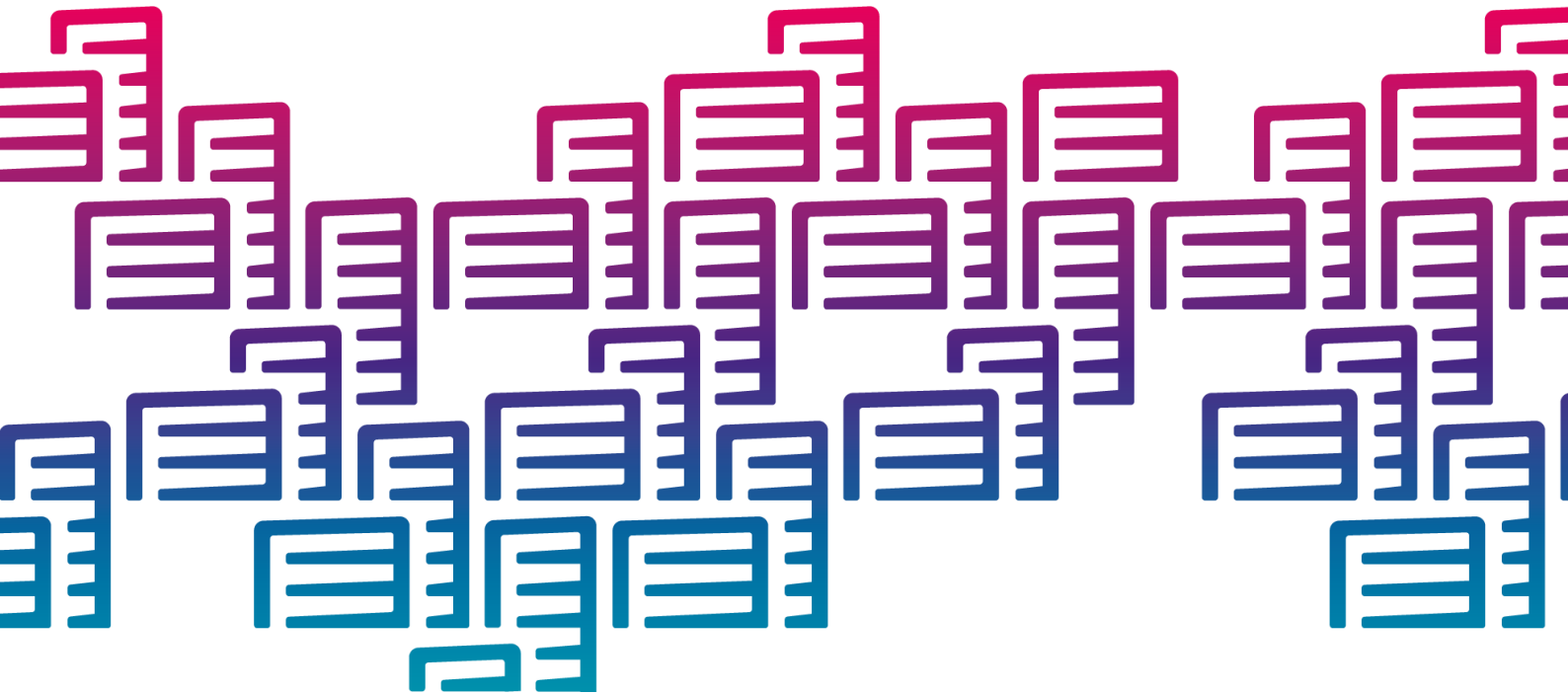


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¹ PU = Public

PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

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Executive Summary

In order to ensure the timely implementation of the new District Heating and Cooling systems at the demo sites of the WEDISTRIC project, this Acceptance Dialogue Strategy was developed to ensure the acceptance of the end-users of the regenerative, fossil free technologies.

The recommendations of this deliverable should further influence directly the Communication and Dissemination Master Plan (Second version - D7.5) and the Communication and Dissemination Master Plan (Final version - D7.6) as update of the D7.1 Communication and Dissemination Master Plan (First version).

The Acceptance campaign for end users was planned for the demo sites in Poland and Spain only. Due to ongoing changes and cancellations of the demo sites in Poland and Spain, only an analysis of the situation on a first Spanish demo site was possible. The Polish demo site was completely cancelled.

We could outline and analyse the attitudes of different target groups at a technology centre in Alcalá, Spain, as first steps of a behaviour change programme. Furthermore, we could identify major hurdles and give specific recommendations for a local acceptance campaign.

The original demo site in Alcalá, Spain has been replaced by an equivalent demo site in Córdoba. The conclusions extracted from this study can be applicable to this demo site. Additional lessons learned during the process are to be reported in a separate deliverable.

For this reason, instead of focussing on a specific demo site, we propose an acceptance dialogue strategy with an acceptance level scoring – mainly influenced by the respective technologies involved, but also the environment and the end-users of the DHC systems and a campaign toolkit with different actions that can be easily adapted and localised to all demo sites as required.



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Description of Content

This deliverable describes the Acceptance Dialogue Strategy developed for fostering dialogue and awareness about WEDISTRICK technologies for end-users in all relevant participating countries.

The first part describes the challenges of acceptance at play in the WEDISTRICK project. Part Two elaborates on the benefits of using a Behaviour Change Programme for this purpose. Part Three gives details on the identified Behaviour Change Programme in action. Part Four shows the methodology at one real demo site in Spain whereas Part Five shows its results and following local recommendations.

In Part Six, the results are being used to develop an acceptance level scoring system and a general campaign toolbox to be able to implement a behavioural change programme when needed.

The success of energy transition and deployment of renewable energy technologies is the result of an interplay between complex strategies that require political, structural but also social changes that may disrupt habitual energy and consumer choices. In this interconnection, social acceptance plays a key role and largely depends on the attitudes and behaviour of the end-users and of other stakeholders affected by the technology. In fact, social acceptance has been identified as a crucial enabler for facilitating the implementation of renewable technologies such as wind energy or biomass ([Panori et al, 2022](#)).

Getting to know more about the behaviours about the citizens concerned by WEDISTRICK project is therefore important and justifies the need for conducting a behaviour change study and possibly also a program to ensure the acceptance of the project.

This Acceptance Dialogue Strategy aims at identifying, understanding, and eventually influencing in a beneficial way individual habitual behaviours that are crucial to ensure the success of a green energy project by an acceptance campaign.

This change behaviour programme consists of six steps:

Step 1: Problem orientation and specifications of goals and objectives

Step 2: Analyses of determinants and target groups

Step 3: Set-up of focus groups/interviews to explore the influencing factors on the energy-related behaviour of the target group

Step 4: Design the acceptance campaign accordingly

Step 5: Implementation of the acceptance campaign

Step 6: Impact evaluation, monitoring and adjustment of the campaign if needed



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Disclaimer

The authors of this report want to express the fact that there were some multiple changes of locations for the demo site during the drafting of this report. In month 30 of the project, the Polish demo site was completely cancelled; furthermore the Spanish demo site has been replaced from Alcalá to Córdoba.

Although the authors believe the main hypothesis should remain valid, the authors stress that any behaviour change programme of an awareness campaign must be specific to a location since context and environment always matter.

This publication reflects only the authors' view. The Agency and the European Commission are not responsible for any use that may be made of the information it contains.



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Part One: WEDISTRIC and acceptance challenges

1. What is WEDISTRIC

WEDISTRIC aims to demonstrate innovative 100% fossil free heating and cooling solutions for new and existing district heating and cooling systems.

The heating and cooling of buildings accounts for 50% of the total EU energy consumption. A large part of this energy (70%) is currently generated from fossil fuels – coal, natural gas, and oil. By switching to fossil-free energy, this sector would bring us one step closer to climate neutrality, better air in European cities and higher quality of life for our citizens.

2. WEDISTRIC technologies in action and expected results

The project relies on multiple sources of renewable energy, excess heat from data centres, advanced thermal storage to redistribute heat to buildings as needed and smart technologies to increase the operational efficiency of the systems.

These technologies will be implemented in three real-scale projects in Spain, Romania, and Sweden. The demonstration cases will present the best practices that can be replicated across different climate zones and building types, transforming the heating and cooling sector.

The expected results of the project are:

- 100% renewable district heating and cooling systems for new and existing constructions.
- self-developed Decision-making tool to perform feasibility studies in new locations.
- A portfolio of replicable solutions for a variety of climates and buildings, in different business scenarios.
- Higher public acceptance of district heating and cooling (DHC) systems due to new environmental benefits.

3. Challenges around the Acceptance and Dissemination Strategy

By drafting its European [Green Deal](#), the European Union has set ambitious goals to become the first climate-neutral continent by 2050 ([EC-Version – Green Deal, 2019](#)).



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The heart of EU strategy is a package that fosters the use and consumption of Renewable Energy Technologies (RET).

This transition is particularly concerned by the modernisation of the heating sector, which is at the origin for almost half of the total energy consumption ([Panori et al, 2022](#)).

The WEDISTRIC project is, in this sense, aligned with the EU objectives as it aims to demonstrate how renewable energies can replace fossil energies for heating and cooling purpose.

The project will particularly make use of innovative biomass technologies as they have been identified as particularly promising in the EU decarbonisation strategy.

The WEDISTRIC Consortium believes that demonstration projects are a beneficial way to showcase the fossil free DHC systems in action, raise awareness about innovative technologies and solutions, and give relevant actors in the sector the chance to learn from their experience. Therefore, WEDISTRIC has set up a network of demonstration cases to validate the technologies at real scale in different geographical, climatic, and politic environments across Europe.

In addition, WEDISTRIC has created a “Demo followers’ community” – eleven selected sites across Europe will receive simulation models for their existing or planned DHC systems. Different scenarios with technologies developed within the WEDISTRIC project will be integrated in the simulation, to evaluate the most cost-effective system for each virtual demo site. This will additionally assess and showcase the replicability of the WEDISTRIC technologies and raise awareness of renewables integration potential as a profitable project.

But successful deployment of renewable energy technologies also must consider the needs of end-users and of others affected by the technology. A good understanding and a strong backing by the public is essential.

In the past, several studies have highlighted the concerns raised among the population by implementing Renewable Energy Technologies (from now on “RET”) projects in their area and especially biomass ([Azarova et al, 2019](#); [Upreti et al, 2004](#), [Zoellner et al, 2008](#)).

In this context, public acceptance is a decisive factor in designing and deploying new technologies aiming to change energy production and consumption.

To achieve the awareness and acceptance goals, WEDISTRIC has agreed on setting-up a dissemination strategy relying on 5 main goals:

Goal 1: Raising awareness and interest of potential end-users and energy providers on the project results

Goal 2: Engaging in a dialogue with stakeholders and potential users to foster exploitation opportunities of the WEDISTRIC results

Goal 3: Knowledge transfer among the partners

Goal 4: Foster the acceptance of WEDISTRIC technologies by end-users and other stakeholders

Goal 5: Training and support of Behavioural Change Programme



Part Two: Behaviour Change Programme justification

1. Awareness, support and acceptance of WEDISTRIC

Addressing climate change requires not only a shift in the way citizens use energy but also a profound behaviour change in consumer action.

Individuals have a responsibility to change the way she or he lives to reduce their impact on climate change. We can all play our part together, and the combination of these small changes will multiply into a large contribution.

In this sense, public policies and awareness campaigns can play an important part to inform citizens about the actions they can take or support to contribute positively to sustainable environment policies.

A successful awareness campaign should find means to elevate green values among citizens. The true motives of human behaviour are driven by unconscious biases and habits firmly ingrained into individuals and communities. A successful awareness campaign and dissemination strategy about WEDISTRIC should thus carefully consider all the factors potentially influencing citizens concerned by the demo sites.

WEDISTRIC will gain insights regarding the key factors that influence public acceptance of renewable DHC to provide suggestions that can be useful to make a shift towards greater use of renewable DHC in Europe, including improvement of conditions for renewable heating policies and markets in European countries.

The dissemination strategy will further promote the WEDISTRIC results and benefits for the external awareness creation and knowledge building within the targeted industry, citizens, and end-users as well as within relevant associations, interest groups, and academia communities belonging to heating and cooling sectors of the EU.

This approach ensures that public funding will support the progress and positioning of EU industries as benchmark players within the global marketplace by strengthening and promoting the profile of the partners that form part of the consortium.

