

Expert Feedback on Community Dialogue Outcomes

Deliverable D5.2

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About the ENTRUST Project

ENTRUST is mapping Europe’s energy system (key actors and their intersections, technologies, markets, policies, innovations) and aims to achieve an in-depth understanding of how human behaviour around energy is shaped by both technological systems and socio-demographic factors (especially gender, age and socio-economic status). New understandings of energy-related practices and an intersectional approach to the socio-demographic factors in energy use will be deployed to enhance stakeholder engagement in Europe’s energy transition.

The role of gender will be illuminated by intersectional analyses of energy-related behaviour and attitudes towards energy technologies, which will assess how multiple identities and social positions combine to shape practices. These analyses will be integrated within a transitions management framework, which takes account of the complex meshing of human values and identities with technological systems. The third key paradigm informing the research is the concept of energy citizenship, with a key goal of ENTRUST being to enable individuals to overcome barriers of gender, age and socio-economic status to become active participants in their own energy transitions.

Central to the project will be an in-depth engagement with five very different communities across Europe that will be invited to be co-designers of their own energy transition. The consortium brings a diverse array of expertise to bear in assisting and reflexively monitoring these communities as they work to transform their energy behaviours, generating innovative transition pathways and business models capable of being replicated elsewhere in Europe.

For more information see <http://www.entrust-h2020.eu>

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- Cleaner Production Promotion Unit (Coordinator)
- Institute for Social Science in 21st Century



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Executive Summary

Finding alternative energy sources and transition pathways toward a more sustainable energy future is proving to be essential not just in terms of addressing dwindling fossil fuel reserves but also because current energy practices have caused unsustainable damage to the environment and the earth's atmosphere (Chilvers & Longhurst 2016). However, this process of transition has been negligent in overcoming the many obstacles that have considerably stalled and delayed a substantial decarbonisation of the energy system (Grübler 2012). One of the areas that has been relatively underdeveloped in current debates about energy transitions relates to energy system governance and the potential implications for the way in which transitions can considerably change the way in which energy is managed as a public good (Chilvers & Longhurst 2016). In fact, recent research broadens this debate by suggesting that energy demand systems are more influential for leading transitions than energy supply systems (Grübler 2012). These new paradigms have turned conventional understandings of energy system change on its head. As common assumptions were based on the notion that large scale energy supply systems were the main driver of energy transitions. Furthermore, in terms of working towards a vision of energy sustainability, equity has come to represent one of the core pillars for achieving sustainability in consonance with environmental and economic sustainability (Ringrose 2017). Understanding and mediating end-user needs and requirements is therefore a critical component of a successful energy transition towards a more sustainable future.

The work presented in this document focuses on providing a detailed report of expert and stakeholder engagements carried out with respect to the community dialogue outcomes. The thematic focus of the report concentrates in particular on energy transitions. From this particular perspective, this deliverable combines with T6.1 and T6.3 to provide a summary and critical overview of the feasibility of suites of collated transition pathways. Community capacities to achieve carbon reductions are further assessed using the Shared Socio-economic Pathways Framework. These insights are developed through enhanced views of transition pathways for the community of practice in Gràcia, Spain and a University student cohort in Ireland.

A key component of the work produced for this report relates to the development and implementation of two distinct data collection instruments. Firstly, using a modified Delphi-panel to develop a set of principles for a fair and inclusive energy transition in Europe. Drawing down initially from key findings from WP 3, 5 and 6 key principles based on areas of concern highlighted at community level. These principles were refined and validated through the modified Delphi-panel process, which relied on key inputs from a panel of academic experts. Secondly, to augment this iterative process of community engagements, surveys were conducted with local stakeholders to capture information in order to promote energy system change at community level. These surveys draw on insights from five distinct communities across Europe and offer a range of findings pertaining to how energy system change is perceived at local level and potential barriers for promoting further transitions.

Finally, a strategy which highlights a range of feedback mechanism with the communities that have been centre stage in the work carried out by ENTRUST is forwarded, which highlights the need for a 'conscientisation' strategy (after Freire 1970) that seeks to foster deeper dialogue with communities.



1 Introduction

1.1 Background

ENTRUST is examining the human factor in the energy system, and is dedicated to providing an in-depth understanding of how human behaviour around energy is shaped by both technological systems and socio-demographic factors. Work Package 5 is focussed on the engagement with the communities that provide the real-world environment for the empirical research elements of the project. This deliverable documents the collection of specific expert views on the results emerging from these dialogues. This was primarily achieved through use of a modified Delphi panel technique (augmented by mini-surveys with professionals in the communities).

Any research project that has at its core focus an exploration of human behaviours and human practices is inevitably complex – this is because not only is human behaviour complex, but so are the socio-cultural systems in which they evolve. Investigating the human factor in the energy system is inevitably more complex again because the energy system also shares the qualities of being multi-aspected and multi-faceted, and is itself intermeshed with the aforementioned human socio-cultural system with which it has evolved. Both human society and the energy system have evolved simultaneously, to a significant degree, by means of, and in conjunction with, people’s energy practices – in the broadest sense, ranging from infrastructural to domestic practices, as well as the political, technical, policy, and regulatory landscapes that frame and contribute to their development. Successfully engaging with communities requires a contextual understanding of their complexity.

A central aim of the project was the production of intersectional socio-demographic analyses of energy practices and attitudes within the communities. In the course of conducting this work, meaningful engagement with these communities has been achieved, and continues to be achieved, by means of an iterative reflexive participatory process. This process, which is explained in more detail below, delivers on the project’s aim to provide an in-depth understanding of how human behaviour around energy is shaped by both technological systems and socio-demographic factors.

Importantly, the iterative reflexive participatory process captures the core methodological considerations which are implicated by the centrality of intersectionality to the conduct of the research. As explored in the project’s previously released socio-demographic analyses¹ the concept of intersectionality, its import, and its operationalisation as both research paradigm and conceptual tool of analysis, as well as for the conduct of the research process, has been key to developing understanding of the aforementioned human factor in the energy system. Embedding intersectionality, and all it entails, within the methodology and research processes, including significantly, the iterative reflexive participatory process has created the conditions that have facilitated the production and re-production of the community dialogues that have developed over the duration of the project. These dialogues, described in previously released D5.1 ‘Report on Community Dialogues’ (Gaffney *et al.* 2017), have also been reflected in the visioning of the pathways presented in D6.1

¹ D3.2 ‘Intersectional Analysis of Energy Practices’ (Dunphy, Revez, Gaffney, Lennon, Ramis Aguilo, et al. 2017), D3.3 ‘Intersectional Analysis of Perceptions and Attitudes Towards Energy Technologies’ (Dunphy, Revez, Gaffney & Lennon 2017), and D3.4 ‘Synthesis of socio-economic, technical, market and policy analyses’ (Dunphy, Revez, Gaffney, Lennon, Sanvicente, et al. 2017).



‘Energy system visioning and low-carbon configurations’ (Morrissey, Axon, Aiesha, *et al.* 2017), and in D6.3 ‘Innovation Pathways to Transition’ (Morrissey, Axon, Hillman, *et al.* 2017).

In brief, an iterative reflexive participatory process captures the key requirements for successfully engaging with communities, ideally incorporating intersectionality as a guiding concept – particularly in terms of gender amongst other socio-demographic positions. This process provides the means for developing understanding of energy practices and attitudes towards the energy system amongst a diverse population within those communities, and for collaboratively developing potential transition pathways to a sustainable energy system. Clearly, reflexivity is a required activity across all aspects of the research process, for researchers and participants alike, and is integral to the successful development of both the intersectional analyses, and the conduct of the iterative participatory process.

One of the significant advantages that the approach to community engagements that ENTRUST has brought is that it allows for the emergence of a broad and varied range of perspectives on how people live with the energy system, and how they would like to see it transition. Recognising that people are the experts on their own lives, on how they live their lives, and on the everyday practices that subtend and enable the living of those lives, and integrating that awareness into the iterative reflexive participatory process has allowed the development of a range of pathways for transition that integrate the participants’ perspectives and input at all stages of their development, enhancing outcomes.

1.2 Deliverable overview

This deliverable provides a detailed report of expert stakeholder engagements carried out with respect to community dialogue outcomes thus far. Particular attention is given to energy transitions. This theme links this deliverable, with complementary work in WP6 and provides a summary and critical overview of the feasibility of suites of collated transition pathways. Community capacities to achieve carbon reductions are further assessed using the Shared Socio-economic Pathways Framework (see Bauer *et al.* 2017). These insights are developed through an enhanced view of transition pathways for the communities.

Progressively developing the reflexive participatory process in order to garner further expert feedback, two bespoke elements that have been produced for this task, the modified Delphi-panel, and the community stakeholder survey have been created – effectively augmenting the reflexive iterative participatory process. It is intended that the results of this iterative phase will be “fed back” to the communities of practice for their consideration.

The mini survey participants are located in five of the communities of practice – Dunmanway, Cork (IE); Gràcia, Barcelona (ES); Le Trapèze, Paris (FR); University students (IE); and Stockbridge, Merseyside (UK). There are slightly more female participants than male, and they come from a diverse range of areas of expertise including: architecture, construction, education, energy sector, engineering, environment, farming, finance and banking, health, hospitality, insurance, legal sector, manufacturing, property development, politics, real estate, research, retail, third sector, and the trades.

The modified Delphi-panel participants are composed of a panel of academic experts based in five jurisdictions – Germany, Ireland, Portugal, Spain, and the UK; men outnumber women by just one, and they



practice in a range of diverse disciplines including: civil engineering, economics, geography, health, planning, and sociology. These two methods, their development, and their deployment are described in Section 2.

In Section 3, building on previous research carried out for Deliverables 6.1 and 6.3, this report identifies a range of community energy innovation priorities. Offering a reflexive summary and discussion of the main findings from the two deliverables, the report expands on these by integrating further insights from communities of practice in response to those findings. The outcome of this process is the development of customised energy-policy recommendations which includes a collaborative and community based consideration of socio-demographically differentiated impacts, economics and governance, technological and environmental resources, and overarching policy context. The focus on transition in this section is broad-ranging, encompassing not just technology but also examining transition in terms of ideas and governance providing a multi-dimensional view of change.

Guided by the community engagement outcomes, the major contribution of this report has been the development of principles for a fair and inclusive energy transition in Europe. The principles have been iteratively developed from reflexive engagement with the core findings of Work Packages 3 and 6. The principles that emerged from the community dialogues generated by the engagement processes were further refined and validated using the modified Delphi-panel that was developed. Integrating the feedback and observations offered by the interdisciplinary panel of academic experts, the final iteration of the principles offered in Section 4 are the result of academic debate and consensus over how best to achieve equality and inclusion in terms of energy transition in Europe.

2 Expert and stakeholder engagement

An iterative reflexive participatory process captures the key requirements for successfully engaging with communities. This process provides the means for developing understanding of energy practices and attitudes towards the energy system within those communities and for collaboratively developing potential transition pathways to a sustainable energy system. Below, the bespoke methods developed as part of this process to fulfil the requirements for this task, T5.3, are explored in detail. Prior to this exploration, we elaborate on the overall iterative reflexive participatory process, which the methods feed into.

2.1 Iterative reflexive participatory process

As outlined in the Description of Action (DoA), we are assessing the feasibility of suites of collated transitions pathways as well as the capacity to achieve carbon reduction targets by means of an iterative reflexive participatory process at the community level. In D5.1 the Participatory Action Research (PAR) approach to research and its benefits are outlined. The iterative reflexive participatory process is inherently PAR oriented. Here we explore the iterative reflexive participatory process, the benefit of bringing that approach to community research and the detail of the process implementation.

In order to signpost and position the process within the overall context of the project the phrase 'iterative reflexive participatory process' is 'unpacked' here and the meaning and import of each of the significant elements of this process and their interconnectedness, are explained here.



Within qualitative research, an iterative process involves repetition with the intention of developing insight into a particular area of interest. However, while iteration involves repetition, it is more than mere repetition – it is a developmental process where there is enhancement, refinement and evolution of understanding and meaning with each iteration. Within the social sciences and particularly in relation to data analysis, iteration is conceptualised as being inherently reflexive – Srivastava and Hopwood describe the role of iteration as a “reflexive process” that is “key to sparking insight and developing meaning” (Srivastava & Hopwood 2009, p.76). Essential to this enhancement and refinement during the iterative process is the foregrounding of a thoroughgoing ‘reflexivity’.

Reflexivity involves reflection – again, it is more than mere reflection – it is a process of critical reflection that involves the researcher(s) interrogating their own ‘paradigm’, that is, their belief-system or world-view including their ontological and epistemological concepts. For Bordieu, “reflexivity is a precondition of any adequate sociology” (Outhwaite 1999, p.15). Reflexivity has “etymological roots in self-reflection and critical self-reflection” with links to “critical theory, standpoint theory, textual deconstruction and sociologies and anthropologies of knowledge, power and agency” (Macbeth 2001, p.36). The requirement for reflexivity is central to the entire process of community engagement and extends beyond researcher self-reflexivity across the entire research process, including data analysis and is a crucial method for validating the research findings. Reflexivity is also an important requirement of the participatory element of the overall process ranging from considerations concerning participant selection, participant engagement and the operation of the process itself.

The practice of reflexivity is also crucial for the participants themselves and the research design and process – including the method choice – facilitate the development of this. The reflexive iterative participatory process operates as a series of feedback loops between researchers, researchers and participants, participants and participants and researchers. “Reflexive iteration is at the heart of visiting and revisiting the data and connecting them with emerging insights, progressively leading to refined focus and understandings” (Srivastava & Hopwood 2009).

The participatory element of the research process respects the ‘bottom up’ approach detailed in the DoA and is vital for the successful realisation of the aim to develop insight into the ‘human factor’ in the energy system. The ethos of participatory research rejects a positivist paradigm and claims of the possibility of absolute objectivity that may be entailed therein. In contrast to such research approaches that relegate participants to the role of ‘subject’ of inquiry, participatory research includes participants as co-creators of knowledge. Participatory research is focussed “on a process of sequential reflection and action, carried out with and by local people rather than on them. Local knowledge and perspectives are not only acknowledged but form the basis for research and planning” (Cornwall & Jewkes 1995, p.1667).

2.1.1 Benefits that the Reflexive Iterative Participatory Approach brings to community research.

An iterative reflexive participatory process is an approach to research that is fundamental for action research and process-oriented approaches to sustainability transition management (Wittmayer & Schöpke 2014). As detailed below, the reflexive iterative participatory process extended across all elements of the ENTRUST project, including all aspects of the community engagements – ranging from the development of the



engagement methodologies, the approaches to participant recruitment, the conduct of the engagements and the analyses of the dialogues produced by those engagements.

A constant iterative feedback loop has been maintained over the duration of the project research ensuring that findings from the initial reflexive analyses of the data coming from early interviews went on to inform subsequent community engagements. The data and themes that emerged from these subsequent engagements were incorporated into and informed new analyses, as well as being integrated into the ongoing analyses of the earlier engagements thus allowing the themes to evolve and to reflect the contributions and insights from the participating communities of engagement. The reflexive iterative participatory process also provides the means for validating the research findings within the communities of practice themselves throughout all stages of the engagement process.

In addition to their primary purpose of data gathering, the data produced by means of quantitative methods, the ENTRUST Time-Use Survey (D3.2: Appendix 5) and the ENTRUST Energy Technologies Survey (D3.3: Appendix 5), were also utilised as supplementary measures to compare and contrast with the themes and analyses emerging from the reflexive analysis of the on-going community dialogues – thereby demonstrating the robustness and integrity of the iterative reflexive process. The maintenance of a persistent reflexive stance on the part of the research team and the constant attention to the participation and contributions of community members provides better research outcomes that properly reflects community views and also provides a better opportunity to explore issues that may have been unforeseen by the research team during the early stages of the project.

Maintaining ongoing relationships with participants from the communities of practice is essential for ensuring that the iterative reflexive participatory process is sustained. The respectful and ethical, approach towards engaging with the communities of practice that the research team brought to the research process was vital for the successful delivery of this process. Building on community and professional connections, personal networks, as well as face to face, on the street enrolment of participants, the research teams developed the trust with participants which was vital for producing successful community dialogues capable of generating the rich data which was necessary for the substantial analyses that have been produced by ENTRUST. Engaging with community members in a respectful and mindful manner also encouraged their fullest participation in the research process which, facilitated by the research methodology and design, provided the ‘thick’, ‘rich’, data which is a pre-condition for meaningful analysis.

Below, the reflexive iterative participatory process is set out in a series of consecutive stages. While these stages are presented as discrete, in practice there can be a significant degree of overlap between some of the stages. And even if not necessarily made explicit in each step of the stages as set out – researcher-reflexivity was central to each and every stage of the process.

