the environment in the manufacturing process, from the extraction of raw materials to the finished product and recycling. It was hoped that decision-makers, businesses and consumers will not put all their chips on one horse, but that resources will also be allocated to the development of other, new technologies.
- Burnout if too much stress about these risks.

4.2.6 COVID- and Climate Change/Energy Transition

At the time of the survey, the citizens had already been living with the COVID-19 pandemic for 16 months. Therefore, it was interesting to observe the influence of the pandemic on the attitude of citizens towards energy transition technologies to address climate change. Four questions below have been asked to acquire an impression of this aspect. For example, 20% of respondents feel that recovery from the COVID-19 pandemic should be prioritized over climate change measures, though 54.4% of respondents think that climate change measures are achievable (Q1, Figure 48). It appeared that there was no clear influence of pandemic on the daily movements of all respondents (Q2, Figure 49), while the use of private cars increased dramatically (Q3, Figure 50). The majority has agreed that the environmentally friendly way of moving caused by the COVID-19 pandemic should be maintained in the future (62.8%), though it was interesting to see that almost a third of respondents (29.3%) couldn't decide if the same pattern for travelling should stay (Q4, Figure 51).

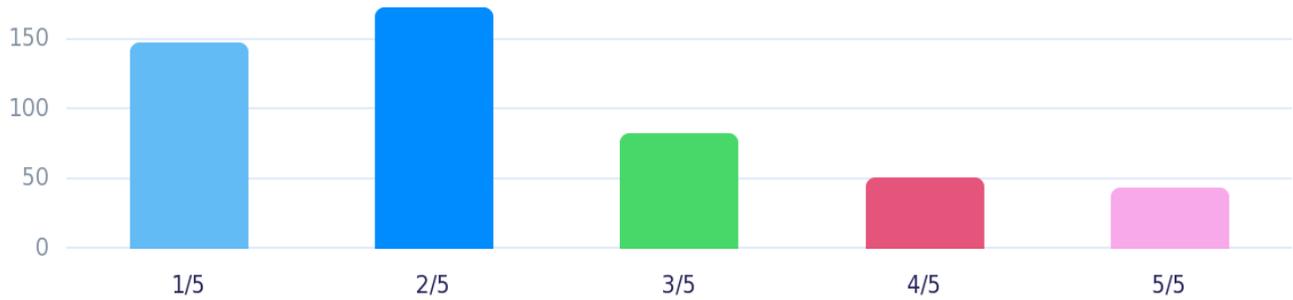


Figure 48 - Q1. I do not think we can now afford climate change measures, because all financial resources should be allocated to revitalizing society after the COVID pandemic (1- 29.7% | 2- 24.7% | 3- 16.6% | 4- 10.2% | 5- 8.8%)

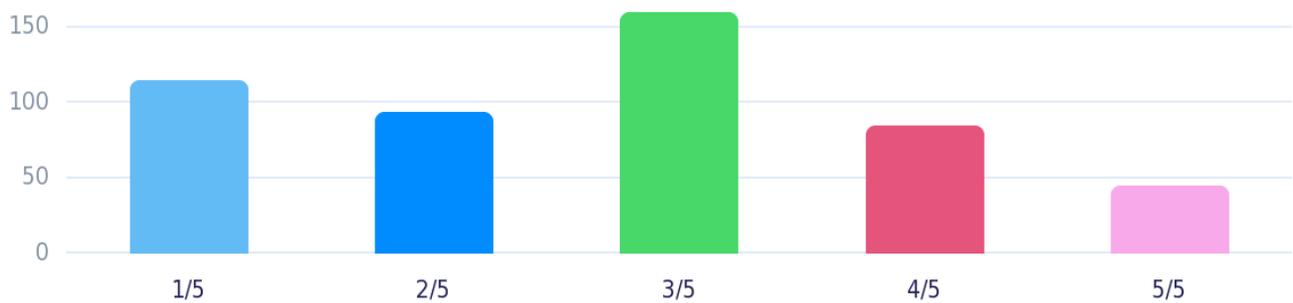


Figure 49 - Q2. The COVID pandemic has made my movement more environmentally friendly (1- 23% | 2- 18.8% | 3- 32.1% | 4- 17% | 5- 9%)

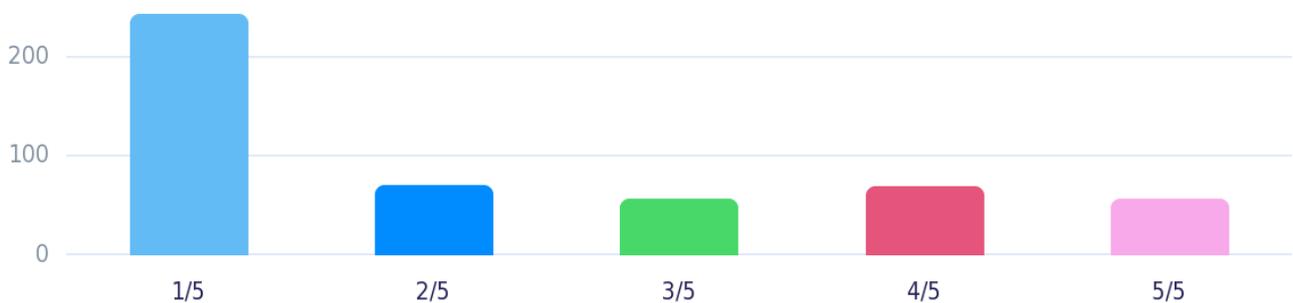


Figure 50 - Q3. Due to the COVID pandemic, I use more private cars (1- 48.9% | 2- 14.2% | 3- 11.4% | 4- 14% | 5- 11.4%)

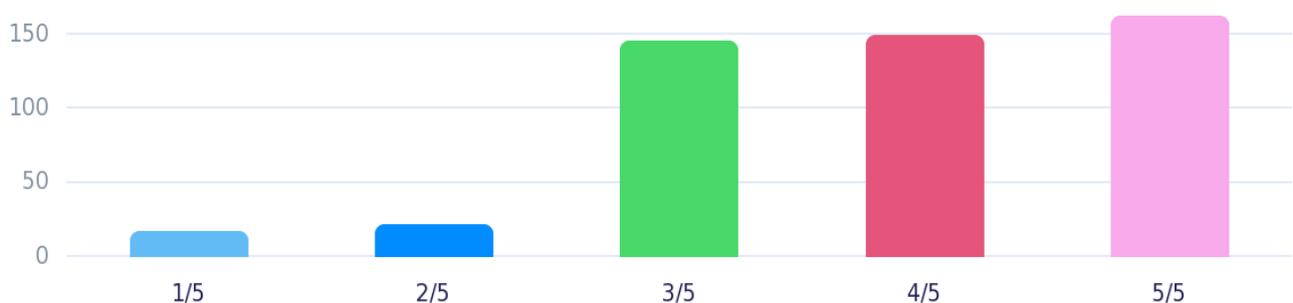


Figure 51 - Q4. The environmentally friendly way of moving caused by COVID should be maintained in the future (1- 3.6% | 2- 4.4% | 3- 29.3% | 4- 30.1% | 5- 32.7%)

4.2.7 Conclusion: needs analysis and deduction

Overall survey results showed that the RESPONSE project can contribute to creating more awareness to citizens about energy technologies that are close to them (appliances and sources of energy). Another important lesson learned is that more effort should be put on the involvement of citizens in political decision-making and in urban planning activities to create and enhance the important feeling of belonging and relatedness to their own living community. Many needs came also from ideas provided by residents towards the implementation of new services and applications such as “journey planner” to be developed in Turku. Finally, yet importantly, the risks related to energy transition technologies need to be further analysed.

4.3 Comparisons of LHCs general citizenship considerations

As similar questionnaires have been distributed to both RESPONSE LHCs citizens, it is interesting to compare results between LHCs citizens. It will be possible to highlight differences in population and opinions. Results are summarised in Table 12.

The main common issue for the two cities is that of supporting the improvement of the competence on the subjects of the energy transition. This observation is consistent with the stakeholder surveys results (see section 5.3.2). The aim is to mobilize the citizens so that they do not observe the project from afar, but take a part in it, as actors. This point is consistent with the point-of-view of policy-making partners regarding their citizens.

These observations should be taken into consideration for WP4 solutions deployment, as:

- some solutions should be specifically designed to match local concerns
- for example, a significant share of Dijon PED inhabitants are parents, while most of Turku PED inhabitants are students
- common issues may call for shared solutions between LHCs
- The solutions aimed at similar concerns should be shared between both LHCs, to optimize the efficiency of empowerment and communication strategies.

Table 12 - Comparison in population and opinion between Turku and Dijon citizen survey respondents

Specific to Dijon	Similar	Specific to Turku
Mostly 36-55 years old employees and over 65 years old pensioners	Sensitivity to environmental issues and challenges The desire to monitor energy consumption	Mostly students below 35 years old Shy positioning on political issues The COVID crisis should not take precedence over climate change

<p>Think they are already making efforts to make their lifestyle environmentally friendly</p> <p>Difficulty in understanding the main objectives and certain issues (COVID, carbon neutrality)</p> <p>People see new technologies as a risk</p>	<p>Citizens declare that they pay attention to the time of day at which they consume energy</p> <p>General agreement with the management of energy savings by automats</p> <p>Raising energy bills are a major concern</p> <p>Lack of knowledge on the source of energy and the consumption of household appliances</p> <p>Fear that personal data may be exposed to the wrong hands</p>	
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4.4 Fellow Cities

All 6 Fellow Cities have disseminated the same questionnaire as the LHCs to their citizens in the scope of T1.1. In comparison with LHCs, gathering results was more difficult, as FCs citizens are not as engaged as in LHCs. Nevertheless, this work enables to compare with LHC results and give some insight on subjects that should be addressed in FCs in WP8.

4.4.1 Ptolemaida

Ptolemaida is a city in Northern Greece and since 2011 been the capital of the municipality of Eordaia, of the Kozani Regional Unit of the Western Macedonia Region. The municipality has a population of 45450 residents whereas the population of the city of Ptolemaida was 32142 residents (2011), occupying an area of 57508 km². Ptolemaida is well known for its coal (lignite) mines and its thermal power stations. Before 2010 and for approximately 30 years, the city has experienced spectacular population and economic growth due to the strong presence of the Public Power Corporation (PPC) in the area, which transformed it into an urban center. Due to the decarbonization policies, existing power plants of installed capacity of approximately 2 GWe are about to cease their operation, soon. Ptolemaida is the first Municipality of Greece that entered the initiative of Covenant of Mayors in 2008, but the local government approved the Sustainable Energy Action Plan (SEAP) in 2016, while a revision of the SEAP was recently prepared to include measures of adaptation to climate change. The region of Western Macedonia is one of the four pilot projects within the Platform on Coal Regions in Transition, funding the implementation of projects contributing to the gradual transition to the Meta lignite era.

This analysis is based on a small number of responses (14) which only allows us to make assumptions.

The typical profile of the 14 respondents corresponds to the age group 46-55 years who occupy a position of chief or senior officer and who live in the PEB (see Figure 52, Figure 53, Figure 54).

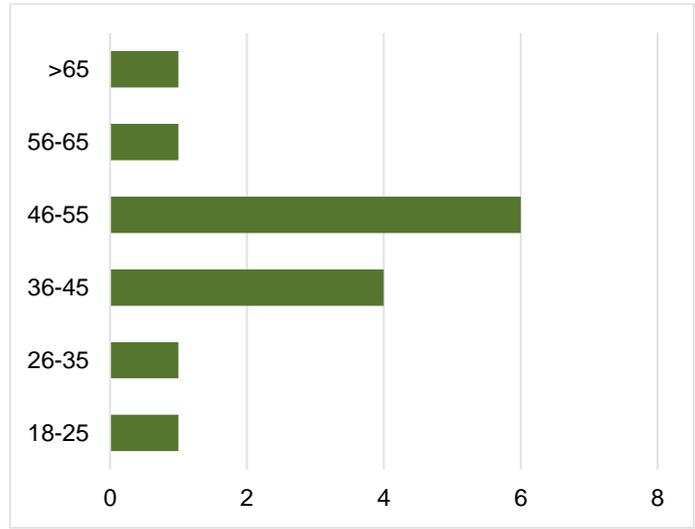


Figure 52 - Distribution of the Ptolemaida surveyed population by age group

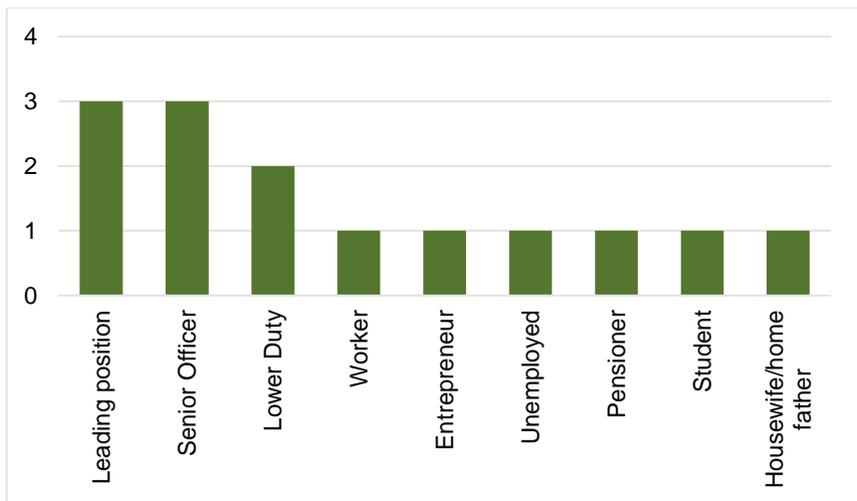


Figure 53 - Socio-professional category of Ptolemaida surveyed population

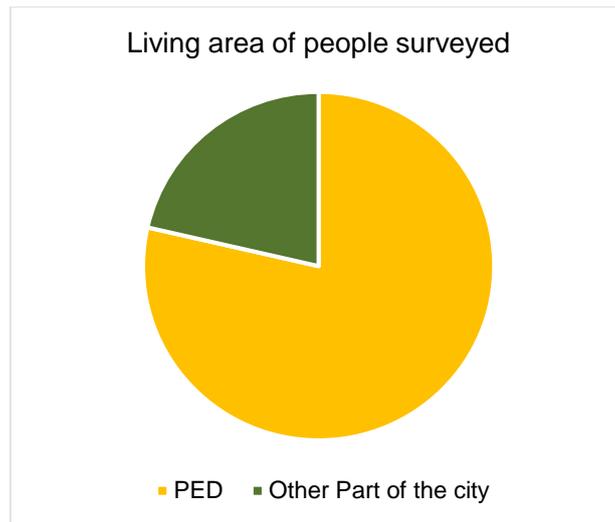


Figure 54 - Living area of Ptolemaida people surveyed

The analysis of the answers to the questions on citizens' attitudes towards climate change shows an interest in current environmental issues. However, the respondents think that the carbon neutrality objective attracts too much attention (Figure 55).

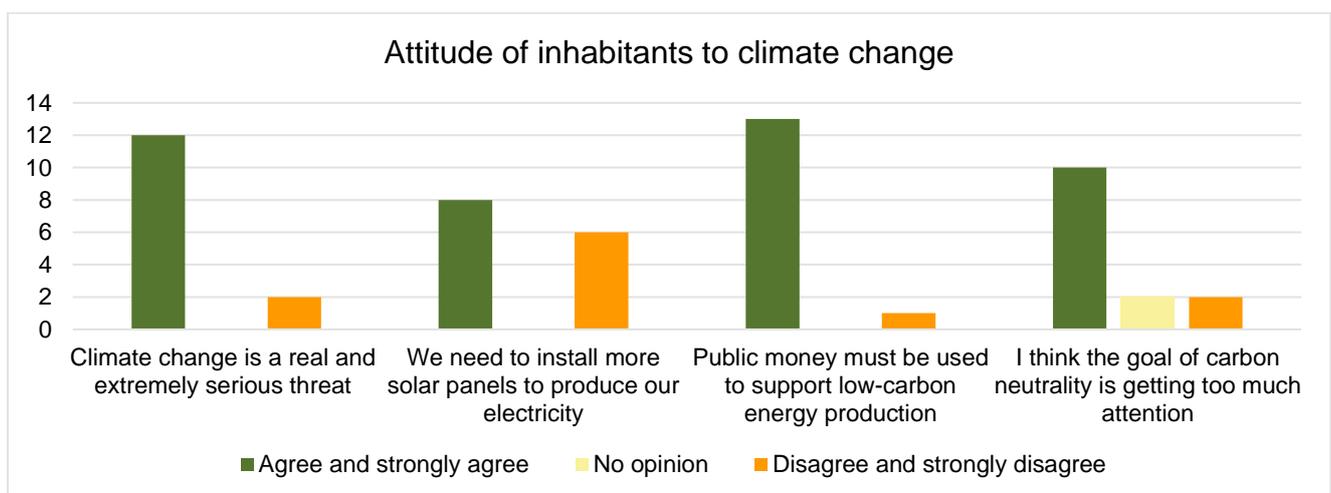


Figure 55 - Opinion of Ptolemaida citizen survey respondents concerning climate change and energetic transition policies (percentage states for the share of the most frequent answer for each statement)

Citizens of Ptolemaida think they are already making efforts to make their lifestyle more environmentally friendly. They say that they pay attention to the hours at which they consume energy (Figure 56). According to them, everyone can contribute with their habits and they know how to make their lifestyle more frugal.