2. On the benefits of implementing a behaviour change programme

WEDISTRIC will first need to gain insights regarding the key factors that influence public acceptance of renewable DHC. The goal is to provide suggestions that can be



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useful to make a shift towards greater use of renewable DHC in Europe. For doing so, WEDISTRICK has decided to get to know more about the behaviours at play when people need to deal with changes in the field of renewable energy and specifically about the trade-offs and interconnections between personal concerns and public interest.

Each day across the world, individuals make small choices and take small actions that have, all together, huge impacts on our planet's natural resources. It is thus of great importance to help citizens make more sustainable choices. In this context, many policies rely on the assumption that consumers rationally weigh the costs and benefits of all available options and make decisions appropriately.

However, humans do not always make rational decisions or behave in predictable ways.

Nobel Prize Winner, [Daniel Kahneman \(2011\)](#) has shown that human-beings typically process information through two systems of thinking. System 1 is our most ancient way of thinking. It is concerned with processing almost automatically and with no effort easy information such as simple calculations. For more complex decisions, such as critical thinking, we should use System 2. However, the human brain has a limited cognitive capacity and gets easily tired. As a result, we tend to use our effortless System 1 for reflecting on topics that would typically require us to make use of System 2. As a result, cognitive biases and flaws in judgment occur. This can impair our judgment because we let emotions or cues in our environment influence our decision-making.

Human behaviour is determined by unconscious and conscious inference and decision processes. These are elicited by conditions in the external environment in combination with internal factors including expectations, goals and some limitations in attention, memory and in the way, people process information.

When talking about environment and human behaviour, there are some common cognitive biases that are always at play. A glossary listing all the behavioural concepts and cognitive biases is available in **Annex 1**.

1. The biggest issue to address is certainly the **intention-action gap**: there is a gap between what people know they could or should do and what they do.
2. Everyone wants to save the planet, but when it is time to make personal efforts, people are reluctant and prefer the comfort of living in their present setting (**status-quo bias**) over trying something new.
3. The present is more valued: Potential changes in the environment such as construction works are usually perceived only through an annoyance and negative lens, even if they can lead to future improvements (**loss aversion**). This is known as **present bias**, which causes individuals to overweigh immediate costs and benefits, contributing to outcomes like procrastination and inefficient use of resources. Combined with loss aversion, short-sightedness makes the immediate costs and sacrifices required for environmentally responsible behaviour loom large whereas future benefits have little appeal.

There are also some other phenomena influencing environmentally relevant decisions:



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When environmental threats or goals seem abstract or distant, people fail to properly react to important classes of environmental risk. On top of that, people do not feel personally involved as they do not understand well how an adjustment/change of personal actions can have direct consequences on a collective basis to reach environmental goals. Understanding human behaviour is thus crucial to achieving sustainable consumption but changing human behaviour is challenging.

The field of Behavioural Science, that is making use of psychological insights to improve the understanding of the bounded rationality of human-beings ([Kahneman, 2011](#)) and more specifically the tools proposed by Applied Behaviour Change Strategies, ([Service et al, 2014](#); [Michie et al, 2011](#)) offers practical insights for designing policies that are better aligned with the human decision-making processes.

3. Description of a behavioural change programme

A behavioural change programme aims at influencing and potentially changing consumer habitual behaviours. These routine behaviours are crucial to ensure the success of a green energy strategy. In fact, it is useless to offer a consumer the possibility of using energy saving technologies if they continue keeping the lights on when they leave a room. Changes in this type of behaviours can lead to important savings in energy use and is itself an essential component in reducing consumption patterns. Following a rigorous behaviour change strategy will help us identify how we can make consumers becoming part of WEDISTRICKT journey towards achieving climate neutrality objectives. This will allow to run an effective awareness campaign to make the end users become advocates of a proper use of green energy and to adapt their behaviours accordingly.

A six-steps strategy capable of eliciting behavioural obstacles potentially detrimental to the project will be used to specify what are the main biases at play in the contexts of the demo sites. This protocol will then provide us with accurate tools to design an efficient awareness strategy and acceptance campaign.

Step 1: Problem orientation and specifications of goals and objectives by gathering field specific information; start with background research and a review of relevant articles and reports.

Step 2: Analyses of determinants and target groups.

Step 3: Following the review and analyses of target groups, set-up focus groups to explore the influencing factors on the energy-related behaviour of the target group and optionally conducts surveys.

Step 4: Design the acceptance campaign accordingly.

Step 5: Implementation of the acceptance campaign.

Step 6: Impact evaluation; monitoring and adjustment of the campaign if needed.



Part Three: Behavioural Change Programme in action

Step 1: Problem orientation and specifications of main goals

In this first step, the Behaviour Change Programme performed a literature review to become informed about the challenges around the WEDISTRICK project. This literature review was conducted to find out more about barriers and drivers of acceptance of RET. Psychological factors and specifically cognitive biases were at the heart of the research.

Potential differences between the types of technologies and other variables of interest for fostering acceptance such as proximity with infrastructures and knowledge were also screened.

An interesting hypothesis and influential factor about place attachment and proximity to RET structures was highlighted as being either an enabler or a barrier towards acceptance depending on the framing and the context. This hypothesis has led the following dissection of the challenge around acceptance of WEDISTRICK.

1. General considerations about public acceptance in the field of environment and renewable energy

It is commonly accepted that most people support the green energy transition towards more renewable and efficient sources of energy as a mean to counter the effects of climate change. More specifically in Europe, citizens are generally aware of European climate energy package aiming at creating the necessary transition towards a greener society.

However, it would be inaccurate to assume that all the populations are fully supportive of all the ongoing projects and fully own the argument that this transition will bring more well-being for their specific case. In fact, many projects involved major changes in the immediate environment of the citizens.

[A Special Eurobarometer \(n°490\)](#) carried out in the 28 Member States in April 2019 among 27,655 respondents from different social and demographic groups, has found that more than eight in ten agree more public financial support should be given to the transition to clean energies. More than nine in ten respondents also stressed on the importance for their national government to set ambitious targets to increase renewable energy use by 2030.

But these findings do not mean public acceptance of RET should be taken for granted. For example, the survey highlighted that people who dropped off early from education or experience financial difficulties are less likely to support the implementation of RET. In fact, it seems impossible to please all the European citizens given the huge



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population and the potential unequal distribution of impacts generated by the proximity with RET ([Panori et al, 2022](#)).

The current scientific literature ([Thomas et al., 2022](#)) dedicated to climate change argues that attitudes about climate change, and energy transition by extension, are driven by four key elements / aspects:

- 1) sociodemographic
- 2) underlying values and beliefs
- 3) perceptions about climate change and the energy industry
- 4) short term cues, such as news media.

However, the formation of opinions and beliefs about projects is not straightforward and requires in-depth local assessment. It is also important to notice that opinions might differ depending on the type of energy envisaged in any project. Some people might have biased views and express clear preferences or marked rejection of a specific type of energy.

Since each type of technology will display different impacts on the local economy, community and environment, public attitudes and behaviours towards RET can potentially vary a lot.

2. Bounded rationality and the diversity of renewable energies

Considering the fact human beings are not fully rational, it makes more sense to understand why citizens do not accept fully RET that, in principle, will bring them benefits on the long run. In fact, the concept of public acceptance is far from being straightforward and public views about renewable energies are encompassing multi-faceted realities.

This complexity can be explained not only because of the human cognitive biases but also because the concept of renewable energies is made of diverse technologies such as solar photovoltaic panels; wind turbines of different forms; scale, energy from waste plants or biomass plants of different scales...

Since each of these technologies involve different uses and impacts on their direct environment, it seems obvious that they do not trigger the same kind of perceptions among the population directly concerned by their implementation.

Although individuals are aware of different energy sources, some studies highlight the fact that individuals exhibit diversity in understanding the nature of these technologies. In a review of his previous work, [Devine-Wright \(2008\)](#), has found that when asked about their knowledge about RET, most people refer to wind and solar energies that are ingrained as iconic RET in the mind of most citizens whereas there is less familiarity with biomass that is more rarely perceived as a green source of energy.

One could thus think that increasing awareness about these types of technologies will increase familiarity and consequently acceptance but because of the bounded rationality of human beings, providing information is not enough to debias perceptions.

For example, a study carried out among 2000 respondents across four nations (Germany, Austria, Italy, and Switzerland) ([Azarova et 2019](#)) has shown that solar



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farms and power-to-gas infrastructure increase acceptance of local energy communities, while wind farms have an ambiguous effect, and gas power decrease acceptance. According to the authors, despite evidence and knowledge about the sustainable nature of wind power, the visibility of the turbines and the noise were perceived as detrimental for the local properties.

It seems obvious in this sense that a low level of public acceptance can simply be the result of the perceptions of citizens influenced by visual cues such as windmills or biomass chimney.

Another study about biomass acceptance in the UK ([Upreti et al, 2004](#),) has found similar results while conducting in-depth interviews. In fact, the people were hyper focusing on visible elements of the plant while not thinking of potential benefits. Emissions of unpleasant odors, vibration and noise, visual impacts like big chimneys were cited as the main reasons behind the reluctance of citizens.

In Germany, a study about biomass and bioenergy acceptance ([Zoellner et al, 2008](#)) has compiled case studies confirming that when people are emotionally loaded, they systematically underestimate the potential benefits of such a project and tend to deny facts and figures that can be provided by the promoters of a project.

Another German study concludes in this sense that public attitudes towards a biomass can simply be the result of the visibility of truck movements, changes in the appearance of the landscape and emitted smells ([Upham and Shackley, 2006](#)).

In addition, it is important to note that it is not only the complexity behind RET technologies and the potential salience of perceived changes in the environment that matters for public acceptance. As mentioned in the beginning of this chapter, public acceptance is not straightforward, and the same kind of technology can be perceived differently depending on various personal factors.

The 2017 [EU report “Sustainable and optimal use of biomass for energy in the EU beyond 2020”](#) dedicated to biomass has previously pointed the fact that citizens might be reluctant to support biomass because of potential emissions, harm caused by what they think will lead to deforestation, but are in favour of this type of energy if full transparency about facts and figures are provided.

The analysis of the surveys found in the annexes of this report do not point a general hostility towards biomass but some specific concerns such as threat for land-use, deforestation or also if biomass was to be used for large scale electricity providing. The surveys also reveal that scientists seem to be more in favour of biofuels/biomass than the general population. This point might be an interesting entry-point to consider for Alcalá de Henares demo site where the target population is composed mainly of people working in a scientific environment. The report also shows that people are in favour of biomass when it is part of a mix of green energy and not proposed as a single source of energy.

Knowing the strong power of emotions and cognitive biases, it is of particular interest to notice that providing information about a project is not enough if behavioural and psychological factors behind acceptance are not properly addressed through a behavioural perspective. In fact, public acceptance is now documented as an important



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challenge to consider for the implementation of renewable energy technologies and for the wider goal of meeting energy policy goals. ([Devine-Wright, 2008](#)).

3. Dissecting the potential biases at play in WEDISTRICKT

Whether it is about noise caused by the works, or changes in their visual environment, some citizens might feel more suspicious about the potential benefits of renewable energy when they face the proximity of major and disrupting changes in their neighbourhood. All these perceptions can relate to cognitive biases, emotional perceptions, and psychological factors. To foster public acceptance, public authorities should make the effort to understand and address the concerns of local populations if they do not want to face fierce resistance that can ultimately lead to jeopardizing the project.