2.1.2 Stages of the iterative reflexive participatory process

1) In the ENTRUST Description of Action three key socio-demographic criteria are identified as important for investigating the ‘human factor’ in the energy system – gender, age and socio-economic privilege. **Issues and key criteria identified.**



2) D3.1 Initial mapping of available socio-demographic data on energy practices maps and characterising the available datasets and research that provide information on the socio-demographic aspects that are significant for energy practices. The review of the literature affirms the particular relevance of gender, age and socio-economic privilege for energy consumption thus confirming the appropriateness of using those criteria as key attributes to be considered for the participant selection process. **Literature review – key criteria confirmed.**

3) Development of the methodology including discussion and analysis of key conceptual understandings and interrogation of the particularities of the research paradigm amongst the research team, including epistemological and ontological considerations. Exploration and assessment of alternative methods for engaging with participants. **Reflexive iterative development of research paradigm, methodology and methods.**

4) Selection of communities to conform to the criteria set out in the DoA. A reflexive approach was maintained toward participant recruitment within those communities in order to ensure that the requirements for considerations of intersectionality were incorporated into the participant selection process. Facilitating the observation of these requirements, workshops were held for the research partners to develop understanding about research criteria and processes, including explorations of reflexivity and intersectionality, in particular. **Reflexive participant selection.**

5) Development of the semi-structure interview question schedule by means of a reflexive iterative process amongst the researchers. Questions were specifically designed to encourage participant reflexivity and to facilitate expansive contributions from participants. **Reflexive iterative development of interview schedule.**

6) Initial meeting with gatekeeper and community members to outline project goals and receive feedback from participants on approach. **Reflexive iterative participatory engagement.**

7) Further revision of the interview schedule in light of gatekeeper and participant feedback. **Reflexive iterative development of interview schedule.**

8) Semi-structured interviews conducted across all communities. Particular attention paid to the conduct of the interview: attentive and respectful attitude of interviewer, including attention to details such as ‘active listening’, ‘open’ stance of interviewer, empathic and encouraging affirmations of interest in participant narratives. **Reflexive iterative participatory conduct of interviews.**

9) Review of interview recordings and commencement of process of transcribing, coding and developing key themes including identifying issues of particular significance for each community. Based on participant narratives, development of themes to inform community workshop schedule. Reflexive discussion of themes and issues – identifying commonalities and differences amongst and between communities and amongst and between different socio-demographic groups. **Reflexive iterative analysis of narratives.**

10) Community workshops in the form of focus groups conducted across all communities. Particular attention paid to the conduct of the focus groups: attentive and respectful attitude of facilitators, ensuring full participation by all participants, with particular attention paid to gender inclusivity and encouragement for



the expression of the range of opinions and experiences from all participants. **Reflexive iterative participatory conduct of community workshops.**

11) Review of workshop recordings as well as transcribing the recordings, integrating the dialogues into the coding and building on the existing key themes. Reflexive discussion of ongoing evolution of findings integrating the workshop participants' further insights and perspectives into the analysis and further clarifying issues of particular significance for each community. Utilisation of quantitative surveys as a supplementary measure to assess the robustness of the themes and analyses emerging from the reflexive analysis of the community dialogues. **Reflexive iterative analysis of workshop discussions.**

12) Holding of mini-publics in the form of the 'citizen jury'. Citizen juries are designed to facilitate the active participation of community members in decision-making processes about the significant social issues affecting their communities. Topics of discussion are informed by the future oriented findings produced from the community workshops and from the analysis of the previous community engagements. The citizen jury incorporates an interactive reflexive process amongst participants. Community members are shown brief expert presentations before having facilitated in-depth discussions in small groups, before coming together to envision the future of the energy system in their community. **Reflexive iterative participatory conduct of citizen juries.**

13) Reflexive review of the participant discussions and future oriented 'imaginings' produced from the citizen juries in the communities and incorporating those community discussions, explorations and future-visioning across a range of tasks as outlined in the DoA. **Reflexive iterative analysis of citizen jury discussion and envisioning of energy future.**

14) The findings and analyses produced from the breadth of community engagements will be incorporated across a number of key outputs from ENTRUST, including being incorporated as content contributions for the project's Knowledge Platform. The reflexive iterative participatory process with the communities of practice is ongoing, with future engagements with the communities planned to provide further opportunities to feedback to the communities on the key issues and findings that emerged from the analyses of the community and expert dialogues. This feedback will incorporate the outcomes from the two survey instruments used for this task T5.3 – The modified Delphi-panel and the Local Stakeholder Survey – as outlined below. **Ongoing reflexive iterative participatory process.**

2.2 Description of methods

Completion of task 5.3 entailed a number of additional engagements with experts and community stakeholders, which have not been previously described and recounted in Deliverable 5.1. These engagements represent a supplementary layer of research which required the development of specific methods and resulted in added empirical insights. In this context, the ENTRUST team developed a survey instrument which sought to target local community stakeholders. The modified Delphi-panel was another supplementary academic expert engagement, which required a defined strategy of recruitment, survey materials and feedback mechanisms. The methods used for these supplementary engagements are outlined in following sections.



2.2.1 Mini survey: Informative tool for descriptive applied research

ENTRUST has taken a mixed-methods approach to investigating the human factor in the energy system which involves the collection, analyses, and integration of both quantitative and qualitative data. Clearly, given the topic and nature of the investigation, and the type of data that is required for the in-depth analyses of the broad spectrum of people's engagement with the energy system, the primary methodological approach to the investigation is qualitative. However, a limited number of bespoke quantitative instruments have also been developed and used during the iterative research process, and integrated into the research findings.

In D3.3 Intersectional analysis of perceptions and attitudes towards energy technologies (Dunphy, Revez, Gaffney & Lennon 2017) the benefits of using the quantitative method of the 'survey' as a useful component in our suite of methods are explored. The survey is a form of empirical research that is used to "look at" an area of research interest, and it is a research strategy that can be used with a range of data collection methods. Groves *et al.* (2009, p.2) describe a survey as "a systematic method for gathering information from (a sample) of entities for the purpose of constructing quantitative descriptors of the attributes of the larger population of which the entities are members". The survey utilises a questionnaire as its basic tool, the purpose of which is to administer a standardised survey across all subjects, which entails asking the questions in the same way to different respondents.

The 'mini survey' is a small survey with a typical sample size of between 20 and 80 respondents and it is particularly useful in applied and/or policy research (Finsterbusch 1976, p.117). Finsterbusch suggests five different uses for mini surveys: (a) to provide the same type of information as large surveys, but with wider margins of error; (b) to assess the accuracy of expert opinion; (c) to assess the applicability of broader findings to a particular case; (d) to pilot a larger study or to investigate/explain some of the results from one; (e) to convert the "survey into a dynamic research instrument" (Finsterbusch 1976, p.118).

The primary limitations to small surveys – that they cannot support complex multi-variate analyses, and their wide margin of error on point estimates (Finsterbusch 1976, pp.124–125) – do not limit their usefulness with regard to their purpose within the ENTRUST research process. While there are limits to the applicability of results from mini-surveys, nevertheless, as Finsterbusch (1976, p.124) points out, they "should be highly useful for much applied research which is more descriptive than analytical".

The mini survey that was developed for the production of this report: "Stakeholder views of energy transitions at community level", has been designed as an element of the iterative participatory research process engaging with a range of energy system actors within the community setting; and the results and findings developed through the analyses of the data generated from the broad expanse of community engagements are being fed back to the communities of practice. With reference to Finsterbusch's five suggested uses listed above, while the purposes of the survey under discussion do not discretely map solely onto one of his uses, instead it can be demonstrated that they are in sympathy with the broad thrust of his suggestions, namely that the survey: (a) provides the same type of information as large surveys, moreover for this survey, the size of the margin of error is irrelevant as the it is not claimed to be, nor is it intended to be, in any way statistically applicable to the population demographics of the communities; (b) is used to assess expert opinion, which is contrasted with the findings from other engagements, and which will inform



the feedback to the community. Bringing together the significant elements from the final three suggested uses, (c), (d) and (e), it can be said that the survey is being utilised as part of the assessment of the broader findings from within the larger datasets produced by the research process as part of the inherently dynamic reflexive iterative participatory process.

Mini survey administration: Participant recruitment

Surveys can be administered in a number of ways. The 'self-administered' survey includes the traditional pen and paper survey, usually filled in by the participant with the researcher present; the postal survey filled out by the participant alone; and the online survey. Surveys can also be conducted in person, either as a face-to-face structured interview, or as a telephone survey. Recruiting community members to participate in any form of empirical research can pose significant challenges. A number of strategies were employed to recruit participants with varying levels of success.

The survey was created and published online using a dedicated survey website to host it. Using internet resources, key stakeholders were identified in each community and a database was created. Personalised emails were sent to the stakeholders informing them about the project, and including the link to the online survey. However, the response rate from this approach was negligible, for example, in Dunmanway out of approximately 70 personalised email invitations to participate, only four people filled in the survey. These significant lacunae in survey take-up was replicated across the rest of the communities who were invited to participate. Given the very low response rate across the communities it was decided to take a more 'hands-on' approach to participant recruitment, and so members of the research teams went out into the community with print outs of the survey and 'door-stepped' a range of key stakeholders. This approach was more successful and generated a sufficient number of participants to fulfil the criteria for a 'mini survey'.

2.2.2 Delphi-panel: Origins and rationale: a consensus oriented tool

Qualitative research goes hand in hand with the progression of social and political thinking (Gerring 2017). For instance, ground-breaking developments in relation to perspectives on gender and social class relations owe much to insights captured through qualitative research. Qualitative methodologies have substantially improved and developed over the years and new and promising methods of inquiry are emerging regularly. The Delphi-panel is, in comparative terms, a relatively novel qualitative technique that was originally developed by Dalkey and Helmer (1963) on behalf of the RAND corporation (Hsu & Sandford 2007). This technique is increasingly becoming utilised in disparate areas of research from policy development, needs assessments, health treatments and energy transitions visioning. However, compared to other more traditional and established qualitative research techniques such as interviews, case studies and focus groups this technique is still relatively under-utilised (Avella 2016). The Delphi-panel in general terms can be described as a technique, which captures group information through a series of rounds, where group members remain anonymous to each other.

A key component of the Delphi-panel is that it enables and promotes a process of consensus amongst the research participants through an iterative process based on anonymous dialogue between different participants (Eubank *et al.* 2016). This form of qualitative inquiry is particularly relevant in areas of research that are extremely complex, or where there is a degree of uncertainty. It is also beneficial in research areas



where disagreement is a predominant obstacle for further developments or in cutting edge fields of study where there is little information available (Avella, 2016). The design and process of the Delphi-panel, which is typically based on a series of rounds, makes it possible to feedback preliminary findings to the respondents and in this manner, it encourages respondents to reflect on their initial perspectives based on these findings (Hsu & Sandford 2007).

While other methods such as focus groups or group interviews have the potential for generating new forms of knowledge through interaction with other participants, there are common limitations emerging from face-to-face group dynamics. These limitations include facilitation issues in terms of providing an inclusive space where all participant voices are heard, dealing with dominant elements within the group that either intimidate or coerce other group members and overcoming potential participant reserve in sharing ideas in a public space (Avella 2016). The anonymity afforded by the Delphi-panel process is therefore a way of generating new knowledge and promoting reflexivity through engagement with other participant's opinions while at the same time maintaining a degree of privacy, which overcomes these group dynamic obstacles, often associated with the more public research spaces where focus groups and group interviews take place.

The process of consensus involved in the Delphi-panel has a number of characteristics. In the first instance, this process usually does not refer to absolute agreement among all the respondents but instead refers to a pre-established agreement rate, usually between 50% to 70% (Avella 2016). Secondly, the feedback loop which is a critical component enabled by the staged way in which surveys, questionnaires or other forms of data mining are delivered in the Delphi-panel, allows for a gradual paring down of agreed upon items and those that are least agreed on (*ibid.*). This feedback component also helps participants consider other positions and re-evaluate their own views based on these. This process usually leads to greater consensus rates among respondents taking part in the Delphi-panel process (Hsu & Sandford 2007). Understanding the overall position of different respondents in relation to a particular theme and reassessing underlying rationale based on this feedback is an important way of achieving agreement amongst a group of people. This is a valuable aspect that is offered by the Delphi-panel method and while different versions of the Delphi-panel technique exist such as the modified Delphi-panel method it invariably leverages this consensus making process through the use of feedback loops.

The Delphi-panel is thus a useful technique, which helps improve decision-making and knowledge development in a number of ways. The consensus building process can overcome particular deadlocks where no progress is made due to lack of agreement over a particular issue. It can also generate new forms of knowledge through feedback loops which encourage dialogue among the Panel members. Finally, the consensus process itself makes it possible to identify areas of considerable agreement and disagreement over given statements and ideas which greatly validate emerging Delphi-panel findings.

Design overview

The ENTRUST project used a modified Delphi-panel design which differs slightly from the original Delphi-panel technique. The modified Delphi-panel usually means that initial materials for panel discussion are developed and put together ahead of the initial stages of consultation with the panel members (Avella 2016). The modified Delphi-panel technique is less restrictive and provides a degree of flexibility in terms of follow



up rounds based on either a face-to-face wrap-up discussion or an extension of the initial scope of the panel through additional engagements.

The theme for the ENTRUST project entitled: *'The Development of principles for a fair and inclusive energy transition'* was identified and developed prior to the panel consensus led process. The idea was instead informed by the grounded analysis of field research conducted by the ENTRUST team across Europe for Work Package 3 and Work Package 5, whereby community perspectives and experiences with the energy system and changes therein were explored (Dunphy, Revez, Gaffney & Lennon 2017; Dunphy, Revez, Gaffney, Lennon, Ramis Aguilo, *et al.* 2017). A range of gaps and concerns relating to inclusivity and fairness emerged from this research and the notion of creation of principles to address some of these issues was identified by the ENTRUST team as a valuable mechanism.

Nine principles were initially developed and piloted internally with two ENTRUST energy sustainability experts. Principles are useful ways for establishing common standards relating to matters, which are usually complex and require guidance with respect to the development of formal and informal governance systems, laws and behavioural norms (UN Global Compact 2016). The key aim of this Delphi-panel was to reach interdisciplinary consensus amongst academic experts from different areas with regards these core principles to help support a fair and inclusive energy transition pathway in Europe. The initial nine principles are outlined in Box 1 below.

Initial Principles included in round 1 of the modified Delphi-panel

- **Principle 1**
All institutions promoting energy transitions should establish well devised channels of communication, social engagement and inclusive dialogue.
- **Principle 2**
All civic spaces involved in energy system transition dialogues should strive for equality in terms of gender, age, social background and socio-economic status (*e.g.* consultation campaigns, establishment of local committees, *etc.*)
- **Principle 3**
Accountability mechanisms should be included in all new energy projects, which include regular evaluation of citizen complaints and feedback from energy users.
- **Principle 4**
All new energy production and consumption projects and policies should be future proofed.
- **Principle 5**
Energy poverty mitigation strategies should be integrated into new energy projects
- **Principle 6**
All energy projects should adopt a precautionary approach in terms of possible social and environmental harms.
- **Principle 7**
Citizen inputs should be solicited using inclusive participatory procedures and integrated into the process of development and implementation of energy projects
- **Principle 8**
To ensure against unfair impositions on the public, energy behaviour change policies should strive to be consistent and coherent with short and long-term adaptability strategies.
- **Principle 9**
Local impact of large scale energy generation projects should be offset by deepening local social application of social dividends and community ownership

Box 1: Initial Principles included in modified Delphi-panel Round 1

Selection for the academic panel was based on a range of pre-established criteria. Panel membership was limited to academic participants. The underlying objective was to put together a panel of academic experts from different disciplinary backgrounds to test whether the panel could achieve a degree of consensus around a selection of core principles for the development of a fair and inclusive energy system. There was an interdisciplinary focus therefore in the panel selection and recruitment process. Furthermore, the recruitment process also focused on identifying academics, which represented in broader terms different branches of science. Namely, a diversity of academics deriving from applied science and social science backgrounds. Arguably, it is possible to achieve interdisciplinarity within one of these branches of science alone. However, energy transition studies are inherently complex fields of research, which extend towards



all branches of science and therefore the recruitment process included an effort to secure representation within the panel of academics from different branches of research.

Another important factor in the recruitment of academic participants was to establish an appropriate level of academic expertise and engagement with energy system sustainability and transitions research for comment on these principles. Because this area of research can be complex and very broad it is relevant to include perspectives which are at face value more marginal to the theme of energy sustainability. There are often associations made in relation to energy as a field of scientific research, which might include some disciplines and not others. In fact, it is arguably the case that disciplines from an applied science background usually dominate the field of energy system research. However, the central theme for this Delphi-panel focused on the development of principles for a fair and inclusive energy transition, necessitates the involvement of a broader range of perspectives from the onset. Therefore, a purposive sampling strategy was used which selected academic participants in terms of diversity of academic background not just in terms of discipline but also in terms of wider academic fields embracing both applied sciences and social sciences. Indeed, some of the participants were selected for their expertise in fields of research, which are peripheral yet very relevant in terms of energy sustainability. For instance, expertise on conservation policy, food sustainability, human rights law. While these are not niche fields of expertise dedicated solely to energy sustainability, they do bring an added understanding of how energy interacts with other social and environmental dimensions that were deemed essential for the critical development of these principles. Fifteen academics were initially selected and contacted to take part in the Delphi-panel Survey. A brief invitation email was sent out to these pre-selected participants. This invitation had a response rate of 67% with ten out of the fifteen pre-selected participants agreeing to take part in the survey. The final interdisciplinary panel was composed of academics from different backgrounds that included Civil Engineering, Geography, Social Anthropology, Sociology, Health Promotion and Economics.

The panel process itself consisted of two survey rounds, which were conducted through email. As shown in Box 1 above, the first round of the survey outlined nine core principles. Panel respondents were asked to consider each principle individually and were given three basic criteria to assess these on the basis of: agree, disagree or re-frame. Panel members were also encouraged to provide brief commentary on each specific choice. Additionally, a final section of the survey offered the option to recommend alternative principles or to include further comments regarding the survey and/or the theme of energy transitions. The response rate for the first round of the survey was 90% and nine out of the ten participants who agreed to take part in the survey completed the task. There were however two late responses which were not included in the second round of the survey but whose comments are addressed in this report.

In general, the innovative component of the Delphi-panel in terms of design is that the findings from the first round are not merely used as a stand-alone source of information but are also used to re-shape the subsequent rounds of the Delphi-panel. These rounds work as feedback loops which provide information to the participants and outline areas of agreement or disagreement. The ENTRUST Delphi-panel used two iterations of the survey. The second ENTRUST Delphi-panel survey provided the feedback component. Based on an overview of the information in the survey, the second iteration entailed a re-framing and re-wording of the nine initial principles. The panel was asked to consider these alterations and re-evaluate their position.



Again, panel respondents were asked to review each principle individually and were given three basic criteria to assess these based on: agree, disagree or re-frame. A brief summary of the findings was provided at the start of the survey and participants were asked to re-evaluate their position based on these.

Round 2 method adjustments

Largely, the first round of the survey showed that there was considerable agreement amongst most academics concerning the general ideas proposed in the nine principles offered. However, there were some issues identified in terms of the manner in which some of the principles were worded. Either because they lacked clarity or were slightly incomplete and required additional information. **Error! Reference source not found.** below illustrates the varied opinions offered in relation to the principles initially suggested.