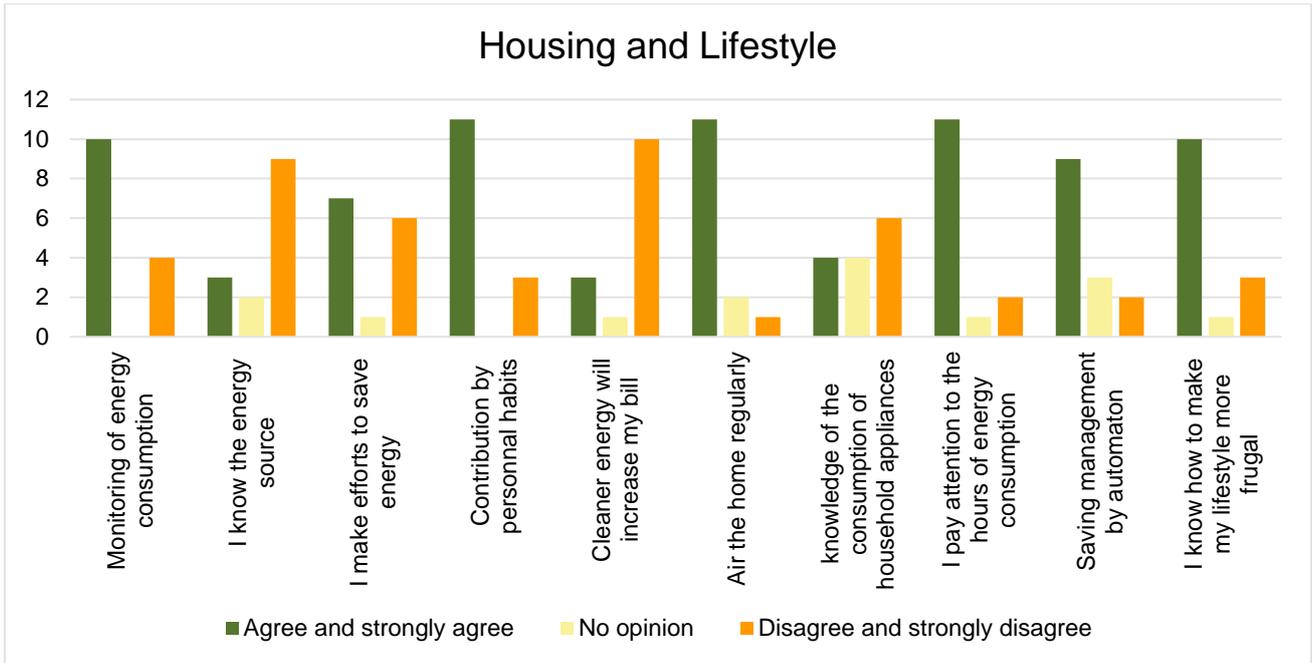


Figure 56 - Ptolemaida citizen survey respondents answers for housing and lifestyle relative questions

The main concern for the respondents is the aesthetic aspect of technical solutions that will be implemented in the city (Figure 57). This observation is specific to the FCs.

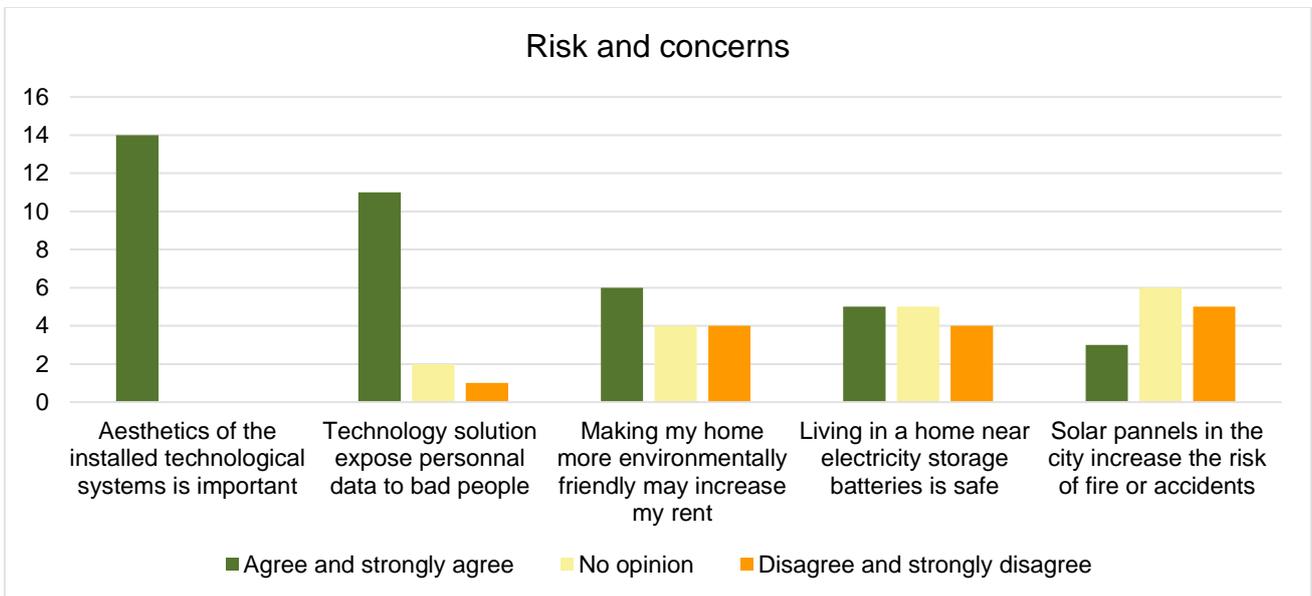


Figure 57 - Ptolemaida citizen survey respondents rating of various statements about concerns relative to the RESPONSE project.

Respondents are divided between reviving the economy or dealing primarily with climate change and its effects (Figure 58).

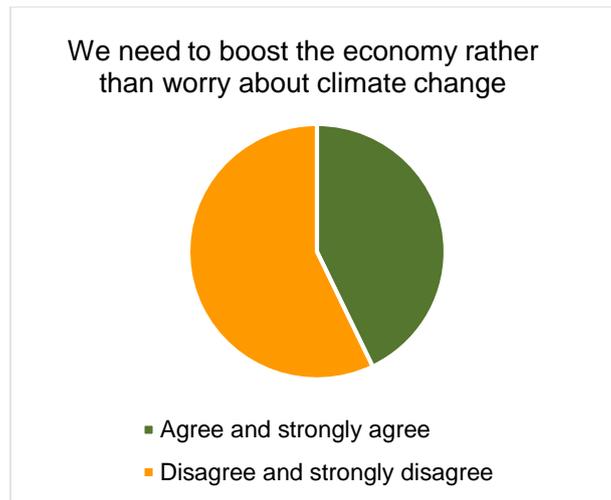


Figure 58 - Ptolemaida citizen survey respondents opinions about the need to boost the economy rather than worry about climate change

4.4.2 Gabrovo

Gabrovo is situated in the North Central Region of Bulgaria. The municipal territory spans over 555579 km² with a population of 62763 people. The city is part of trans-European transport corridor N°9 (Helsinki -Istanbul) and more than 600 companies are operating in the area. Gabrovo is a pioneer in EE projects and intelligent energy in Bulgaria with experience dating back to 1992. Gabrovo’s long-term vision is imprinted in the phrase “Gabrovo Municipality-Green, Innovative and Effective”. The municipal network for EE Eco-Energy was established in Gabrovo in February 1997, based on the initiative of 23 mayors. Gabrovo Municipality also joined the Covenant of Mayors in 2013 and is a leader in regional development and strategic planning; the municipality is mentoring the new network for sustainable and innovative public procurement (SPPI) in Bulgaria. The Municipality of Gabrovo became a member of the public-private collaboration initiative "Building Efficiency Accelerator" at the beginning of 2018. Gabrovo is a member of the national cluster for electric vehicles.

This analysis is based on a small number of responses (14) which only allows us to make assumptions.

The typical profile of the 14 respondents belongs to the age group 46-55 years who occupy a position of chief or senior employee (Figure 59, Figure 60).

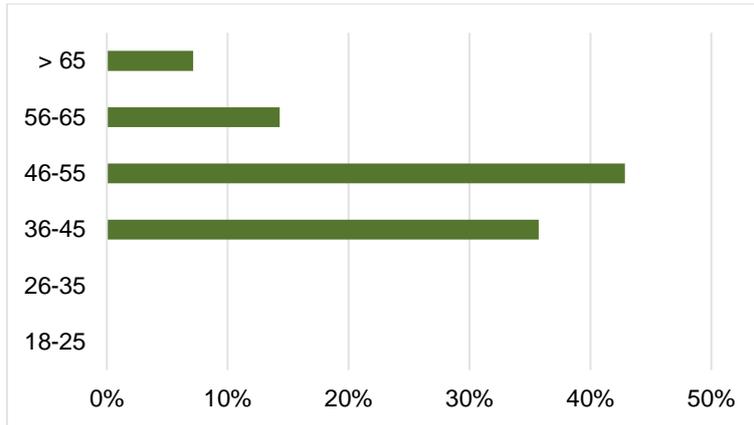


Figure 59 - Distribution of the Gabrovo surveyed population by age group

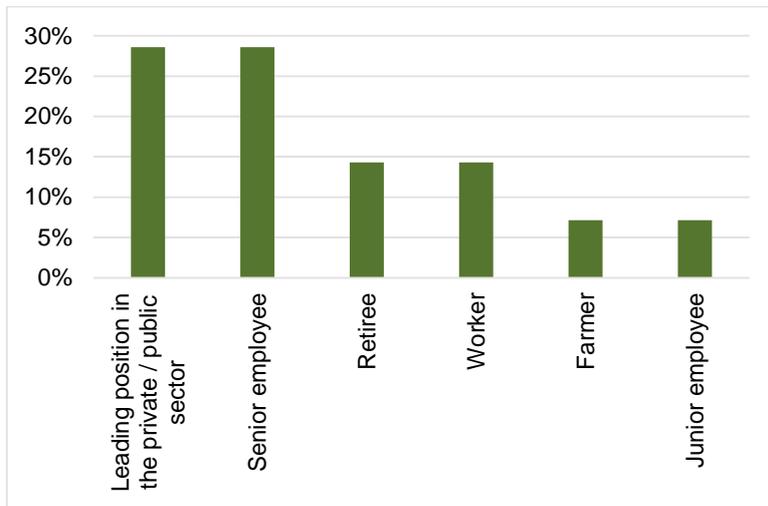


Figure 60 - Socio-professional category of Ptolemaida surveyed population

Figure 61 shows the attitude of the respondents towards climate change issues. The citizens of Gabrovo seem to be sensitive to the threat of climate change and support the production of electricity through solar panels. For them, public money should support the production of low-carbon energy.

Finally, the carbon neutrality objective seems to be misunderstood by this small sample of citizens. The hypothesis of lack of knowledge on this topic can be confirmed as it is common to all cities in the RESPONSE project.

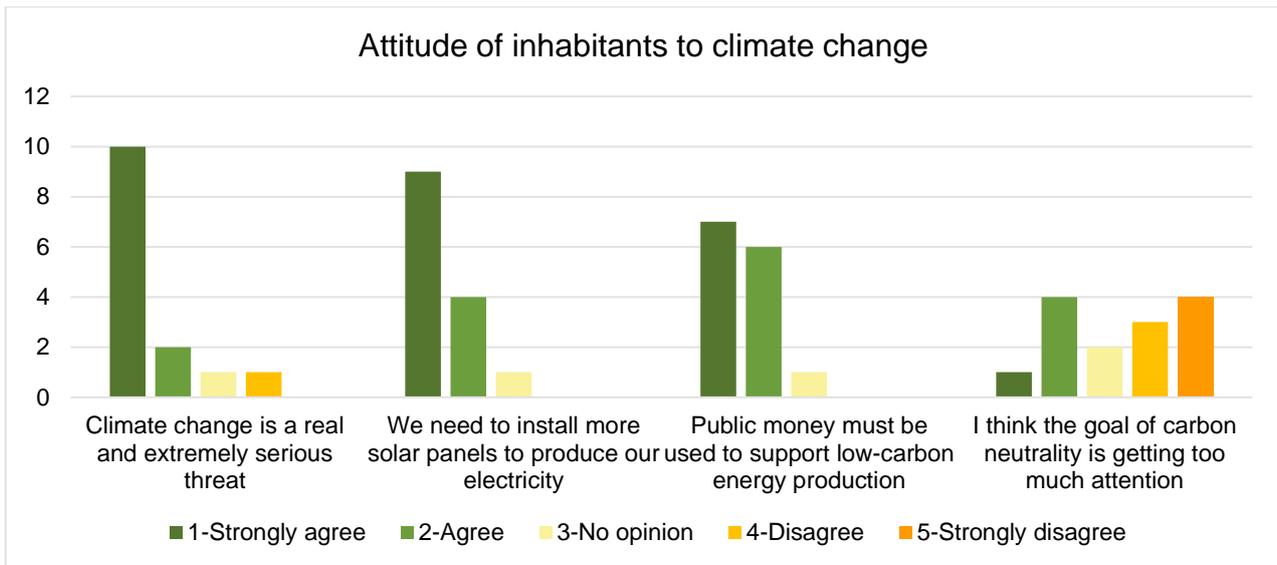


Figure 61 - Opinion of Gabrovo citizen survey respondents concerning climate change and energetic transition policies (percentage states for the share of the most frequent answer for each statement)

According to the 14 respondents, the 2 major societal issues are “Increasing the share of renewable energy” and “Emission reduction and climate change mitigation” (Figure 62).

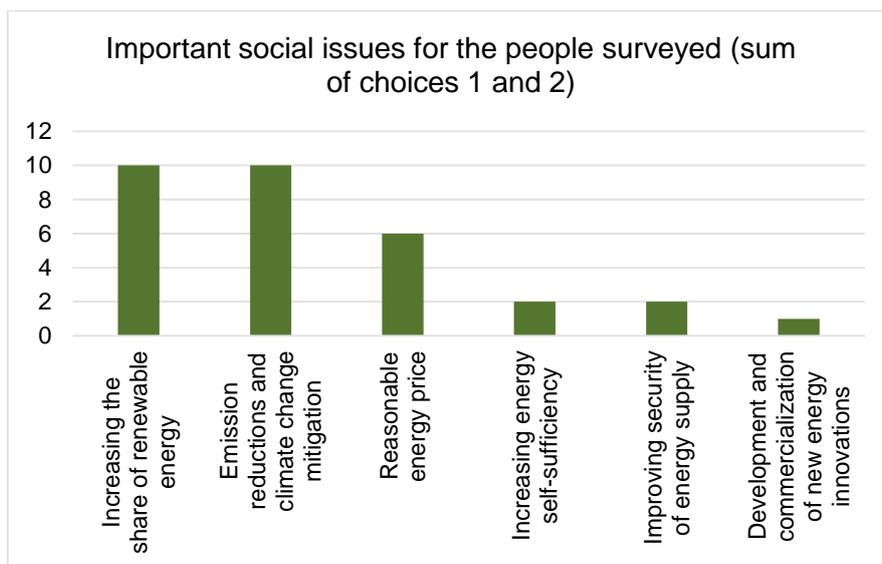


Figure 62 - Gabrovo citizen survey respondents political priorities regarding energy and environmental issues

Questions about the lifestyle of Gabrovo residents (Figure 63) reveal that most of them do not know how to make their lifestyle more frugal.

A specificity of this CF is that the interviewed citizens do not agree to track their energy consumption through automats.

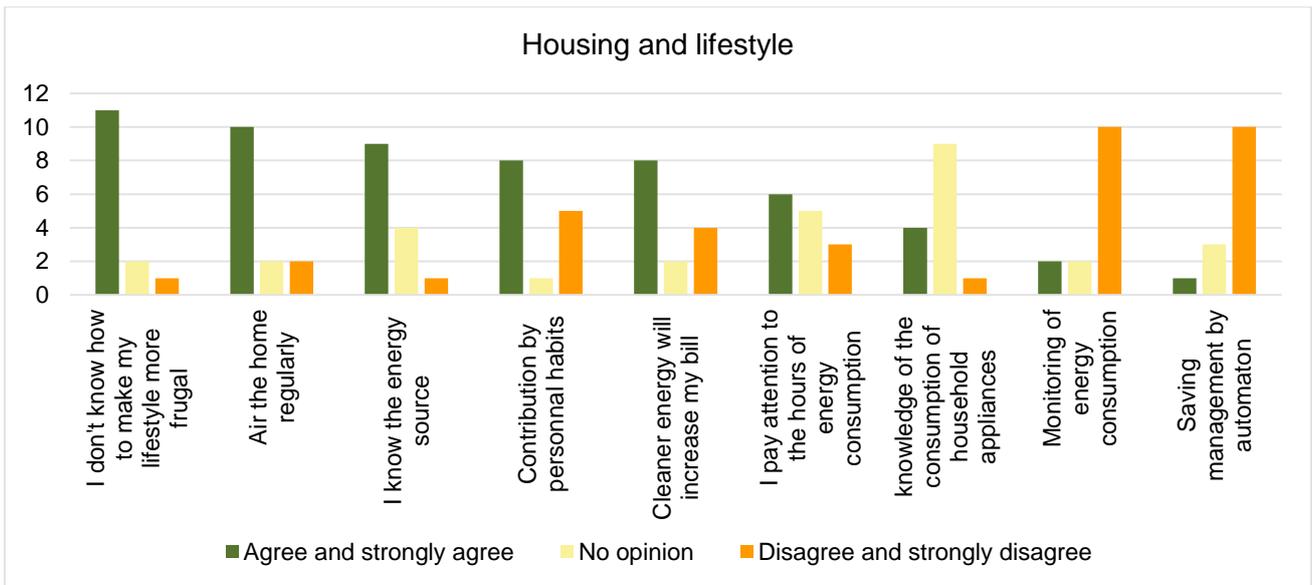


Figure 63 - Gabrovo citizen survey respondents answers for housing and lifestyle relative questions

Figure 64 shows the fears, risks, and concerns of respondents. The biggest fear of respondents is that their data will be exposed because of technological solutions. Unlike other cities, Gabrovo residents are not afraid of having their bills increased.