Here is a list of potential elements to consider as such:

- a. Many choices in consumption are often habitual and the **status-quo bias** is powerful. This means that it may be difficult to ask people to make efforts to change their routine to welcome a new energy or sustainable choice in consumption.
- b. People tend to focus to the present (**present bias**) and can rarely easily predict their futures preferences. It is easier for someone to focus on any disturbing element coming from a change of energy right now than to trying to go over this present annoyance to imagine the future benefits.
- c. Consequences of consumption in terms of energy are hard to see and it might be difficult to ask someone to make some efforts for something that he or she is considering to be abstract. There is a certain lack of salience. The **salience bias** describes our tendency to focus on items or information that are more noteworthy while ignoring those that do not grab our attention. For example, the benefits of a renewable energy such as reduction in polluting emission are not immediately relevant for most people. On the contrary, noise, fumes and change in the environment caused by major works is particularly salient to people.
- d. Sustainable consumption may not seem personally relevant. We all agree to save the planet but when it is time to make individual efforts, many people tend to believe their own personal action will be useless. It is hard for them to understand that one single project - such as WEDISTRICKT - can be an essential element of a sustainable general framework in which every single piece counts. **Self-serving bias, availability bias, prospect theory and lack of salience are also at play.**
- e. It can be hard to follow through on sustainable choices. If the hassle factors attached to the new kind of energy are perceived as outweighing the potential benefits, people tend to go back to their more obvious non-sustainable choice or to perceive this new form of energy as an obstacle in their daily life. This might be true especially if people need to pay more for this type of energy and



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even if they state they are ready to pay (**stated preferences**) more for that. On the field, reluctance (**revealed preferences**) may be what they only attach to this new energy, and they might take a step back. In Spain, the works in the streets might be seen as a major obstacle. **Loss-aversion and prospect theory are also at play.**

- f. Behaviour is influenced by peers and social groups. If the people are negatively biased about biomass, it might be hard to de-bias them even if we provide objective evidence of the benefits and of the harmless specificities of this energy. **Social norms are at play.**
- g. When facing the unknown, people are naturally sceptical. They rely on the most easily available information, wrongly assuming availability equals accuracy. This is partly due to the **availability bias.**

All these biases and elements can be an illustration of the intention-action gap applied to the very specific case of personal acceptance to renewable energy. In the scientific literature, this phenomenon is known as the proximity hypothesis or NIMBY-effect for Not-In-My-Backyard, ([Lindén et al., 2015](#)). It illustrates the fact that even people who are generally supportive of general green projects on principle can become more reluctant when this plan directly concerns their neighbourhood.

In a study carried out in Portugal ([Ribeiro et al., 2018](#)) aiming at studying the differences of public opinion towards different types of technologies, the researchers have found among their target population, different degrees of expression of NIMBYism depending on the type of energy. More specifically, they have found that wind power and solar panels were less prone to this effect whereas in municipalities with biomass plants, the effect was stronger.

In this perspective, it is of foremost importance to take into consideration the potential emergence of a NIMBY-effect. This can be achieved through a thorough study of the local attitudes at play for every single project.

4. From NIMBY to place attachment: the proximity factor

There is a common pattern emerging from the studies previously mentioned: emotional perceptions are generally triggered by an immediate proximity of the future RET to come in a specific area.

The effect of the proximity of these RET to homes is often mentioned as of being the “Not-in-My-Backyard” effect, whereby there is a contradiction between a general positive view regarding a green project perceived as beneficial. But when zooming in a specific place, the same people generally in favour of the project strongly reject it if it must take place in their own neighborhood.

It has become popular to blame NIMBY as a general bundle of psychological factors explaining most of the reasons behind the rejection of RET projects. But [Devine-Wright et al \(2015\)](#) perceive NIMBY as a lazy hypothesis that is too general to be blamed for every difficulty faced when thinking of implementing a RET project.

In fact, the proximity linked to NIMBY is not a straightforward concept. It has been shown that proximity to such a project can work in both ways and can have a positive,



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negative or no impact on acceptance, depending on type of power plant and specific context ([Azarova et al, 2019](#)).

In the context of building acceptance for a local energy community, it is critical to understand the social norms at play to ensure the success of a RET project. Following a common saying in Behavioural Science, we can summarize this consideration by claiming context matters.

To understand this context, [Devine-Wright et al \(2015\)](#) suggest to reconsider this issue from the perspective of place attachment instead of NIMBY, which is a more general concept: The theory of place attachment suggests that people or communities have an emotional bond with the locations they live in or visit frequently, and those with stronger attachment will be more likely to resist changes to their surrounding landscapes. But the theory is not necessarily negatively loaded. In fact, the researchers have found common patterns around the concept of place attachment that can explain acceptance or rejection to a RET project.

If we consider place attachment as an emotional concept that can encompass many psychological factors, emotions and potential cognitive biases, it has been found that when a RET project is perceived as a threat to a place (e.g. as a potential danger for the natural landscape or a potential source of danger), local people who are strongly attached to the place are more likely to reject the project. On the contrary, when the project is perceived to maintain or positively promote place attributes and values, then residents with strong place attachments are likely to support such initiative.

Since WEDISTRIC is an European project aiming at finding some common strategies for engaging in a dialogue about the acceptance of DHC technologies in Europe, considering in the whole the concept of attachment to place as a trigger for acceptance seems relevant and is important to inform the acceptance and awareness campaign. But any Behaviour Change Programme should consider the specificities on the field. Context and environment always matter, and each intervention should always be tailor-made to the needs of each demo site.



Part Four: Analysis and Methodology

As the second step of the behaviour change programme, the determinants of the specific situation have to be analyzed:

Step 2: Analyses of determinants and target groups

1. Common bonds for engagement and research hypothesis

Building on the findings retrieved from the previous literature review, it seems obvious that place attachment and making salient how WEDISTRICK project can value the place people live in is likely to be a facilitator of acceptance.

Framing positively environmental features is in fact a strong driver of acceptance and more accepted than framing on the importance of welcoming such a project to fight adverse effects of climate change.

In fact, the studies including Behaviour Change insights ([Weber, 2013](#)) applied to the field of environment agree on the assumptions that making salient a worrisome future -if people are not acting in a sustainable way- is not efficient to change behaviours and to foster acceptance.

Successful interventions should thus change the focus from individual concerns to social views by priming social identities and positive views of the project to induce people to incur personal sacrifices (e.g. having a chimney in front of their window). In fact, people who feel a sense of belonging, are more ready to work harder to reach a goal capable of benefiting the whole community they can relate to.

For building a positive strategy towards place attachment, we can tap into civic ecology, which is a field of interdisciplinary study concerned with individual, community, and environmental outcomes of community-based environmental stewardships practices, ([Krasny & Tidall, 2012](#)). They point out the fact that stressing on the links between human beings, attachment to place and nature protection is a strong trigger of green behaviour. Civic ecology practices have proved that enhancing green infrastructure is closely related to improving the well-being of people in urban systems.

Researchers have also found that when people have the feeling of belonging to a local community ([Manzo and Perkins, 2006](#)), they are also ready to work together to protect, restore, and renew their place, area. We particularly believe that working around the concept of community and attachment to the place might be a good starting point in the demo sites. The key is to make more salient the potential benefits of WEDISTRICK for the end-users by providing more knowledge and transparency and by creating some community values people can feel attach to.



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But the hypothesis about place attachment has mainly been tested around home of citizens. This is in line with the scope of the project for the originally planned demo site in Poland, since the end-users there were mainly inhabitants of a housing area. But in Spain, the target population is composed of people working or studying, teaching in a technological working area. However, it seems possible to rely on this hypothesis. Research points to the fact that people who feel attached to their living and working place are more eager to do some efforts for the environment. ([Krasny & Tidall, 2015](#)). Another study insists on the fact that the concept of “home” which is full of attachment and of potential engagement of the people is not necessary attached only to the place someone live (Ikalovic & Chiesi, 2019).

The study by [Manzo & Perkins \(2006\)](#) explains that if we can create a link for connecting the community into one place, people really feel that the addition of their individual actions is creating a virtuous circle and a collective effort. The goal of this research is thus to test the place attachment hypothesis among target population of demo sites and if confirmed to analyse what could be the main factors/enablers to work on in the awareness campaign in their place to make sure WEDISTRICK can fit in their area and enhance its characteristics.

Consequently, the research questions are:

- *Do the people directly impacted by the project care about their environment and how?*
- *If this is holding true, do they feel enthusiastic about welcoming a green energy project in this area?*
- *With an underlying question concerning a potential preference in terms of green energy and consequently of support.*
- *How do they think this project will impact their area?*

2. The first demo site in Spain

WEDISTRICK solutions were planned to be demonstrated in four demo sites. Two of them were selected for behavioural change study and activities – a demo site in Alcalá de Henares, Spain, and a demo site in Poland. These demo sites showcase different settings and should help detect a wide range of potential biases and behavioural factors that can influence public acceptance of DHC systems based on renewable energy sources. (Please note that in the end the demo sites had to change!)

a. Technology centre in Spain: Alcalá de Henares

The objective of the Alcalá demo site is to substitute the current thermal supply at CEPSA R&D building with the new renewable district heating and cooling supply, which will be built within the WEDISTRICK project. A big solar laboratory supported by biomass will be built from scratch, allowing a 100% renewable thermal supply, satisfying CEPSA building thermal needs and evaluating various WEDISTRICK technologies for heat and cold generation. This power plant will be constructed in a plot located 300 meters away from the CEPSA Building. The building itself is located at the technological park of Alcalá de Henares known as Tecnoalcalá,



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which encompasses companies from different sectors, mostly from IT, healthcare, and industry. The University of Alcalá is also associated with this business park. Due to availability of local biomass sources (wood chips coming from local Spanish trees), high efficiency with low emission biomass boilers will become part of the technological design. The location of this demo site allows also for the testing of other technologies involved in the project, such as a solar panel field.

The CEPESA building consists of laboratories, state-of-the-art machinery, and pilot plants capable of reproducing the processes that CEPESA carries out at their production centres, mainly in refining and chemicals. There are 77 employees working in the building, notably people from ENGIE, who do operation maintenance. They will be directly affected by the new technologies since they will have to maintain the processes in a new way.

There are several companies located directly next to the construction of the facilities, which will be indirectly affected by the operation of the facilities: gas and dust from the biomass emissions, solar park, traffic caused by the trucks that must bring the biomass to the boilers. In addition, road works will have to be scheduled to install four DHC underground pipes – this might additionally affect Tecnoalcalá workers, and could make them focus a lot on present annoyance and develop bitterness from scratch towards WEDISTRICT.

Preliminary investigation for a Behaviour Change Programme cannot be seen as complete if it does not consider the interest and concerns of all the organisations, people, and parts sharing an area where major changes are about to happen. It is thus crucial to check the wider context in which such a project is embedded.

For all these reasons, the opinions, and considerations of the people from University of Alcalá matter as much as the ones from the workers from the private companies directly or indirectly concerned by the project and must be collected.

b. Do the workers care about their place, and can we use this concept for increasing acceptance?

In Spain, the situation at the technology centre is different than in a residential area, as the end-users do not live near or at the demo site, but only work there; many of them commute from Madrid.

A 2019 study insists on the fact that the concept of “home”, which is full of attachment and of potential engagement of the people, is not necessary attached only to the place someone live ([Ikalovic & Chiesi, 2019](#)). Nowadays, the concept of home can extend to a certain area, a routine, including the usual way of transportation, working place and the coffee shop people go to every morning. This is especially true for those living in big urban areas.

The hypothesis is that some workers in the Spanish demo site might have a certain attachment to their working environment. If this is the case, it will be easier to engage them through a ‘care about your area’ strategy.



3. Setting-up the interviews for a qualitative research study

For all demo sites, the concept of attachment to a place could be crucial if we want to engage the citizens in the WEDISTRICK project. This hypothesis will be tested by specifically asking questions about the relationship of the people with their living or working area during the focus groups and the interviews in the next Step of the behaviour change programme:

Step 3: Setting-up the focus groups / interviews

a. Recollecting the stories from the source

Qualitative research methods such as focus groups or in-depth interviews allow to enter everyday lives of people by letting them talk about their stories. There is no ‘one size fits all’ solution to onboard people in particular in renewable energy projects. The context matters and it is important to know more about the specificities of each place.

Qualitative methods are useful when a programme manager needs to understand human experiences that encounter a particular audience. This method is particularly relevant for the WEDISTRICK project as each demo site has its specificities and can impact very specific population.

The method allows to get data and answers to the questions “why” and “how” can we provide reliable details about complex psychological mechanisms underlying human beliefs. The goal is to gain insight about habits, preferences, beliefs, knowledge, and personal experiences of the people that may trigger behaviours that any behaviour change study seeks to address. ([The Compass for Social Behavior Change](#)). The main benefit of this method is its capacity to get stories directly from the source. In fact, even those who are part of the project can be biased: some project partners shared their preoccupation about negative perception of the project at the demo sites, but were, however, not able to provide us with some evidence regarding this statement.

The combination of answers collected should allow to draw an accurate description about the way the target audience perceives the project and to eventually discover unnoticed interconnections, patterns that can inform the strategies envisaged for the awareness campaign. However, this technique is not made to generalise conclusions to a general audience. Contrary to quantitative studies, qualitative studies do not need to rely on large sample of population to deliver useful insights about the target population ([Marshall, 1996](#)).

b. Research questions and sample size



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There is no consensus among researchers about the right size that a **qualitative** sample should reach. The right number is generally the one that allows to answer the research question.