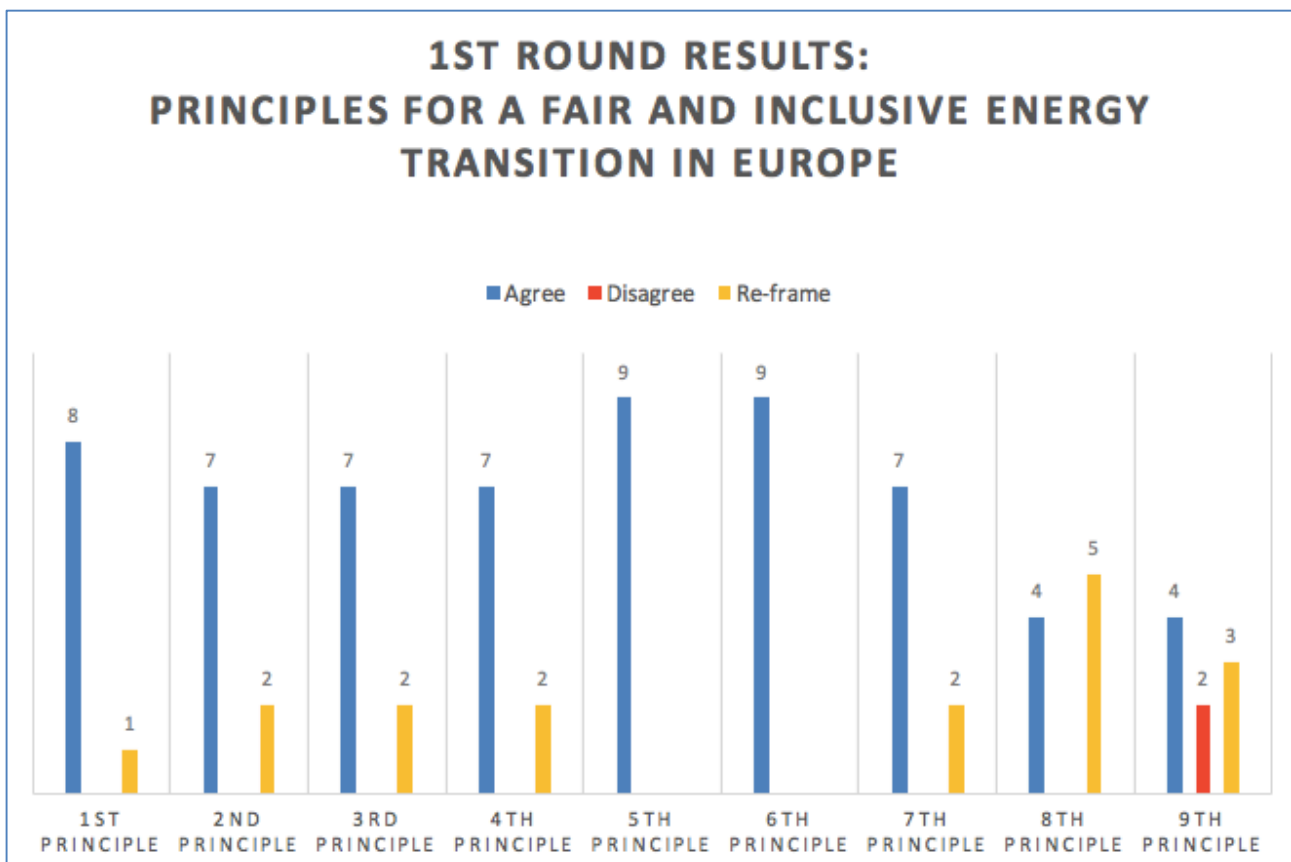


Figure 1: Summary of results - first round modified Delphi-panel

Principles 1, 5 and 6 were agreed by all participants. Principles 2, 3, 4, 7, 8 and 9 were flagged as needing further re-framing. Two participants disagreed with principle 9. One participant also suggested an additional principle which was added to the second-round survey for appraisal by all the panel members. Based on the results slight alterations were made to some of the principles. These alterations included: Re-framing of principles 2, 3, 4, 7, 8 and 9; Review of position on principle 9; Suggestion for an additional principle 10. Box 2 below offers a list of the re-framed principles which were included in the second round of the survey for re-evaluation.

Re-framed Principles (round 2)

- **Principle 2 (re-worded)**

All civic and public spaces involved in energy system transition dialogues should provide a stage for participation based on equality in terms of gender, social background and socio-economic status.

- **Principle 3 (re-worded)**

Accountability and monitoring mechanisms should be included in all new energy projects, which include regular evaluation of citizen complaints, feedback from energy users and regular reports that demonstrate how citizen complaints and comments have been addressed.

- **Principle 4 (re-worded)**

All new energy production and consumption projects and policies should be future proofed. This evaluation must include a strategy to address any expected shortcomings or impacts as well as have a long-term feasibility strategy

- **Principle 7 (re-worded)**

Citizen inputs should be solicited using inclusive participatory procedures, integrated into the process of initial conception, planning, development and implementation of energy projects

- **Principle 8 (re-worded)**

Policies seeking to reduce or change end-user energy practices should strive to be consistent and coherent with existing structural and social conditions as well as adequately linked to short and long-term adaptability strategies.

- **Principle 9 (re-worded)**

Local societal impact of energy generation projects should be offset by normalising community ownership and deepening the application of local social dividends

- **Principle 10 (new addition)**

Consumer protection measures should be devised and enforced to protect end-users from potential unforeseen financial liabilities relating to implementation of large scale energy projects.

Box 2: Re-framed Principles included in modified Delphi-panel

Response rates for the second round of the Delphi-panel was also 90% and all participants who participated in the first round took part in the second round. Further discussion of the results of the Delphi-panel are expanded in section 4 of this report.

3 Energy transitions and visions: a community level perspective

ENTRUST has carried out extensive field engagements at grassroots level with six different communities. Deriving from these engagements, which span work carried out for Work Package 3, Work Package 5 and Work Package 6, is a rich variety of empirical based knowledge. This includes a deeper understanding of energy practices from the perspective of different socio-demographic groups; an evaluation of attitudes



towards large-scale energy technologies and an assessment of community capacities to achieve significant carbon reductions. The following section focuses on community capacities to achieve carbon reductions, which is also linked to the development of sets of feasibility of suites of solutions derived and collated from transition pathways carried out through an iterative process at community level. This section builds on work carried out in Work Package 6, specifically, Deliverable 6.1 (Morrissey, Axon, Aiesha, *et al.* 2017) and Deliverable 6.3 (Morrissey, Axon, Hillman, *et al.* 2017). The following sections includes a critical summary and discussion of the main findings of these two deliverables. Furthermore, findings from these two deliverables are developed further here and enhanced by adding to the existing analysis of the initial 4 ENTRUST communities addressed in D6.3: *Stockbridge, Le Trapèze, Secondigliano and Dunmanway* with the 2 remaining cast study communities, *Gràcia* and the *University student cohort* (carried out specifically for this report and included as Appendix 1). Outcomes of this analysis point to new policy mixes and practice-based changes at the community level to inform innovation pathways for each community.

3.1 Visions for the future: a multiple stakeholder perspective

In a previous project output, Deliverable 6.1, a mixed-methods approach was utilised to gain insights into the complex understandings, expectations and feelings towards the energy system and its future development. Both citizen and expert opinions identified a series of preferred visions and expectations for the future of the energy system. Based on findings from citizens and experts, portfolios of energy system visions were developed and analysed with a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis and appraisal of lifecycle and cost-benefit implications visioning exercises, including scenario development, as applied in D6.1 provided an essential foundation from which to highlight the key mechanisms for long-term and strategic evaluation of policies and strategies, particularly in the context of preparing society, institutions, actors and infrastructure for lasting change. In D6.1 five distinct visions for the future of the energy system emerged:

- Continuity Vision (CONT);
- Directed Decentralisation Vision (DD);
- Gradual Path Reduction Vision (GPR);
- Accelerated Path Reduction Vision (AER); and
- Deep Green Vision (DG)

Three of these relate to community level / community generated visions, Continuity Vision (CONT); Gradual Path Reduction Vision (GPR) and Deep Green Vision (DG). For the purposes of this report, these visions are focused on. The remaining visions, Accelerated Path Reduction Vision (AER); and Directed Decentralisation Vision (DD) relate to SME and Expert visions and are excluded from this particular section of the analysis. The visions presented in D6.1 are predicated on an “...ideal, desirable future state of the energy system” that provide an insight into the ways in which different communities (whether of residents, workers, interest group members, or practitioners) consider how the energy system should transition in the coming years. The visions constitute a portfolio of scenarios of what the energy system could transition to, outlining in particular what residents in their communities want and expect the future of the system to look like. These visions illustrate the role of different energy sources, interventions and stakeholders and the extent, to which each would play within each vision for the future of the energy system. Table 1 presents an overview of the three



key community visions and based on extensive community engagement conducted for WP3 and WP5, aligns each community of practice with a particular vision.

Table 1: Energy visions and community transitions (Developed from D6.1)

	“Continuity Vision”	“Gradual Path Reduction Vision”	“Deep Green Vision”
Features	<ul style="list-style-type: none"> Mixture of top-down and bottom-up approaches Strong preference for hard-infrastructure solutions Moderate support for changes to local technology Minimum social change 	<ul style="list-style-type: none"> Mixture of top-down and bottom-up approaches Moderate support for hard-infrastructure solutions Moderate support for changes to local technology Minimum social change 	<ul style="list-style-type: none"> Strong preference for bottom-up approaches Moderate support for hard-infrastructure solutions Strong preference for changes to local technology Radical Social Change
Description	<p>The status quo of energy sources remains largely the same as current energy production and consumption. While renewable sources of energy are identified, the reliance on fossil fuels is maintained and this energy source is largely viewed to comprise the majority of future energy production. Nuclear energy and fracking of shale gas are deeply opposed to. In terms of interventions, all but local ownership of energy is proposed as favoured methods of approach.</p>	<p>This vision may reflect a ‘middle-ground’ approach whereby fossil fuels and fracking of shale gas are opposed, yet nuclear energy receives moderate support in order to maintain current levels of energy production until further gains in renewable energy are achieved. Interestingly, the “gradual path reduction vision” also reflects the interventions least likely to be preferred by the “continuity vision” and the “deep green vision” – local ownership of energy and tax measures, respectively, neither of which is overly favoured by the Gradual Path Reduction Vision.</p>	<p>It is clear from this vision that traditional methods of producing and consuming energy through fossil fuels are unacceptable. This community also indicated that specific energy sources such as fracking of shale gas and nuclear energy are also not compatible with a view to a sustainable energy system. The “deep green vision” is therefore solely in favour of renewable energy at a national and at a local level.</p>
Where do the Communities Fit?	<p>Stockbridge Dunmanway Secondigliano</p>	<p>Trapieze University student cohort</p>	<p>Gràcia</p>

Figure 2 below ‘maps’ the communities of practice onto a 3 x 3 matrix canvas on the basis of the descriptions presented in Table 1. Three carbon-based categories appear on the x-axis of this canvas, ‘Business-as-usual/Carbon intensive energy future’, ‘Business-as-usual with some decarbonisation’ and ‘Decarbonised

energy future'. Three social categories appear on the y-axis of the canvas, 'Minimal social change', 'Moderate social change', 'Radical social change'.

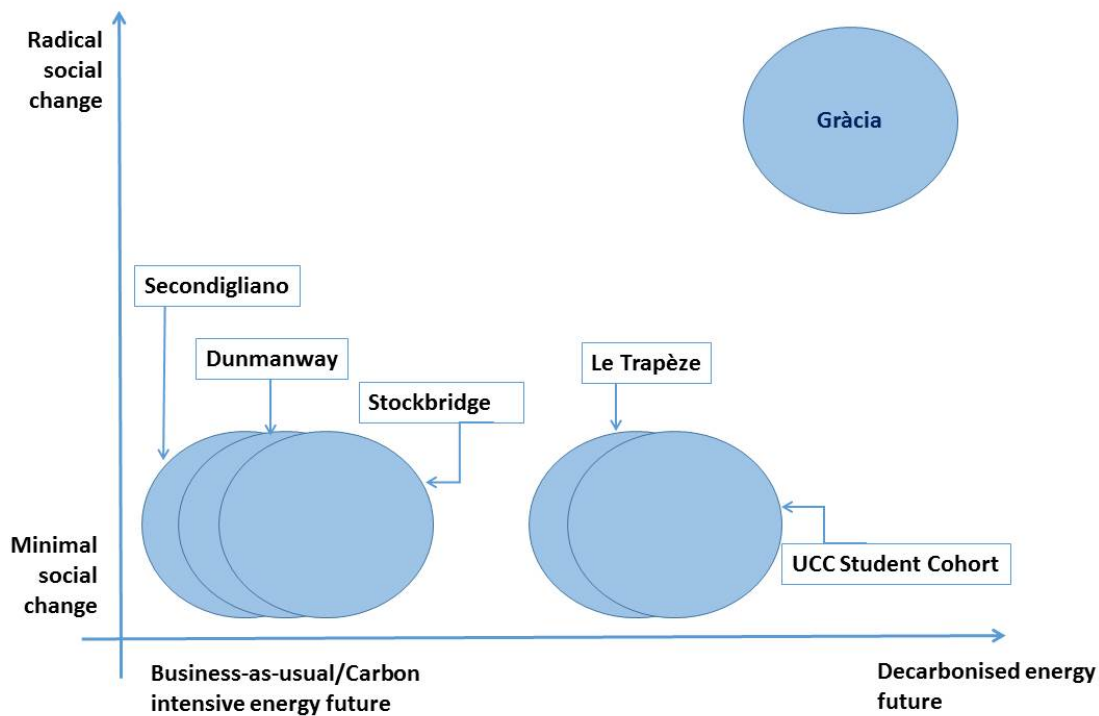


Figure 2: Mapping six communities to 'Transition Visions'

Stockbridge, Dunmanway and Secondigliano are communities most aligned with a business as usual vision, with some support for renewable energy sources but a greater emphasis placed on continuity and current economic development models. In each of these communities, there is very limited support for social change or radical behaviourally focused interventions.

Le Trapèze and the University student cohort appear to have greater appetite for deeper decarbonisation, but as largely middle-class communities, issues of job security, career prospects and costs appear to be afforded greater priority. As with Stockbridge, Dunmanway and Secondigliano, there is not widespread support for radical social change. As the most active community from an activist perspective and with widespread support for low carbon solutions, Gràcia would appear to be the community most aligned with a deep green vision.

One interesting discussion point which emerges from Figure 2 above is the obvious need to engage in a 'transition of ideas' as well as a transition of technology, social practices and organisational models. It is clear that for communities such as Stockbridge, Dunmanway and Secondigliano there is not a widespread awareness that the energy system needs to radically and rapidly change for the purposes of carbon reduction and climate change mitigation. For such a radical and rapid change to occur, it is likely that community visions themselves need to transition to a deeper-green vision such as that favoured by residents of Gràcia.



3.2 Analysis of transition approaches at community level

In terms of low carbon transitions, it is clear that each of these communities has a very different and unique context and that residents are supportive of particular types of transition approaches. It is necessary to identify what the granular level challenges at the community level are and how these might be addressed using for example, innovation approaches (See D6.3). Research suggests that changes at the community level have the largest potential to be scaled-up and have substantial impacts towards low-carbon transitions (Moloney *et al.*, 2010; Mulugetta *et al.*, 2010). However, these changes need to be carefully aligned to the community in question.

In WP5 and WP6, the Shared Socio-economic Pathway Framework (van Vuuren *et al.* 2017; O'Neill *et al.* 2017; Riahi *et al.* 2017) is applied to explore where innovation is required in each of the ENTRUST communities of practice. This is based on the starting assumption that bottom-up and practice-based social innovations need to be incorporated in an integrated manner to achieve the required paradigm shift. To identify innovation needs for each community, an analytical framework was developed based on the Shared Socio-economic Pathway (SSP) concept. The SSPs are a set of five storylines on possible trajectories for human development and global environmental change, which include five different global futures (SSP1-5). The SSPs complement and build upon, existing scenario development frameworks by adding socio-economic narratives and quantitative pathways consistent with the challenges to mitigation of and adaptation to climate change. These scenarios allow exploration of different futures with and without climate policy responses. The different characteristics and main dynamics of each SSP scenario are as follows:

- 1) SSP1: Sustainability;
- 2) SSP2: Middle-of-the-road;
- 3) SSP3: Regional Rivalry;
- 4) SSP4: Inequality;
- 5) SSP5: Fossil fuelled Development (Kriegler *et al.* 2017).

In this deliverable and in D6.3, a qualitative description and identification of where constituent components of the SSPs match the characteristics of the profiled communities serves to highlight where innovations are required. These areas include population growth, energy use, agriculture, urbanisation rates, income and emissions and climate change. For this Deliverable, a spreadsheet was applied to 'map' the constituent components of the SSPs including population size, migration, consumption and diet, land use and environmental policy according to the characteristics of each of the studied communities. Developed SSP profiles outline how the characteristics of the profiled communities match with constituent components of the SSPs and where each community most likely aligns to one of the 5 SSPs.

The developed profiles are then applied to identify where innovation for sustainability is required for each of the communities in a bespoke and community-specific manner. Innovation needs identified from the SSP analysis are collated with appropriately matching innovations from the policy tool-kit presented in D4.4. In addition, community based innovations from the literature are identified and matched with the specific requirements of each of the communities of practice. Mapping in this way allows a granular mapping of



sustainability challenges at the community level and identification of transition supporting innovations which are carefully aligned to the needs of the community in question.

3.3 Identified Community Innovations

Tables 2-4 present an overview of identified innovation needs for each of the six communities of practice. Innovation needs identified from the SSP analysis are collated with appropriately matching innovations from the policy tool-kit presented in D4.4. In addition, community based innovations from the literature are identified and matched with the specific requirements of each of the six communities. presents a summary of analysis to date.

Table 2: Summary of identified innovation priorities for each community

Community	Social/Demographic	Economics/Governance	Technology/Environment:	Overarching Policy Issue(s)
Stockbridge	Equity, Social cohesion, Societal participation & Health	International trade and Institutional strength.	Technology development, Technology transfer and Environment.	Equity; Access to Opportunity Just Transition
Le Trapèze	Social cohesion	Consumption and Diet	Environment	Individualised, high consumption lifestyles
Secondigliano	Health investments, Access to health facilities, water, sanitation and Gender equality.	Economic Growth (per capita), Inequality, Environmental Policy and Policy Orientation	Energy Tech Change, Carbon Intensity, Energy Intensity, Fossil Constraints	Equity; Access to Opportunity Just Transition
Dunmanway	Urbanisation level (linked to lack of population growth).	Economic Growth and Globalisation	Carbon Intensity and Energy Intensity	Economic Growth Decarbonisation
Gràcia	Population Growth and Urbanisation	International trade and Globalisation, Policy Orientation, Institutions and Consumption/ Diet	Carbon Intensity and Energy Intensity	Sustainable Growth Decarbonisation
University student cohort	Urbanisation Level, Urbanisation Type and Equity issues	International trade, Globalization, Policy Orientation, Institutions and Consumption & Diet	Energy Tech Change, Carbon Intensity and Energy Intensity	Economic Growth Decarbonisation

Table 3 presents an overview of targeted innovations for Stockbridge Village, Merseyside, UK. Stockbridge is a community with considerable challenges, particularly on social and economic fronts. Poor health, high unemployment, marginalisation and energy and fuel poverty represent considerable challenges to the community. Five specific innovations are forwarded for Stockbridge (Table 10). Community Energy Projects are deemed of particular importance in the context of this community, with the scope to develop community ‘benefits payments’ mechanisms to address local social issues. In addition, more imaginative use of ICT, for example through local schools could serve to address social cohesion and build invaluable social capital in the community.