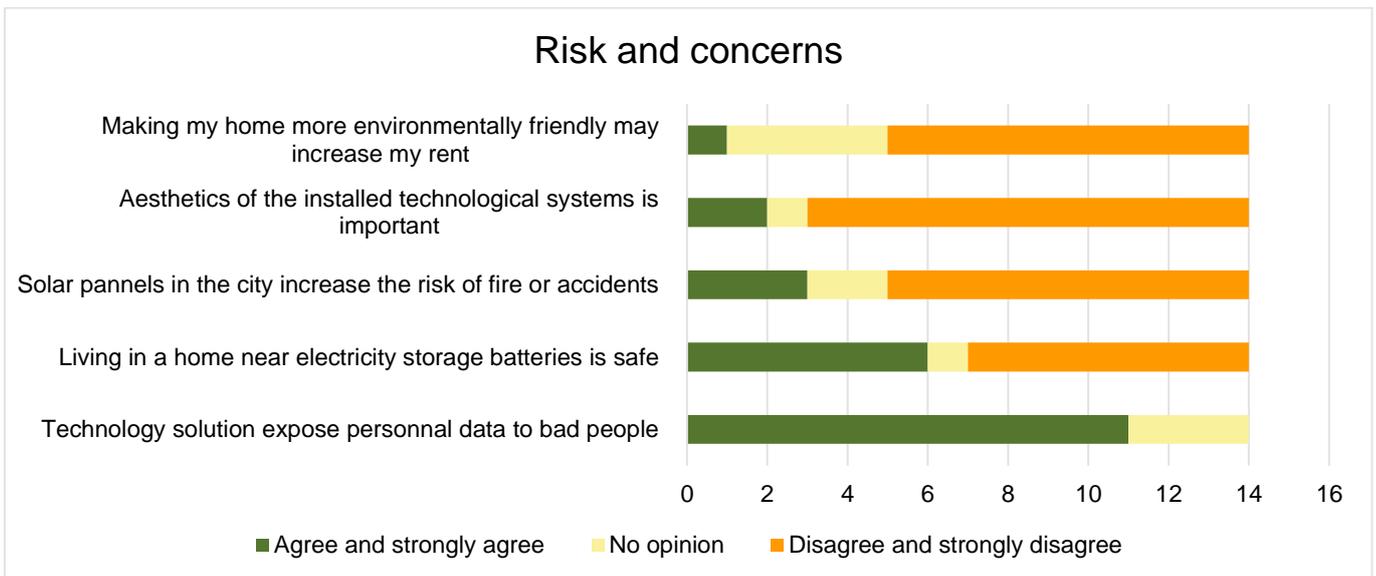


Figure 64 - Gabrovo citizen survey respondents rating of various statements about concerns relative to the RESPONSE project.

Concerning the need to boost the economy rather than worry about climate change, 50% agree that the economy must be the priority after COVID-19 (Figure 65). The other 50% have no opinion on the question.

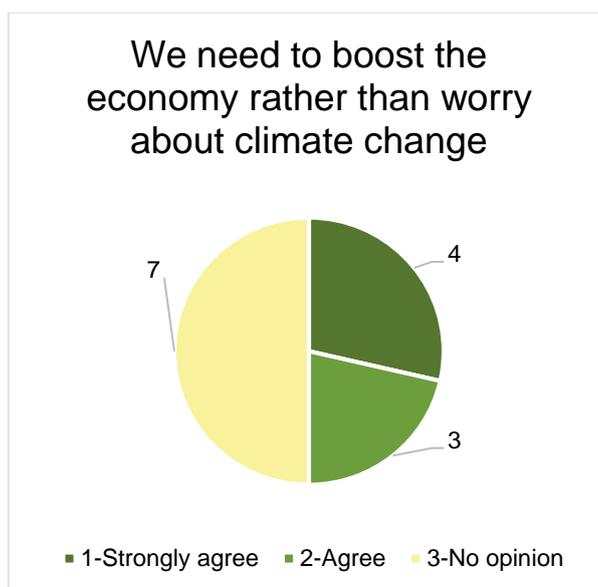


Figure 65 - Gabrovo citizen survey respondents opinions about the need to boost the economy rather than worry about climate change

The graph highlights an apparent contradiction that should be explored further: the inhabitants affirm in previous questions (see Figure 61) that climate change is a real threat that everyone must tackle quickly, but they prefer to revive the economy following the health crisis of COVID-19.

4.4.3 Severodonetsk

Severodonetsk is currently a regional centre of the Luhansk Oblast, located in the east of Ukraine. The city has a population of about 113616 spread over 58 km². Severodonetsk is bordered by the cities of Lysychansk, Rubizhne, and all together form the Severodonetsk agglomeration with a population of 300000 people, being the largest centre of the chemical industry in Ukraine. A network of educational institutions is established in the city i.e. Volodymyr Dahl East Ukrainian National University (V. Dahl EUNU), Institute for Advanced Studies, etc., while approximately three thousand non-resident students come to Severodonetsk to study every year. Severodonetsk has been involved in the EU/UNDP "Community Based Approach" program since 2016, including environmental and energy policy reforms, while the same year, Severodonetsk and Rubizhne became the winners of the USAID project on Municipal Energy Reform in Ukraine. As part of the project, energy audits of typical buildings in the city were carried out, including schools, the Department of Labor and Social Welfare, multifamily residential buildings, and V. Dahl EUNU. In September 2017, the new Resource Center on Clean Energy was inaugurated aiming to provide advice and assistance in opening newly related to energy-saving technologies. In October 2018, Severodonetsk City Council presented the Smart City project focusing on:

- intelligent city transport infrastructure
- provision of green buses

- RES provision in every house.

The city collected 83 responses to the questionnaire.

The majority of respondents are students between 18 and 25 years old living in the future PED. This population is similar to the one of Turku who works in a student village (Figure 66, Figure 67, Figure 68).

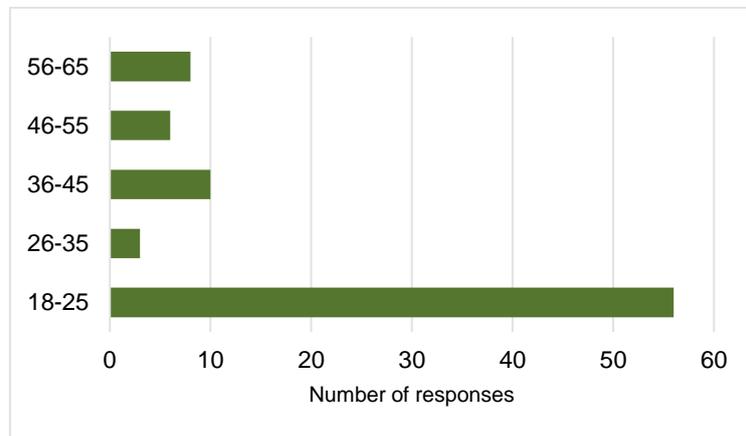


Figure 66 - Distribution of the Severodonetsk surveyed population by age group

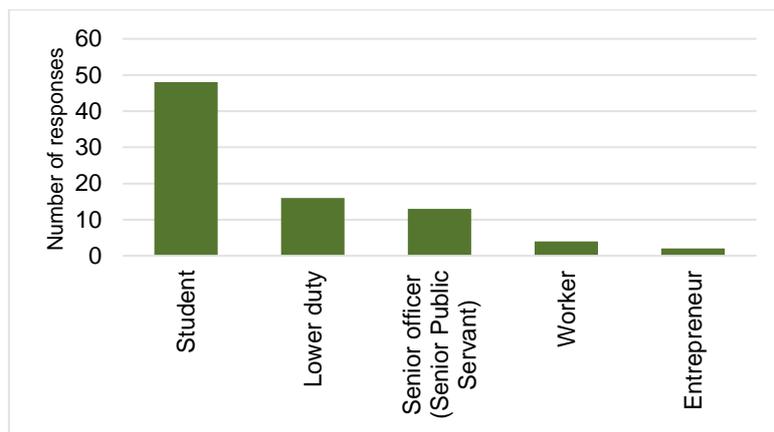


Figure 67 - Socio-professional category of Severodonetsk surveyed population

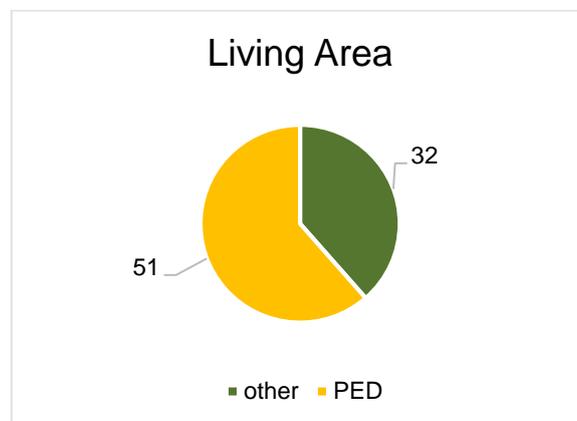


Figure 68 - Living area of Severodonetsk people surveyed

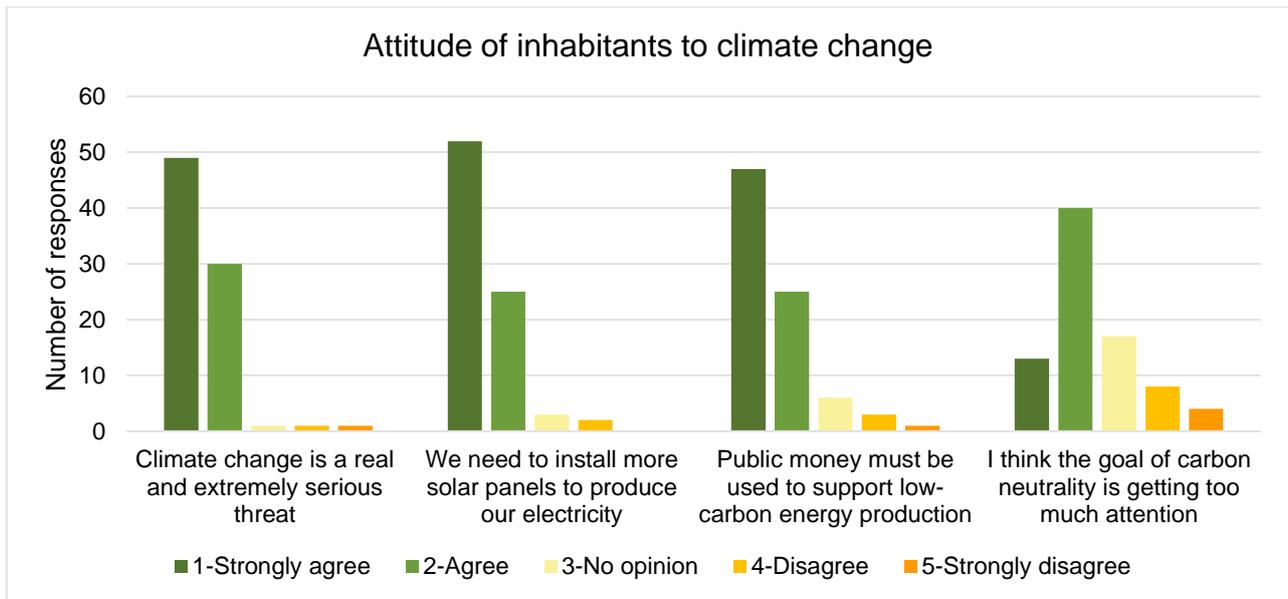


Figure 69 - Opinion of Severodonetsk citizen survey respondents concerning climate change and energetic transition policies (percentage states for the share of the most frequent answer for each statement)

On the questions of citizens' attitudes towards climate change, the same pattern as in the LHCs has been observed (Figure 69). Citizens feel concerned about current environmental issues and think that climate change is a serious threat.

The question of carbon neutrality shows a less marked distribution than in the first questions, which seems to indicate a lack of knowledge on the subject (Figure 70). There is therefore a need to communicate and inform the population about the objectives of carbon neutrality.

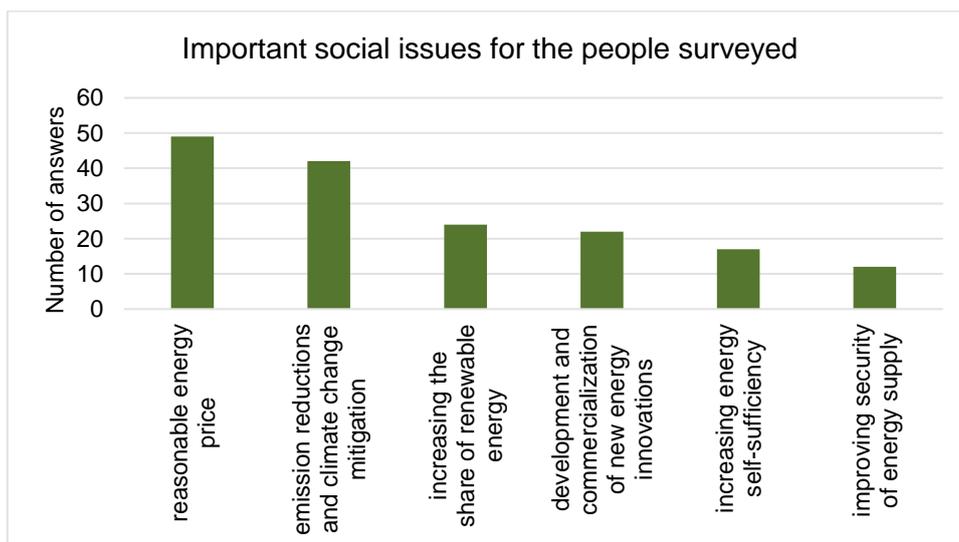


Figure 70 - Severodonetsk citizen survey respondents political priorities regarding energy and environmental issues

The two main social issues for the people of Severodonetsk are ensuring a reasonable energy price and reducing emissions to mitigate the effects of climate change (Figure 71).

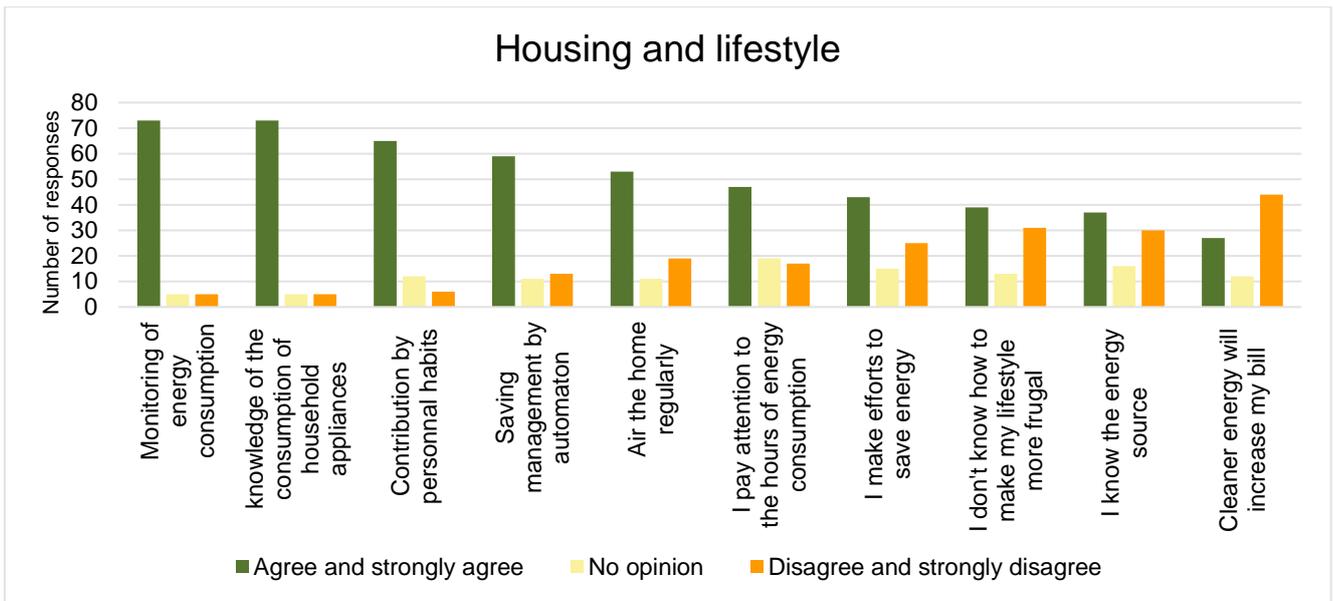


Figure 71 - Severodonetsk citizen survey respondents answers for housing and lifestyle relative questions

A significant risk that is common with other cities is that of rising bills (Figure 72). Citizens are afraid that their rent will increase with the use of greener energy but also by making their homes more environmentally friendly.

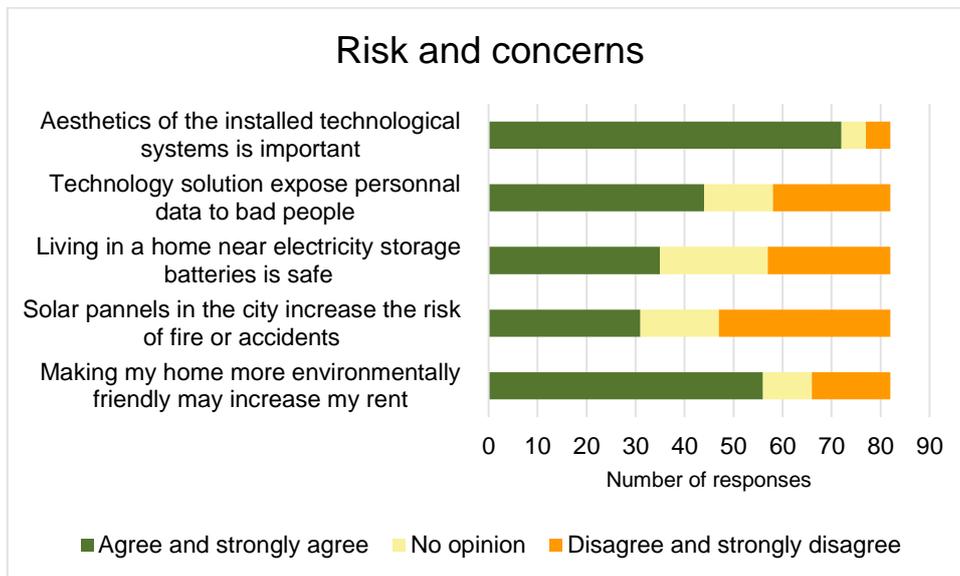


Figure 72 - Severodonetsk citizen survey respondents rating of various statements about concerns relative to the RESPONSE project.

Residents agree that the aesthetics of technical and technological solutions is an important element (Figure 73). This desire to make the future PED an aesthetically pleasing district is much more pronounced than in the LHCs.