In this project, the **research questions** are:

- *Do the people directly impacted by the project care about their working environment and how?*
- *If this is holding true, do they feel enthusiastic about welcoming a green energy project in this area?*
- *With an underlying question concerning a potential preference in terms of green energy and consequently of support.*
- *How do they think this project will impact their area?*

However, it is common practice and recommended for conducting content analysis to aim for getting between 15 to 20 in-depth interviews or 3 to 4 focus groups comprising between 9 to 12 individuals ([Moser & Korstjens, 2018](#)). For the Spanish demo site in WEDISTRICT the sample comprises 16 in-depth interviews.

c. Moving from focus groups to in-depth interviews due to COVID-19

Both methods are effective for uncovering what motivates individuals and communities to behave a certain way and how they view the world or the community around them. It was first envisaged to conduct focus groups in Spain to foster discussion about the recruited people.

A focus group is a small group of interested individuals - usually between 9 and 12 - who discuss a theme or topic identified by the researcher. Focus groups are praised for being capable of creating energy and dynamic and interactions through discussion.

However, due to the outbreak of the Covid 19 crisis, it was not possible to organise some focus groups in Spain during the time this research was conducted.

To avoid any unmanageable delay of the project, we have decided to opt for the second type of method: in-depth interviews. Although this method does not allow for interaction between participants, it can offer more details about the participants beliefs and is more private, meaning the people might want to disclose more about their own attitudes.

d. The recruitment process of the sample

Since the promoters of the project were suspecting different beliefs at play regarding the project among the audiences potentially impacted by the demo site - people working in companies located in Tecnoalcalá park and people working at the university (the later were supposed to be more suspicious regarding the benefits of the project) - we have decided to recruit interviewees in both companies and the university.



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We have identified the potential sample following a purposeful sampling method. This most common technique in qualitative research is used when a researcher selects the most productive sample to answer the research question. It means the researcher chooses the most suitable variables as criteria for recruiting the samples based on her knowledge of the area where the study is conducted and based on the previous underlying specificities of the project and of her preliminary literature review.

Here, the purposeful samples were made based on the location of the potential target audiences: one sample was drawn among employees of Tecnoalcalá park and the second one among employees of the University.

Concerning the employees of companies nearby the demo site, the recruitment campaign was made with the support of Tecnoalcalá communication team via emails campaign.

As for the university, the author has directly contacted by mail staff from the university in both administrative and reaching staff with the hope of getting a diversity of people occupying different job positions and representing potentially diverse opinions.

In our design, we have aimed for running a total of 20 interviews on a remote basis using digital solutions.

e. The invitation process: “your voice matters”

Invitations were sent electronically at the end of 2020 and were made to prompt the importance of listening to people working and living in this area.

Here is a sample of the invitation received by workers of Tecnoalcalá park:

“Dear professional,

We would like to invite you to participate in a research study concerning renewable energy in Alcalá de Henares, conducted by the European Science Communication Institute.

The study looks at the views of people regarding sustainable environment and green energy in their workplace.

*The results of the study might help to improve green energy policies in the Alcalá industrial park. **Since you work in this area, your voice matters.**”*

WEDISTRIC offered a **25 EUR voucher** as a token of appreciation for the people who have kindly accepted to offer their view for this interview. This is a common practice when conducting research in the field of economy as to compensate the time given by the interviewees.

f. Finding the right facilitator

Conducting in-depth interviews requires some skills and experience especially to successfully lead the type of interviews we have selected for the project: semi-structured interviews. In semi-structured interviews, the interviewer or facilitator follows a pre-determined set of questions but can freely choose to adapt, skip, or stay on a



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particular question to not disrupt the flow of a conversation, especially when the interviewee is offering specifically relevant and unexpected insights.

A facilitator also needs to pay careful attention to the body language of the interviewees. Even if the decision was made to run 20 minutes online interviews, the facilitator could still have the possibility to look carefully at the people who chose to have their camera on (they were allowed to switch it off if they preferred). In this perspective, it is important for the facilitator or interviewer to allow the recruited people to fully express their opinions in their mother tongue – e.g. Spanish - for getting unbiased and seamless transcripts of their opinions.

An experienced market researcher and economist, Dimitri Schmitow - Director of [Sumar Research](#) - was hired to perform the field research. Based in in Valencia, he oversaw conducting the interviews in Spanish, translating them, and making the early cleaning of the data received to craft the scripts.

4. Crafting the questionnaires accordingly for Alcalá de Henares demo site

a. From general attitude to knowledge about biomass

Given the context at Alcalá de Henares demo site, we crafted questionnaires with the main aim of asking the interviewees about their views and relationships between innovation, environment-friendly technologies, and the trade-offs they are ready or not to accept the emergence of a greener world and more specifically a change in their direct surrounding. Starting from general questions to go to more specific questions, the goal was to reveal attitudes of the interviewees about environment (no initial priming about biomass) and then studying their personal engagement, their relationship with their place, their knowledge about renewable energy and, only at the end, the biomass was mentioned. We did not talk about biomass beforehand because this technology is a less known source of renewable energy and is frequently associated with biases and beliefs that could jeopardize the rest of the interview if the topic is raised to their awareness too soon during the conversation.

Most people who are working in the area are commuters who directly face annoyance caused by traffic congestion to go to their work. It is important to understand how much they are focusing on personal annoyance or are more connected to a sense of belonging to their place. These elements are crucial to analyse to what extent a NIMBY-effect is vivid among the interviewees and if this effect can be neutralized by priming other aspects of the project in the awareness campaign.

We have designed two slightly different questionnaires (one for the people working in companies near the demo site and a second one for the staff of the university) but the general goal was similar with an intention to: to understand how much, they care about their area, how they feel in this working area (their well-being, what is their type of



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occupation) and how this relates with their environmental attitude, their personal engagement, and opinions.

We continue by telling them about the fact that an important renewable project is coming soon and ask for their knowledge about renewable energy. Finally, we narrow the scope of the questions and disclose information about a biomass plant and consequently wait for their reactions. The set of questions are available in Annex 2.

The hypothesis: People with strong connection with their working place, would be more enthusiastic about the WEDISTRICK project. They can thus be reliable messengers to spread enthusiasm about the project in their community.

b. Methodology for analysis: grouping themes to draw patterns

We have screened the data retrieved from the semi-structured interviews following the most common method used in qualitative research: the thematic analysis. A thematic analysis typically looks to spot recurring themes in the interview data to draw patterns that can inform the direction of the research ([Chandrasekara, 2019](#)). We first group the items following an initial code of themes or patterns to create original codes. We combine then our findings and compare them with the initial themes to draw broader patterns that are telling a story from the stories of the interviewees.

In accordance with the facilitator, who was responsible for conducting the interviews in Spanish, collecting the data, and finally translating the descriptions, we have created an initial code to sort out the collected data based on the following themes:

- Working experience in Tecnoalcalá or the University
- Perceived environmental issues and personal initiatives / engagement with environmental projects
- Reactions to the entirely renewable energy plant project
- Reactions to the biomass plant
- Suggestions



Part Five: Results and Recommendations

1. Results of the interviews in Alcalá de Henares

The results provided below are some valuable insights about the behaviours at play in the Spanish demo site and would allow the promoters of WEDISTRIC to get an accurate picture of the main hindrances that have to be dealt with and the main assets of the project that should be highlighted in the acceptance and awareness campaign.

a. The Interviews in Alcalá de Henares at a glance

- 16 interviews conducted among a purposeful sample at the Spanish demo site.
- 12 conducted among the workers of Tecnoalcalá.
- 4 among people working in the University.
- No strictly negative opinion about the project were received, only two to three people were somehow sceptical.

b. Thematic analysis of the 12 interviews conducted among the workers of Tecnoalcalá park

- Working experience in Tecnoalcalá park

The respondents have highlighted their enjoyment of working in a natural place and some also pointed out the fact that they feel privileged to work in an innovative place, a pleasant environment with plenty of space. Well-being, attachment to place and enjoyment to come working there are common themes among all the interviews.

People insist on the fact they do not work in a “*technopark but in a technological park*”. They insist on the difference and say they are not valued enough as being tech and innovative people. They look for an opportunity to be recognized as such.

However, most people have expressed the willingness to have more opportunities to connect, to get more social interactions. Most of them mention the lack of cafés, restaurants, bars, and places to gather.

- **Perceived Environmental issues and personal initiatives / engagement with environmental projects**



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Most of the interviewees were very knowledgeable about environmental issues, have exhibited technical knowledge about the topic and were eager to see more initiatives coming in their working area, some of them are even pushing for small initiatives at work. They ask for future developments of the park such as charging stations for electric cars and are **eager to see new initiatives**.

One sentence retrieved from a script summarize the overall attitude:

“The greener you are, the more competitive you could be”.

- Reactions to the entirely renewable energy plant project

When being informed about a major renewable energy project coming in their surroundings, most interviewees have expressed a lot of enthusiasm using a lot of superlatives such as *“perfect, great, fascinating, wonderful”*. They were supportive and have expressed enjoyment about the potential of increasing sustainability in terms of energy in their workplace.

When asked about their preferences and knowledge about green energy, they have all mentioned solar energy and then wind power but one of them spontaneously came up with biomass. Some of them also stress the fact that this kind of project is fitting well with concerns of cost and energy savings concerns of their companies.

- Reactions to the biomass plant

Overall respondents were in favour of biomass but there were differences in between the answers. The ones who are knowledgeable about biomass, have expressed their enthusiasm about the *“spectacular potential, the cost-savings opportunities”* of the project.

One interviewee has even stated this is: *“an elegant project that will increase the park reputation. if I had a lot of money, I would invest in it!”*

Among the people who know about biomass, the recurring theme is the importance of the project to foster pride about the technological and innovation aspects of Tecnoalcalá. Some also point out the potential of creating new job opportunities in the area.

Among the ones who did not know a lot about biomass, when informed about more specificities, they were in favour of the project but have expressed a few concerns such as security of power supply, potential noise, smell, emissions. None of them really thought a temporary increase of traffic for works or delivering pellets to the plant would be a major issue.

- Suggestions:

In this last part of the interview, respondents could freely elaborate about their reactions concerning biomass or anything else of importance for them.



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There was an overwhelming claim for providing clear, precise, transparent communication about the project even from press releases.

This request was made equally among people who were totally supportive and knowledgeable about biomass but also among the ones with fewer knowledge.

As most people work in scientific and R&D fields, they seem to be aware that there is clear need to populate information, explain simply about this kind of project that typically suffer from misunderstanding and biases.

They have made a clear request to build confidence around the project to foster general enthusiasm and acceptance.

As one respondent has spotted:

“You cannot just tell the people working in the park “we are going to put here a smoky chimney”.

Some others have even made a list of questions that need to be answered:

The origin.

From where these pellets will come?

The safety.

Is there any risk of an explosion? (if the plant would produce gases)

The smoke.

Is it going to produce bad odours?

The economy

What economic benefits this plant might bring?

Could this plant pollute the surrounding areas?

Will the combustion affect the quality of the air and people health?

Will this combustion produce some wastage?

Where would this wastage (remains) be stored and how will this be managed?

c. Thematic analysis of the 4 interviews conducted among the staff of the university

- Working experience in the university area

In the university sample, the respondents have also expressed their enjoyment of working in a green and natural place, some of them have specifically mentioned an *“healthy environment”*.



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- **Perceived environmental issues and personal initiatives / engagement with environmental projects**

Under this category, there is a clear request for seeing greener initiatives in the campus and some respondents have insisted on the necessity of refurbishment of infrastructures and the need for more energy-efficient facilities.

- **Reactions to the entirely renewable energy plant project**

When prompted with the fact a renewable project will come in their neighbourhood, they have also use very positive adjectives such as “*perfect*” to express their excitement. They have a good general knowledge about green energy and some respondents have expressed clear preferences for some sort of technologies like solar farms whereas another respondent clearly express its opposition to windmills.

A respondent explained that he perceives such a project has a great opportunity to promote green energy and to showcase it as many people do not have clear ideas the way they are concretely functioning.