Table 3: Targeted Innovations for Stockbridge

	Social / Demographic	Economics / Governance	Technology / Environment
Broad Trend – Identified Innovation Needs	Equity, Social cohesion, Societal participation & Health	International trade and Institutional strength	Technology development, Technology transfer and Environment
Innovations - D4.4:	Initiating thermal refurbishments in buildings		<i>Enabling green energy self-consumption</i>
Other Potential Community Innovations:	Use of ICT to link schools for community cohesion (Austin <i>et al.</i> 2015)	Grassroots community innovation for sustainability (Seyfang <i>et al.</i> 2014), <i>e.g.</i> , Community Energy Projects (Martiskainen 2017)	
	Community ‘benefits payments’ from Energy Projects (Kerr <i>et al.</i> 2017)		

Table 4 below presents an overview of targeted innovations for Le Trapèze. While the project of Le Trapèze has been designed to optimise its ecological and environmental goals through best practice approaches in the built environment, the community faces challenges in developing social cohesion and in fostering a community identity. As with other communities, Community Energy Projects are deemed important and appropriate to the community in Le Trapèze. Innovation on the social domain could include use of community heritage or history projects to develop community identity and social cohesion. In addition, as the community is relatively prosperous, environmental issues are strongly linked to consumption patterns, particularly in view of the relatively environmentally friendly nature of the built environment. Community partnerships in healthy eating and lifestyle promotion therefore potentially represent an innovation to address unsustainable consumption as well as issues with social cohesion in this community.

Table 4: Targeted Innovations for Le Trapèze

	Social / Demographic	Economics / Governance	Technology / Environment
Broad Trend – Identified Innovation Needs	Social cohesion	Economic Growth	Environment and Consumption and Diet
Innovations - D4.4		Enabling green energy self-consumption	
Other Potential Community Innovations:	Use of ICT to link schools for community cohesion (Austin <i>et al.</i> 2015)	Grassroots community innovation for sustainability (Seyfang <i>et al.</i> 2014), <i>e.g.</i> , Community Energy Projects (Martiskainen 2017)	
	Use of community heritage / history projects to develop community ethos and identity (Cauchi-Santoro 2016).	Community Citizen Science Projects on Environment, consumption and Diet (Aristeidou <i>et al.</i> 2017) Community partnerships in healthy eating and lifestyle promotion (An <i>et al.</i> 2017)	



Table 5 below presents an overview of targeted innovations for Secondigliano. There are significant environmental issues in Secondigliano, especially related to waste management, directly attributable to deficiencies in infrastructure provision and governance /institutional weaknesses. Economic growth remains very clearly fossil fuel driven in this community. Therefore, and as with other communities, Community Energy Projects are deemed important and appropriate to the community in Secondigliano, coupled with community benefits payment mechanisms to address local social issues. Secondigliano, along with Stockbridge and Dunmanway is very much in need of investment in infrastructure development and upgrade. For this reason, a large-scale urban retrofit programme with goals of energy reduction and improved residential thermal comfort is appropriate for Secondigliano. On the social domain, *Regular Community Health Fairs* represent a cost-efficient innovation for dissemination of preventive services to vulnerable populations and would seem to be especially suitable for the community in Secondigliano. In addition, financial support schemes for local female entrepreneurs could begin to address economic development and gender inequality problems locally.

Table 5: Targeted Innovations for Secondigliano

	Social / Demographic	Economics / Governance	Technology / Environment
Broad Trend – Identified Innovation Needs	Health investments, Access to health facilities, water, sanitation and Gender equality	Economic Growth (per capita), Inequality, Environmental Policy and Policy Orientation	Energy Tech Change, Carbon Intensity, Energy Intensity, Fossil Constraints
Innovations - D4.4:		Initiating thermal refurbishments in buildings	Enabling green energy self-consumption Reducing electricity usage through smart technologies
Other Potential Community Innovations:	Regular Community Health Fairs (Health fairs are a cost-efficient platform for dissemination of preventive services to vulnerable populations) (Opperman <i>et al.</i> 2017)	Grassroots community innovation for sustainability (Seyfang <i>et al.</i> 2014), <i>e.g.</i> , Community Energy Projects (Martiskainen 2017)	
		Large Scale Urban Retrofit Programmes (<i>e.g.</i> , investing in cross-cutting strategies to reduce exposures harmful to health and to establish conditions that support healthful daily practices (Miller <i>et al.</i> 2011)	
	Financial support mechanisms for female innovators (Fhlatharta & Farrell 2017) Community ‘benefits payments’ from Energy Projects (Kerr <i>et al.</i> 2017)		

Table 6 below presents an overview of targeted innovations for Dunmanway. Dunmanway, like many rural communities across Europe is faced with challenges of depopulation, an aging resident population, changing land use patterns, shrinking local employment opportunities, along with the homogenising influence of multinational retail and the inability of local business to compete. It is a highly car-dependent community, owing to poor public transport infrastructure and as a result, is a very carbon and energy intensive



community. Therefore, and as with other communities, Community Energy Projects are deemed important and appropriate to the community in Dunmanway. In addition, transport related innovations from D4.4 are deemed to be especially appropriate for Dunmanway. Infrastructure in the form of Rural Broadband and ICT infrastructure are deemed as essentials for economic functioning and resilience for Dunmanway.

Table 6: Targeted Innovations for Dunmanway

	Social / Demographic	Economics / Governance	Technology / Environment
Broad Trend – Identified Innovation Needs	Urbanisation level (linked to lack of population growth)	Economic Growth and Globalisation	Carbon Intensity and Energy Intensity
Innovations - D4.4:	Increasing the purchase and use of electric vehicles Increasing the practice of car sharing Encouraging automobiles commuters to carpool	Initiating thermal refurbishments in buildings	Enabling green energy self-consumption Reducing electricity usage through smart technologies
Other Potential Community Innovations:		Grassroots community innovation for sustainability (Seyfang <i>et al.</i> 2014), <i>e.g.</i> , Community Energy Projects (Martiskainen 2017)	
	Rural Broadband and ICT infrastructure as essentials for economic functioning and resilience (Roberts <i>et al.</i> 2016)		

Table 7 below presents an overview of targeted innovations for Gràcia. Demographically, there are a lot of families in the area with the population populated in the majority by middle class professionals. However, home ownership remains a challenge in Gràcia. While there is a tradition and practice of community group organisation in Gràcia, this potential remains largely untapped when it comes to sustainable energy practices. As with other communities, initiating thermal refurbishments in buildings, enabling green energy self-consumption and Reducing electricity usage through smart technologies are deemed important. However, it would appear that split incentives remain as a significant barrier to more extensive uptake of these innovations. For this reason, measures to address the split incentive issues at the community level are important innovations to prioritise. In addition, the rapid gentrification of the area poses long term sustainability challenges, especially in the social domain. Community level measures to tackle this issue are deemed appropriate.



Table 7: Targeted Innovations for Gràcia

	Social / Demographic	Economics / Governance	Technology / Environment
Broad Trend – Identified Innovation Needs	Population Growth and Urbanisation	International trade and Globalisation, Policy Orientation, Institutions and Consumption/ Diet	Carbon Intensity and Energy Intensity
Innovations - D4.4:	Initiating thermal refurbishments in buildings		Enabling green energy self-consumption Reducing electricity usage through smart technologies
Other Innovations	<p>Innovation to address split incentive issue at building level <i>e.g.</i>, carefully designed program of incentives for participants (including landlords) in conjunction with a unique type of utility-managed on-bill financing mechanism, as described by (Bird & Hernández 2012) has significant potential to solve many of the complications.</p> <p>Local innovations to address problems of gentrification: (Lees & Ferreri 2016) report three innovations which may be applicable in the Gràcia context: (i) local civil society network organising to support open master planning through active engagement with planning; (ii) self-organised activities to keep the estate open and accessible during the displacement of its residents; and (iii) legal challenges to the compulsory purchase order</p>		

Table 8 below presents an overview of targeted innovations for the University student cohort. The student community shows a very noteworthy increase in commuting from students from outside of the city to attend University. This increase in commuting can be attributed to the economic down-turn, cost of housing *etc.*, with many students electing to remain at home with parents rather than navigate the high-cost housing market. This feature is deemed of most immediate significance in terms of targeting sustainability related innovations for the University student cohort. Transport related innovations identified in D4.4 are deemed appropriate for the student cohort, including Increasing the purchase and use of electric vehicles; Increasing the practice of car sharing and Encouraging automobiles commuters to carpool. In addition, regional improvement in broadband levels would enable and facilitate on-line learning and reduce the imperative for daily on-campus attendance.



Table 8: Targeted Innovations for University student cohort

	Social / Demographic	Economics / Governance	Technology / Environment
Broad Trend – Identified Innovation Needs	Urbanisation Level, Urbanisation Type and Equity issues	International trade, Globalization, Policy Orientation, Institutions and Consumption & Diet	Energy Tech Change, Carbon Intensity and Energy Intensity
Innovations - D4.4:	Increasing the purchase and use of electric vehicles Increasing the practice of car sharing Encouraging automobiles commuters to carpool		Behaviour Change for Energy Reduction Reducing electricity usage through smart technologies
Other Innovations:			Rural Broadband and ICT infrastructure as essentials for economic functioning and resilience (Roberts <i>et al.</i> 2016)

4 Development of principles for a fair and inclusive energy transition

4.1 Energy as a public good: towards a fair and inclusive energy sustainability model

One of the areas that has been relatively underdeveloped in current debates about energy transitions relates to energy system governance and the potential implications for the way in which transitions can considerably change the way in which energy is managed as a public good (Chilvers & Longhurst 2016). In fact, recent research broadens this debate by suggesting that energy demand systems are more influential for leading transitions than energy supply systems (Grübler 2012). These new paradigms have turned conventional understandings of energy system change on its head. As common assumptions were based on the notion that large scale energy supply systems were the main driver of energy transitions. Furthermore, in terms of working towards a vision of energy sustainability, equity has come to represent one of the core pillars for achieving sustainability in consonance with environmental and economic sustainability (Ringrose 2017). Understanding and meditating on end-user needs and requirements is therefore a critical component of a successful energy transition towards a more sustainable model.

Developing an underlying basis that establishes core guidelines concerning the manner in which different actors involved in the governance of the energy system consider the social implications of their actions and decisions is essential. The principal context for developing principles for a fair and inclusive energy transition is grounded on the realisation that energy transition is confronted with many social and technical problems. Indeed, previous studies have shown that these limitations have considerably slowed down the pace of energy system transitions. Most significantly, a number of social and political questions remain unanswered,



which can have serious repercussions for the way energy users relate to energy in the future. For instance, is it possible that alternative energy production and consumption systems will result in new forms of exclusion and poverty? What is the fairest means to achieve responsible energy consumption? What is the role of place and community in mediating and protecting individuals from potential impacts of energy system change? How can we ensure equal voice and empowerment regardless of gender, age or socio-economic status?

While there are no universal solutions and answers to these questions, there are a number of core ideas which could promote a fairer and more inclusive vision for the future of the energy system. Developing a set of expert sanctioned principles helps establish critical standards which will ensure that energy transition and development evolves in consonance with adequate systems of governance which are underscored by a concern to promote equity and inclusion. Within a context of change and uncertainty the consensus driven process promoted by the Delphi-panel helps refine and validate the development of key principles. Principles are useful ways for establishing common standards relating to matters, which are usually complex and require guidance with respect to the development of formal and informal governance systems, laws and behavioural norms (UN Global Compact 2016). The principles developed by the Delphi-panel are complementary to the Bellagio Principles, which have established a broader strategy for assessing progress toward sustainable development (Pediaditi *et al.* 2010; Cundy *et al.* 2013). The aim of the Delphi-panel exercise overall is to reach interdisciplinary consensus amongst academic experts from different areas with regards core principles to help support a fair and inclusive energy transition pathway in Europe. In this context, they enhance the criteria established by the Bellagio principles by making them context specific regarding energy transition trajectories with a specific focus on developing a more holistic approach that takes into consideration the adequate engagement and participation at grassroots level.

In total ten principles have emerged from the Delphi-panel exercise conducted by the ENTRUST team and each principle is discussed individually in terms of the level of agreement received by the panel members and the core comments and complementary suggestions made. The feedback offered by the panel is valuable and helps ensure each principle is interpreted and employed correctly. It was not possible to reach consensus in one of the principles (Principle 9) and the concluding list includes nine revised principles as opposed to the ten considered by the Delphi-panel.

4.2 Principle 1: inclusive communication and engagement


All institutions promoting energy transitions should establish well devised channels of communication, social engagement and inclusive dialogue

Principle 1 is largely concerned with ensuring that institutions promoting energy transitions have a set of well-devised communication channels that facilitate social engagement and inclusive dialogue. This seeks to mediate against overly tiered and technocratic forms of communication within institutions, which often present barriers for the public to interact and engage with energy transition issues. The consensus rate relevant to this principle was high and during the 1st round iteration of the Delphi-panel survey, eight out of nine expert participants agreed with including this principle in the final list.



Table 9 below demonstrates that eight expert respondents agreed with the principle, while only one participant requested re-framing. All participants agreed that the guiding ideas framing this principle were important and that it would lead not just to higher levels of participation but it would enhance transparency and project effectiveness. However, two participants offered a more critical analysis of this principle and noted that there are three key elements distinguishable in this principle. These are: i) channels of communication; ii) social engagement and; iii) inclusive dialogue. In this context, one of the experts added that while the principal is relevant there are many challenges in terms of delivering on these aspirational goals, which include budgetary and resource constraints. In particular the expert added, these challenges are more poignant when considering the third aspect included in this principle (*i.e.*, inclusive dialogue) which is seen by this expert as the least developed of these three elements. Furthermore, it was also noted that there should be more methods made available to help institutions promote engagement and dialogue. This in essence highlights the difficulty in putting into practice a communication strategy and stresses the need for adequate tools to support future communication, social engagement and inclusive dialogue practices. Consequently, while some of the experts agreed with Principle 1 they also added a cautionary note. Mainly, experts highlighted that although engagements are important it is critical that these have a meaningful purpose and that this is identified and communicated in a clear, easy to understand and tangible manner.

Table 9: Principle 1 – Summary of expert feedback

	Principle	Feedback
1st Iteration	All institutions promoting energy transitions should establish well devised channels of communication, social engagement and inclusive dialogue	<div style="text-align: center;"> <p>8</p>  <p>Agree Disagree Re-frame</p> </div>
2nd Iteration	<i>n/a</i>	
3rd Iteration		

The single request for re-framing this principle derived from the rationale that because there are three distinct elements included in this principle, they should be separated as they can suggest different options and different strategies. One possible alternative suggested was to add two additional principles to cover each element independently. After further analysis of the finding this alternative was not pursued because i) there was an overall agreement around this principle in general and ii) elsewhere other principles enhance and complement these guidelines. There were no further additions after the first iteration of the Delphi-panel.



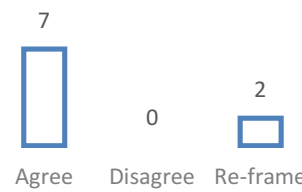
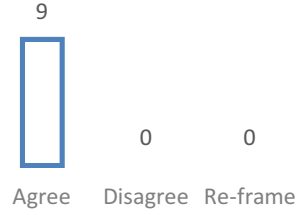
4.3 Principle 2: equity of participation

All civic and public spaces involved in energy system transition dialogues should provide a stage for participation based on equality in terms of gender, social background and socio-economic status

To ensure wider participation it is often necessary to spell out specific criteria that recognises difference and is mindful of pervasive discrimination and marginalisation processes. There is often a tendency to homogenise public and community voice. This is problematic as it reduces and absorbs a large set of experiences by focusing on those that are most visible. For instance, having a gender-biased space of participation is still a common concern in many areas of policy, including energy transitions policy. This principle seeks to address this common problem by highlighting the need to ensure that spaces for participation are based on equality in terms of gender, social background and socio-economic status. By stating, in Principle 2, these three common areas of bias and discrimination the principle strongly suggests that active steps should be taken to recognise and assume that difference is the norm rather than the exception.

As table 10 below illustrates, in the first iteration of the Delphi-panel survey seven expert participants agreed with the principle and two asked that the principle be re-framed. Expert participants in general supported the principle but some of the participants added that social difference may extend to other areas and that these should perhaps be highlighted as well. Namely, that discrimination is also felt in terms of cultural background, disability, religious diversity and that it could be problematic to identify some aspects while leaving others out. In terms of the first iteration of this principle, there were also some comments offered regarding the examples provided on the type of stages of participation that this principle might apply. Examples were given to help contextualise the types of spaces of participation where it could be necessary to include these equality criteria. The examples included were typical forms of statutory engagements with the wider public such as consultation campaigns and local committees. One expert participant suggested that giving examples and adding these to the principle could constrain the manner in which the principle is interpreted. While another participant noted that these examples are valuable but suggested that these illustrative examples are best suited as complementary information. Two expert participants (while they agreed with the principle) debated the merit of 'giving equal voice to those who are less knowledgeable'. The first participant offered the view that 'being experts on their own lives' provided valuable information which is crucial for grasping public attitudes and behaviours towards energy transitions. The second expert participant highlighted that an alternative perspective on this issue could be considered in terms of focusing on high impact groups such as large corporations rather than centring participation and transition dialogues based on an end-user perspective. This participant illustrates the point by noting that recent 'leave it in the ground' approaches considerably change the emphasis on individual energy behaviours and places greater weight to corporate action regarding further investments in fossil fuel companies.

Table 10: Principle 2 – Summary of expert feedback

	Principle	Feedback
1 st Iteration	All civic spaces involved in energy system transition dialogues should strive for equality in terms of gender, age, social background and socio-economic status (e.g. consultation campaigns, establishment of local committees, etc.)	 <p>7 0 2</p> <p>Agree Disagree Re-frame</p>
2 nd Iteration	All civic and public spaces involved in energy system transition dialogues should provide a stage for participation based on equality in terms of gender, social background and socio-economic status.	 <p>9 0 0</p> <p>Agree Disagree Re-frame</p>
3 rd Iteration	n/a	

Principle 2 was re-framed or rather re-worded to ensure greater clarity in terms of the ideas being suggested. After these minor improvements, all expert participants agreed to include the principle in the final list.