As for Dijon and Turku, opinions on the following question are disparate. We cannot identify a priority for the inhabitants between the economic recovery after the COVID-19 pandemic and the fight against climate change.

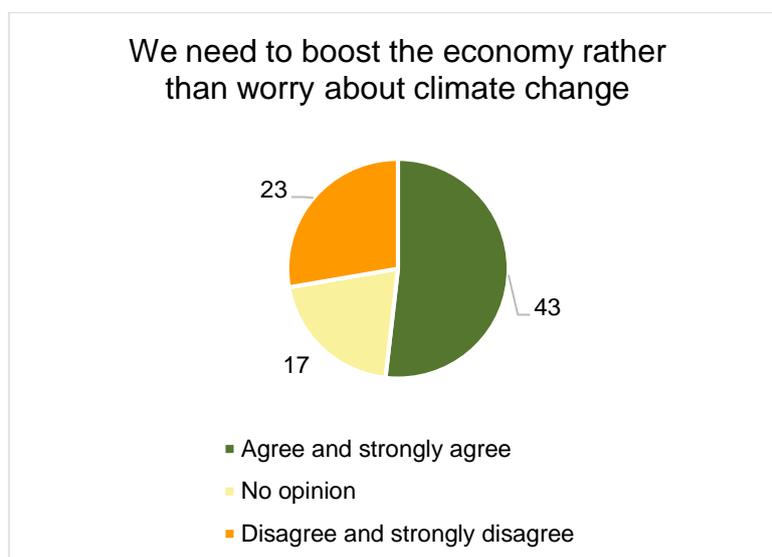


Figure 73 - Severodonestk citizen survey respondents opinions about the need to boost the economy rather than worry about climate change. Numbers stand for the number of responses for each category.

4.4.4 Botosani

Botoșani is the capital of Botoșani County, situated in the Northeast of Romania. The municipality is located in the contact area between the high hills on the left of Siretului valley, in the west, and that of the low hills of the Moldavian Plain, which stretches to the east. According to the 2011 census, Botoșani has a population of 106847 inhabitants. At the level of Botoșani municipality, there are four branches (approx. 200 students) for distance education of “Petre Andrei” Universities Iasi, “Danubius” Galați, “Gr. T. Popa” Iași (University Medical College) and “Spiru Haret” Bucharest. They have specialities in the fields of law: law, political science, psychology, finance, accounting, business administration, social assistance, medicine, etc. Botoșani is in the stage of SECAP implementation and monitoring, and the next step is to develop the Climate Action Plan to develop a strategy for reducing CO² emissions with a minimum of 40% by 2030.

88 citizens answered the questionnaire proposed in the Romanian city.

The most represented age groups are the 36-45-year-olds who are mostly workers and the over 65-year-olds who represent the pensioners (see Figure 74, Figure 75). This population is similar to the Fontaine D’Ouche population (Dijon, see section 4.1.1). Very few respondents live in the future PED (Figure 76).

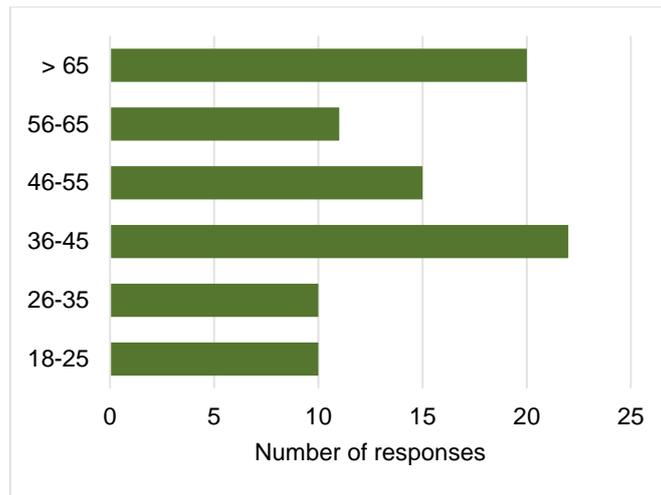


Figure 74 - Distribution of the Botosani surveyed population by age group

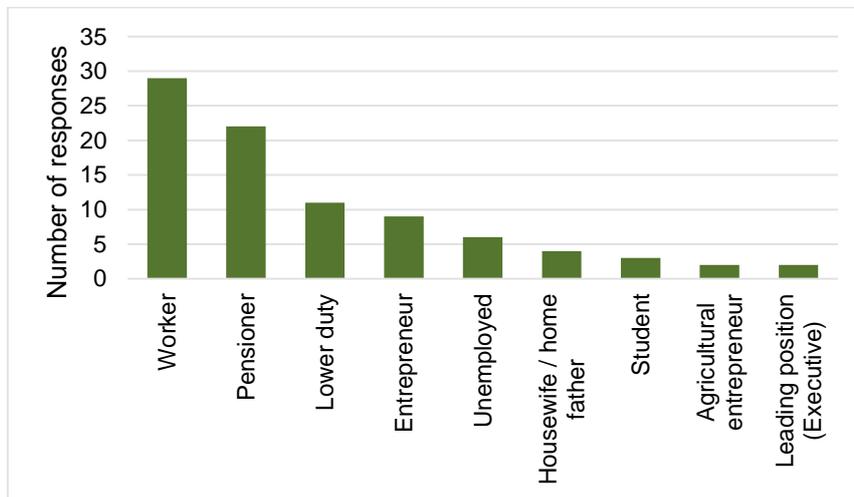


Figure 75 - Socio-professional category of Botosani surveyed population

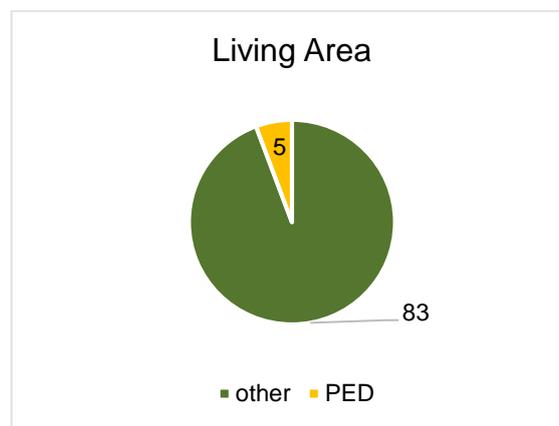


Figure 76 - Living area of Botosani people surveyed

Citizens agree with the fact that “climate change is a real and extremely serious threat” and “we need to install more solar panels to produce our electricity” (see Figure 77). This analysis is similar to the one in other

RESPONSE cities. The particular point here is that the majority of respondents disapprove of supporting low-carbon energy production with public money.

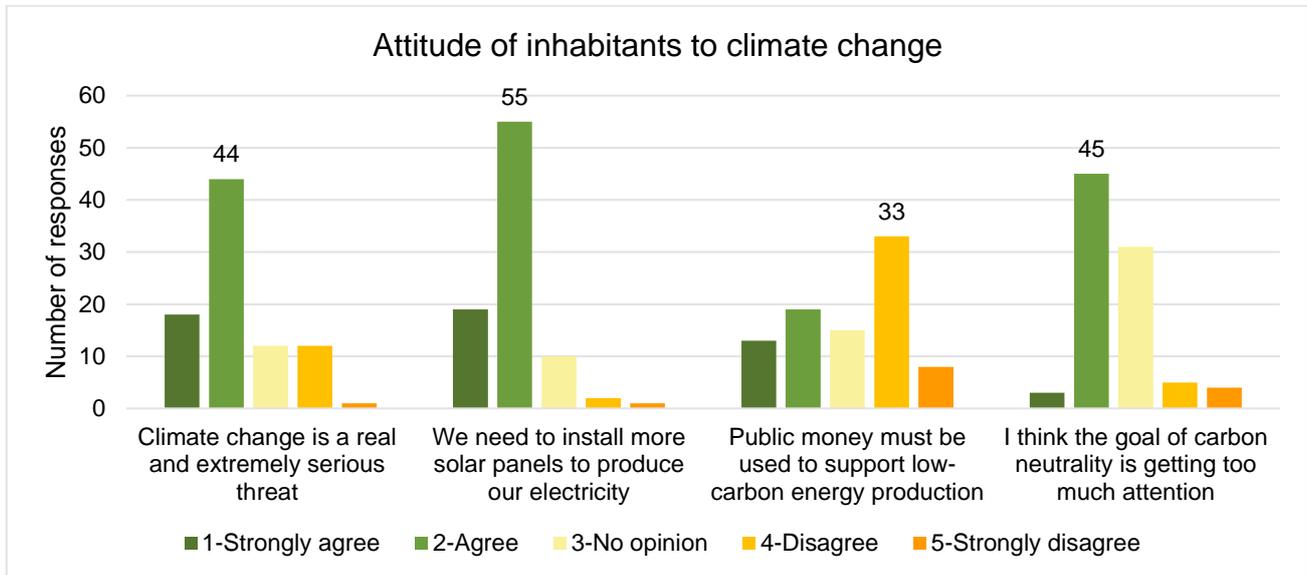


Figure 77 - Opinion of Botosani citizen survey respondents concerning climate change and energetic transition policies (number states for the share of the most frequent answer for each statement)

One societal issue stands out for the population surveyed. It is to guarantee a reasonable price for energy. One can therefore imagine a fear of rising bills and rent (Figure 78).

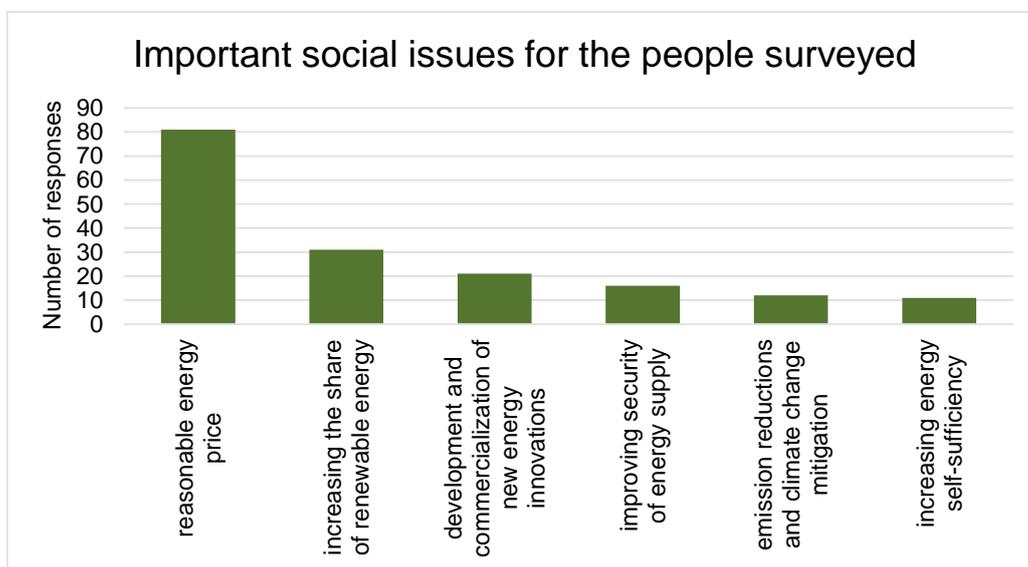


Figure 78 - Botosani citizen survey respondents' political priorities regarding energy and environmental issues

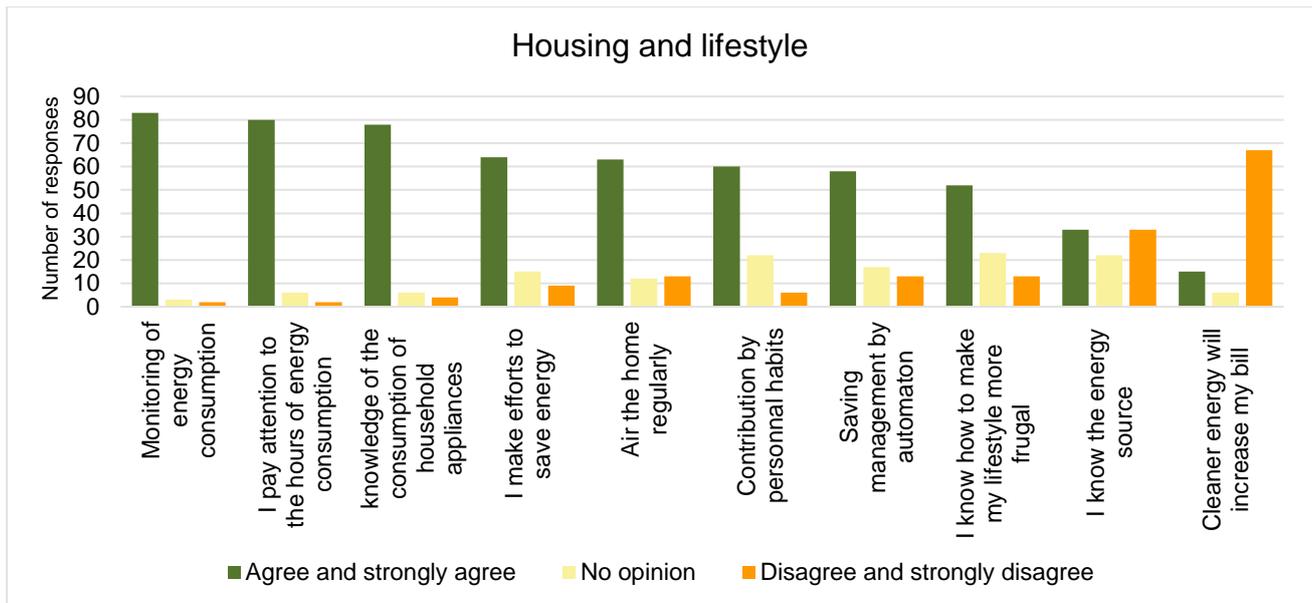


Figure 79 - Botosani citizen survey respondents' answers for housing and lifestyle relative questions

The sources of energy used in housing are unknown to the inhabitants (Figure 79). This reinforces the need to raise awareness of citizens around energy issues. The subject of energy is difficult to understand for the citizens because we cannot see the energy.

It is important to note that a large proportion of respondents believe that everyone can contribute to change through daily habits and say that they are already making efforts to make their lifestyle more environmentally friendly.

The respondents do not agree with the following statement "Cleaner energy will increase my bill" but we observe in the following graph that they are afraid that their bill will increase by making their housing more environmentally friendly.

One of the biggest concerns of the inhabitants is the aesthetics of technical and technological solutions, as for the citizens of Severodonetsk. Then there is the concern of rising bills already mentioned above (Figure 80).

Respondents are not afraid to live near battery storage and do not think that solar panels are a danger.

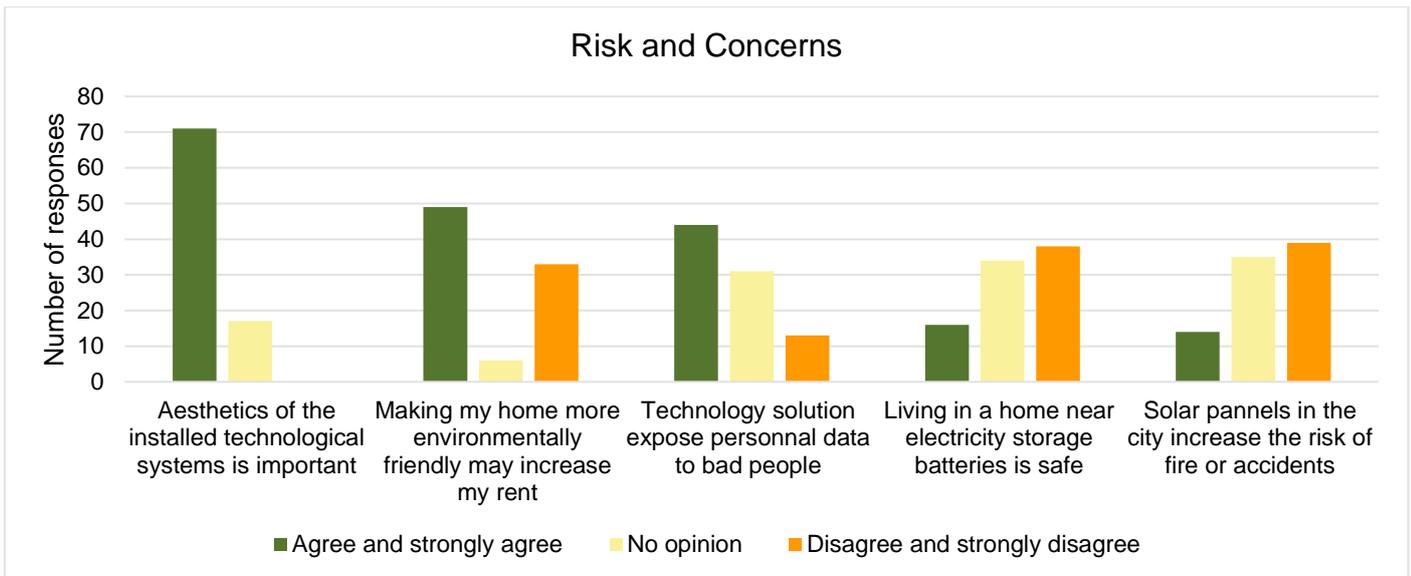


Figure 80 - Botosani citizen survey respondents rating of various statements about concerns relative to the RESPONSE project.

More than 50% of the respondents have no opinion on the following statement (Figure 81), which proposes to choose between boosting the economy rather than focusing on climate change. However, the majority of the rest of the citizens think that climate change should be the main concern.