- **Reactions to the biomass plant**

The reactions towards the biomass plant were less clear:

One interviewee spontaneously claimed, “*It will still produce CO₂ emissions!*” but was ready to accept this option as “*this type of energy is “little bit greener than the fossil fuels, but it produces the same amounts of CO₂ with a consequential greenhouse effect”*”, whereas another one expressed concern about “*soil depletion*” related to biomass.

On the opposite, some respondents who were knowledgeable about biomass highlighted the “*clear benefits*” of this technology:

“It would reduce costs, it will be sustainable, it will be a good claim for the university”.

- **Suggestions:**

There is here no clear attitude or direction emerging among the university sample as two respondents were rather sceptical and concerned about the cost of this energy and its emissions whereas the other ones - on the contrary - have voiced their enthusiasm about how good this project could be for the image of the university.

The last ones have associated biomass with criteria of sustainability and cost-effectiveness and were eager to use this project as an opportunity for the university to promote “*environmental consciousness and the broader use of biomass as source of energy.*”



d. Quality of the data and limitations

As mentioned earlier in this report, qualitative research is made to draw stories about a particular audience and cannot be generalized without further investigation and comparison. However, some clear patterns have emerged especially into the 12 interviews conducted among the workers of Tecnoalcalá.

We have reached a point of saturation, meaning that the themes summarized below were expressed by most of the interviewees. We are thus clearly confident about the conclusions and of the directions to follow concerning the strategy for the awareness campaign regarding these points.

But concerning the interviewee conducted among the staff of the university, we must note that the size of the sample (N=4) is too small to make any firm conclusion about the opinions concerning the project in the university. We have aimed to get answers from people belonging both from academic and from administrative positions, but we only received answers from academic staff. Nonetheless, we can notice some common themes shared by both interviewees in the University and the workers from Tecnoalcalá.

Consequently, we will elaborate below only on the shared themes that reached the saturation point and have clearly drawn patterns capable of informing the acceptance campaign.

e. Key takeaways and main findings from the interviews

- Many people express their **love of their working place/area. The green and natural aspects of the area are highly valued and praised.**
- The most sceptical are working in **university buildings that are old or show dysfunctions.** They were disappointed and see a contrast between the nice nature / innovative surrounding and poor quality of their office.
- All the interviewees **feel attached to their place. The well-being aspects are present.**
- **Innovation matters:** They insist on the fact they work on a technological park referring to R&D and not a technical park.
- They look for occasions **to be more valued as tech and innovative people.**
- **They ask for greener initiatives in their area.**



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- None of them believes the construction and installation works in the area should be a major issue.
- However, they ask for **more opportunities to socialise, to connect and to be able to have gatherings places such as cafes, or restaurants.**
- They are **all enthusiastic about having a renewable energy project** coming in their area.
- Most of them are **knowledgeable about renewable technologies** but they cite first solar energy and wind power.
- **None of them spontaneously cited biomass.**
- The ones **who know about biomass** are enthusiastic **but believe** there is some **misconceptions about this technology that need to be fixed.**
- The ones who know about biomass believe this is **a fantastic opportunity for the growing the prestige of their area.**
- Whether they are really in favour of biomass or not, **they all ask for clear, concise, and precise information about the plant.**
- Most people report that the main challenge would be to **build confidence in this technology by explaining diligently how it works and how advanced it is.**
- People ask for **transparency** in terms of information that will be provided regarding the project.
- Some people expressed **some concerns regarding emissions, quality of the air and smell, as well as the management of the waste produced by the plant.**
- **Some people want to get guarantee that nothing dangerous will be installed in the plant** and that the electricity supply will never be interrupted.
- It is important to notice that **most people mention these potential issues with no firm opinion about them, they just need to get information about this.**



2. Preliminary suggestions for the acceptance and awareness campaign

a. Putting the patterns identified into perspective to draw an action framework: the bottlenecks and the entry points

At this stage of our study aiming at creating a behaviour change programme with the goal of fostering public acceptance around WEDISTRICK project we have completed 3 steps out of the 6 steps of our programme:

Step 1: Problem orientation and specifications of goals and objectives by gathering field specific information: start with a background research and review of relevant articles and reports.

Step 2: Analyses of determinants and target groups.

Step 3: Following the review and analyses of target groups, set-up focus groups or interviews to explore the influencing factors on the energy-related behaviour of the target group and optionally conducts surveys.

The analyse of the data retrieved has allowed to draw a general framework of what are the themes at play for WEDISTRICK project

Based on these findings and in preparation **of step 4 - Design The acceptance campaign accordingly**. - we need to dive deeper into the patterns to clearly define are the potential drivers and of barriers of public acceptance for the specific case of our target groups.

Any behaviour change programme is supposed to list the behavioural issue also called bottlenecks that can prevent individuals or groups to perform a desired behaviour. In this case, we investigate the determinants of public acceptance. The interviews are also relevant to spot the entry-points: the elements that can trigger the beneficial behaviours based on preferences, beliefs, life experiences or specificities of the target group.

In this section, we check the validity of our findings with the insights brought by the scientific and institutional literature that has already explored this topic. For this purpose, we compared our data with one of the most recent works (published in January 2022) conducted at a European level and investigating public acceptance regarding renewable technologies among specific European regions. We specifically refer to the report *“Innovative actions and strategies to boost public awareness, trust and acceptance of trans-European energy infrastructure projects”* ([European Commission, 2022](#)). Commissioned by the Directorate-General for Energy (DG ENER), this research has investigated over a period of 24 months the barriers and drivers of public acceptance towards energy infrastructure projects.



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The study was made using a combination a quantitative and qualitative approach for the identification of issues in selected regions and on specific target groups. It is interesting to note that the report has found during the qualitative study, some common drivers of public acceptance and some common barriers that are summarised below:

- **Drivers of public acceptance:**

- Transparency and fairness of process
- Involvement of residents in decision making
- Siting of the infrastructure
- Awareness of the environmental benefits
- Positive impact on local economy
- Involvement of local organizations
- Use of a familiar technology
- Energy supply security
- Trust in investors and project promoters.

- **Barriers of public acceptance:**

- Lack of involvement of residents in decision making
- Lack of transparent communication
- Unfair distribution of costs and benefits
- Impact on landscape
- Noise, malodour, or other nuisances
- Health and safety
- Impact on air and water quality
- Impact on personal comfort.

b. Checking for the validity of the patterns identified in Alcalá de Henares within a drivers-barriers framework of acceptance

We have checked for the validity of the patterns identified in our study by trying to match them with the drivers-barriers framework of acceptance proposed by the European study.

- **Drivers**

5 out of 8 criteria for driving public acceptance identified throughout the large-scale European project were relevant patterns applicable for the case of Alcalá de Henares.

- **Transparency and fairness of the process:**

Most interviewees have stressed the importance to give full transparency regarding the details of the projects to fully support its implementation. As previously explained, even the more sceptical individuals about the project were ready to give support upon the condition they could know more about the project. This is a critical element also mentioned by the experts and project managers interviewed into the EU report



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([European Commission, 2022](#)). According to the authors of the publication, regularly sharing information with the public and demonstrating transparency are key elements for reaching large support.

- **Awareness of the environmental benefits:**

Broadly speaking, the more the people were aware about the specificities about renewable energies, the more they had their preferences but also felt engaged to support such a project. Even if no one spontaneously cited biomass, some of them were clearly well informed about this technology when we prompted them with the topic.

We have noticed a clear positive relationship between the fact of being knowledgeable about biomass and being ready to accept the project. The findings for WEDISTRICT confirm the ones from the large-scale European study, as the researchers also mention a direct relationship between the quantity of knowledge, information, and the support. The increase of knowledge and information provided are reinforcing factors for acceptance.

- **Positive impact on local economy:**

There is a clear need among the interviewees to be valued as innovative people. Respondents are eager to see this project as an opportunity to flash the light on their working area. Some have even mentioned job opportunities and prestige for their place and the neighbourhood.

- **Energy supply security:**

The ones who know about biomass were convinced this technology would bring cost-effective energy supply. However, we must note that some people working in companies that are developing energy-consuming products or services are concerned about the reliability of energy supply coming from the biomass plant stressing the fact non interruption is critical for their activity.

- **Trust in investors and project managers:**

It is about building confidence about the quality, benefits, and safety of the project. It is also closely related to being knowledgeable and having enough information about the project. The respondents have claimed that building confidence to inspire trust would be a challenge and that the condition for reaching this level of trust would depend on the clarity and quality of information provided.

These elements should be prioritized in the acceptance campaign.

One should remember the statement of one interviewee about the biomass plant: “*You cannot just tell the people working in the parc: “we are going to put here a smoky chimney”.*”



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- Barriers

All the potential barriers spotted as of being critical for public acceptance towards renewable energy projects were in fact raised during our discussion within the WEDISTRICT samples.

- **Lack of transparent communication:**

This is a recurring theme among the answers. Even the most potentially supportive respondents insist on the fact that the project cannot be properly accepted without a clear effort of communication coming from the promoters of the project

- **Unfair distribution of costs and benefits:**

This is a point to consider for some respondents triggering diverse attitudes: some of them believe biomass will represent a huge potential in terms of costs-benefits and energy savings for the area, whereas some others are more sceptical and are not sure about the quality of energy supply and are concerned about the cost of the project and its impact on energy pricing.

- **Impact on landscape:**

One person specifically mentioned some worries about soil depletion due to biomass.

- **Noise, malodour, or other nuisances:**

Emissions, potential pollution, smell coming out of the plant were recurring concerns among the respondents.

- **Health and safety:**

Respondents have asked for guarantees that the plant will not produce any output that can represent a danger for the health of people working there and the safety for of? the area.

- **Impact on air and water quality:**

The concerns about air quality are clearly an issue to address for most of our respondents.

- **Impact on personal comfort:**

The promoters of the project have voiced apprehension about the potential reaction of the people working in the area that could be annoyed by the works necessary for building the plant. However, the interviewees did not perceive this as a major source of annoyance impacting their personal.



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But since people feel attached to their place and value the natural environment in which they are working, efforts would certainly need to be made for not affecting their perception of working in a privileged area.

As a summary of the comparison, our findings fit well into the drivers-barriers framework of acceptance. We are confident about the validity of the data retrieved. It is interesting to note that there is a certain porosity in between the drivers and barriers meaning that a driver can potentially become a barrier (the reverse is also true) if not properly considered in an awareness and acceptance campaign. From a behavioural perspective, we can explain this phenomenon as of being closely related to the perception of individuals and beliefs: for example, under the item “energy supply security”, some respondents perceive biomass as of being a safe, reliable, and sustainable source of energy whereas some others are unsure about the reliability of the technology. It stresses the importance of framing the information and carefully addressing beliefs, attitudes and perceptions of individuals and groups.

c. Going a step further: How creating a community of messengers attached to their place can be the key enabler of acceptance for the specific case of Alcalá de Henares

The European report mentioned above is listing involvement of individuals and/or groups as another key element for boosting acceptance around energy infrastructure projects. This affirmation is based on the opinions and testimonies of projects managers of major renewable energy projects who insist on the importance of involving as soon as possible the residents living in the neighbourhood of the project to boost willingness to support the plan. This finding might sound counter intuitive if we take into account that raising awareness of a project nearby can also be associated with the emergence of a NIMBY-effect ([Lindén et al., 2015](#)) people who are generally supportive of general green projects on principle can become more reluctant when a plan directly concerns their neighbourhood. It might be in fact tempting to avoid providing too much information to people who - upon reflection - can be reluctant to see a major project coming next to their home, hoping for the project to be accepted by default.

If the NIMBY-effect is considered as unidimensional then the conclusion should be that if we prime attachment to place among the people concerned by a project, they will focus only on the potential negative aspects that this change will bring in their area: disruption. But as we have previously stated, we consider that key elements for acceptance -drivers and barriers- are not unidimensional and can work in different directions depending on perceptions and beliefs of the target audience.

Building on the importance of framing the information, we consider that the NIMBY-effect can be neutralized and attachment to place can be an asset rather than a barrier for acceptance.

For example, a study about public acceptance of an innovative renewable project named Seagen, which is a grid-connected tidal energy and was described as the first commercial system in the world to generate electricity from marine currents in 2008, found that bonds to place are not necessarily negatively correlated with acceptance



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([Devine-Wright, 2011](#)). It suggests that by shifting the meaning of the bonds from “backyard” to places, policy makers, decision makers and project managers can gain a better understanding of how major renewable projects will affect the response of the targeted audience. Further, the symbolic meanings of the place should be carefully screened to craft public acceptance strategies. In fact, projects were negatively perceived when there was a lack of ‘fit’ between the symbolic meanings associated with a place, and the project itself.