4.4 Principle 3: monitoring and accountability

Accountability and monitoring mechanisms should be included in all new energy projects, which include regular evaluation of citizen complaints, feedback from energy users and regular reports that demonstrate how citizen complaints and comments have been addressed.

The Bellagio Principles set forth a range of guiding elements with a particular focus on monitoring assessing and evaluating progress as it pertains to sustainable development (Cundy *et al.* 2013). Principle 3 enhances these core ideas, which focus on the need to assess progress by adding the notion that accountability mechanisms should be a key element within these strategies. The focus on end-user feedback also highlights the need to rely on external measures of assessment rather than developing more insular and internal criteria, which omits to consider progress from the perspective of end-users. The regularity of these evaluations is also noted as an important element and it speaks of the need to address any issues in a timely manner. It is further noted that these assessments need to be proactive in order to avoid adopting a remedial stance by over relying on complaints as a driver for improvements.

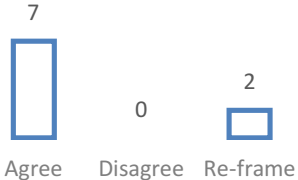
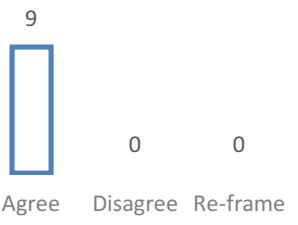
Overall, there was general consent by expert participants over Principle 3. As Table 11 below demonstrates seven out of nine participants agreed with the principle on the first iteration of the Delphi-panel and only two participants requested a further re-framing of this principle. Those in agreement highlighted that this is an ‘important aspect of the feedback loop’ as it ensures ‘proper treatment and consideration of feedback’. Another expert participant noted that it is vital that people and ‘especially vulnerable people’ know who is accountable and whether they themselves are accountable. Enhancement of this principle, as it was reflected



in the second iteration, focused on the need to highlight adequate treatment of feedback provided by end-users. For this reason, further elements were added to this principle which focus on the need to ‘demonstrate how citizen complaints and comments have been addressed’.

In more practical terms what most participants stressed in different ways was that it should be visible and measurable how feedback and evaluations are addressed and furthermore that this information is made available in an open and transparent manner. Similar to Principal 1 there were calls for the development of appropriate and practical methodologies that will enable the implementation of this principle using well-developed and tested methodologies. One participant further suggested that independent watchdog organisations are the way in which to ensure this important principle is adhered to. In the second iteration of the Delphi-panel all nine expert participants agreed with the principle.

Table 11: Principle 3 – Summary of expert feedback

	Principle	Feedback
1 st Iteration	Accountability mechanisms should be included in all new energy projects, which include regular evaluation of citizen complaints and feedback from energy users.	 <p>7 0 2 Agree Disagree Re-frame</p>
2 nd Iteration	Accountability and monitoring mechanisms should be included in all new energy projects, which include regular evaluation of citizen complaints, feedback from energy users and regular reports that demonstrate how citizen complaints and comments have been addressed.	 <p>9 0 0 Agree Disagree Re-frame</p>
3rd Iteration	n/a	

4.5 Principle 4: future-proofing

All new energy production and consumption projects and policies should be future proofed. This evaluation must include a long-term feasibility and contingency strategy.

There is a temporal component to the promotion of energy transition projects and policies, which needs to be carefully acknowledged. Particularly because it is often not easy to foresee the level of impact that certain projects might have both directly and indirectly. However, it is essential that projects are considered both in terms of long term and short-term projections. Additionally, it can be the case that these short and long-term goals maybe be inconsistent or incompatible. For instance, sustainability strategies are strongly influenced by political and electoral cycles, which considerably influence the timing and consistency of policy trajectories. In terms of sustainability and equity exploring future impacts and dynamics is highly important as it ensures that strategies include targeted projections which are well understood and adequately







communicated. Furthermore, future proofing works towards achieving continuity and stability in the process of new energy project implementation.

While there was general agreement regarding the key ideas underpinning Principle 4, the comments made during the first iteration of the Delphi-panel highlight a common concern with regards the validity of these projections in the face of high levels of uncertainty concerning the future. As Table 12 below demonstrates in the first iteration of the survey seven expert participants agreed with principle while two participants requested that this principle be re-framed. There were numerous comments regarding what social and environmental dimensions should be included in this evaluation process. Two of the respondents stressed that climate change and population growth are key elements to consider. However, from a practical perspective some experts raised concerns by noting that there is a high degree of uncertainty and lack of agreement concerning the best means to evaluate what can be a highly subjective conception of ‘the future’. Nonetheless, most participants were in agreement and suggested some practical devices for addressing evaluations of the future. Suggestions included that results of these evaluations are presented in scenario format and furthermore that contingency plans are incorporated into this process.

There were slight alterations to Principle 4 based on the comments (see Table 12 below) and in the second iteration of the Delphi-panel a re-worded version of the principle was proposed. There was greater agreement with this principle and there was only one re-quest to slightly shorten the wording of the principle. Based on these comments a final version of this principle was re-drafted with confidence that there is robust consensus in terms of including Principle 4 in the final iteration list.

Table 12: Principle 4 – Summary of expert feedback

	Principle	Feedback
1st Iteration	All new energy production and consumption projects and policies should be future proofed.	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">7  Agree</div> <div style="text-align: center;">0 Disagree</div> <div style="text-align: center;">2  Re-frame</div> </div>
2nd Iteration	All new energy production and consumption projects and policies should be future proofed. This evaluation must include a strategy to address any expected shortcomings or impacts as well as have a long-term feasibility strategy	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">8  Agree</div> <div style="text-align: center;">0 Disagree</div> <div style="text-align: center;">1  Re-frame</div> </div>
3rd Iteration	All new energy production and consumption projects and policies should be future proofed. This evaluation must include a long-term feasibility and contingency strategy.	




4.6 Principle 5: energy poverty mitigation

Energy poverty mitigation strategies should be integrated into new energy projects

Principle 5 received overwhelming agreement between all expert participants. The principle overall indicates that all new energy projects should include an energy poverty mitigation strategy. The high level of support for this principle indicates the well-established understanding that energy poverty is a critical issue to consider in new forms of energy supply and consumption. It is becoming increasingly accepted in academic circles that energy transitions may lead to new processes of exclusion, which culminates in new experiences of energy poverty. For instance, one of the expert participants agreed with the principle and offered the point that many retrofitting programmes have had negative effects on tenants. Another expert participant also illustrated instances of exclusion by noting that both energy projects and energy policies should consider this principle in order to ‘ensure that subsidising PV does not lead to the poor further subsidising the wealthy’. There was some debate in terms of the relevance of this principle in more developed regions. Two expert participants noted that this issue may be more relevant in some countries and less in others. For instance, from an Irish context perspective two of the expert participant stated that this is not a critical issue for Ireland in comparative terms. Overall, our academic panel accepted this trend and while there were some concerns with how this can be implemented in practice all nine expert participants agreed with the principle without further re-framing (please see Table 13 below). The main concerns highlighted were: Practical implementation of this principle; Social class divides and power struggles. One suggestion to help implement this principle was proposed which entailed the development of pilot strategies to adequately evaluate process and outcomes ahead of large scale project implementation.

Table 13: Principle 5 – Summary of expert feedback

	Principle	Feedback
1 st Iteration	Energy poverty mitigation strategies should be integrated into new energy projects	<div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;"> <p>9</p>  <p>Agree</p> </div> <div style="text-align: center;"> <p>0</p> <p>Disagree</p> </div> <div style="text-align: center;"> <p>0</p> <p>Re-Frame</p> </div> </div>
2 nd Iteration	n/a	
3 rd Iteration		

4.7 Principle 6: precautionary approach to social and environmental impact

All energy projects should adopt a precautionary approach in terms of possible social and environmental harms.

The precautionary principle as it is applied to new energy projects highlights the significance of equity from an intergenerational perspective. It also highlights the fact that potential harmful outcomes should be addressed whether or not significant scientific evidence exists to understand the full extent of these potential




harms. This idea is closely linked with Principle 4, which established the necessity to future proof new energy projects. However, the guiding idea here is that even in the face of uncertainty regarding the future and the specific risks associated with the development of new projects, if there is the potential of a significant threat, proactive measures should be prioritised. Seeing that fossil fuel energy is closely linked with climate change, measures to prevent and mitigate against these adverse effects should be an essential element in this principle. Additionally, this principle also brings into focus the procedural way in which decisions are made in the face of uncertainty. Namely who judges what levels of threat are acceptable and what degree of certainty is necessary before decisions are made. Inclusive stakeholder deliberations are often an answer to these procedural dilemmas especially when there are obvious limitations in terms of existing scientific evidence.

As Table 14 below demonstrates all expert participants agreed with Principle 6 in the first iteration of the Delphi-panel and no further changes to the principle were requested or carried out. A few comments were offered which highlight that this is a welcome and well-established principle, which should be included for the purposes of promoting equity and inclusivity with regards sustainable energy transitions. However, one expert participant noted that the practical application of the precautionary principle has ‘often been undermined by powerful (business) interests across a range of environmental policy areas’ and that ‘monitoring’ the use of the precautionary principle is essential. Another participant added that it ‘likely more difficult to anticipate [and] quantify/assess the social harms’

Diversification of risk as they pertain to energy transition is a suggestion made by one of the participants in terms of applying this principle in practice.

Table 14: Principle 6 – Summary of expert feedback

	Principle	Feedback
1 st Iteration	All energy projects should adopt a precautionary approach in terms of possible social and environmental harms.	<div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;"> <p>9</p>  <p>Agree</p> </div> <div style="text-align: center;"> <p>0</p> <p>Disagree</p> </div> <div style="text-align: center;"> <p>0</p> <p>Re-Frame</p> </div> </div>
2 nd Iteration	n/a	
3 rd Iteration		

4.8 Principle 7: inclusivity in energy projects

Citizen inputs should be solicited using inclusive participatory procedures, integrated into the process of initial conception, planning, implementation and evaluation of energy projects

Principle 7 is a core idea in terms of ensuring that inclusivity is reflected in all energy projects in a meaningful way. It also offers a breakdown of different stages where participation should be taking place. Oftentimes, participatory procedures either are staged as single events detached from the process of project development or are carried out at times where input is no longer viable. Thus, different opportunities, which



follow more closely the process of project development, is an important factor to address. Participation at different stages also encourages more organic forms of participation, which might not necessarily align with scheduled events.

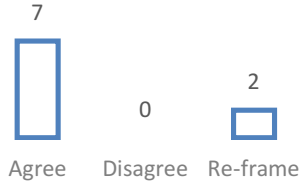
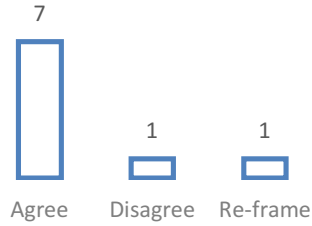
Because citizen engagement and participation has been poorly handled in the past, problematic patterns of participation have emerged. In particular, there are growing concerns regarding participation as a tokenistic practice with little influence or benefit for those involved as well as participation as a form of transfer of responsibilities from state to community level. These can produce new demands for community involvement or engagement in a process, that is not always transparent or indeed fair. The emphasis on inclusive participatory procedures is thus highlighted as a means of distinguishing between more superficial citizen engagement procedures and practice that is more meaningful. For instance, public consultation is often a term largely associated with tokenistic engagements while emerging engagement fora such as citizen juries imply and much deeper form of engagement.

Overall, there was agreement over the ideas framing the principle as well as the general way, which the principle was articulated. As table 15 below demonstrates in the first iteration of the Delphi-panel seven out of the nine expert participants agreed with the principle. Where participants asked to re-frame the principle two main issues were highlighted. For one, it was noted that this principle has many similarities with Principle 1 and that these two principles could perhaps be merged. Secondly, it was noted that the initial stages of a project are vital in terms of inclusive input and therefore initial conception and planning stages should be added to the stages of which participatory procedures should take place. Because there was general consensus offered over the merit of having Principle 7 as a stand-alone principle the suggestion to merge these ideas with Principle 1 were not carried. There was some re-framing of the principle which specifies a series of stages, where participation is important in the project development process and these were subject to a second review in the 2nd round iteration of the Delphi-panel.

Results from the second iteration of the Delphi-panel show that revisions to this principle were less successful. As table 15 below demonstrates there was little progress in terms of improving consensus rates for this principle. Indeed, there were still two participants not fully agreeing with the principle and in fact one of these participants disagreed with the principle overall. The rationale for disagreeing with the principle was that the citizens body might not be the most 'appropriate collective for informing large energy project decisions' and whether this is best suited as a government role. This idea represents a fundamental problem in terms of governance practices whereby there are stances, which see the government as the central stakeholder in overseeing and commenting on these large-scale matters while there is a growing view that governance must extend and promote influence beyond government bodies to include local and grassroots stakeholders. Because there was, over 70% agreement on the merits of adopting a more inclusive approach there is no revision of the principle based on this rejection from round two of the Delphi-panel.



Table 15: Principle 7 – Summary of expert feedback

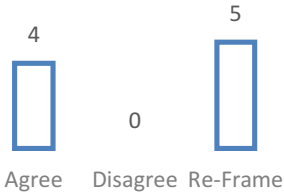
	Principle	Survey Results
1 st Iteration	Citizen inputs should be solicited using inclusive participatory procedures and integrated into the process of development and implementation of energy projects	 <p>7 0 2</p> <p>Agree Disagree Re-frame</p>
2 nd Iteration	Citizen inputs should be solicited using inclusive participatory procedures, integrated into the process of initial conception, planning, development and implementation of energy projects	 <p>7 1 1</p> <p>Agree Disagree Re-frame</p>
3 rd Iteration	Citizen inputs should be solicited using inclusive participatory procedures, integrated into the process of initial conception, planning, implementation and evaluation of energy projects	

4.9 Principle 8: consistency of policies

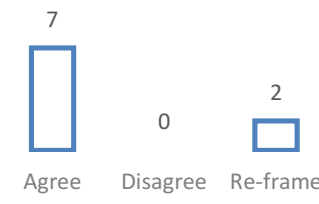
Policies seeking to reduce or change end-user energy practices should strive to be consistent with existing structural and social conditions and short and long-term adaptability strategies. Proactive measures should be taken to overcome major barriers.

Behaviour change policies have gained considerable traction in terms of energy transition policies. From calls to reduce energy consumption at household level to campaigns to counter current mobility and transportation practices. Many of these practices however are closely tied and aligned with a range of external factors and cannot be reduced to a matter of choice by individual consumers. In other words, there is a complex range of prerequisites which guide and discipline behaviour. Understanding the conditions that enable change with regards more problematic energy practices and behaviours is the only way to adopt a more holistic and realistic approach. Energy behaviour is thus a component within the energy system and the links that have shaped collective behaviours are best understood if correctly situated within this bigger picture dynamic.

Table 16: Principle 8 – Summary of expert feedback

	Principle	Survey Results
1 st Iteration	To ensure against unfair impositions on the public, energy behaviour change policies should strive to be consistent and coherent with short and long-term adaptability strategies.	 <p>4 0 5</p> <p>Agree Disagree Re-Frame</p>



	Principle	Survey Results
2nd Iteration	Policies seeking to reduce or change end-user energy practices should strive to be consistent and coherent with existing structural and social conditions as well as adequately linked to short and long-term adaptability strategies.	 <p>7 0 2</p> <p>Agree Disagree Re-frame</p>
3rd Iteration	Policies seeking to reduce or change end-user energy practices should strive to be consistent with existing structural and social conditions and short and long-term adaptability strategies. Proactive measures should be taken to overcome major barriers.	

As Table 16 above demonstrates initial consensus rates for this principle in the first iteration of the Delphi panel survey were low. Five out of the nine participants requested the principle to be re-framed while only four agreed to carry the principle with no further changes. One of the main issues highlighted was that the message conveyed in this principle was vague. There was also a comment, which highlighted the point that there is need here to have an evaluation component ‘by the intended targeted audiences’ so that it is well understood how strategies may be finding resistance either through lack of structural and social conditions.

Another participant added a cautionary note by pointing out that there is a crucial dilemma between having to ‘respect the pace for societal change’ and meeting the ‘urgent need to transition quickly’. Further to these comments a revision of the principle was carried out. Results from the second iteration of the Delphi-panel regarding this principle suggest that revisions were largely positive and the consensus rate was much higher with seven out of nine participants agreeing with the way in which this principle was put forth.

One of the participants that requested the principle to be re-framed in the second round noted (similarly to the comment above) that the there is a problematic component guiding this principle which ‘induces acceptance of status quo’ and leads to no further ‘motivation for change with explicit actions and procedures’. To address this concern an additional sentence was added to the principle which stipulates the need to undertake proactive measures to address any barriers to behaviour change.

4.10 Principle 9: community involvement and ownership

Local societal impact of energy generation projects should be offset by normalising community ownership and deepening the application of local social dividends

Principle 9 was the most divisive from the list provided in the Delphi-panel and despite the two rounds of the Delphi-panel survey, acceptable consensus rates for this principle could not be reached. For this reason, this principle will not be included in the final list of principles coming out of this exercise.

Community ownership has gained increased interest around Europe as nation states seek to stimulate the uptake of new technologies and reduce local resistance to the development of new technologies with varying degrees of impact for urban and rural neighbourhoods (Walker 2008). Offsetting some of the impacts of energy production through community ownership models is a key idea often associated with these types of strategies. Furthermore, community ownership could also lead to the promotion of smaller-scale and lower-

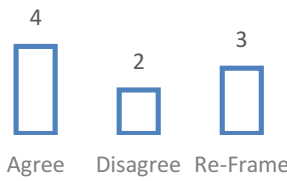



impact projects. These ideas have gained increased currency in policy circles. However, there are significant disparities within Europe regarding the promotion of community ownership as a model of energy system sustainability. For this reason, the conditions, which could allow energy generation projects to become more adequately embedded in the localities where energy is extracted and produced, are underdeveloped. There are a number of difficulties in promoting this form of energy ownership and it is perhaps unsurprising that Principle 9 has meet with several objections. Some of the objections highlighted include:

- Difficulty in choosing adequate forms of compensation and offsetting (beyond monetary compensation)
- Commodification and marketisation of social needs
- Financial discourses side-stepping political questions
- Difficulty of implementation
- Emphasis on meaningful participation rather than ownership

One of the participants offers further commentary by illustrating the point with an example: *‘Imagine two different communities facing the same problem local impact of an energy generation project; one community is economically vulnerable and the other is well-off. The first one is more likely to accept the burden of the energy project than the second one, for obvious reasons. This however reproduces the kind of environmental injustice that we are seeing everywhere’*. Table 17 below demonstrates that the rates of consensus regarding this principle remain very low.