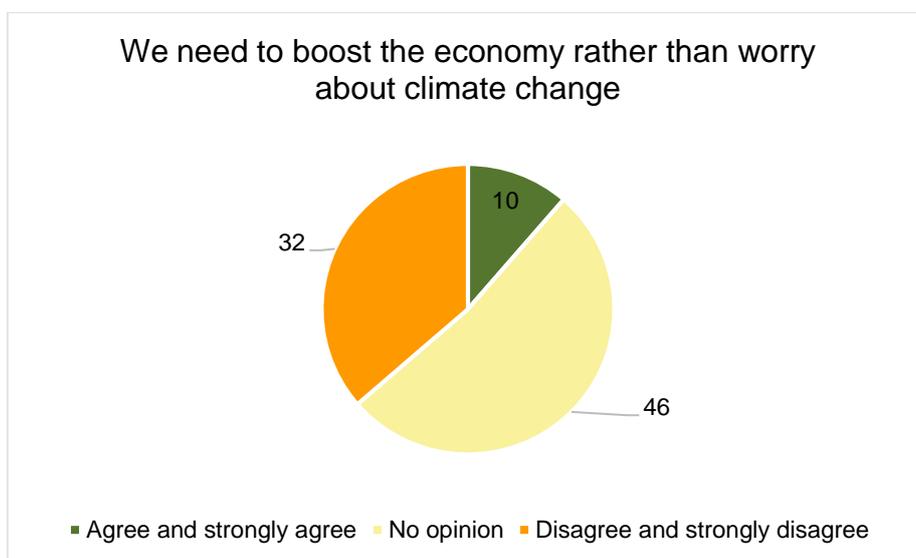


Figure 81 - Botosani citizen survey respondents opinions about the need to boost the economy rather than worry about climate change. Numbers stand for the count of responses.

4.4.5 Brussels

The City of Brussels is the capital of Belgium and has a population of 181726 inhabitants spread over 33.1km². The City of Brussels is aiming to become a real Smart and Sustainable City, evidenced by the launch of several initiatives in the domains of IoT infrastructure, open ICT platforms, and participatory projects. The City has

developed a Smart City Strategy, consisting of 6 strategic axes such as mobility, governance, well-being while its vision can be summarized as “A connected City to foster a high quality of life and a sustainable urban development”. The development of Brussels’ first PED is also an ambition of this program and is even mentioned in the Political Majority Agreement 2018-2024. The city of Brussels developed also a distinctive (but linked to the Smart City program) and ambitious masterplan called “BXL2021” which reviews completely the IT architecture and changes the organizational processes. Finally, Brussels has joined the Covenant of Mayors in 2016 and does the Covenant of Mayors (validate currently deploying its SECAP).

At the time of the writing of the deliverable, due to the lack of demonstration of the project for the inhabitants, Brussels Municipality has been unable to gather a significant amount of answers from the citizens, the improvement of the understanding of the population will be further addressed in WP4 and WP8, in particular:

- *T4.5 Citizen and Stakeholders Awareness and Collaborative Development mechanism for citizens and business shaping their cities bottom-up*
- *T8.1 FCs Replication strategy, activities planning and Sustainability roadmap creation*
- *T8.3 Brussels Smart City Scan and Replication Roadmap and 2050 Bold City Vision*

4.4.6 Zaragoza

Zaragoza is the capital city of the Zaragoza province and Aragon Region (Spain) and the Ebro River divides the city in half. Zaragoza is one of the largest municipalities in Spain (about 1.000 km²) being the fifth city in terms of citizens in the country and its municipality is home to more than 50% of the Aragonese population. Its privileged location in the country makes Zaragoza nerve centre of communications between Madrid-Barcelona and Valencia-Bilbao and a functional centre of commerce, industry, services, and administration for the region, being the largest terrestrial logistic centre of Europe and the fourth Spanish city in terms of its Economic Activity Index. The budget linked to R&D&I integrates the environmental items of "Zaragoza Smart City" with an annual budget of more than 3.5 M€. The municipal environmental expenditures in 2012 amounted to 170 million euros and the municipal budget in Science and Technology in 2013 to 4.5 million. Currently, 13000 green jobs are estimated at Zaragoza (4.9% of total employment in the city). Zaragoza in 2010 achieved self-sufficiency of 70.14% of the electricity consumed thanks to the renewables installed in its surroundings. Zaragoza signed the Covenant of Mayors in 2011.

At the time of the redaction, due to the lack of materiality of the project for the inhabitants, Zaragoza Municipality has been unable to gather a significant amount of answers from the citizens, the improvement of the understanding of the population will be further addressed in WP4 and WP8, in particular:

- *T4.5 Citizen and Stakeholders Awareness and Collaborative Development mechanism for citizens and business shaping their cities bottom-up*

- T8.1 FCs Replication strategy, activities planning and Sustainability roadmap creation
- T8.4 Zaragoza Smart City Scan and Replication Roadmap and 2050 Bold City Vision

4.4.7 Conclusion for FCs citizen surveys

The analysis of the results of the citizens' questionnaires of the FCs made it possible to identify the needs (summarised in Table 13). More than for the LHCs it is necessary to take into account the aesthetic aspect. Then there is a common need of raising awareness of citizens on climate change subjects and concepts. To this end, the feedback and gathered experience from LHCs should be a resource for FCs.

Table 13 - Conclusion of the fellow cities questionnaire analysis

Fellow Cities	Keys points
Ptolemaida	<ul style="list-style-type: none"> ● Feel concerned about the current environmental issue ● The aesthetics aspect of technological solutions is important
Gabrovo	<ul style="list-style-type: none"> ● Fear of exposure of data to bad people ● No concerns about possible energy price increases
Severodonetsk	<ul style="list-style-type: none"> ● Feel concerned about the current environmental issue ● Lake of knowledge on Carbon Neutrality subject ● Fear of rising energy prices and bills
Botosani	<ul style="list-style-type: none"> ● Feel concerned about the current environmental issue ● Lake of knowledge on Carbon Neutrality subject and other climate change concepts ● The aesthetics aspect of technological solutions is important
Brussels	<ul style="list-style-type: none"> ● Actions need to be taken to increase people's understanding of the RESPONSE project.
Zaragoza	<ul style="list-style-type: none"> ● Actions need to be taken to increase people's understanding of the RESPONSE project.



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 4

Stakeholders: power and interest

Chapter 4 – Power and interest

RESPONSE project stakeholders have been classified into three main categories: industry and private sector service providers, research centres and municipalities/policy-makers. Specific questionnaires have been submitted to these stakeholders.

For the sake of clarity, each stakeholder category will be considered separately in the sections of this chapter.

5. Stakeholders: power and interest

5.1 Survey respondents general information

72 organizations sent a full questionnaire. The survey gathered answers from the following distribution, taking into account that some respondents consider their organization as belonging to more than one category:

- 35 industries & private service providers,
- 21 municipalities & policymakers,
- 19 research centres.

In the majority, respondents are RESPONSE partners, as LHCs had difficulties in identifying local stakeholders who weren't already RESPONSE partners. FCs mostly gathered answers from non-partners (external stakeholders). As the RESPONSE consortium includes several partners with various profiles, the results will remain relevant.

5.2 Industry and private sector service providers

5.2.1 Needs of stakeholders and opportunities brought by RESPONSE

Industry partners representatives have been asked to select the three most interesting technologies, from a collaboration with research, industry or municipalities point-of-view. Results are presented in Figure 82.

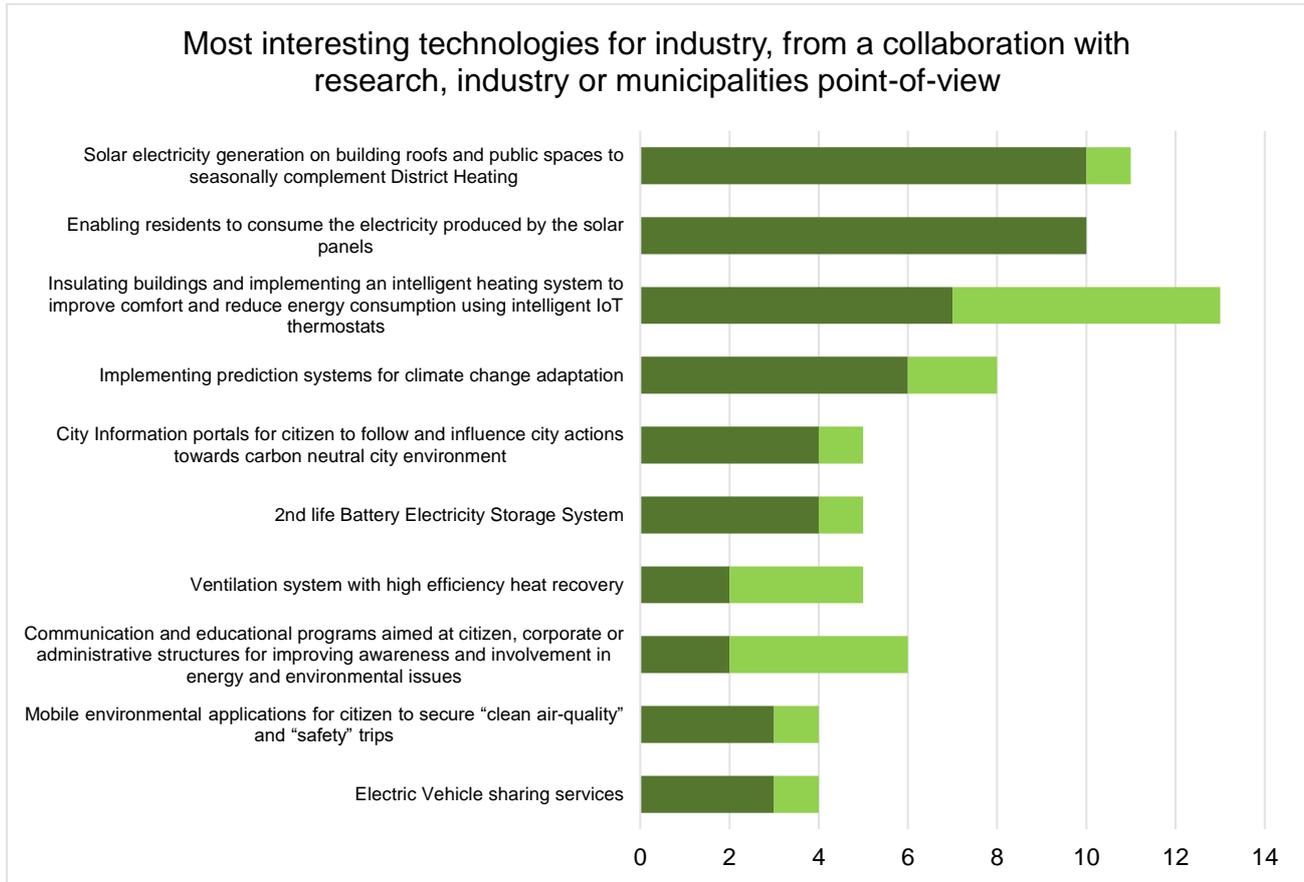


Figure 82 Most interesting technologies for industry, from a collaboration with research, industry or municipalities point-of-view. Dark green: LHC consortium, Light green: FCs consortia.

Industry partners representatives have been asked to grade, on a scale from 1 to 5, their agreement to the question: "If you are on the energy market (energy or technology provider), do you think that any specific investment framework or financially driven incentive is necessary to consolidate your market position?". The average of the answers in LHCs is 3.7, hence a slight agreement (3.8 in Turku consortium, 3.5 in Dijon consortium).

Respondents have also been asked to give details about the investments framework and incentives that they deem necessary to consolidate their market position. Results are summarised in Table 14.

Table 14 - Summary of answers to the financial needs of energy industrialists

Consortium	Average value (LHCs avg. 3.8)	In case you agree or strongly agree to the previous question, please elaborate on what investment framework or incentive you deem necessary
Dijon consortium	3.8 5 answers	<ul style="list-style-type: none"> In France, smart building and smart city economic models are still missing. Urban energy microgrid regulation is not stabilized.

		<ul style="list-style-type: none"> • Retrofitting of buildings for energy production, energy saving for buildings are still insufficiently subsidized. Regulation could also enforce the installation of some energy-saving smart devices in any new construction or even older buildings.
Turku Consortium	3.8 5 answers	<ul style="list-style-type: none"> • In Finland, solar energy is insufficiently subsidized either for personal homes as well as public and business buildings. • Incentives on innovative technologies: Incentives on building retrofit should include a condition on system energy efficiency, to give an advantage to innovative higher efficiency systems rather than the installation of technologically mature systems
Horizontal partners¹²	4.1 6 answers	<ul style="list-style-type: none"> • Public incentives that will give a market advantage to renewable energy in comparison with fossil fuels
Fellow cities	4.2 5 answers	<ul style="list-style-type: none"> • Public incentives for improving energy monitoring and energy efficiency are needed

Industry partners representatives have been asked to grade, on a scale from 1 to 5, their agreement to the question: “Would you be willing to share your know-how by offering license-based use of objects i.e. on a pay-by time basis (patent or knowledge) to try to engage in open innovation opportunities and enter other sectors of the energy market?”. The average of the answers in LHCs is 3.0, hence a neutral position, but with a significant difference between both LHCs: 4.0 in the Turku consortium, 3.0 in the Dijon consortium.

Respondents have also been asked to give details about the interesting sectors for their business and the methods for offering their expertise. Results are summarised in Table 15.

¹² Horizontal partners stands for partners who do not belong to the local consortium of a LHC or a FC. Examples: EIFER, CERTH, RINA.

Table 15 - Summary of answers for the willingness of industrial stakeholders to share their know-how

Consortium	Average value (3.5)	In case you agree or strongly agree to the previous question, please elaborate on, which sectors are interesting for your business and ways/methods you foresee for offering your know-how
Dijon consortium	3.5 4 answers	<ul style="list-style-type: none"> • Smart building providers are eager to have a part in the development of integrated smart cities and smart building solutions. New technological solutions from smart building management may provide a shared service with energy providers. • Electricity providers are ready to provide solutions for electric vehicles, such as recharging systems installation and maintenance • Software developers can share expertise on algorithms with third parties through a licensing or a royalty agreement
Turku Consortium	4.0 5 answers	<ul style="list-style-type: none"> • Smart grid in local microgrids for photovoltaic electricity, integrated with local electricity production devices, ideally integrated into buildings • Energy providers propose to share knowledge about energy peak demand shaving • In addition, RESPONSE partner <i>Sunamp Ltd</i> describes a wide spectrum of technologies, for which they have a “strong portfolio of patents” in order to protect innovations built-in partnership. Demand-side response, district heating and cooling, space heating, hot water management. • Integration of batteries with other HVAC systems, such as heat pumps, solar PV, etc.
Horizontal partners	3.3 6 answers	<ul style="list-style-type: none"> • Maintenance engineering or inspection services for industrial facilities • Energy and sustainability, optimisation in the use of natural resources

Fellow cities	3.6 13 answers Gabrovo: 4.6 Severodonetsk: 2.3 Botosani: 3.4	<ul style="list-style-type: none"> • Production and storage of energy from renewable sources and heat/electricity cogeneration technologies • Automation systems related to production and storage of renewable energy • Tailor made software solutions for energy consumption monitoring • Smart solutions for energy management/apps
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Industry partners representatives have been asked to grade, on a scale from 1 to 5, their agreement to the question: “Considering the RESPONSE solution(s) you are developing, do you believe that it will be necessary to test or implement new business or market models to facilitate the adaptation of your technology?”. The average of the answers in LHCs is 3.5 (3.4 in Turku consortium, 3.7 in Dijon consortium).

Respondents have also been asked to give details about the needs for technology testing of industrial stakeholders. Results are summarised in Table 16.

Table 16 - Summary of answers about the needs of industrial stakeholders for technology testing during the RESPONSE project

Consortium	Average value (3.5)	In case you agree or strongly agree to the previous question, please elaborate on what type of tests and/or market models you deem necessary
Dijon consortium	3.6 7 answers	<ul style="list-style-type: none"> • Collective self-consumption is considered to be a fruitful opportunity to test the potential of connected energy communities (in comparison with isolated communities) • PV panels installation require specific authorizations before installation on buildings. Therefore, the RESPONSE project will advance the field of authorisation for the installation of solar equipment. • Installation of smart building devices will enable to increase the interface efficiency between hardware systems.
Turku Consortium	3.4 5 answers	<ul style="list-style-type: none"> • From the energy grid sector point-of-view (heat and electricity), tests are necessary to assess the needs, requirements and capabilities of the following stakeholder categories:

		<ul style="list-style-type: none"> ○ Car manufacturers ○ Car owners ○ Facility/Real estate owners ○ Distribution system operators (DSO) ○ The assessment of the needs should focus on: ○ willingness in buying grid support service, ○ the needs in power safety, availability and safety, ○ technical, financial and practical aspects in the case of heat-as-a-service
Horizontal partners	3.3 3 answers	<ul style="list-style-type: none"> ● PAAS (Product As A Service) is relevant for innovation, as it enables lower initial investment cost of technologies ● Market models and business models oriented towards innovation for both private companies and public administrations are a crucial step in entering the market with new technology

Industry partners representatives have been asked to grade, on a scale from 1 to 5, their agreement to the question: “Are you interested in developing synergies for commercializing a synergistic market approach for the RESPONSE product after the conclusion of the project?”. The average of the answers in LHCs is 4.0 (4.3 in Turku consortium, 3.7 in Dijon consortium).

Respondents have also been asked to give details about the relevant market area(s) for their products and the type of collaboration. Results are summarised in Table 17.

Table 17 - Summary of answers about the collaboration business opportunities

Consortium	Average value (4.0)	In case you agree or strongly agree to the previous question, what are the market area(s) for your product and the type of collaboration?
Dijon consortium	3.8 7 answers	<ul style="list-style-type: none"> ● Collective self-consumption operations shared between several stakeholders are considered a major opportunity for building durable synergies between RESPONSE actors. ● For example, the connection between collective self-consumption operations and electric vehicle charging stations for electric vehicles is still an innovative field in

		<p>France and should gather several actors (such as electric vehicle consumers, providers, and self-consumption grid operators)</p> <ul style="list-style-type: none"> • The authentication process for PV panels on buildings will enable the industrialization of validation processes between panel providers, building worker companies and local building authorities. • Moreover, PV panel can be commercialized as integrated solutions by building manufacturers in relation to PV panel providers. • Building Operating Systems are designed to interface with several services and hardware devices. As such, BOS can act as a platform for synergies, as well as directly implement such synergistic innovative market offers. • Both startups and larger industrial companies are eager to participate in programs such as RESPONSE for identical reasons: RESPONSE project replication for building experience and financial support.
Turku Consortium	4.3 5 answers	<ul style="list-style-type: none"> • Energy providers are interested in building relations with customers and suppliers • Sensors providers are interested in establishing relations with building owners, energy companies and local governments. • In the energy field, several services could benefit from the interaction between energy providers, consumers, and energy-related service providers, such as: <ul style="list-style-type: none"> ○ demand-side response forecasting <ul style="list-style-type: none"> ○ heat-as-a-service ○ district heating or cooling ○ domestic hot water • Local municipalities are interested in collaboration for building local energy microgrids, for example, local

		electricity grids for supplying electric vehicles with power from local PV panels.
Horizontal partners	4.3 3 answers	<ul style="list-style-type: none"> Decision-making tools have a wide application area (large companies and municipalities). Collaboration with partners during the RESPONSE project is a key opportunity for service providers.