We consider this study is particularly relevant to inform our WEDISTRICK acceptance campaign regarding what we have found in Alcala de Henares.

In this project, focus groups have revealed that the residents value the beauty of the nature of their area and were for this reason particularly attached to their place. In this case, being attached to the place was the best predictor of acceptance of this project and the residents were clearly perceiving the tidal as an element capable of enhancing the beauty of their place rather than a disruptor.

In fact, the people of Alcalá de Henares have expressed a clear attachment for their working area that they consider as a privileged natural place.

In this sense, we consider that an interesting and effective strategy could be to find a way - as suggested by the interviewees - to attach the project into the symbolic meaning associated to this place with the aim to use it as a proxy to magnify the natural assets of the place.

This should be related to the framing of the information provided regarding the future plant and specific efforts should be made to show this plant will complement the environmentally friendly aspects of the place and will not come as a disruptor.

As for the framing, studies have confirmed people are forming their attitudes towards a specific technology by balancing benefits, costs, and risks ([Huijts et al. 2012](#)).

However, this internal cost-benefit analysis is not necessarily related to monetary considerations but also to personal and might not seem rational but matter a lot for acceptance.

The above-mentioned study has, for example, found that in the case of agri-biomass, people were more ready to welcome this technology when learning it was produced by local farms and/or processed by local manufacturers. Using the “local energy” was in this sense an important convincing argument.

If we continue to list what could be reinforcers of place attachment and public acceptance, we can go back to the preliminary theories we have mentioned at the beginning of this report and more specifically to the field of **civic ecology** (The full definition of the concept is available in the [glossary in Annex 1](#)) that makes clear the fact place attachment and efforts to embrace change are reinforced when individuals have the feeling to belong to a community of people who share the same.

Clear patterns of innovation associated with pride, but also the feeling of not being valued enough as tech people have emerged from the interviews. This is potentially a strong bond and a solid opportunity to create a community of people favourable to WEDISTRICK. The plant could be the critical element to put more light on their innovative area.

Creating these conditions for acceptance would allow to deliver information -framed in the right way – about the project without fearing the emergence of NIMBY-effect. In doing so, knowledge as highlighted in the EU report about acceptance, would only be a catalyser of acceptance. But for creating a community of supporters and



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positive messengers raising awareness about WEDISTRICKT, we should be able to create a bond and build on connectedness.

However, most of our respondents have voiced their willingness to have more opportunities to get gatherings places in their rear whether they can take the form of restaurants bars or cafes. This is certainly an alley to explore around the project. The potential benefit of creating community spaces or pops cafes next to WEDISTRICKT information points, to install a friendly atmosphere and offer occasions to meet and speak about the project and its benefit.

d. Takeaways for framing the messages and concluding remarks about Alcalá de Henares demo site:

- Interviewees are deeply attached to their working area that they consider to be a privileged natural area.
- People are generally in favour of the project but still have concerns
- Give clear and detailed information about the project and full transparency regarding the technology and its impact on the area are requested to fully support the implementation of the plant.
- In fact, emissions, potential pollution, smell coming, potential danger for health because of the functioning of the plant are recurring concerns among our respondents.
- Very few people spontaneously cited biomass but there is a clear relationship between the fact of being knowledgeable about biomass and being ready to accept the project.
- Clear patterns of innovation associated with pride but also the feeling of not being valued enough as tech people have emerged from the interviews.
- Respondents are eager to see this project as an opportunity to flash the light on their working area
- Building confidence to inspire trust would be a challenge.
- The NIMBY effect can be neutralized and attachment to place can be an asset rather than a barrier for acceptance.
- We can avoid NIMBY effect by framing the information around the project to ensure a good fitting with the symbolic meaning attached to this place: nature and innovation.
- The plant could be the critical element to put more light on their innovative area.
- We can create a community of positive messengers supporting the project if people perceive the plant as: a proxy for putting light on their innovative work; a proxy for promoting renewable energy and as way to magnify the natural aspects of the area.
- But for creating a community, people need to feel more connected. Most of the interviewees miss opportunities to meet in gatherings places (bars, restaurants...) to fully enjoy the atmosphere of the area.



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3. Methodology for dissecting the issue, mapping the drivers and barriers, and progressing towards an acceptance campaign

a. Redefining acceptance through a behavioural lens

In the previous section, we have elaborated on the importance for WEDISTRCT plants and demo site to be perceived as possibilities to ignite pride, celebrate environment, and create bonds around renewable energies that are capable to enhance the benefits of the place they will be located. In this section, we describe the behavioural process to follow for designing a campaign to gain the support of the citizens towards WEDISTRCT based on the findings about main drivers and barriers towards the project in both demo sites.

In Applied Behavioural Science, we usually start by mapping bottlenecks (barriers) and entry points (drivers) to get a favourable or desired behaviour. The process is made of the following stages: determining who are the stakeholders or target groups, understanding what the desired behaviour is we want them to perform, screening potential bottlenecks and finally detailing the entry points before moving to intervention design.

Concerning Alcalá de Henares demo site, here are what we know and how we put it through this behavioural mapping exercise:

- **Stakeholders/target groups:** The workers of Tecnoalcalá, specifically from CEPESA, and the staff of the university were identified as stakeholders who can play an important role in supporting or rejecting the project.

- **The desired behaviour:** The stakeholders will accept the project and potentially become supporters by spreading awareness about its benefits.

- **The bottlenecks:** Misconceptions about biomass, lack of knowledge, fear of potential harmful outputs are some elements making some of them asking for more information about the project. Lack of transparency is mentioned as a potential condition for rejecting the project. They feel that there is a lack of spaces to meet in between companies and share their attachment to the place.

- **Entry points:** In general, the stakeholders know and support renewable energies. They enjoy their working place perceived as a privileged natural area and they ask for more opportunities to be valued as innovative people. They are willing to get gatherings places and to meet other people in the area. They are eager to learn more about biomass and the plant.



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Once the process is set and the stages clearly identified, we usually rely on precise methodologies to design an intervention and/or an experiment that could help the people going into the direction of the desired behaviour.

b. Using the COM-B model of behaviour for reaching the target behaviour

As a general framework, we recommend using of the COM-B model of behaviour ([Michie et al., 2011](#)) for designing any intervention aiming at reinforcing acceptance and awareness about WEDISTRIC in each demo site. The COM-B model proposes that there are three components to any behaviour (B): Capability (C), Opportunity (O) and Motivation (M).

This model is particularly relevant as it allows to look to specificities of each target group and can consequently allow us to confront these elements with the general framework of fostering attachment to place. To perform a particular behaviour, a person needs to feel he/she is psychologically and/or physically able to do so (C), has the social and physical opportunity for the behaviour (O), and wants or needs to choose this particular behaviour more than other competing behaviours (M). Since these components interact, interventions must target one or more of these to deliver and maintain effective behaviour change.

From this perspective, one or more of its components must be changed to facilitate effective and sustainable behaviour change. By changing both perceived capabilities and opportunities, we can influence a person's motivation for executing a particular behaviour and facilitate behaviour change.

Concerning specifically the demo site Alcalá de Henares, this is how we can break down tentatively the acceptance challenge:

- **Capacity:** We want the target groups to get the capacity to understand what the project is and how it fits well in their area.
- **Opportunity:** We want the target groups to have the opportunity to show acceptance or support towards the project.
- **Motivation:** People should have enough capacity and opportunities to know the project to be motivated to accept and/or support if asked about their opinions.

c. Crafting the right message using the EAST framework

Regarding renewable technologies the European report (European Commission, 2022) dedicated to public acceptance challenges enumerates some general guidelines for communication: It is about setting clear goals and objectives that the campaign and communication activities should achieve; this should help to identify key messages to outline. This point cannot be reached without proper identification about the right stakeholders and their specificities. In the last stage, the communication should be



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created to address the concerns topics of interest for the stakeholders to facilitate their involvement around the project.

For doing so, it is essential to design a message in a clear and a non-technical manner.

These are general guidelines, but every communication campaign should of course be tailored to respect and take into the account the specificities of each place (demo site) and audience. In the process design of an intervention, we rely on behavioural framework or toolbox to dissect, and progress tin an orderly manner towards the design of an intervention.

In this context, the EAST framework will be used to guide our communication campaign. The EAST framework ([Service et al., 2014](#)) is a mnemonic that was first designed by the [Behavioural Insights Team \(BIT\)](#) in 2012. The BIT was one of the first Nudge Unit in the world and was using applied Behavioural Science to improve the efficiency of the public policies of the UK Government. This framework is a methodology that was built upon the BIT experience of developing major strategies for the UK Government but relies also on the behavioural literature. It finally provides guidelines for rigorous application of tools for testing “what works”. It is further praised and used globally for the design of diverse public policies interventions.

The EAST framework encompasses four principles for applying behavioural insights: to encourage a behaviour to occur, it is necessary to make it **Easy, Attractive, Social and Timely**.

Make it Easy: It is important to find a way to break down complex information into one or several clear and simple messages with as little as possible technical jargon. Showing factsheet or simple figures, reference points with visualisation are some examples to follow.

Make it Attractive: Following the idea of visualisation, it is important to remember that people are more likely to do something when we can catch their attention. The use of images, colours, and finding ways to personalise messages are some important points to consider.

Make it Social: We are social animals, and it is all about leveraging the power of networks and social relationships to encourage behaviours to occur. Finding messengers people can relate to or creating a community of supporters can help.

Make it Timely: It is important to communicate with people when they are more likely to be receptive and when they are more likely to perceive the framing of the message as of being beneficial for them. People are more attracted by immediate benefits than by later or more distant ones because of present bias. It might be important to show present benefits of a project even if they are not as important as what the project will bring on the long run.

d. Recommendations of interventions for Alcalá de Henares demo site

Below, we provide some recommendations for interventions in line with the COM-B model and the EAST framework to foster the capability, the opportunity, and the



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motivation of the end-users to engage, accept and support the WEDISTRICK project.

There are only general insights that need to be discussed at this stage with the promoters of WEDISTRICK in the preparation of the step 4 of our Behaviour Change Programme, which consists of designing the awareness campaign.

- **Transparency:** Creating online and on-site activities, for easy-to-understand communication (cartoons, short videos) to explain the project and some factsheets about the specific type of technologies in action.
- **Salience:** Creating material insisting on how innovative this project is and encouraging the feeling of pride among the workers (who truly identify themselves as innovative people). Presenting data and figures to compare in terms of emissions saved by the new biomass plant compared to a more polluting energy or for example comparing the emissions of the plant to the ones coming from exhausting fumes of vehicles during peak traffic hours.
- **Social Norms and Belonging:** Creating places to gather around the project area. Designing a park next to the plant (confidence and community building) with cafes, some restaurants, or pop-up bars with information points about the project.
- **Attachment to place:** The project should be an opportunity to generate positive civic ecology feelings. Is it necessary to investigate the willingness of people to get more innovative green initiatives around the project, such as e-car charging stations.

However, as the whereabouts of the Spanish location was still under discussion at the time of this report, no further recommendations were developed.



Part Six: Acceptance Campaign for end-users

Due to the constant changing of the demo sites of the projects mainly due to technical and administrative problems and to the fact that the Spanish Alcalá demo site cannot be completed, it was decided to develop a modular, flexible, and adaptable awareness campaign that could be adjustable for all countries, if needed, following step 4 of the behaviour change programme:

Step 4: Design the *acceptance* campaign accordingly

The situation of every real and virtual demo site for DHC systems involved in the project is very different and therefore the individual campaign must be adapted and designed flexible and modular. Therefore, a quick evaluation of the specific demo site location is needed. We base this evaluation on the Socio-Economic Model of Change in order to define the right communication level. The resulting acceptance level scoring for the demosites can also be used for the virtual demo sites involved in the project and beyond.

1. Socio-Economic Model for Change

We base our dialogue actions on the Socio-Ecological Model for Change as suggested by [C-Change](#) 2020. This model is based on the view that overlapping levels of influence like individual, interpersonal, community and environments factors can influence the social context and therefore simplify changes (see Graphic 1).

The four cross-cutting factors of this model - information (transparency), motivation (attitude), ability to act (self-efficacy) and norms (sociocultural influence) - are in line with mentioned factors of the COM-B model.