Table 17: Principle 9 – Summary of expert feedback

	Principle	Survey Results
1 st Round Iteration	Local impact of large scale energy generation projects should be offset by deepening local social application of social dividends and community ownership	 <p>4 2 3</p> <p>Agree Disagree Re-Frame</p>
2 nd Round Iteration	Local societal impact of energy generation projects should be offset by normalising community ownership and deepening the application of local social dividends	 <p>4 0 5</p> <p>Agree Disagree Re-frame</p>
Final Iteration	n/a	

4.11 Principle 10: consumer protection

Adequate measures should be devised and enforced to protect consumers from unforeseen financial liabilities and other drawbacks arising from large-scale projects

Principle 10 was not part of the initial list of principles set out and put forth for feedback in the first iteration of the Delphi-panel. As discussed in the methodology there was an option at the end of the first iteration of

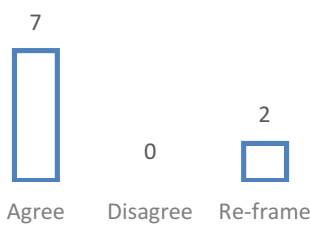


the Delphi-panel for the participants to make a suggestion for alternative principles. Only one of the participants suggested a principle, which relates to consumer protection measures.

The merits of greater consumer protection measures can be understood by the fact that energy transition as they bring new energy production and consumption models represent a considerable risk to the consumer (Monast & Adair 2013). While there are consumer laws and regulations these transitions require a level of monitoring and regulatory refinement which is often lacking. Nation states have a critical role in overseeing that consumer rights are upheld, however increasing delegation to different organisations and agencies has often led to regulatory laxity.

Overall, there was substantial agreement to include this principle in the final iteration. As the table 18 below demonstrates seven participants agreed with the principle while two participants asked that the principle be re-framed including the participant that initially suggested Principle 10. The main objection related to the fact that there is usually already consumer protection legislation in place.

Table 18: Principle 10 – Summary of expert feedback

	Principle	Survey Results
1st Round Iteration	n/a	
2nd Round Iteration	Consumer protection measures should be devised and enforced to protect end-users from potential unforeseen financial liabilities relating to implementation of large scale energy projects.	 <p>7 0 2</p> <p>Agree Disagree Re-frame</p>
Final Iteration	Adequate measures should be devised and enforced to protect consumers from unforeseen financial liabilities and other drawbacks arising from large-scale projects	

4.12 Future and application of the principles in Europe: concluding comments

The Delphi-panel exercise focused on the development of principles for a fair and inclusive energy transition offers a set of standards that have been validated by the inputs and comments of a panel of interdisciplinary expert academics with a diversified and extensive knowledge of this field. Overall the Delphi-panel process has been successful in terms of refining the original proposed principles based on the comments that were offered during the two rounds of survey that were carried out with the nine expert participants that formed the Delphi-panel. Eight out of the original nine principles received over 70% consensus are included in the final list of principles offered below (see Box 3). One principle failed to meet the required consensus rate (Principle 9) and will not be included in the final list. Additionally, there was an alternative principle added that was suggested by one of the participants and this was very well received and is also included in the final list.

Principles for a fair and inclusive energy transition (final iteration)

Principle 1

All institutions promoting energy transitions should establish well devised channels of communication, social engagement and inclusive dialogue.

Principle 2

All civic and public spaces involved in energy system transition dialogues should provide a stage for participation based on equality in terms of gender, social background and socio-economic status.

Principle 3

Accountability and monitoring mechanisms should be included in all new energy projects, which include regular evaluation of citizen complaints, feedback from energy users and regular reports that demonstrate how citizen complaints and comments have been addressed.

Principle 4

All new energy production and consumption projects and policies should be future proofed. This evaluation must include a long-term feasibility and contingency strategy.

Principle 5

Energy poverty mitigation strategies should be integrated into new energy projects

Principle 6

All energy projects should adopt a precautionary approach in terms of possible social and environmental harms.

Principle 7

Citizen inputs should be solicited using inclusive participatory procedures, integrated into the process of initial conception, planning, implementation and evaluation of energy projects

Principle 8

Policies seeking to reduce or change end-user energy practices should strive to be consistent with existing structural and social conditions and short and long-term adaptability strategies. Proactive measures should be taken to overcome major barriers.

Principle 9

Adequate measures should be devised and enforced to protect consumers from unforeseen financial liabilities and other drawbacks arising from large-scale projects

Box 3: Principles for a fair and inclusive energy transition



5 Views of energy transitions at community level

This section summarises the results of the mini-survey that was conducted with five communities across Europe. The survey explores stakeholder views of energy transitions at community level. More specifically the survey has captured information from a range of professional and local based stakeholders focusing on perceptions and experiences of energy system change at community level. Findings are subdivided into five subsections, which include:

- Local awareness of initiatives promoting and opposing energy system change
- Prominence of energy efficiency issues in working life
- Foreseeing change in 20 years times
- Barriers towards implementing energy system change in the community
- Channels of Communication

5.1 Local awareness of initiatives promoting and opposing energy system change

Two survey questions were used to capture information pertaining to local awareness of initiatives promoting and opposing energy system change, the results are presented in Table 19 shows below.

Table 19: Awareness of initiatives promoting and opposing energy system change

	Promoting sustainability		Opposing sustainability	
	Yes	No	Yes	No
Dunmanway	8	12	9	1
University student cohort	10	6	3	13
Le Trepèze	9	6	4	11
Vila de Gràcia	7	19	3	23
Stockbridge	1	9	3	7

Just under 60% of respondents stated that they were not aware of energy initiatives promoting sustainability. The no response rate increased significantly when respondents were asked about awareness of projects opposing sustainability. Just under 75% of respondents said that they were not aware of initiatives opposing energy sustainability. Looking at a breakdown in terms of community responses, stakeholders coming from the University student cohort and from the Le Trapèze community were the only two which had a higher proportion of stakeholders stating they were aware of initiatives promoting energy sustainability. There are specific community characteristics which contribute towards a greater awareness of initiatives promoting energy sustainability in these communities. The University Campus (University College Cork) was the first third level institution to be awarded a Green Flag, which is awarded internationally by the Foundation for Environmental Education. Le Trapèze is an emerging residential community which has been developed and promoted as an eco-neighbourhood



Notable as well is that fact that the Dunmanway community displayed the highest awareness of initiatives opposing energy system change. Again, this result is unsurprising if the context of recent energy developments in Dunmanway is considered where there was significant opposition to the development of wind farms in the locality. While the general lack of awareness identified in this survey was somewhat anticipated based on previous work carried out in these communities for WP3, they demonstrate that energy system change is often understood as something that happens elsewhere and is seldom readily identified at community level.

5.2 Prominence of energy efficiency in working life

Tables 20 and 21 offer a detailed account of the results pertaining to the prominent of energy efficiency issues for stakeholder and their clients.

Table 20: Summary of results pertaining to prominence of energy issues for stakeholders

	Very low	Low	Medium	High	Very High	Total
Architecture	0	0	1	0	3	4
Industry and manufacturing	0	1	0	0	1	2
Insurance	0	0	2	1	0	3
Other	0	1	0	2	3	6
Public sector	0	0	0	0	2	2
Real estate	0	2	2	0	1	5
Retail	0	0	1	12	2	15
Community sector	0	0	1	0	1	2
Construction	0	0	2	4	4	10
Education	0	2	6	4	3	15
Engineering	2	0	1	2	5	10
Farming	0	0	0	0	1	1
Finance & banking	1	1	1	2	2	7
Other services	1	1	0	0	1	3
Hospitality	1	0	0	1	1	3
Total	5	8	17	28	30	90

In general, the findings indicate that stakeholders consider energy efficiency to be of high or very high importance in their working life. Just under 15% of all respondents rated energy efficiency as being low or very low. Whereas 65% of all respondents said that energy efficiency was either high or very high. Looking at the different professional categories of the respondents, Retail has the highest scoring rates in this survey. While there are considerable limitations due to the small sample on which these results are based. Looking at the five categories most representative in the sample (*i.e.*, Retail, Construction, Engineering, Education



and Finance and Banking) holds the highest scores in terms of prominence of energy efficiency issues for stakeholders.

Differences can be found when respondents were asked about the prominence of energy efficiency issues for their clients. Rates of importance were perceived as much lower (see Table 21 below). In terms of very low and low rating for clients this stands at just over 25% while the very high and high rating is just under 40%. This indicates a substantial decrease in prominence of energy issues for clients as these have been perceived by local professional stakeholders. Again, stakeholders in retail stand out as the one's with the highest rating.

Table 21: Summary of results pertaining to prominence of energy issues for clients

	Very low	Low	Medium	High	Very High	Total
Architecture	0	0	1	2	1	4
Industry and manufacturing	0	1	0	0	1	2
Insurance	0	1	1	1	0	3
Other	1	1	0	2	2	6
Public sector	0	0	0	1	0	2
Real estate	0	1	3	1	0	5
Retail	1	3	5	4	2	15
Community sector	1	0	0	1	0	2
Construction	0	2	4	2	2	10
Education	0	3	6	5	0	15
Engineering	3	0	3	2	2	10
Farming	0	0	0	0	1	1
Finance & banking	1	1	3	2	0	7
Other services	1	1	0	1	0	3
Hospitality	0	1	2	0	0	3
Total	8	15	28	24	11	90

5.3 Foreseeing change

In order to capture a sense of whether energy system change is something that local community stakeholders foresee as forthcoming in the community context one specific question was asked which inquired if stakeholders anticipate change based on their professional experiences in the locality. The results show that overwhelmingly stakeholders expect change in the next twenty years. Over 70% of all respondents said that they anticipate energy system change, while only 10% said they expected no change and the remaining respondents said they didn't know.



There is little variation if the results are examined at community level. Only Vila de Gràcia shows greater disparity, with a marginally lower expectation of change at 60% and a much higher anticipation of no change at just under 20%, while the remainder respondents said they don't know.

5.4 Barriers towards implementing energy system change in the community

One of the most significant findings pertaining to this small survey looking at energy system change at community level pertains to the potential barriers towards implementing energy system change in the community. Respondents were given eight different options as to potential barriers and were asked to tick up to three of the factors, which they felt were most significant. (see Figure 3 below for summary of the findings). On average respondents ticked two options.

Lack of knowledge was the factor that stood out as the most significant barrier towards implementing change. Four out of the five communities surveyed rated lack of knowledge as the most significant factor. For the communities in Dunmanway and Le Trapèze this factor was particularly salient, while for the Stockbridge community infrastructural obstacles stood out at the most significant.

The three top rated barriers were lack of knowledge, infrastructural obstacle and lack of resources. A further analysis was carried out which looked at potential variations in these results in terms of the professional category of the respondents. Thus, results pertaining to the top three barriers were cross tabulated with the top five professional categories of the respondents. As Figure 4 below demonstrates the results of this analysis shows that stakeholders involved in the retail sector identified a lack of knowledge as the most significant barrier. Whereas, stakeholders in the construction sector were the top sector in terms of rating Infrastructural obstacles and lack of resources as potential barriers.

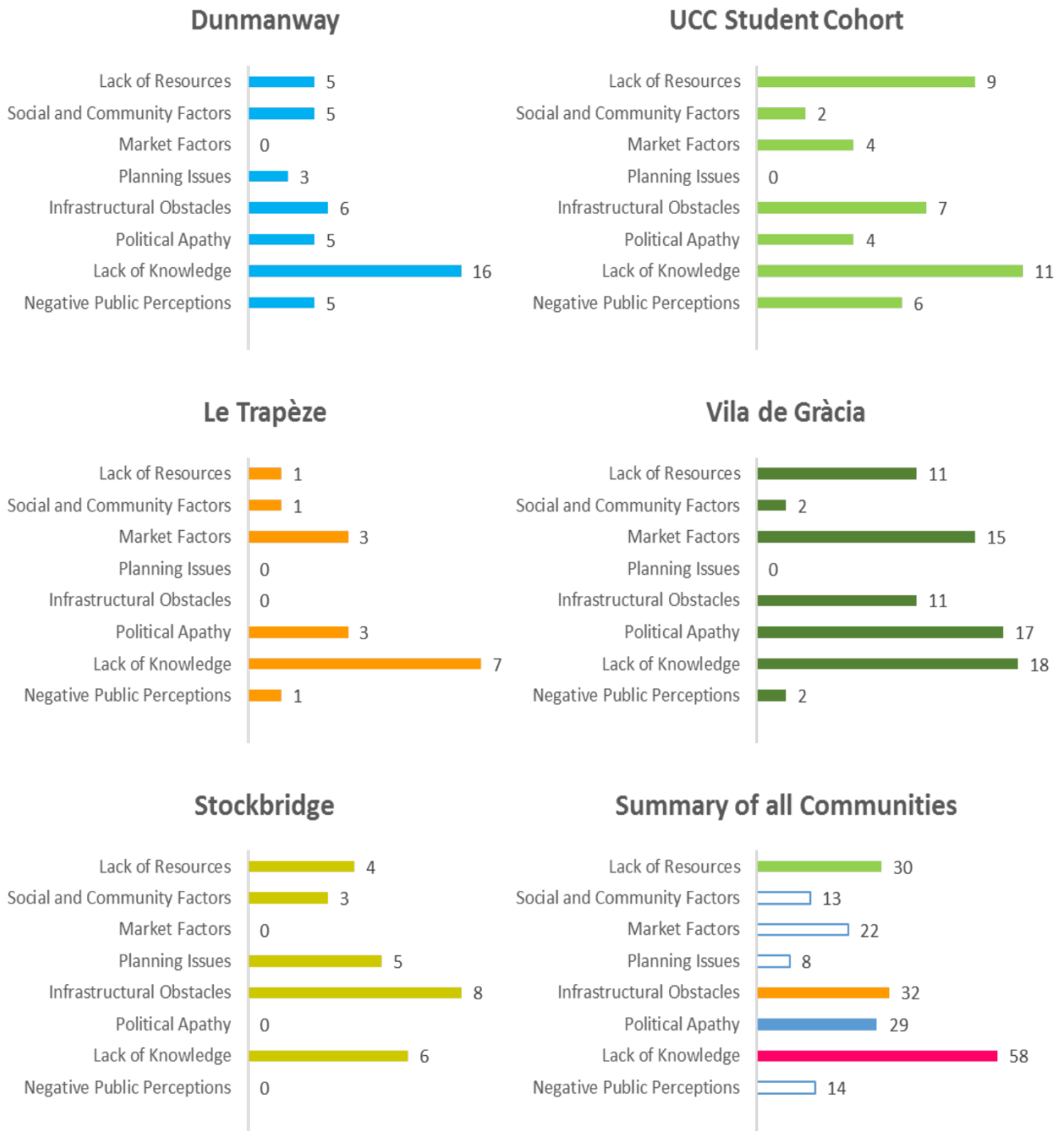


Figure 3: Barriers towards implementing energy system change (number of responses by community)



Figure 4: Barriers towards implementing energy system change at community level (Overview)

5.5 Channels of communication

The final topic to be explored in this small survey pertaining to existing channels of communication for the community to participate and voice their ideas about the future of the energy system. As shows in figure x



below it is clear that all communities believe that there not enough channels of communication for communities to participate. Over 60% of all respondents believe existing channels of communication are not sufficient to allow for meaningful participation. Moreover, only 10% of respondents believe that existing channels of communication are adequate while 30% of respondents stated that they don't know.

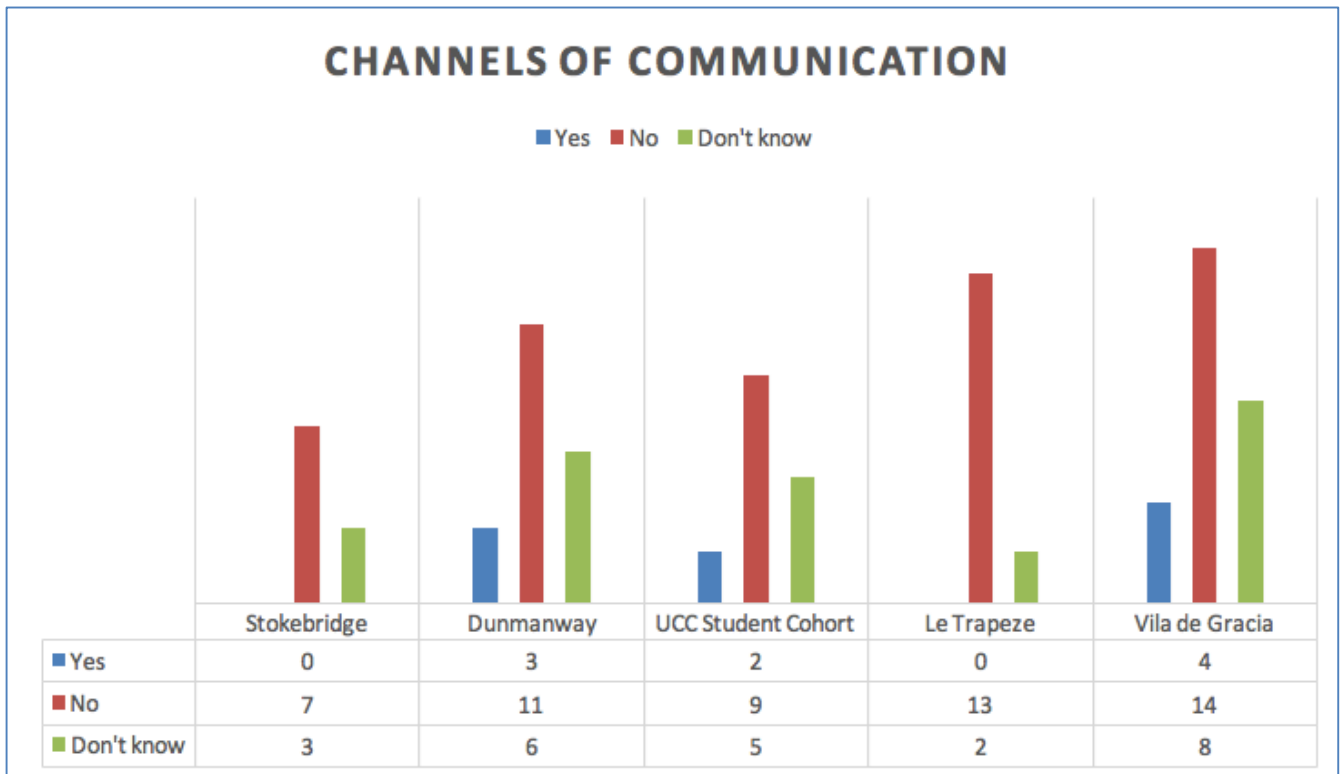


Figure 5: Satisfaction with channels of communication

5.6 A strategy for community feedback mechanisms

Communication activities are extremely important and for this reason they require precise, meticulous and well-prepared outputs. The initial approach to research communication and sharing for instance can be problematic. Dalkir (2011) cautions against the common initial approach to inventory all available knowledge in order to create open access portals. While these appear to be valuable, Dalkir states that it is best to cater to the knowledge needs of specific groups of people. The best means to communicate research findings therefore involves offering a variety of different communication outputs. Each communication output developed should have a clear purpose and a target audience. In essence, it is necessary to take into account how different forms of knowledge may benefit different groups and create a strategy to communicate value to these targeted groups (Dalkir 2011). This initial needs-based assessment not just ensures that the right people obtain access to relevant information but that this is communicated in a way which maximises engagement with the information offered. Furthermore, consideration of language, content and use of appropriate and context specific examples will enrich the value of the material offered and their impact to specific groups. For instance, a policy brief and a community brief are different outputs in that they essentially aim to cater to the knowledge needs of different audiences. In the case of the policy brief attention to clear policy recommendations and impact should be offered whereas for a community brief it



could be the case that the value of local based issues should be enhanced and policy recommendations could be distilled to an understanding of how they might affect people locally.