Industry partners representatives have been asked to grade, on a scale from 1 to 5, their agreement to the question: “Please indicate the strategic implementation priorities for your technology for RESPONSE, in a descending order, from the most important to the least important.” Results are summarised in Table 18.

Table 18 - Summary of answers about the industrial stakeholders' strategic priorities. Numbers in brackets stand for the count of answers for the priority.

Consortium	Strategic implementation priorities for your technology for RESPONSE (higher priorities on top)
Dijon consortium	<ul style="list-style-type: none"> Proof of commercial concept [4] Establishing market strategy [3] Financial planning [2] PV panel installation administrative authorization (ATEX¹³) [1] Industrialisation capacity [1] Technical competence on data [1] Social and societal responsibility compliance [1] Develop new products [1] Social acceptance of technological solutions [1]
Turku Consortium	<ul style="list-style-type: none"> Proof of technical concept [4] (DC-DC V2G technology, BIPV solutions, power-sharing between buildings, energy usage metering solutions) Proof of commercial concept [3] Develop new products [1] Understanding exact customer needs [1]
Horizontal partners	<ul style="list-style-type: none"> Integration of tools in the framework of local web platform [1]

¹³ *Appréciation Technique d'Experimentation* (Technical Experimentation Autorisation needed in France for testing innovative technologies in building <https://evaluation.cstb.fr/fr/appreciation-technique-expertise-atex/>)

5.2.2 Perceived risks and threats

Industry partners representatives have been asked to answer the following question: “Please indicate any existing needs/barriers for the development of your technology in RESPONSE, in a descending order, from the most important to the least important”. In this section, too few answers from horizontal partners have been gathered, hence they won't be described. Results are summarised in Table 19.

Table 19 - Summary of needs of industrial stakeholders for technology development in RESPONSE project

Consortium	Existing needs/barriers for the development of your technology in RESPONSE (higher priorities on top)
Dijon consortium	<ul style="list-style-type: none"> ● French regulations on PV panels installation, in particular for innovative technologies ● Regulation on smart building devices could be more incentive for saving energy. ● Technical development manpower (integration of solutions in existing technical environments) ● NanoSense: System derogating from RT2020¹⁴ concerning demand-side ventilation ● NanoSense: Need for technical validation from CCFAT (<i>Commission Chargée de Formuler les Avis techniques</i>¹⁵, Commission in charge of formulating technical opinions) ● Enedis: lack of technical training and knowledge of the stakeholders, mostly citizens and policymakers. ● Communication difficulties due to the profusion of partners and stakeholders ● 2nd life batteries: insufficient cost difference with brand-new batteries due to low demand. ● EV-sharing solutions: incomplete optimal use-case identification.
Turku Consortium	<ul style="list-style-type: none"> ● Lack of technological solutions ● Regulatory barriers ● Immature market ● Communication fluidity between partners inside the RESPONSE project

¹⁴ Building thermal regulation in France: <https://www.ecologie.gouv.fr/reglementation-environnementale-re2020>

¹⁵ <https://evaluation.cstb.fr/fr/rechercher/>

	<ul style="list-style-type: none"> • Lack of standardisation • Integration of solutions in existing technical environments (e.g. <i>Sunamp</i> heat storage systems)
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Concerning the previous questions, industrial partners representatives have been asked to detail the solutions that might help overcome the barriers in the development of their technologies. Results are summarised in Table 20.

Table 20 - Summary of solutions for overcoming existing barriers in the development of the technology in RESPONSE

Consortium	Solutions for overcoming existing barriers in the development of the technology in RESPONSE
Dijon consortium	<ul style="list-style-type: none"> • Modification of the French regulation or obtaining derogations for: • HVAC systems on-demand ventilation requirements • The installation of PV panels on buildings • Local or regional control bodies should be involved in the promotion of the implementation of innovative solutions when in conflict with regulation. • Establishing synergies, data sharing and better communication with partners and stakeholders to better anticipate technical issues and identify solutions. • Training of stakeholders and citizens could help in the integration of new solutions in existing technical environments and buildings • 2nd life batteries: cost is expected to decline due to demand raise in the future. • EV-sharing: ongoing use-case study, including a final user survey.
Turku Consortium	<ul style="list-style-type: none"> • Regulatory derogations are needed to implement technical solutions (PV panels, HVAC regulations). Local or regional control bodies should be involved in the promotion of the implementation of innovative solutions) • Participation in partnerships and research programs could help with building expertise. • Participation in international standardization work could help with integrating innovative solutions into standard frameworks.

- Communication between partners and stakeholders could be improved by the application of standard project management methods.

5.2.3 Conclusion: needs analysis and deduction

Results gathered among industrial representatives enabled the identification of some concerns and opportunities of RESPONSE partners. Discussions in the analysis sections can be summarised as a SWOT matrix (see Table 21).

An easy win for the RESPONSE project lies in the improvement of communication between industrial partners in their local consortium.

Regulatory constraints have been identified as a major brake on innovation in the building sector. This topic was explored in detail in Deliverable D1.2 *Assessment of Smart Cities Regulatory and Legal Environment* of the RESPONSE project.

Table 21 - SWOT analysis of RESPONSE industrial and private sector stakeholders

	Helpful	Harmful
Internal	<p>Strengths</p> <p>Development of collective self-consumption in Dijon, which brings many tech/business opportunities (e.g. batteries integration in microgrids, interaction with BOS and thermal efficiency technologies)</p> <p>The RESPONSE Project enables to build technological and commercial Proofs-of-concept (POC) and Proofs-of-value (POV), which is a major priority for industrial partners</p> <p>Some FCs have identified relevant tech industries to help them improve municipal technical knowledge and competence.</p> <p>In comparison with LHC consortia, FC consortia tend to have more expectations of more "low-tech" solutions (building insulation, communication with the general public)</p>	<p>Weaknesses</p> <p>Financing: Need for public support (energy-saving technology development)</p> <p>Communication inside the project</p> <p>Need of manpower for technological deployment</p>

External	Opportunities	Threats
	Interactions and data sharing between users, technology providers and energy suppliers	National regulations on innovative technology deployment (in particular PV panels deployment)
	Interaction between technologies thanks to BOS technologies	Need for financial support for long term investments, in particular, building thermal retrofit
	Municipalities are strongly committed to building relationships with industries	
	The RESPONSE consortium includes horizontal partners providing widely applicable tools, which may be easily replicated in the development of other PEDs	

5.3 Municipalities and policy-makers

5.3.1 Survey results

To assess the readiness level of various public sector organizations, representatives have been asked to grade (on a 1 to 5 scale) the priority of missions for their organizations and preparation level for the same issue. The two same questions have been asked for 5 subjects.

The five subjects are:

- Democracy and citizen involvement
- Economic dynamism
- Education
- Environmental protection and natural catastrophes mitigation
- Energy management and saving

For each one of those subjects, public sector representatives have been asked the following questions:

- On a scale from 1 to 5, to what extent [SUBJECT] is a priority for your organization's mission?
- On a scale from 1 to 5, how is your organization prepared (existing processes, internal education programs, the existence of a dedicated team, piloting of the subject by a strategic manager, etc.) to deal with [SUBJECT]?

Where [SUBJECT] is replaced by each one of the five subjects described above.

Results for both questions, for each of these 5 subjects have been compiled in graphs in order to display the correlation between the priority of each subject, in comparison with the readiness of the organization for the same subject (Figure 83, Figure 84, Figure 85, Figure 86, Figure 87).

A “noise” has been added to avoid confusion of points for identical answers, and hence make common answers visible for the reader.

Points located under the dotted lines mean that the organization estimates that its readiness for the mission is not as high as the priority of the mission.

It must be emphasised that, in a majority of cases, the readiness for high priority missions is generally considered lower than the mission’s importance. In addition, missions requiring interaction with the general population tend to have significantly lower readiness than the corresponding mission importance (in particular for “Democracy and citizen involvement”).

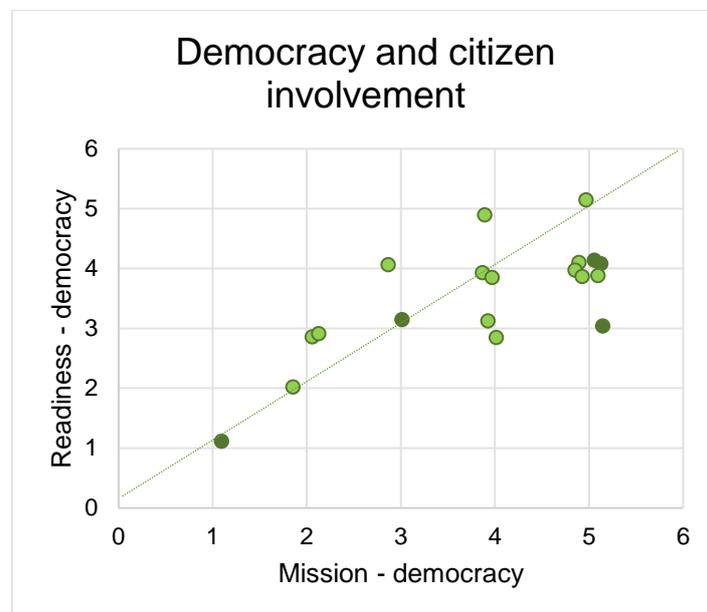


Figure 83 - Priority and Readiness of Democracy and citizen involvement for stakeholders. Dark green: LHC consortium, Light green: FCs consortia.

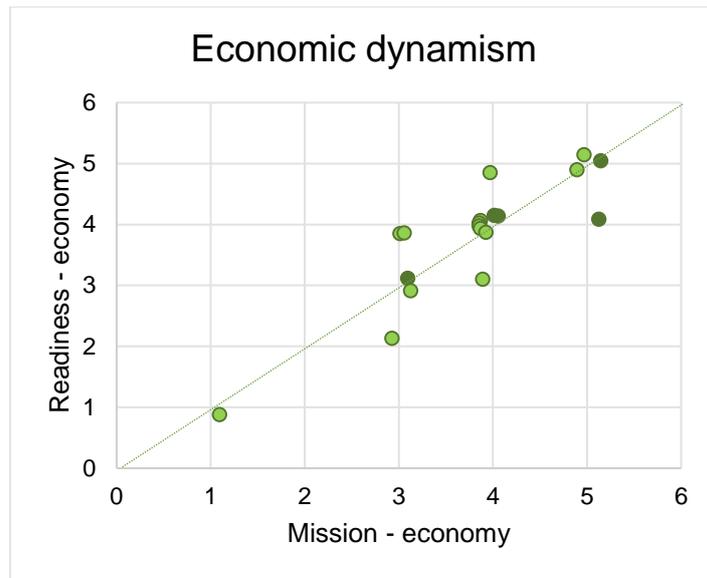


Figure 84 - Priority and Readiness of Economic dynamism for stakeholders. Dark green: LHC consortium, Light green: FCs consortia.

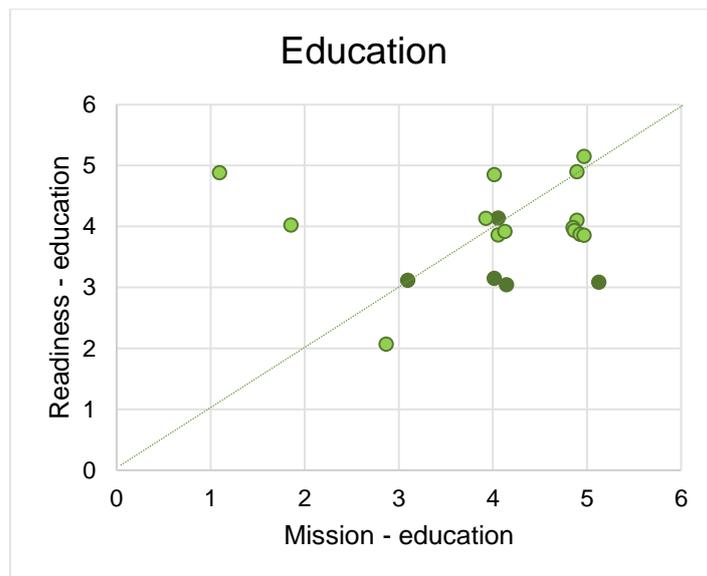


Figure 85 - Priority and Readiness of Education for stakeholders. Dark green: LHC consortium, Light green: FCs consortia.

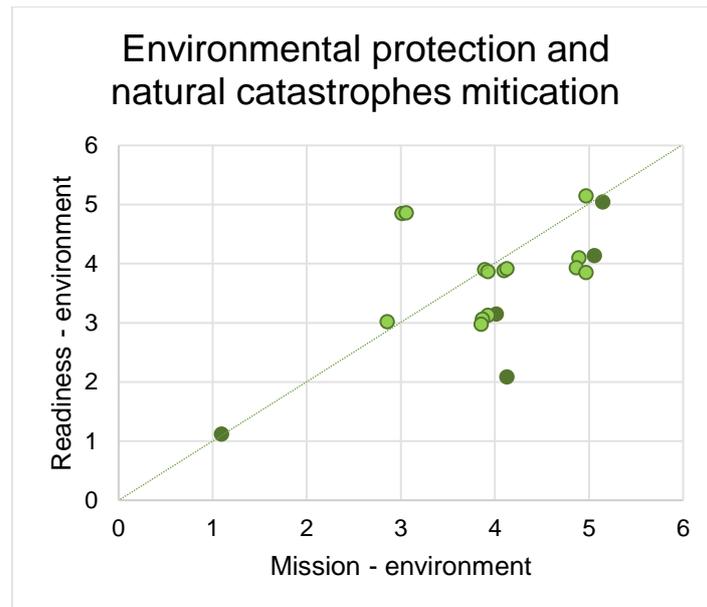


Figure 86 - Priority and Readiness of Environmental protection and natural catastrophes mitigation for stakeholders. Dark green: LHC consortium, Light green: FCs consortia.

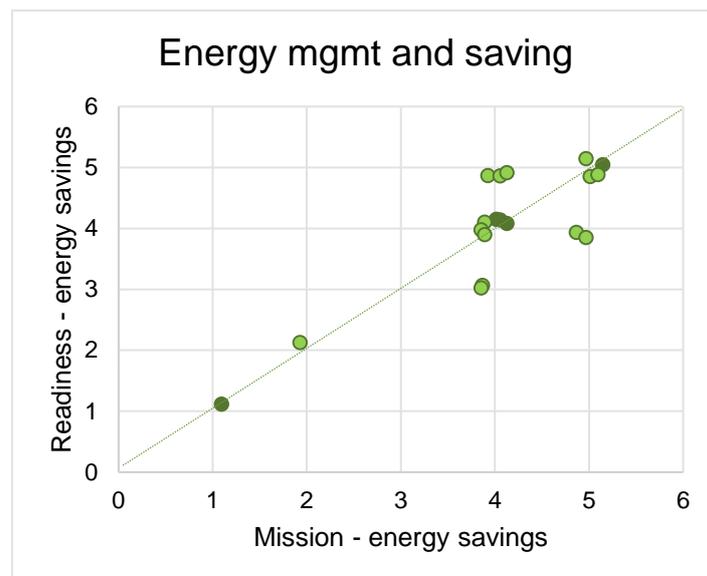


Figure 87 - Priority and Readiness of Energy management and saving for stakeholders. Dark green: LHC consortium, Light green: FCs consortia.

The average answer to the following question: “The RESPONSE project should invest in increasing the competence of municipalities on the energy issue.” is 4.3 (4.4 when including FC answers).

When asked for details, most of the respondents in LHCs agree that the RESPONSE project should invest in increasing the competence of municipalities on the energy issue.

Most opportunities pointed out by the respondents are focused on:

- Citizens involvement in

- participation in political decision-making
- environmental issues
- energy savings behaviour
- Open data development

- Development of mobilisation educational tools
- Economic development for energy transition issue
- Improvement of external partnerships for public organizations

The average answer to the following question: “Do the decision-makers in your organization believe that enhancing the relationship with **industries** is needed for improving the effectiveness of your mission?” is 4.6 (4.5 when including FC answers). This score denotes a strong agreement with the statement.

Most opportunities of fruitful relations with industries pointed out by the respondents are focused on:

- The priority for building strong relationships between municipalities and RESPONSE industrial partners
- Building trust in the industry partner for providing good quality products
- Building innovation between industry and laboratories
- Improving technical expertise of municipalities
- Helping municipalities with saving energy
- Establish a more flexible regulatory and financial framework

When asked for the most important barriers to the establishment of fruitful relationships with industries, the respondents mostly point out the “Financial barriers” and “Regulatory barriers” (LHC respondents mostly point out the “Local policy orientation” as the main barrier). The need for “Technical knowledge of the subject” is pointed out by FC stakeholders (results are gathered in Figure 88).