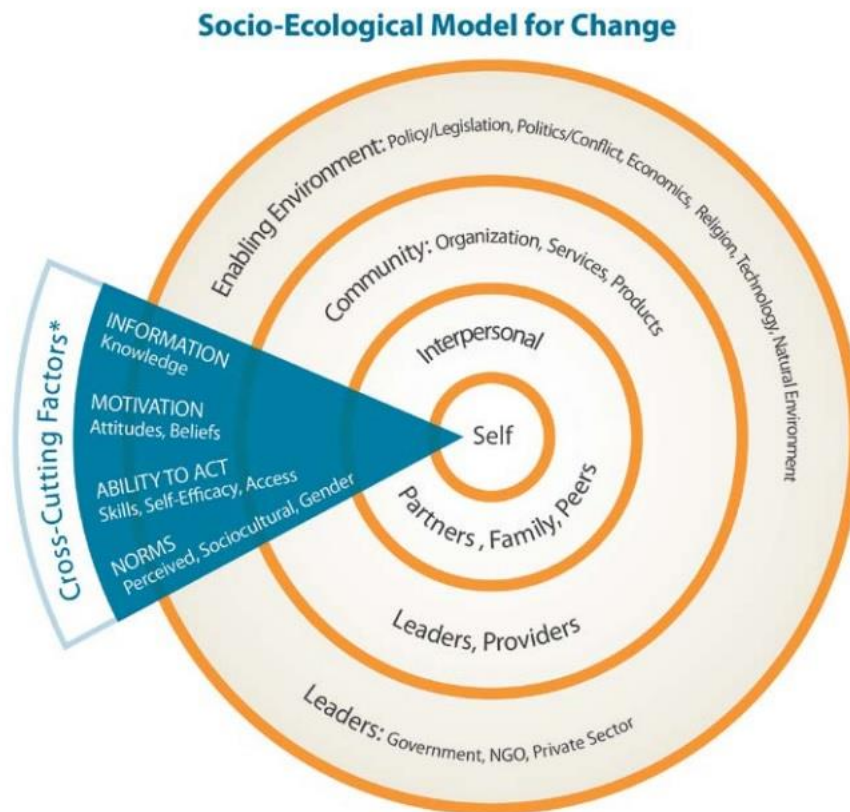
While environmental factors (on outer rings in Graphic 1) have a passive influence, but are crucial for the implementation of the changes. Community-based, interpersonal or direct communication (in inner rings) are closer to the “self” in order to actively motivate acceptance.

However, when the environment is not enabling because policy or legislation is setting major barriers, an acceptance campaign including dialogue actions with end-users might not be effective. If the “self” has already a positive attitude or low involvement, no major changes might be necessary.

Therefore it is essential to identify the existing acceptance level on the basis of the technologies, the environment and the end-users before choosing campaign actions.



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*These concepts apply to all levels (people, organizations, and institutions). They were originally developed for the individual level.

SOURCE: Adapted from McKee, Manoncourt, Chin and Carnegie (2000)

Graphic 1 Image taken from *C-Modules: A learning Package for Social and Behavior Change Communication (SBCC)* [C—Change](#) 2020, page 2012: People (Self) are influenced by different personal and environmental factors.

2. Evaluating the acceptance level

As was shown in the previous chapters, the main result was that most people only have problems with single technologies - mainly due to visibility or emissions of the regenerative energies or major changes in their environment.

Especially long-term residents with high local attachment are very sceptical towards changes while people have a less negative attitude at their (possibly non-permanent) work place.

Furthermore, the educational level of the target group is essential for an acceptance campaign as the resistance can be more rational or emotional.

These factors differ for all real and virtual demo sites involved in the project. Therefore it is essential to evaluate the situation for each demo site before drafting the campaign.



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a Acceptance level scoring

In order to evaluate how much effort is necessary to ensure acceptance of end-users we introduce an acceptance level scoring. Depending on the factors, specific recommended actions will help to decide whether just an informational campaign or a more elaborate acceptance campaign with behavioural change elements is appropriate.

Acceptance Level	Factors	Recommended Actions
Level Green (Almost) full acceptance by end-users	<ul style="list-style-type: none"> • Non-critical technology • Enabling environment • Knowledgeable end-users 	Ensure full transparency : <ul style="list-style-type: none"> • Local information campaign to show people the personal benefits and gain their support • Open House Events • Mainly passive information with feedback possibility • Regional reporting in local newspaper or TV
Level Yellow Local resistance expected	<ul style="list-style-type: none"> • Critical technologies involved (e.g. biomass) • High local attachment of end-users (e.g. residential area) • Existing negative feedback of end-users 	Influence behavioural change: <ul style="list-style-type: none"> • Local acceptance campaign necessary with EAST framework • Possibility for active interaction with end-users to listen to their concerns • Regional ambassadors, Townhall Meetings to deeply discuss issues
Level Red No acceptance - major hindrances	<ul style="list-style-type: none"> • political, financial or administrative issues • prolonged resisting end-users • All problems that cannot be solved by intensification of dialogue actions 	Behavioural change programme not productive: <ul style="list-style-type: none"> • Involvement of other players (political stakeholders) necessary to change regulations • Incentives might be necessary (tax reduction, subsidies etc.) • More time for administrative permits required

Table 1: Acceptance level evaluation, factors and recommended actions



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The proposed acceptance level scale is just a rough estimation. However, often times the boundaries between levels are blurred and actions from a higher level might be required to clear some upcoming obstacles.

b Analysis of critical technologies

During the WEDISTRIC project, we are developing and testing different new technologies. Furthermore, conventional technologies are being implemented in the heating and cooling systems.

The core question for acceptance by the end-users and successful implementation of those technologies is: Will the renewable energy sources potentially cause emissions or waste of any kind, visual changes in the landscape, or disturbances with noise due to major construction works?

Below in Table 2 we give an overview of the technologies used and a first evaluation of their possibly critical factors:











	Concentrated Solar Collectors for DHCs	Possibly critical due to space requirements
	Fresnel Collectors for DHCs	Possibly critical due to space requirements
	Concentrated flat plate collectors for DHCs	Probably non-critical in most areas
	Geothermal-PV Hybridization for DHCs supply	Possibly critical due to construction works (bore hole drilling)
	Renewable air cooling technology (RACU)	Indoors - probably non-critical
	High-efficiency absorption chiller	Probably non-critical
	Molten salts for DHCs thermal storage	Possibly critical due to space requirements and waste production
	Waste heat recovery from data centre to district heating	Non-critical
	Low-emission high efficiency biomass boiler for DHCs supply	Critical due to CO ₂ emissions, low emissions of SO _x , HF, and HCl, NO _x
	Advanced Digitalisation	Non-critical

Table 2: WEDISTRIC technologies and their critical factors



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This is just a preliminary overview. At any demo site the specific details and configuration of the technologies will make disturbances more or less likely. Therefore, this has to be evaluated specifically for each demo site.

c Analysis of demo site environments

As already mentioned in the previous chapters, it is essential to analyse the environment for the project area.

A historic district might even be protected by a local or national preservation order making any visible changes - even photovoltaics on roofs - impossible. In this case, the acceptance level will automatically move to Level Red because the acceptance campaign might not change rules. In this case, technical alternatives (like historically colored photovoltaic tiles) could be proposed in close collaboration with the regulatory authorities. In case of a timely limited project, only change of locations might help.

As the WEDISTRIC project is only a showcase project for switching to fossil-free energy with renewable district heating systems, change of location is usually not an option and political solutions are required – like change of regulations etc.

On the other hand, we figured that highly technological environments like technology centres and universities – especially in the field of regenerative energies - are usually welcoming environments, where all players involved try to help implement the renewable DHC systems in order to comply with the European Green Deal.

d Analysis of end-user groups

Furthermore, it is essential to evaluate the target groups of end-users of the DHC systems. A behavioural change programme might not be necessary for people with a positive attitude and extensive previous knowledge in the new technologies.

We figured that it is also important to find the right communication level for the respective target group. People that are familiar with the European Green Deal and its consequences might be more welcoming towards change than people with less knowledge in the matter, when high transparency is guaranteed for all users involved.

Here it is important to differentiate between permanent residents, who have to spend every day of their private lives in the affected areas with the occurring changes, and workers or short-term residents – like a student in dormitories, who are usually not as attached to the area and sensitive to changes. Furthermore, it is important whether the end-users are home-owners or tenants only. It is also dependent on their socio-economic status. Possible increasing or reducing heating costs could also become an important factor for acceptance. In case of technology centers or university sites this often only plays a minor role, because the end-users are not involved in the costs for the energy.



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In order to evaluate the end-user groups for the DHC systems, extended interviews as conducted in Alcalá might be necessary. The whole process for the Alcalá demo site was described in detail in [Part Four](#) and [Five](#) of this study and should be conducted similarly as required when critical technologies or demo site environments are involved as determined by the acceptance level scoring. The respective questionnaires can be found in the [Annex 2](#) of this study and should be modified for any other demo site.

e Preliminary acceptance level for demo sites

In order to give a rough estimate about the current acceptance levels of the involved demo site, we evaluate the so far occurred progression of the different DHC systems at demo sites involved in the project.

Based on the evaluation of the first Spanish demo site, the end-users involved where so far not a critical issue, because they were mainly workers or university members without major concerns. However, in the case of the Spain demo site external major barriers were thwarting the project, causing a red acceptance level (see Table 3). Similarly, in Poland there were mainly outside barriers with a non-enabling environment that led to cancellation of the demo site there.

On the other hand, inner support was fully enabling in the university environment in Bucharest and with non-critical technologies in Lulea which lead to a green acceptance level.

For the these and the other virtual demo sites involved in the WEDISTRIC project, the acceptance level has to be properly evaluated before rolling out DHC systems onto a larger scale.

Demo site	Local Factors	Acceptance Level
Racibórz, Poland	Major financial and legal barriers	Red
Alcalá de Henares, Spain	Long-term legal barriers with critical technology	Red
Lulea, Sweden	Low-critical technology with only temporary installation; no major disadvantages	Green
Bucharest, Romania	University environment with renewable energy focus, support of management	Green

Table 3 Preliminary estimation of acceptance level for WEDISTRIC demo sites

The critical factors and hindrances in the projects demo sites – especially for Poland and Spain - will be evaluated in another deliverable “Lessons learned” in order to ensure simplified processes for virtual and follow-up projects. Political changes might be required in these countries to enable installation and retrofitting of DHC systems with regenerable energies and fossil-free in all European countries.



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3. Implementation of campaign tools for acceptance dialogue actions

After analysis of the acceptance level, the appropriate campaign should be implemented as Step 5 of the behavioural change programme:

Step 5: Implementation of the acceptance campaign

The implementation of the campaign should be developed in close cooperation with the respective local partners. As mentioned earlier, it is important to ensure high transparency about the project for all players involved.

Here we outline possible tools that could be used to inform the end-users and increase their acceptance,

a Toolkit material

For all technologies involved on the demo site of the WEDISTRIC project, an infopoint should be installed, in order to ensure knowledgeability about the construction works and expected changes.

This includes:

- Poster / Roll-Up about the project and the demo site
- QR codes on the area linking to a website for more information on the project (translated to local languages if necessary)
- Information card on technologies and explanation
- Information sheets next to accessible / visible DNC parts
- Infocards / Postcards / brochures about the project – in local languages when necessary

b Informational / Feedback website

The website could include - on top of the basic information about the specific technologies - a feedback section in order to be available for feedback. This could include the social media accounts (preferably operated in local languages) and possibly a comments section for positive and negative comments.

Furthermore, one could include a short, neutral questionnaire with 5-10 short questions in order to test the acceptance and knowledge level of website visitors. For more participation, one could even make a competition with small prizes in order to collect data about the participants and their attitudes. This could help evaluate the regional attitude although those competition mainly target only specific people that might not be the end-users.



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c Trainings for behavioural change for players involved

In order to ensure that there is a good response to possible negative biases, the local players involved in interaction with local end-users should take part in a training on behavioural change communication. They should be sensitised for all parts of behavioural change programme, the components of resistance and some techniques to overcome misconceptions, wrong expectations and to identify possibly major problems.

d Dialogue actions

The dialogue actions range from passive to active depending on the situation as visible in the socio-ecological model for change.