The ENTRUST project field based communities constitute the targeted audience for this purpose. The six communities are:

- Dunmanway, Co. Cork, Ireland
- University student cohort, Cork City, Ireland
- Stokebridge, Knowsley, UK
- Secondigliano, Naples, Italy
- Gràcia, Barcelona, Spain
- Le Trapèze, Paris, France

In terms of developing feedback mechanisms in relation to ENTRUST findings pertaining to energy system transitions while there are very distinct community characteristics and knowledge needs there is an overarching knowledge gap which is common in all of these communities. This gap refers to the overall lack of critical engagement with Energy System Transitions. Findings from the local stakeholder survey reinforce this idea. In this survey, all communities identified lack of knowledge as a significant barrier towards energy system change. The survey also shows that many respondents believe that there are not enough channels of communication between the community and wider energy system change actors. Overall, ENTRUST research analysis has shown that while these communities have a general awareness of the kind of debates which are driving changes in the energy system in terms of climate change, peak oil issues and environmental degradation, this awareness is usually more superficial. Overall, the needs analysis highlights the fact that most communities lack a deeper involvement with energy that is linked to two critical dimensions, which are reflection and action (Bell *et al.* 2012). The ENTRUST strategy for community mechanisms is grounded on the need for promoting a 'conscientisation' process that seeks to foster deeper dialogue. This process entails linking energy transition debates with situated experiences and developing positive messages, which compel communities to reflection and action (Bell *et al.* 2012). This approach seeks to destabilize the notion that knowledge communication is a passive process by developing materials, which will provide communities with new paradigms grounded in the knowledge of their own localities. Conscientisation is therefore a critical component of the feedback strategies pertaining to energy system transitions with the six field based communities.

This strategy also entails the use of different communication channels. Initial feedback mechanism communication includes the development of two community research briefs. These materials aim to provide the communities with an overview of key ENTRUST research findings which highlight critical dimensions of energy system change pertinent to the context and experiences of these localities. These briefs and research feedback mechanism provide a synthesis of diverse experiences relating to energy, which take into account socio-economic and socio-demographic dimensions. Use of local media is being leveraged to enhance the reach of these research outputs.

The current interest and use of Web based technologies is regarded as an important element for research dissemination. Web based technologies are varied and include in a broader sense the internet, web based



applications and web GIS platforms (Payakpate *et al.* 2008). In this context, dedicated online platforms can provide a means towards interacting with local stakeholders, students and academics. The ENTRUST Project has set in place a web based strategy which seeks to enhance community engagement and dissemination of findings. The development of a knowledge platform and the creation of content for the knowledge platform is a key component of this strategy. For example, the ENTRUST knowledge platform has developed a set of online ‘gamification’ tools to raise awareness and promote behaviour change towards energy sustainability across Europe. Gamification is a relatively new method for engaging with online users and entails applying elements of game playing (such as point scoring) to activities related to energy in order to pursue changes in behaviour toward the energy system. This tool has potential value in terms of enabling a wider community engagement with the energy system through the expanding broadband infrastructure incorporating deeper knowledge and active engagement with energy efficiency tools, energy simulations and the internet of things.

6 Conclusion

The report focused on expert feedback on community dialogues, this work significantly engages and expands research previously carried out for work packages 3, 5 and 6. Through a process which focuses on iterative and reflexive learning the report makes use of collaborative processes of engagement to enhance existing ENTRUST findings and strengthen community feedback mechanisms. While there are different elements to this report with distinct purposes, the common theme of enhancing energy transition pathways is observable across the different sections which make up this report.

The report identifies a range of community energy innovation priorities in Section 3. This section builds on previous research carried out for Deliverables 6.1 (Morrissey, Axon, Aiesha, *et al.* 2017) and 6.3 (Morrissey, Axon, Hillman, *et al.* 2017). Offering a reflexive summary and discussion of the main findings from these two deliverables, the report also expands on these by adding to the existing research additional insights from 2 additional communities of practice. Namely, *Gràcia* and the *University student cohort*. The outcome of this process is the development of customised energy-policy recommendations which a collaborative and community based consideration of socio-demographics, economics and governance, technological and environmental resources and overarching policy context. For instance, rather than focus on transition as it may pertain to technology alone this section also looks at transition in terms of ideas and governance which allows for a multi-dimensional view of change.

The major contribution in this report has been the development of principles for a fair and inclusive energy transition in Europe. The principles were originally developed from reflexive engagement with the core findings of work packages 3 and 6. These initial ideas were significantly refined and validated using a modified version of the Delphi-panel approach. Taking on board comments offered by a panel of interdisciplinary academics, the final iteration of the principles offered in Section 4 are the result of academic discourse and eventually consensus over how best to achieve equality and inclusion in terms of energy transition in Europe.

Making use of a mini-survey to engage with five communities in a European context a deeper understanding of how energy transitions are perceived in a community context was achieved. The survey results which are offered in Section 5, relay findings from engagement with local key stakeholders with close professional



connections with the ENTRUST communities of practice (*i.e.*, Le Trapèze, Dunmanway, University students, Stockbridge and Vila de Gràcia). One of the core findings from this engagement pertains to identification of lack of knowledge as key barriers toward community participation in energy transitions. Based on these findings a refined strategy for community engagement was developed.

Finally, a strategy for feedback mechanisms with the ENTRUST communities of practice was developed. This strategy entails a range of ongoing plans that will allow for deeper and more meaningful interaction with the different communities. The initial approach includes a needs assessment, which considers how different knowledge and research outputs may be beneficial for these communities. Making use of findings from the survey highlighted above the strategy includes a ‘conscientisation’ component that seeks to develop a range of innovative and community specific messages, which prompt communities to understand and connect more fully with the implications of energy transitions at local level.

The different components of this report are relevant in terms of enhancing community based strategies and innovation strategies but they also offer a more universal contribution. The work developed in Section 3 for instance provides community specific innovation pathways which are policy relevance of these localities. On the other hand, the development of principles for a fair and inclusive energy transition have a potential to guide more generally the way that transitions projects are managed and developed and highlight the importance of developing energy systems which are mindful of equity and inclusion standards.



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Appendix 1: Community pathways (Addendum to Deliverable 6.3)

The following work offers an overview of the community of Gràcia in Barcelona, Spain and the UCC student cohort in Cork City, Ireland, using the Shared Socio-economic Pathway (SSP) analytical framework. This framework highlights possible trajectories of change and development and adds to these further dimensions focused on socio-economic narratives. Applying this framework to access the background of these two communities the following sections provide an overview of the two profiled communities as well as highlighting where innovations are required. This work expands on the profiling carried out in Deliverable 6.3.

1. Gràcia Pathways

Table A: Overview of Count of all SSP Elements for Gràcia

Pathway	Count / 28 elements
SSP1: Sustainability	7
SSP2: Middle of the road	12
SSP3: Regional rivalry—A rocky road	1
SSP4: Inequality—A road divided	5
SSP5: Fossil-fuelled development—Taking the highway	3

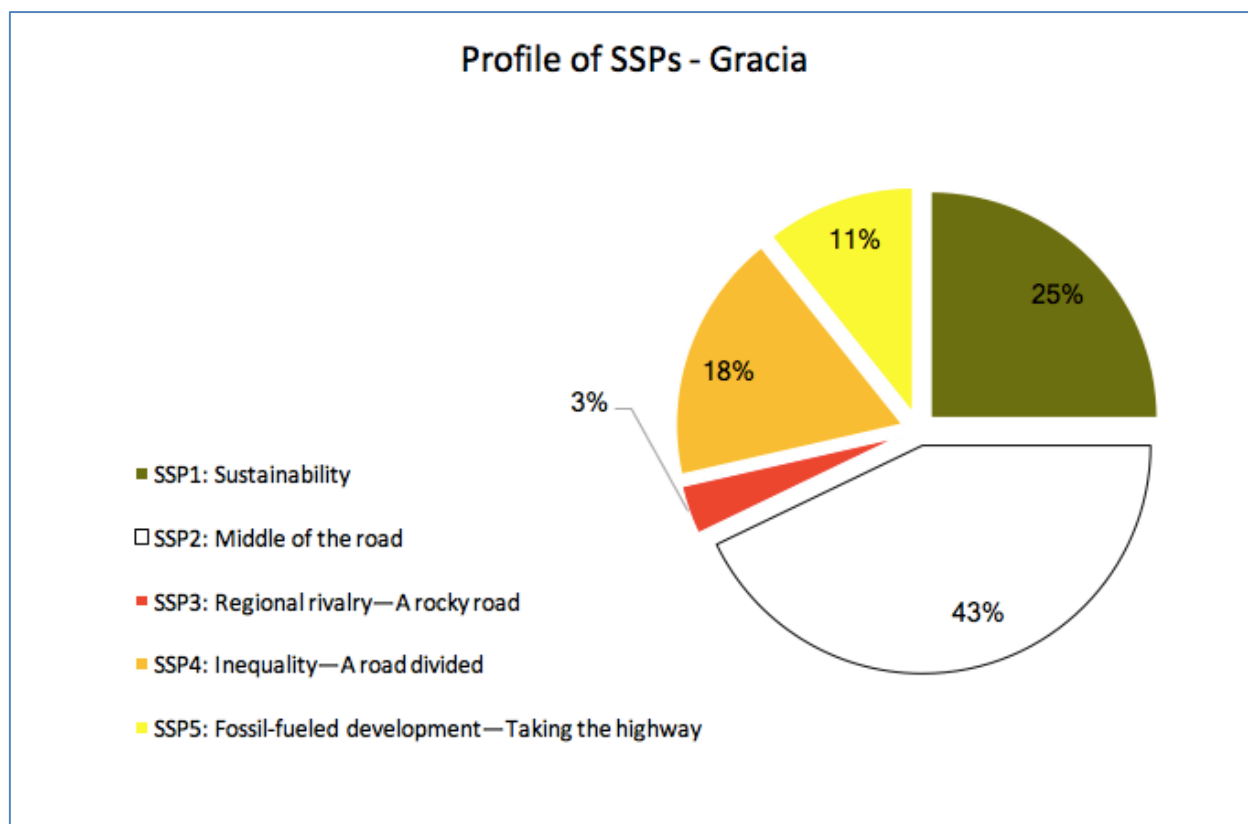


Figure A: Profile of SSPs, Gràcia

As can be seen from Table B and Figure B below, the social / demographic pathway elements most in need of innovation and policy focus for Gràcia include population growth and urbanisation. It is clear that high



rates of growth will need to be sustainably managed in the years to come. Sustainability pathway elements of social cohesion, societal participation, access to health facilities, water, sanitation and education are all evidenced for Gràcia for the social / demographic dimension.

Table B: Social / Demographic Pathway Element Characterisation - Gràcia

Pathway Element	Local Description	Corresponding Pathway
Population Growth	Relatively High	SSP4: Inequality—A road divided
Migration	Medium	SSP2: Middle of the road
Urbanisation Level	Medium	SSP2: Middle of the road
Urbanisation Type	Mixed across community	SSP4: Inequality—A road divided
Education	High	SSP1: Sustainability
Health investments	Medium	SSP2: Middle of the road
Access to health facilities, water, sanitation	High	SSP1: Sustainability
Gender equality	Medium	SSP2: Middle of the road
Equity	Medium	SSP2: Middle of the road
Social cohesion	High	SSP1: Sustainability
Societal participation	High	SSP1: Sustainability

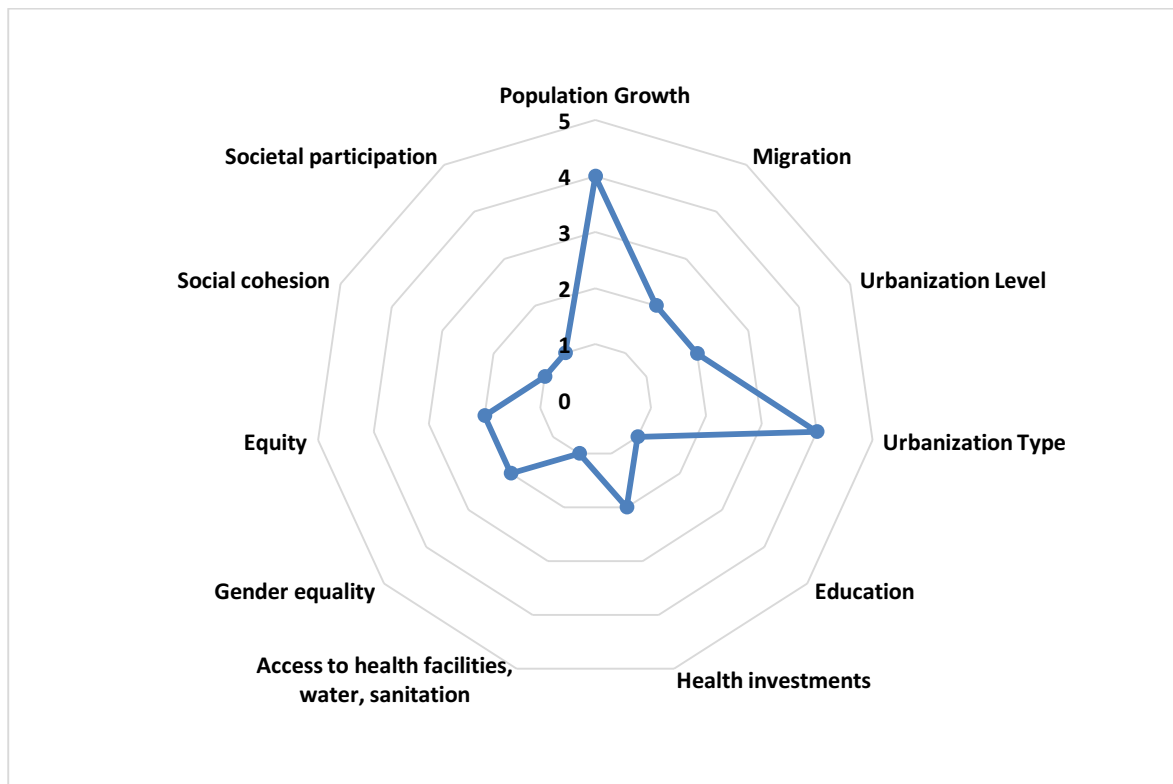


Figure B: Social / Demographic Pathway Element Characterisation - Gràcia

Demographically, there are a lot of families in the area with the population profile characterised in the majority by middle class professionals. Lots of middle-class European and White North Americans have settled in the area for work reasons. As a result, the neighbourhood around the urban core of Vila de Gràcia has been significantly gentrified in recent times. Population change can therefore be characterised as inward



migration related to gentrification processes. Post-crisis there has been lots of speculation on property in the area. The price of rent has increased by approx. 200 euro over the past 5-6 years. Ownership of property in Gràcia is concentrated in the possession of just a few landlords as a result of the economic crisis and historical patterns of bourgeois owners (and inheritance of these properties inter-generationally). The area has experience considerable property speculation with the knock-on impact of residents being pushed out of homes because of higher rent; at the same time, there has been a trend of landlords transforming flats for rent to tourists or to sell to investors.

In terms of the social environment, Gràcia has a left-wing local government with a social agenda on LGBT rights *etc.*, with the result that social issues are actively considered at local government level. The area is characterised by many social movements where people take action against issues such as gentrification *etc.* Tactics employed by these groups to date include occupation of community space; for example, a group of anarchists occupied an old bank, called 'Ex-propiado'. The area has lot of community collectives; collectives related to energy but also from cultural, traditional perspectives, historical groups *etc.* One part of Gràcia has a small community of Roma people. There are also lots of students, recent graduates and younger people who are struggling with rent, as are some retirees. The picture is therefore of smaller groups of poorer and disadvantaged people alongside the majority established community. Home ownership is a key determinant of engagement in carbon transitions debate in the area. There is a perception of a lack of agency amongst residents if they are not in-home ownership.

From Figure C and Figure C, economics / governance pathway elements most in need of innovation and policy focus include 'international trade and globalisation', 'policy orientation', 'institutions and consumption / diet'. As a wealthy community with a globalised economy, the wealth of the community may impede low carbon and sustainability focused initiatives if these were to undermine or threaten local income and economic well-being. Sustainability pathway elements of 'level of local control (subsidiarity)' and 'environmental policy' were identified in Gràcia for the economics / governance dimension.