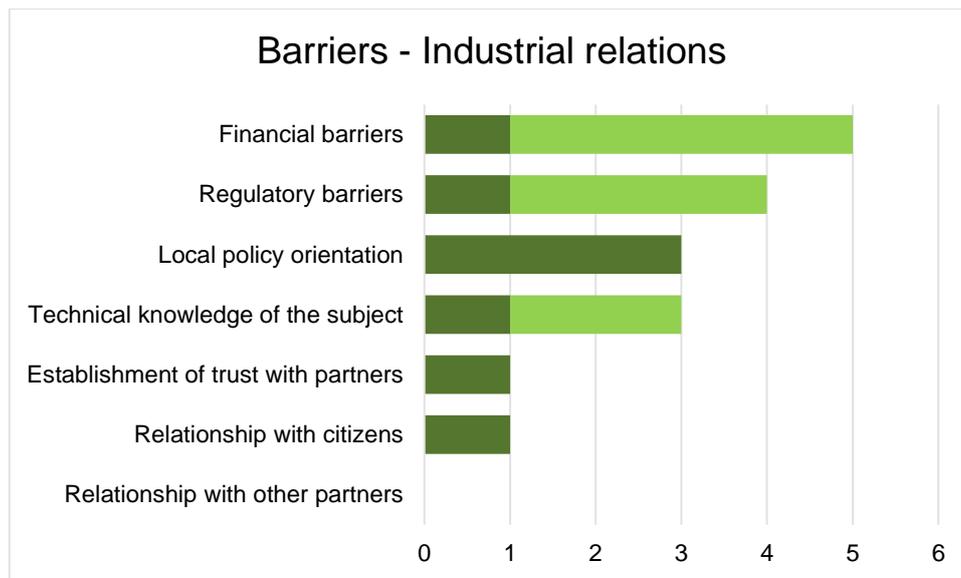


Figure 88 - Main barriers in the establishment of collaboration between public organizations and industries, from the point-of-view of public organizations. Dark green: LHC consortium, Light green: FCs consortia.

Concerning the suggestions of drivers and solutions proposed by respondents, very few answers have been collected. It can be pointed out that respondents point out the lack of technical knowledge in their own organization. No driver or solutions are aimed at Local policy orientation, though it is considered as the main barrier for establishing proper relations with industries, at a local level.

The average answer to the following question: “Do the decision-makers in your organization believe that enhancing the relationship with research centres is needed for improving the effectiveness of your mission?” is 4.0 (4.5 when including FC answers).

Concerning the main expectations of the respondents for the partnerships between their organizations with research centres, there were two main feedbacks:

- Public research organizations already grant much effort in the elaboration of relationships with other research centres.
- Municipalities consider that their main expectation for relations with research centres is either:
 - Still unclear, or,
 - Mostly relevant in relation with other organizations, like industries that will grant services to the organization (for better understanding of the new technologies, guidance for energy savings policies)

When asked for the most important barriers to the establishment of fruitful relationships with citizens, the respondents mostly point out the “Citizen involvement for public debates and issues” as the main barrier. The

“Quality of relationships between institution and citizen”, “Financial barriers” come second (results are gathered in Figure 89). Concerning this subject, LHC and FC answers are consistent.

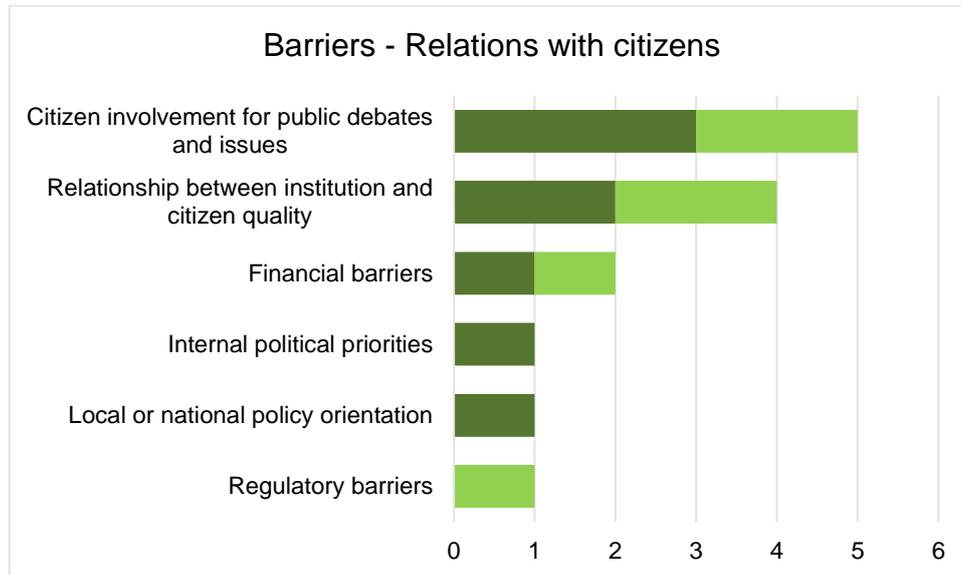


Figure 89 - Main barriers in the establishment of collaboration between public organizations and citizens, from the point-of-view of public organizations. Dark green: LHC consortium, Light green: FCs consortia.

Respondents described the areas for improvement in the field of relations with citizens as follows:

- Enhancement of general public understanding of the issues through the improvement of the communication and outreach methods,
- A better understanding of the environmental subjects by the municipal services,
- The establishment of a more flexible regulatory and financial framework.

5.3.2 Discussion for municipalities

Overall, the agreement between priorities and resources of the organizations seem correct, but it should be pointed out that:

- In general, respondents estimate that, for most crucial missions, their organization lacks resources in comparison with the priority of these missions.
- This observation is mostly pointed out for:
 - local democracy,
 - education,
 - environmental issues.
- These 3 missions are particularly dependent on the quality of the relationship with citizens/users.

- Respondents frequently point out the issues in the relations with citizens and require resources in the improvement of the relationship with their citizens/users (training, interviews).
- From the previous observations, it can be concluded that citizen awareness and involvement is the main issue from the point of public organizations.
- Public organizations agree on the opportunity for the RESPONSE project to improve their internal competence on the energy issue, but at the same time, respondents tend to estimate that their resources fit the criticality of energy management in their work. In general, detailed answers focus on economic development (energy transition) and citizen involvement.
- Municipalities are more interested, at the moment, in establishing partnerships with industries than there are with research centres. This seems consistent with the operational needs of such organizations, which tend to provide readily available services to citizens and users.
- Respondents point out local policy orientation as the main barrier.
- The cause of the hiatus between the issue (local policy orientation), and the main solution (technical knowledge improvement) is not properly understood at the moment. It could be assumed that respondents consider that local policy orientation is exogenous and cannot be controlled, hence they cannot identify solutions.

5.3.3 Conclusion: needs analysis

Results gathered among industrial representatives enabled the identification of concerns and opportunities of RESPONSE partners. Discussions in the analysis sections have been summarised as a SWOT matrix (Table 22).

Table 22 - SWOT analysis of RESPONSE municipality and public sector stakeholders

	Helpful	Harmful
Internal	<p>Strengths</p> <p>High level of commitment by decision-makers for building relationships with industries.</p> <p>High level of commitment by municipalities for building international relationships.</p> <p>A good fit between resources and goals for most objectives (see Weaknesses cell for examples of goals that are not properly resourced).</p>	<p>Weaknesses</p> <p>Lack of resources for fulfilling missions in relation to the population (local democracy, education and environmental issues).</p> <p>Local policy orientation is often considered a barrier.</p> <p>More data would be needed to better understand this issue.</p> <p>A lower level of commitment of decision-makers for building relationships with research institutions, due to a lack of knowledge of the opportunities brought by such partnerships. The RESPONSE project may help raise awareness on the subject.</p>
External	<p>Opportunities</p> <p>Industries are looking for relationships with municipalities for market opportunities.</p> <p>Municipalities are aware of their need for improving competence in energy and environmental aspects. The RESPONSE project is an opportunity to address this particular point.</p>	<p>Threats</p> <p>Communication and relationship quality with citizens.</p> <p>The involvement of citizens in environmental issues may be insufficient now. Empowerment actions implemented in RESPONSE WP4 should address this issue. In particular, municipalities consider that they need help on the issue.</p>

5.4 Research centres

5.4.1 Survey results

To assess the readiness level of various research centres, representatives have been asked to grade (on a 1 to 5 scale) the opportunity for scientific research on the following subjects:

- Solar electricity generation (Photovoltaic panels, solar thermal electricity) to seasonally complement district heating and cooling
- Enabling prosumers to use, store and sell electricity produced by the photovoltaic solar panels by constituting a local energy community
- Thermally insulating buildings to reduce heat consumption

- Implementing an intelligent heating system (e.g. including IoT thermostats) to improve comfort and reduce energy consumption
- Ventilation system with high-efficiency heat recovery (public building, office, residential)
- 2nd life Battery Electricity Storage Systems to reduce peak loads
- Safety and environmental oriented mobile applications for citizen
- Electric Vehicle charging and sharing services
- City Information portals for the citizen to follow and influence city actions towards the carbon-neutral city model
- Predicting future climate change to help cities with their planning (identify heat islands, choose building technologies adapted for forecasted climate)
- Communication and educational programs aimed at citizen, corporate or administrative structures for improving awareness and involvement in energy and environmental issues.

For each one of these subjects, the following question was asked: “Do you think that the following technology does still need research and there is a window for scientific innovation?” The average of ratings for each technology has been calculated, sorted and compiled in Figure 90.

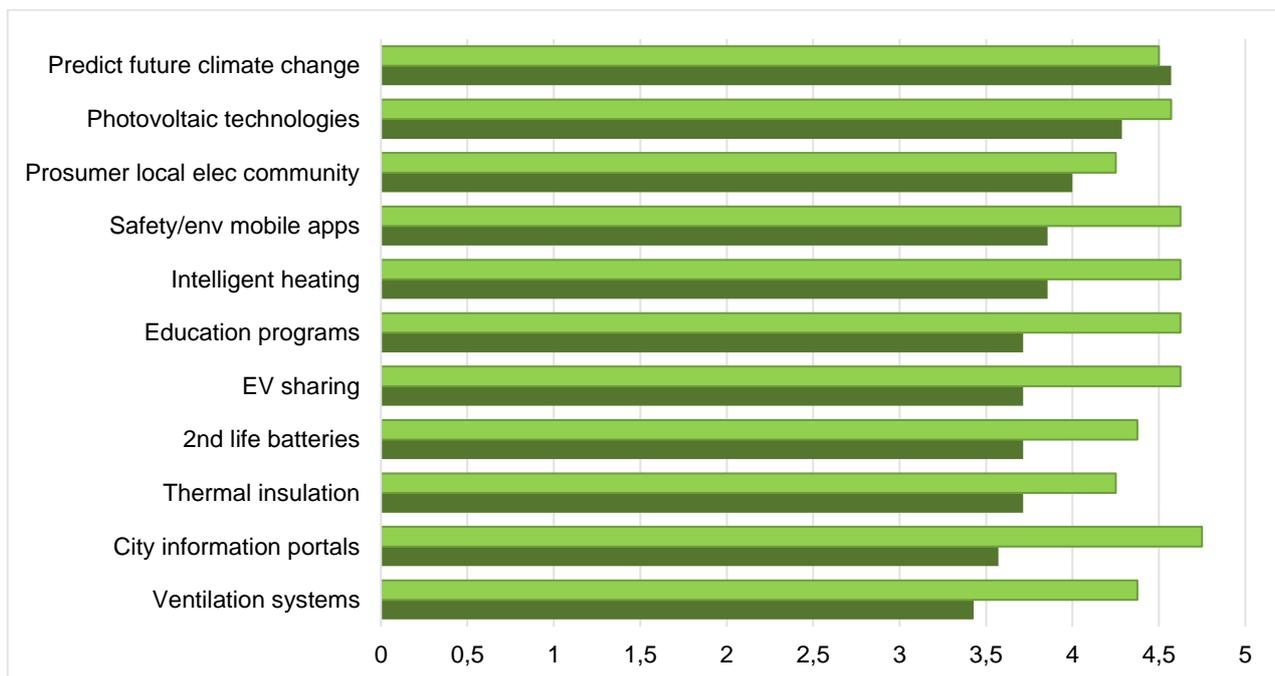


Figure 90 - Sorted average ratings gathered for various technologies research opportunities, sorted by decreasing average value. Dark green: LHC consortium, Light green: FCs consortia.

The average answer to the following question: “Do you think that collaboration with **industrial** partners in particular technological areas would improve the outcome of your research in RESPONSE?” is 4.25.

When respondents have been asked to give detail about the technological areas for which collaboration with industries could be profitable for carrying their research, answers focus on the following points.

The most frequently invoked point is the sharing of data with other actors:

- Data about urban climatological provided by various actors, in relation with local authorities, specialized associations (in France), and energy providers could grant opportunities for:
 - climate change forecasting, climate scenario co-construction with partners,
 - Sensor technology,
 - Data crowd-sourcing,
 - Data platforms.
- Energy data could be studied to improve energy management systems, for consumption control, optimization, and improvement of infrastructure usage practices
- Indoor air quality metrics can be studied for the improvement of health factors
- Decision-making tools are relevant to converting data into usable information. Cutting-edge models must be tested before any market exploitation. To this end, the availability of data is crucial.

The average answer to the following question: “Do you think that collaboration with **municipalities** would improve the outcome of your research in RESPONSE?” is 4.25.

When respondents have been asked to give detail about the technological areas for which collaboration with municipalities could be profitable for carrying their research, answers focus on the following points:

- Data sharing for climate change modelling and forecasting
- The relation with cities is considered crucial, in relation with the following points:
 - Development of data platforms that will grant research centres with needed data.
 - Data centres can provide guidance to the cities in the adaptation to the climate change and carbon neutrality transition.

5.4.2 Discussion for research centres survey

It should be noted that a significant share of respondents works in centres specialized in climatology. Therefore, it is not surprising that respondents consider predicting future climate change as the most promising research subject.

Opportunities given by respondents are consistent with answers on detailed technological opportunities (climate change and adaptation, sensor technologies, data platforms).

Although photovoltaic production is considered as the second most promising research subject, no specific technology was given by the respondents, as such research subject is the speciality among the respondents' organizations.

A significant result of the gathered answers is the strong need for cooperation on data, with both industries and municipalities. In addition, data sharing associations have been designated in the French context (*Associations Agréées de Surveillance de la Qualité de l'Air*, i.e. approved air quality monitoring associations)

Respondents agree that collaboration with industries and municipalities is equally important for carrying relevant research. This is consistent with the expressed need for data sharing with both organization types.

From the previous points, it can be concluded that research centres will be key actors in the development of data sharing platforms, due to their interest in conducting research on energy and climate-related subjects.

5.4.3 Conclusion: needs analysis

Results gathered among research institutions representatives enabled the identification of opportunities of RESPONSE research stakeholders. Discussions in the analysis sections have been summarised as a SWOT matrix (Table 23).

A remarkable observation is that, while research centres identify opportunities, they are rarely identified as relevant partners by industrial and public partners. The crucial role of research centres in the RESPONSE project should be highlighted to facilitate the realisation of identified opportunities.

Table 23 - SWOT analysis of RESPONSE research centres stakeholders

	Helpful	Harmful
Internal	<p>Strengths</p> <p>RESPONSE project integrates tasks with innovative elements that provide fruitful research opportunities (publications, patents): climate change forecasting, PV technologies, electric self-consumption, intelligent heating, mobile apps, educational programs.</p> <p>Research partners are eager to share data with industrials and municipalities in data platforms</p>	<p>Weaknesses</p>

External	<p>Opportunities</p> <p>Municipalities need help in developing a long term vision of local climate change.</p> <p>Municipalities lack technical knowledge.</p> <p>Municipalities need help in raising citizen awareness.</p>	<p>Threats</p> <p>Research centres need to be more identified as relevant partners by industrials.</p> <p>Municipalities and public sector services often ignore the benefits of partnerships with research institutions.</p>
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RESPONSE

Integrated Solutions for Positive Energy
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Chapter 5

Conclusion

6. Conclusion

The task T1.1 of the RESPONSE project aimed at identifying:

- the needs of the RESPONSE stakeholders,
- the opportunities opened by the RESPONSE project,
- risks perceived by the stakeholders,
- propose ways of limiting identified risks.

To this end, RESPONSE project stakeholders have been gathered in groups: citizens, industries, research centres and municipalities. To take into account the particular interests and concerns of each of these categories, stakeholders were approached with specific questionnaires. Separate analyses of questionnaire answers have been conducted.

Surveys in both LHCs and all six FCs have been conducted. Each city disseminated two questionnaires: one aimed at citizens, the other to the stakeholders. The questionnaire was designed to dynamically adapt to the category of the organisation's representative. It was therefore possible to produce specific studies for each of the three stakeholder categories.

Surveys of LHC citizens have revealed that they share an interest in environmental issues and an individual capacity to act on the consumption of natural resources. They also highlighted the attention that residents pay to energy bills, and their need for training of residents to better understand the issues that the RESPONSE project aims to address. These common points are interesting in the exchange of methods for the empowerment of citizens (WP4) or the implementation of technological solutions (WP6, WP7). Furthermore, the comparative analysis of the questionnaires to the inhabitants of the LHCs revealed that the inhabitants of the Dijon PED are older than those of Turku, and that they perceive new technologies more as a risk for their autonomy. The inhabitants of the Turku DPE are younger, and therefore more concerned about climate change, although they seem to feel less legitimate to express themselves on social policy issues. Ideally, empowerment actions will be able to take these differences into account when adapting their local strategy.

Surveys of RESPONSE partners and other stakeholders have revealed the opportunities and needs of stakeholders: in particular, through the RESPONSE project, industry stakeholders claim to benefit from valuable testing grounds, which facilitate the design and testing of new synergy-based products. The industrialists of the different local consortia have massively pointed out the regulatory constraints or the lack of financial or regulatory incentives to implement their technological solutions.

The research centres also claim to benefit from the RESPONSE project in terms of new research opportunities and scientific publications. They will be able to play a leading role in the co-construction of data sharing platforms with companies and cities. In addition, these centres can produce offers for cities to help with

planning and training on technical issues. An effort could be made to increase the value of the activity of research centres in the eyes of municipalities and companies.

Finally, municipalities and public services claim to be involved in building relationships with businesses and to have adequate means to carry out economic development projects. However, local public institutions still lack visibility on the usefulness of a prolonged relationship with research centres and lack technical knowledge on climate change and technologies for the city of 2050. Public institutions unanimously affirm their difficulty in maintaining relationships of trust and fluid interaction with their population, among other things on environmental issues and education. However, studies with citizens reveal that inhabitants are interested in learning more about ecological issues. This is one of the major challenges of the RESPONSE project, which will require special attention.

Because of the COVID pandemic context, communication has been made more difficult and less fluid between the project stakeholders. This is evident from the survey, and efforts can be made to improve this point.