The closer the campaign is to the self, the more change it could generate on an individual level. However, some people are hard to address individually. Therefore, it is important to “think local” and implement different levels to be able to affect the right people in the right way.

Actions for information of the involved end-users and their local environment include:

- Articles – Articles in regional newspapers to inform them about the project as well as increase transparency and stimulate the feeling of being informed. This could also be supported by postcards in mailboxes of involved end-users or discussions on the local radio
- Open House events – tours and explanation through the site (e.g. combined with opening event) can help users understand and visualise the technologies involved, thus increasing the interpersonal interactions, communication, and discussions with further people from their communities and networks. These kind of regional information activities increases the project’s salience and enables users to ask questions.
- Ambassadors– Identification of local ambassadors (politicians, multipliers, deans, chairmen or CEOs of institutions, associations or companies involved). This enables the project to become better embedded within the regional context and supports the feeling of the technologies belonging to the environment

Although this kind of support might not be necessary for a green acceptance level, it could be crucial for a red acceptance level to know the relevant stakeholder and have their support. The involvement of the ambassadors is dependent on the acceptance level – ranging from being informed only during green level to active involvement in the campaign in form of interactions with end-users during yellow level. Red acceptance level might even require political advocacy



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- Townhall meetings – When negative feedback increases to numbers that can not be handled and positively solved on a personal basis, it might be necessary to organize townhall events - publicly announced meetings, open for everybody to mention their concerns. This active interaction with a larger number of negatively biased end-users might make it possible to overcome biases and find solutions together that might satisfy the needs of all stakeholders involved.
- Interpersonal Dialogue - Regional ambassadors and project responsible parties should participate to give decisive power to the end-users and increase their feeling of control and importance (Self-Efficacy). The attachment of the objecting parties to the place is often much higher than all other people involved in the projects. Their opinion must be incorporated. When no common solution seems reachable, the acceptance level must be increased to red and further decision makers must be involved.
- Additional Incentives - If resistance becomes visible, the direct approach and interpersonal communication is often the most fruitful because personal concerns, biases, and emotions become apparent. Addressing the concerns with more information and possible advantages, can also lead to the necessity of additional external incentives – like active participation in decision processes or monetary benefits for the end-users of regenerative DHC systems.

At some point intensification of the behavioural change dialogue actions are not helping any more. As the acceptance level changes to red in this case, the strategy has to change to address the identified issues in order to get an enabling environment.

4. Impact Evaluation, Monitoring and Adjustment

The implementation of the campaign has to be accompanied by a constant feedback loop as mentioned in the last step of the behaviour change programme:

Step 6: Impact evaluation, monitoring and adjustment of the campaign if needed

This regular reevaluation is necessary to adjust the campaign if required.

a Evaluation of campaign impact

In order to ensure that the dialogue actions of the information or acceptance campaign are successful, the end-users should always have a direct-access channel to the demo site responsables. This could be via an email address on the website.

The website - which should be accessible via QR code on local information campaign tools like posters, flyers, or brochures – is the key component of the feedback system.



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The feedback can give quantitative and qualitative information about the most discussed issues of interest.

The following questions could give some indicators for the campaign impact via website:

- How much information material and which has been downloaded?
- How many comments have been made?
- How many and what kind of emails did arrive via website?

An appropriate short questionnaire / quizz could also answer the following points:

- How knowledgeable are users about the project and how is this knowledge level developing?
- Is the information available enough for end-users?
- What are the attitudes of the users towards the technologies?
- Does the campaign reach the right users?

Some people might be unfamiliar with online surveys. For them a printed-out questionnaire and a post-box might be an extra option.

The analysis of these questions could make the campaign also comparable to other demo sites involved in the project. Some dialogue tools might be more useful than others and demo sitedemo sites could learn from each other and adapt their campaigns according.

b Monitoring of acceptance level

In addition to the campaign impact, the acceptance level should be monitored and evaluated on a regular basis to make sure that the right dialogue tools are being used to approach the end-users and raise their positive attitude towards the project.

Therefore, the acceptance level should be updated for every major structural change of the DHC system or at least every 3 months. When there is too much negative feedback or some major issues appear, the acceptance level must be adjusted immediately to red to ensure appropriate actions and the right focus on resources.

c Adjustment, when acceptance levels change

Whenever the acceptance level changes, adjustments to the campaign are necessary.

This is specifically the case when the acceptance level decreases, and the response of end-users turns negative. Tiny events can have a huge impact and prevent great projects from happening. Single actors can block implementation via demonstrations or lawsuits that could at least delay the project by several months. Therefore it is essential to ensure full transparency and timely adjustment to be able to find and address negative feedback as early as possible.



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The mentioned dialogue tools can be used to identify if the acceptance level has decreased or possibly if other target groups have to be addressed that had been previously neglected.

Especially when upscaling or extending DHC systems, new end-user groups might have totally different concerns and might make it necessary to run through the preceding steps of the behavioural change programme again. In the worst case, all six steps of the programme would have to be repeated when political regulations or events change the attitudes of end-users to accept changes. Usually only the design of the campaign has to be modified – as mentioned in step 4 of the behavioural change programme.

A timely adjustment and constant transparent communication will/can help finish the projects in time.

At the same time, the increase of acceptance can make additional dialogue actions redundant or even initiate an acceptance campaign when other legal or financial hindrances are removed and only the acceptance of end-users has to be ensured.



Conclusions

This document focuses only on the original proposal for the Spanish demosite in Alcalá. This demosite has been replaced by Córdoba but the same conclusion will apply. Due to the withdrawal of the Polish demosite, it has not been included in this study.

The main finding of this study was that usually there is no general aversion against regenerative energy technologies, but rather only rejection of specific technologies and major changes in one's own life. Especially visual or noise disturbances of personal comfort could trigger negative attitudes – this is in agreement with the research hypothesis.

Furthermore, the degree of rejection of new technologies depends on the respective end-user group involved. While it is usually unproblematic for workers at technology centres and universities, inhabitants of residential areas with less contact with the matter will probably show more scepticism in general.

A behaviour change programme might be required to address the underlying biases that might not even represent their usual attitude towards regenerative energies but rather a result of the “Not-in-My-Backyard” (NIMBY) effect.

Our survey in Alcalá, Spain, amongst workers and university members clearly showed that these end-users have a very positive attitude towards regenerative energies but want to have more information on the specific project and its influence on their lives.

Therefore, it would be essential to increase transparency of the project, of the technologies involved, and of the specific expected changes with the COM-B model and the EAST framework. The elucidated end-users could become supporters of the project with high attachment to the place and develop a feeling of belonging.

We suggest an adaptable awareness campaign that could be adjusted to all real and virtual demo sites involved when needed. Therefore, we introduced an acceptance level scoring system to evaluate how much resistance is expected and how intense the dialogue actions have to be - on top of the normal information campaign. The acceptance level can change over time and should be regularly checked in order to adjust the campaign accordingly.

For each demo site the appropriate dialogue actions have to be chosen to address the real issues of the end-users in the specific region.

The updated Communications & Disseminations Master Plan (D7.5) will give a guideline to all the partners involved to implement these actions in a modified campaign adjusted to their specific needs.

So far, in the WEDISTRIC project, we mainly had to overcome issues at a red acceptance level in demo site locations studied: Poland, which had to be completely cancelled, and Spain, which original location has been replaced. On the other hand, technologies with a temporary installation only as in Sweden or a university



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environment in Romania had green preliminary acceptance levels at the time of this report. Regular reevaluation and adjustment of the acceptance campaign actions are needed.



Annexes

Annex 1: Glossary of Behavioural biases and phenomena described in the report

The definitions provided below are mostly retrieved from these two online resources hubs:

- *The Behavioural Insights Team: <https://www.bi.team>*

- *The Behavioural Economics Group: <https://www.behavioraleconomics.com>*

Availability bias: Availability is a heuristic whereby people make judgments about the likelihood of an event based on how easily an example, instance, or case comes to mind. By overestimating the likelihood of events with greater availability in memory, people tend to confuse accuracy with availability.

Civic ecology: is a field of interdisciplinary study concerned with individual, community, and environmental outcomes of community-based environmental stewardships practices. Civic ecology practices have proved that enhancing green infrastructure is closely related to improving the well-being of people in urban systems

Intention-action gap: The difference between people's values, attitudes, and intentions and how they actually behave.

Loss aversion: This concept is encapsulated in the expression "losses loom larger than gains". The pain of losing is psychologically about twice as powerful as the pleasure of gaining.

Present bias: The present bias refers to the tendency of people to give stronger weight to payoffs that are closer to the present time when considering trade-offs between two future moments.

Prospect theory: Prospect theory is a behavioural model that shows how people decide between alternatives that involve risk and uncertainty. It demonstrates that people think in terms of expected utility relative to a reference point (e.g. current wealth) rather than absolute outcomes.

Salience bias: Tendency to focus on items or information that are more noteworthy while ignoring those that do not grab our attention. In other words, people tend to focus to the most salient information: the ones striking the most their attention.

Self-serving bias: Any tendency to interpret events in ways that favour the interpreter.

Social Norms: Social norms signal appropriate behaviour and are classed as behavioural expectations or rules within a group of people. They represent the tacit or clear perceived as acceptable in a particular group or society.

Stated preferences vs Revealed preferences: Classical Economics assume that people's preferences are representing optimal choices in theory.

However Behavioural Economics shows there is usually a difference between what people say they wish (stated preferences) to do and what they actually choose (revealed preferences). In fact, people tend to poorly predict their future preferences.

Status-quo bias: Status quo bias is evident when people prefer things to stay the same by doing nothing (or by sticking with a decision made previously). This is a preference for things to stay unchanged.



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Civic Ecology: A field of interdisciplinary study concerned with individual, community, and environmental outcomes of community-based environmental stewardship practices, and the interactions of such practices with people and other organisms, communities, governance institutions, and the ecosystems in which these practices take place. Civic ecology practices refer to local environmental stewardship actions taken to enhance the green infrastructure and community well-being of urban and other human dominated systems



Annex 2: Questionnaires for interviews in Spain

Set of questions for the workers

What is your job occupation?

Where is your office located in the Technological Park?

For how long do you work in this area?

What do you enjoy the most in your workplace, in this area?

What do you like the least?

How much do you feel connected with this commercial zone, area?

Since you have started working here, have you noticed some changes in the area?

Can you describe, explain, your feeling?

Generally speaking, tell me about your well-being in this area?

What could be improved so you feel even better working here?

Is taking care of the environment something, you think is important for your well-being?
in your workplace, this area?

Can you name some environment-friendly good practice in your workplace? In this
area? What is your employer doing, what are you personally doing?

Anything about cooling, heating?

In this commercial zone, have you noticed specific efforts for taking care of the
environment? Do you think this is important?

What do you think should be done?

How would you feel about having a fully renewable source of energy for covering your
needs in this area?

What do you know about renewable energy? Your feelings?

Can you name some of them?

Do you know about biomass? Your feelings?

If a renewable energy plant was about to come in this area, what would be your feeling?

Would you care about it? Pros, cons?

Would you like to know more about it? What type of information would you like to get
(exhaust reduction, jobs on site, changes in traffic circulation... (this is only for
interviewer reference in case the interviewee does not know what to say. It is important
not to prime the person with any category)

Is there anything else you would like to add?



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Set of questions for members of the university

For how long do you work in this area?

Can you describe your working environment?

How much do you feel connected/attached with this zone?

How much value do you put in the fact of working in a university?

How purposeful is it for you to work here?

What do you enjoy the most in your workplace?

What do you like the least?

Since you have started working here, have you noticed some changes in the area?
Can you describe, explain, your feeling?

Tell me about your well-being in this area?

What could be improved so you feel even better working here?

Is taking care of the environment something, you think is important for your well-being?
in your workplace, this area? For the students?

In the area of the university, have you noticed specific efforts for taking care of the
environment? Which ones? Do you think this is important?
What do you think should be done?

What are you personally doing for taking care of the environment? Any specific action
at home, in the office, any involvement in an association?

How would you feel about having a fully renewable source of energy for covering your
needs in this area?

What do you know about renewable energy? A definition? Your feelings?

Can you name some of them? Where did you get information about them?

Which ones are your favourite, the ones you do not like and why?

Do you know about biomass? Your feelings?

If a renewable energy plant was about to come in this area, what would be your feeling?
Would you care about it? Pros, cons?

Would you like to know more about it? What type of information would you like to get?

Is there anything else you would like to add?



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