The present document will be useful for the carrying of tasks:

- *T4.2 Dijon implementation of digital solutions for increased Citizen Empowerment and Climate adaptation, T4.3 Turku implementation of digital solutions for increased Citizen Empowerment and Climate adaptation and T4.5 Citizen and Stakeholders Awareness and Collaborative Development mechanism for citizens and business shaping their cities bottom-up.* which focus on the mobilisation of the citizens and stakeholders in cities
- *T6.1 Dijon Smart City Diagnosis and dynamic Master Planning for TA#1-TA#3 and T7.1 Turku Smart City Diagnosis and dynamic Master Planning for TA#1-TA#3* which will lead to the deployment of devices in LHCs
- The risks and opportunities identified in the present work will be an input for tasks *T12.2 Quality and Risk management and T12.3 Technical and Innovation Management*
- *T8.1 FCs Replication strategy, activities planning and Sustainability roadmap creation* which should benefit from both results and methodology of T1.1 to plan PEB deployment in FCs



RESPONSE

Integrated Solutions for Positive Energy
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Appendixes

7. Appendixes

7.1 Appendix A. Citizen questionnaire (English version)

Table 24 - Citizen questionnaire (English version)

Single choice (mandatory)	Area (Zone) of living (PED or other parts of the city)
	FR: Blue, Green, Yellow, Other (Figure 1 was displayed in the questionnaire) FIN: Länsi, Itä, Aitiopaikka, Nummenranta, Ikituuri, xx. halutaanko TYS:n muut alueet mukaan?
Single choice	How old are you?
	18-25
	26-35
	36-45
	46-55
	56-65 > 65
Single choice	Please state your occupation
	Leading position (Executive?)
	Senior officer (Senior Public Servant?)
	Lower duty
	Worker
	Entrepreneur
	Agricultural entrepreneur
	Housewife/home father
	Student
	Pensioner
Unemployed	
Single choice	Please decline your educational background:
	Primary education (primary / vocational school)
	Secondary education (Student/college degree)
	Undergraduate degree Master's degree

	Postgraduate degree (doctoral degree)
Attitude	
Likert scale 1-5	Please rate your agreement with the following statement on current climate issues:
	Climate change is a real and extremely serious threat that the whole world should tackle immediately and by all possible means
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Please rate your agreement with the following statement on current climate issues :
	The share of solar electricity in our electricity production should be increased
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Please rate your agreement with the following statement on current climate issues :
	It is right that tax funds support the development of cleaner methods of energy production
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Please rate your agreement with the following statement on current climate issues :
	I feel that carbon neutrality goals get too much attention, taking resources away from the most important things
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Choix multiples	Please choose the 2 issues the political decisions should primarily aim for

	<ul style="list-style-type: none"> ● reasonable energy price ● increasing the share of renewable energy ● emission reductions and climate change mitigation ● increasing energy self-sufficiency ● development and commercialization of new energy innovations ● improving security of energy supply
Housing and lifestyle	
Likert scale 1-5	On a scale of 1-5, mark how your own opinion matches the statement.
	I feel it is important to monitor my own energy use
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	On a scale of 1-5, mark how your own opinion matches the statement.
	It does not matter to me which energy source is used to generate electricity and heating for my house
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	On a scale of 1-5, mark how your own opinion matches the statement.
	I think my lifestyle is already energy efficient enough
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	On a scale of 1-5, mark how your own opinion matches the statement.
	I believe that everyone can contribute to the achievement of the goal of carbon neutrality by their own behaviour
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	On a scale of 1-5, mark how your own opinion matches the statement.
	I'm ready to pay energy at a higher price in order to reduce environmental damage
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	On a scale of 1-5, mark how your own opinion matches the statement.
	If the electricity charges were not included in the rent, I would be more motivated to save it

	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Single choice	Which form of heating would you choose if you could decide (choose the one you think is the best option)?
	<ul style="list-style-type: none"> ● Geothermal heat* ● district heating produced from renewable energy ● district heating produced by a small nuclear power plant ● wood ● pellet ● fossil district heating (coal, fuel) ● gas ● PV panels ● Solar thermal collectors ● Heat pumps* ● None of the above ● I cannot say
Likert scale 1-5	Mark how your own opinion matches the statement.
	I know with which energy source my house's electricity and heating are produced
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	Inadequate ventilation in my apartment means that I have to keep the windows open
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	I know how different household appliances differ in terms of energy consumption
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	I pay attention to my water use (e.g. laundry, shower)
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.

	I pay attention to the time of energy use
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	I would pay more attention to the energy consumption of my home if I could get more detailed information about it
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	I think that energy savings should happen automatically through technology, and I should not have to pay attention to it myself
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	I do not know how to make my lifestyle more energy-friendly
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Risks	
Likert scale 1-5	Mark how your own opinion matches the statement.
	Environmentally-friendly solutions may increase the cost of my housing
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	Fire safety risks or other risks associated with the use of solar panels (e.g. electric shock or damage to home electrical appliances)
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	Reducing street lighting in my residential area may reduce traffic safety
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	It is harmful to health to live in a house with energy storage facilities/batteries nearby
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)

Likert scale 1-5	Mark how your own opinion matches the statement.
	The rapid technological development associated with my housing means that I always need expert help in problematic situations
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	Technological solutions expose my personal data to the wrong hands
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	New solutions for my housing make me too dependent on technology
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
Likert scale 1-5	Mark how your own opinion matches the statement.
	The aesthetics of technical solutions implemented in the city is very important for me
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)
COVID - related	
Likert scale 1-5	The following statement illustrates the changes brought by the COVID pandemic situation
	Mark how your own opinion matches the statement.
	I do not think we can now afford climate change measures, because all financial resources should be allocated to revitalizing society after the COVID pandemic
	strongly agree (1), somewhat agree (2), neither agree nor disagree (3), somewhat disagree (4), strongly disagree (5)

7.2 Appendix B. Stakeholder questionnaire (English version)

Table 25 - Stakeholder questionnaire (English version)

Questions restrictions (adapted dynamically from the respondents answers)	Free Text	Company/organisation name: Please type answer
	Free Text	Technology/service area:

Generic questions for all stakeholders		e.g. Energy, ICT, e-Mobility, policy, citizen engagement, etc Please type answer	
	Free Text	Product/Technology for RESPONSE: Please type answer	
	Free Text	Location: Please type answer	
	Single choice list	Local consortium (Dijon, Turku, Brussels, Botosani, Ptolemaida, Gabrovo, Severodonetsk, Zaragoza, None of the above)	
	Industrial stakeholder (Yes/no) mandatory	Is your organisation a service provider in the private sector or an industry?	
Questions reserved for Industry or private sector service provider	Likert scale 1-5	If you are on the energy market (energy or technology provider), do you think that any specific investment framework or financially driven incentive (e.g. feed-in tariffs) are necessary to consolidate your market position? <ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i> ● <i>Agree</i> ● <i>Strongly agree</i> 	
	Free Text	In case you agree or strongly agree to the previous question, please elaborate on what investment framework or incentive you deem necessary:	
	Likert scale 1-5	Would you be willing to share your know-how by offering license-based use of objects i.e. on a pay-by time basis (patent or knowledge) to try to engage in open innovation opportunities and enter other sectors of the energy market? <ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i> ● <i>Agree</i> ● <i>Strongly agree</i> 	
	Free Text	In case you agree or strongly agree to the previous question, please elaborate on, which sectors are interesting for your business and ways/methods you foresee for offering your know-how:	
	Multiple choices	Please select the most interesting technologies, from a collaboration with research, industry or municipalities point-of-view: <ul style="list-style-type: none"> ● Solar electricity generation on building roofs and public spaces to seasonally complement District Heating 	

		<ul style="list-style-type: none"> ● Enabling residents to consume the electricity produced by the solar panels ● Insulating buildings and implementing an intelligent heating system to improve comfort and reduce energy consumption using intelligent IoT thermostats ● Ventilation system with high-efficiency heat recovery ● 2nd life Battery Electricity Storage System ● Mobile environmental applications for citizens to secure “clean air-quality” and “safety” trips ● Electric Vehicle sharing services ● City Information portals for citizens to follow and influence city actions towards a carbon-neutral city environment ● Implementing prediction systems for climate change adaptation ● Communication and educational programs aimed at citizen, corporate or administrative structures for improving awareness and involvement in energy and environmental issues
	(Yes/no) mandatory	<u>Are you a RESPONSE partner? If you don't know, please answer “No”</u>
	Internal - Likert scale 1-5	<p>If you are a RESPONSE partner, with reference to the RESPONSE solution(s) you are developing, do you believe that it will be necessary to test or implement new business or market models to facilitate the adaptation of your technology?</p> <p>e.g.: the greening of generation, regulation of grids, digitalization of retail units, Aggregator of Distributed Energy Resources, Platform for Direct Trade, Smart Manager of Autonomous Territories Behind the Meter etc, Power-to-Gas, Power-to-Heat, Power-to-Mobility, etc)?</p> <ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i> ● <i>Agree</i> ● <i>Strongly agree</i>
	Free Text	In case you agree or strongly agree to the previous question, please elaborate on what type of tests and/or market models you deem necessary:

	Internal - Likert scale 1-5	<p>If you are a RESPONSE partner: Are you interested in developing synergies for commercializing a synergistic market approach for the RESPONSE product after the conclusion of the project?</p> <p>(e.g. start-up, collaboration contracts, exclusive resale agreement, etc.)</p> <ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i> ● <i>Agree</i> ● <i>Strongly agree</i>
	Free Text - Internal	In case you agree or strongly agree to the previous question, what are the market area(s) for your product and the type of collaboration?
	Free Text - internal	<p>Please indicate the strategic implementation priorities for your technology for RESPONSE, in descending order, from the most important to the least important</p> <p>(e.g. file a patent, Proof of Business Concept, Market entry strategy, Financial planning and projections, product features etc.)</p>
	Internal - Free Text	<p>Please indicate any existing needs/barriers for the development of your technology in RESPONSE, in descending order, from the most important to the least important</p> <p>(e.g. Policy, Regulatory barriers, market barriers, technology barriers, etc.)</p>
	Internal - Free Text	<p>With reference to the previous question, refer to any drivers that could help in overcoming those barriers?</p> <p>(e.g. synergies with local stakeholders for technical expertise, regulatory derogations, specific funding source, external expertise, etc.)</p>
	Research centre and universities (Yes/no) mandatory	Is your organization a research centre, a university or a higher education institution?
Questions reserved for research centres	Likert scale 1–5 (1 par ligne) – repeat the question with the line each time	Do you think that the following technology does still need research and is there a window for scientific innovation
		<p>Do you think that the following technology does still need research and there is a window for scientific innovation?</p> <p>Solar electricity generation (Photovoltaic panels, solar thermal electricity) to seasonally complement District Heating and cooling</p> <ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i>

		<ul style="list-style-type: none"> ● <i>Agree</i> ● <i>Strongly agree</i> 	
		[...] Enabling prosumers to use, store and sell electricity produced by the photovoltaic solar panels by constituting a local energy community	
		[...] Thermally insulating buildings to reduce heat consumption	
		[...] Implementing an intelligent heating system (e.g. including IoT thermostats) to improve comfort and reduce energy consumption	
		[...] Ventilation system with high-efficiency heat recovery (public building, office, residential)	
		[...] 2nd life Battery Electricity Storage Systems to reduce peak loads	
		[...] safety and environmental oriented mobile applications for citizen	
		[...] Electric vehicle charging and sharing services	
		[...] City Information portals for the citizen to follow and influence city actions towards carbon-neutral city	
		[...] Predicting future climate change to help cities with their planning (identify heat islands, choose building technologies adapted for forecasted climate)	
		[...] Communication and educational programs aimed at citizen, corporate or administrative structures for improving awareness and involvement in energy and environmental issues	
		(Yes/no) mandatory	<u>Are you a RESPONSE partner? If you don't know, please answer "No"</u>
		Likert scale 1–5	[INTERNAL] Do you think that collaboration with industrial partners in particular technological areas would improve the outcome of your research in RESPONSE?
	Free Text	Please elaborate your answer. Give examples of those technological areas	

	Likert scale 1–5	[INTERNAL] Do you think that collaboration with municipalities would improve the outcome of your research in RESPONSE? (Likert scale 1-5, like earlier)
	Free Text	Please elaborate your answer. Give examples of issues.
	Municipality and policy-making bodies (Yes/No, mandatory)	Is your organization a municipality, and administration or a public institution (local school)?
Questions reserved for municipalities, administrations and public institutions	[Likert Scale] 1-5	<p>To what extent are the following objectives a priority for your organization's mission?</p> <ul style="list-style-type: none"> ● Democracy and citizen involvement (e.g. increasing participation to district councils, increasing answers to local voting and surveys)
		<ul style="list-style-type: none"> ● <i>Not relevant for our organisation</i> ● <i>No more than regulatory requirements</i> ● <i>Secondary priority</i> ● <i>Strategic priority</i> ● <i>Everyday business</i>
	[Likert Scale] 1-5	<p>With reference to the previous question, how is your organization prepared (existing processes, internal education programs, the existence of a dedicated team, piloting of the subject by a strategic manager, etc.) to deal with the following issues:</p> <ul style="list-style-type: none"> ● Democracy and citizen involvement (e.g. increasing participation to district councils, increasing answers to local voting and surveys)
		<ul style="list-style-type: none"> ● <i>Not relevant for our organisation</i> ● <i>Limited to regulatory requirements</i> ● <i>Secondary priority</i> ● <i>Strategic priority</i> ● <i>Everyday business</i>
	[Likert Scale] 1-5	<p>To what extent are the following objectives a priority for your organization's mission?</p> <ul style="list-style-type: none"> ● Economic dynamism (e.g. promoting new business opportunities, employment)

[Likert Scale] 1-5	With reference to the previous question, how is your organization prepared (existing processes, internal education programs, the existence of a dedicated team, piloting of the subject by a strategic manager, etc.) to deal with the following issues:	<ul style="list-style-type: none"> • Economic dynamism (e.g. promoting new business opportunities, employment)
[Likert Scale] 1-5	To what extent are the following objectives a priority for your organization's mission?	<ul style="list-style-type: none"> • Education (e.g. defining new education programs/material for citizen or business players, children education, etc.)
[Likert Scale] 1-5	With reference to the previous question, how is your organization prepared (existing processes, internal education programs, the existence of a dedicated team, piloting of the subject by a strategic manager, etc.) to deal with the following issues:	<ul style="list-style-type: none"> • Education (e.g. defining new education programs/material for citizen or business players, children education, etc.)
[Likert Scale] 1-5	To what extent are the following objectives a priority for your organization's mission?	<ul style="list-style-type: none"> • Environmental protection and natural catastrophes mitigation
[Likert Scale] 1-5	With reference to the previous question, how is your organization prepared (existing processes, internal education programs, the existence of a dedicated team, piloting of the subject by a strategic manager, etc.) to deal with the following issues:	<ul style="list-style-type: none"> • Environmental protection and natural catastrophes mitigation
[Likert Scale] 1-5	To what extent are the following objectives a priority for your organization's mission?	<ul style="list-style-type: none"> • Energy management and saving
[Likert Scale] 1-5	With reference to the previous question, how is your organization prepared (existing processes, internal education programs, the existence of a dedicated team, piloting of the subject by a strategic manager, etc.) to deal with the following issues:	<ul style="list-style-type: none"> • Energy management and saving
<u>YES/NO (mandatory)</u>	<u>Are you a RESPONSE partner? If you don't know, please answer "No"</u>	

	Likert scale 1-5	The RESPONSE project should invest in increasing the competence of municipalities on the energy issue
		<ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i> ● <i>Agree</i> ● <i>Strongly agree</i>
	Free Text	<p>Please give details about the main opportunities offered by the RESPONSE project to improve internal competence on the issues:</p> <p>Reminder :</p> <ul style="list-style-type: none"> ● Democracy and citizen involvement (e.g. increasing participation to district councils, increasing answers to local voting and surveys) ● Economic dynamism (e.g. promoting new business opportunities, employment) ● Education (e.g. defining new education programs/material for citizen or business players, children education, etc.) ● Environmental protection and natural catastrophes mitigation ● Energy saving ● “Open Data transition” (e.g. promoting and developing open data repositories, organising open data hackathons, collaborating with companies and research partners in this direction)
Likert scale 1-5	Do the decision-makers in your organization believe that enhancing the relationship with industries is needed for improving the effectiveness of your mission (e.g. in implementing Positive Energy Districts, in reducing energy consumption in the city)? ([Likert Scale] 1-5)	
	(e.g. in implementing PEDs, in reducing energy consumption in the city)	<ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i> ● <i>Agree</i> ● <i>Strongly agree</i>

	Free Text	Please give details about the main expectations of these partnerships for your organization:
	Likert scale 1-5	<p>Do the decision-makers in your organization believe that enhancing the relationship with research centres is needed for improving the effectiveness of your mission? ([Likert Scale] 1-5)</p> <p>(e.g. in implementing Positive Energy Districts, in reducing energy consumption in the city)</p> <ul style="list-style-type: none"> ● <i>Strongly disagree</i> ● <i>Disagree</i> ● <i>Neither agree nor disagree</i> ● <i>Agree</i> ● <i>Strongly agree</i>
	Free Text	Please give details about the main expectations of these partnerships with research centres for your organization:
	Multiple choices	<p>Please choose the 2 most relevant potential barriers, from a collaboration with industrial partners, point-of-view:</p> <ul style="list-style-type: none"> ● Local policy orientation, ● Regulatory barriers, ● financial barriers, ● relationship with the citizens, ● relationship with other partners, ● technical knowledge of the subject, ● establishment of trust with partners
		Considering the collaboration with the industrial partners, please give suggestions about the drivers or solutions that may help you overcome the limits you encounter:
	Multiple choices	<p>If you are a municipality, please select the most relevant potential barriers, from a collaboration with citizens point-of-view:</p> <ul style="list-style-type: none"> ● Local or national policy orientation, ● Internal political priorities ● Regulatory barriers, ● Financial barriers, ● Relationship between institutions and citizen quality ● Citizen involvement for public debates and issues

	Free Text	Considering the collaboration with the citizens, please give suggestions about the drivers or solutions that may help you overcome the limits you encounter:
	Free Text	Thank you for your participation. Do you have a final comment or remark to send us?



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities



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