Table C: Economics / Governance Pathway Element Characterisation - Gràcia

Pathway Element	Local Description	Corresponding Pathway
Growth (per capita)	Medium	SSP2: Middle of the road
Inequality	Uneven moderate reductions within community	SSP2: Middle of the road
International trade	High, with regional specialisation in production	SSP5: Fossil-fuelled development—Taking the highway
Globalization	Strongly globalised, increasingly connected	SSP5: Fossil-fuelled development—Taking the highway
Consumption & Diet	Uneven consumption across social-strata	SSP4: Inequality—A road divided
Environmental Policy	Improved management of local and global issues; tighter regulation of pollutants	SSP1: Sustainability
Policy Orientation	Toward the benefit of the political and business elite	SSP4: Inequality—A road divided
Institutions	Effective for political and business elite, not for rest of society	SSP4: Inequality—A road divided
Level of Local Control (Subsidiarity)	High	SSP1: Sustainability

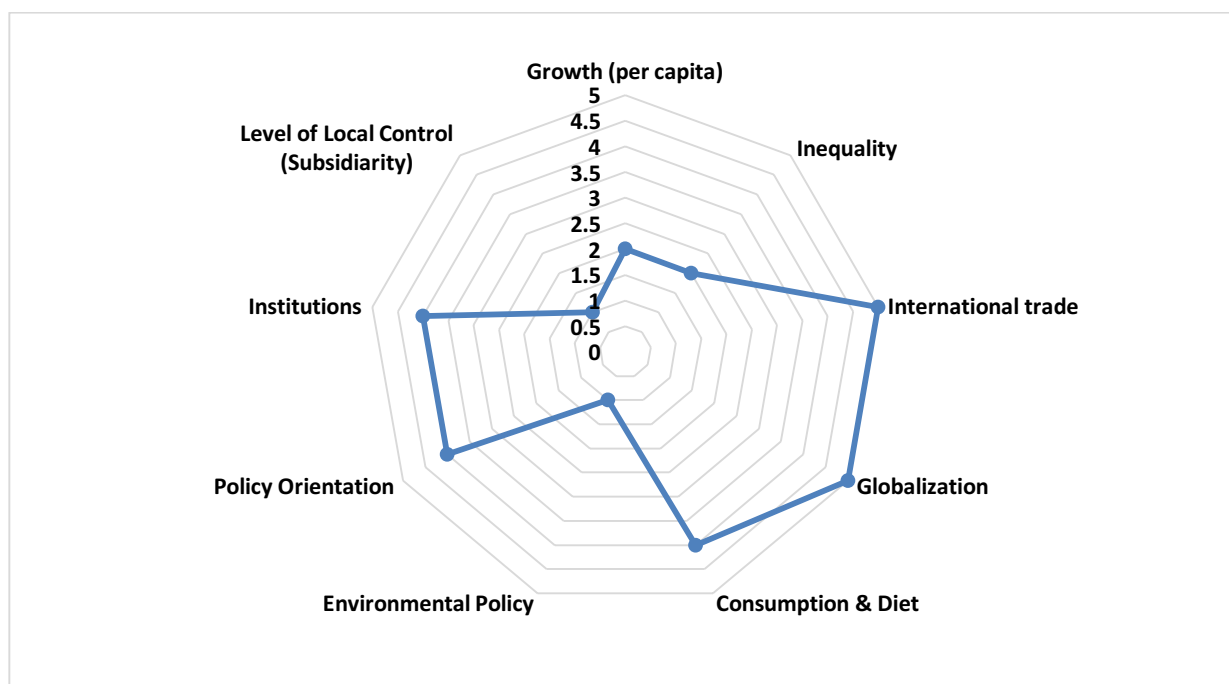


Figure C: Spider-diagram of economics / governance pathway element characterisation - Gràcia

Catalonia is the economic powerhouse of Spain, with strong international links. The local population has strong leaning towards 'eco' goods and services. Economic growth is being driven by local businesses, local markets *etc.* with tourism being very significant for the area. In recent times, lots of bigger franchises have started to take advantage of the local market model. Food/agri co-operatives with direct relations with farm producers, weekly food basket delivery, are popular. Gràcia has a number of groups of people who have self-organised around environmental issues.



In the area, there is a general level of concern about global pollution. People are frustrated with their own inability to enact change, but there is evidence of a proliferation of grassroots initiatives against food waste, initiatives on food sharing *etc.* In Gràcia, noise is a prominent environmental issue, particularly from city-squares populated late at night. The office of energy assessment offers advice on energy use reduction. The Catalan Law 24-2015 initiative is related to dwellings and energy poverty; this law mandates that energy supply cannot be cut without due process. Broadly, the Spanish Government has a primary focus on economic develop. The local authority in Gràcia is left-wing in orientation. As a result, there is a complex local-regional-national political landscape. Gràcia evidences a ‘municipalisation’ of politics and a highly politically engaged citizenry; for example, there was a community driven project to establish an electric public-owned utility company - L'electrica Publica. When the local Council attempted to establish a new law on the use of public space, the neighbourhood organised to develop an alternative proposal and offered viable alternative, the '*Programme for Commercial Use*'.

From Table D and Figure D, technology / environment pathway elements most in need of innovation and policy focus include Carbon Intensity and Energy Intensity. Sustainability pathway elements identified in Gràcia for the technology / environment dimension include fossil constraints and a preference shift away from fossil fuels. These somewhat contradictory technology / environment pathway elements suggest a community with high energy use and current reliance on fossil fuels for energy generation. While there is community support for a shift away from fossil fuels, much work needs to be done on this aspect, remaining primarily aspirational for now.

Table D: Technology / Environment Pathway Element Characterisation - Gràcia

Pathway Element	Local Description	Corresponding Pathway
Tech. Development	Medium, uneven	SSP2: Middle of the road
Technology Transfer	Medium, uneven	SSP2: Middle of the road
Energy Tech Change	Some investment in renewables but continued reliance on fossil fuels	SSP2: Middle of the road
Carbon Intensity	High	SSP5: Fossil-fuelled development
Energy Intensity	High	SSP3: Regional rivalry
Fossil Constraints	Preferences shift away from fossil fuels	SSP1: Sustainability
Environment	Continued degradation	SSP2: Middle of the road
Land Use	Medium regulations lead to slow decline in the rate of deforestation	SSP2: Middle of the road

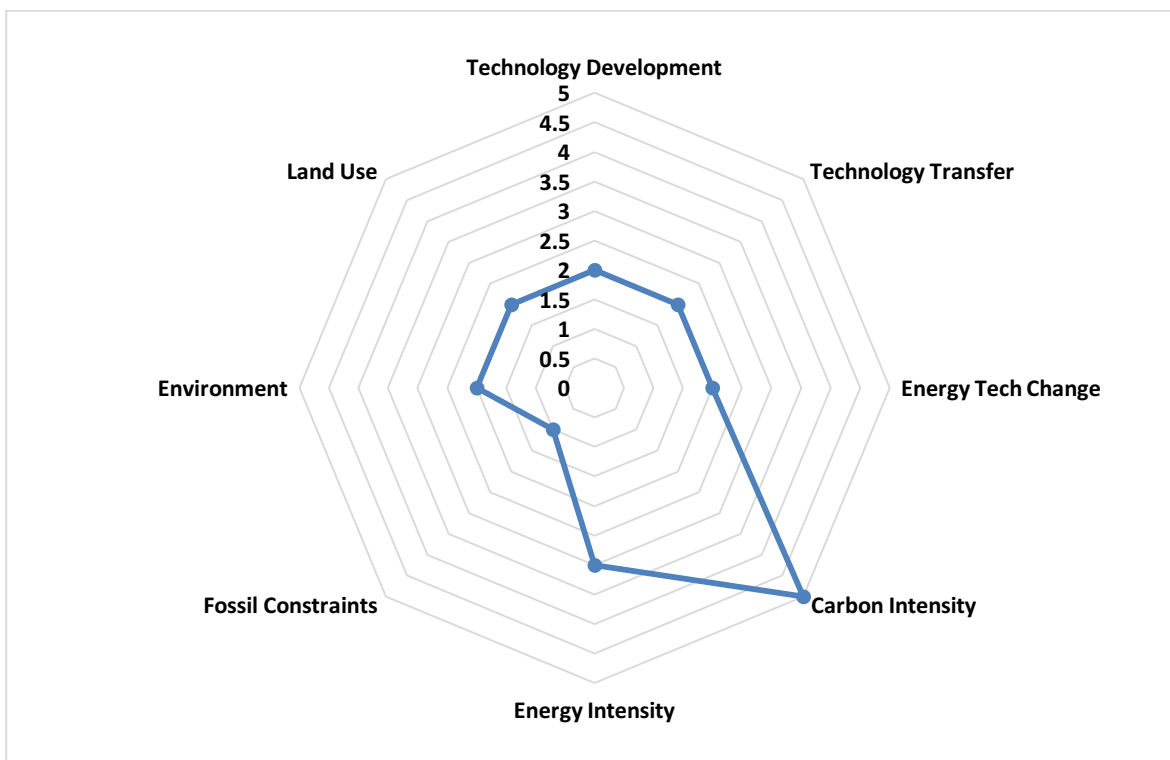


Figure D: Spider-diagram of technology / environment pathway characterisation - Gràcia

In Gràcia, the built environment is characterised by old buildings mixed with new construction. In the area, there is an affordability issue with RE technology accompanied by a lack of systematic policy efforts to foster wide-spread RE uptake. For example, there is an onerous and complicated processes for grant support. Information supports are poor for residents and successful grant acquisition requires considerable determination and proactive engagement on the part of residents. The local council have started to focus on building rehabilitation in community in recent years as an energy management priority; however, progress towards sustainability in terms of reduced energy use in buildings and RE deployment is slow. Primary energy supply still dominated by fossil fuels in the Spanish context. At the same time, the use of electricity is increasing, with *ca.* 15% increase in overall electricity use over the last 10 years. Regulation for the most part emanates from the EU level, with limited local and regional level initiatives. For Barcelona in general, overall environmental quality has not improved across parameters such as air quality and waste management, despite some initiatives vehicles². The city does have a strong planning regime but not necessarily with an environmental focus.

Summary of Gràcia innovation requirements:

Social / Demographic: Population Growth and Urbanisation

Economics / Governance: International trade and Globalisation, Policy Orientation, Institutions and Consumption/ Diet

Technology / Environment: Carbon Intensity and Energy Intensity

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² Measures have been enacted on prohibiting cars into city, including limitations on petrol cars manufactured before 2000 and diesel cars manufactured before 2006; the city is progressively applying restrictions on vehicles without certification (DGT).

2. University student cohort pathways

Table E: Overview of Count of all SSP Elements for University student cohort

Pathway	Count / 28 elements
SSP1: Sustainability	10
SSP2: Middle of the road	7
SSP3: Regional rivalry—A rocky road	3
SSP4: Inequality—A road divided	3
SSP5: Fossil-fuelled development—Taking the highway	5

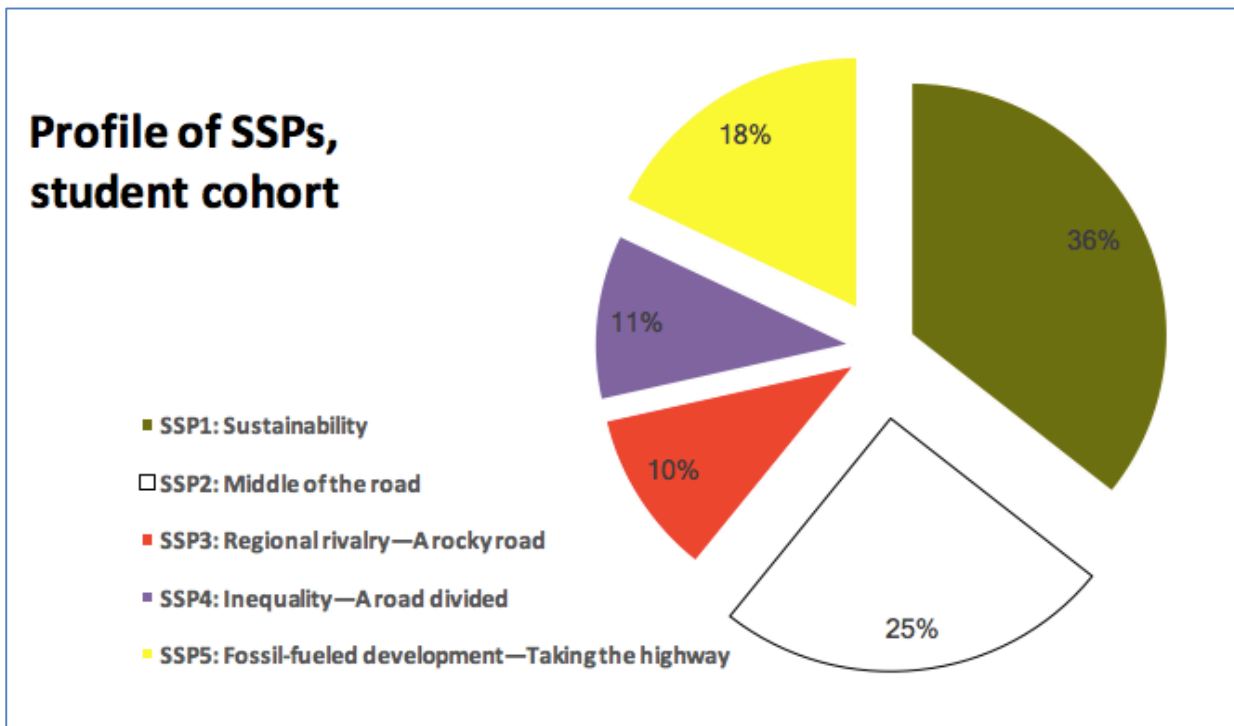


Figure E: Profile of SSPs, University students

From Table F and Figure F, the social / demographic Pathway Elements most in need of innovation and policy focus for the University student cohort include urbanisation level, urbanisation type and equity issues. Sustainability pathway elements of societal participation, Access to health facilities, water, sanitation, gender equality, education and population growth were identified for the University student cohort for the social / demographic dimension.

Table F: Social / demographic pathway element characterisation - University student cohort

Pathway Element	Local Description	Corresponding Pathway
Population Growth	Relatively Low	SSP1: Sustainability
Migration	Low	SSP2: Middle of the road
Urbanisation Level	Low	SSP3: Regional rivalry—A rocky road
Urbanisation Type	Better mgmt. over time, some sprawl	SSP5: Fossil-fuelled development—Taking the highway



Education	High	SSP1: Sustainability
Health investments	Medium	SSP2: Middle of the road
Access to health facilities, water, sanitation	High	SSP1: Sustainability
Gender equality	High	SSP1: Sustainability
Equity	Low	SSP3: Regional rivalry—A rocky road
Social cohesion	Medium	SSP2: Middle of the road
Societal participation	High	SSP1: Sustainability

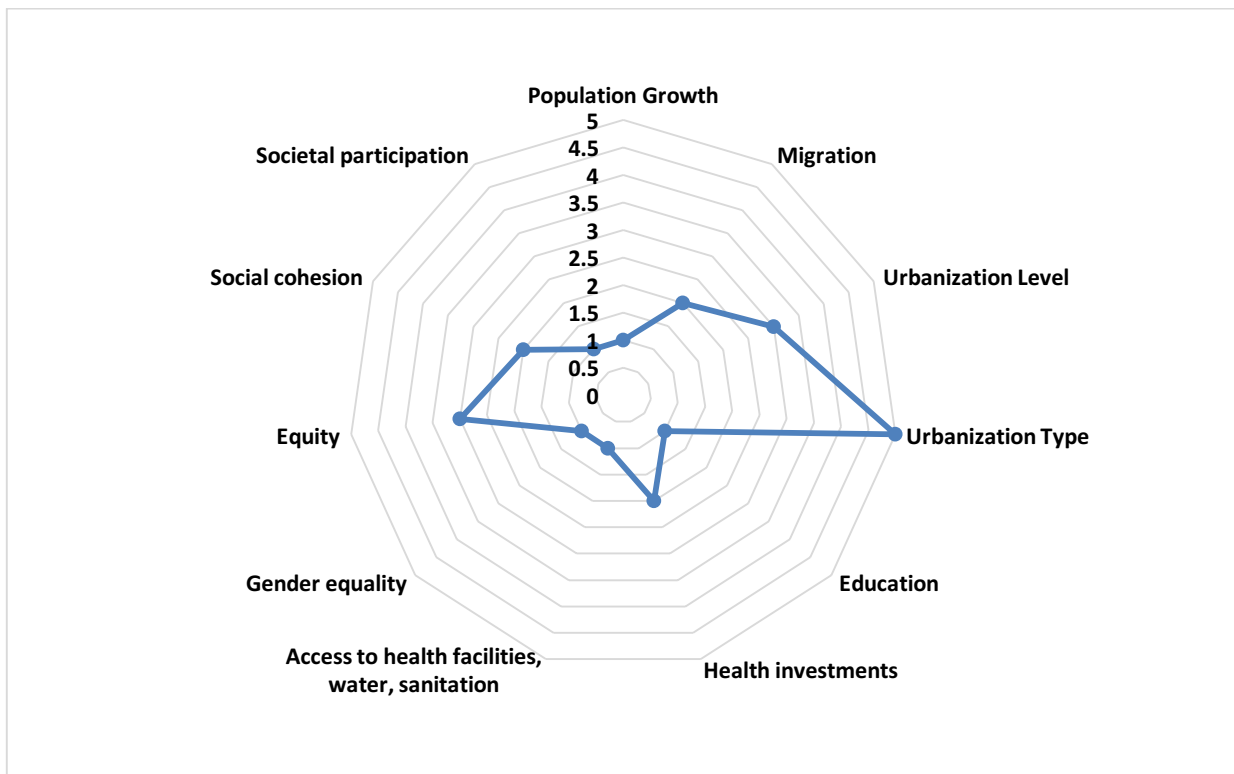


Table F: Spider-diagram of social / demographic pathway characterisation - University students

The University student cohort represents a unique community in the ENTRUST context. The community has been recruited from across the student body at University College Cork. This community is characterised by high participation rates, high rates of incoming students and student levels remaining constant/stable with slight increases over the medium term. Based on demographic data for Ireland, student numbers are unlikely to fall significantly in the coming years. For undergraduates, students starting in 1st year tend to be primarily from the Munster province in Ireland. The student community shows a very noteworthy increase in commuting from students from outside of the city. This increase in commuting can be attributed to the economic down-turn, cost of housing *etc.*, with many students electing to remain at home with parents rather than navigate the high-cost housing market.

The general level of urban planning in Cork city has restricted sprawl and the worst excesses of 'Celtic Tiger' era development did not manifest in Cork city. The green belt around Cork city has mitigated against growth towards regional market towns from the city. Health and well-being of the University community are prioritised by the University with attendant monetary investment. Initiatives on this front include 'Meatless



Mondays', for instance, a student health centre on campus and state-of-the art University facilitates with attendant excellent sanitation *etc.* From a University systems perspective, there is universal equality at undergraduate level. There is equity of access issues for prospective students. Ireland has the 2nd highest University fees in the EU. Post-access to the University system, students face issues regarding varied ability to finance extra-curricular teaching support, certain support services and supports in general. Access to computers, books, travels opportunities, networks for opportunity *etc.* are characterised by socio-economic background. Students from less-privileged backgrounds are more likely to be in part-time or full-time employment. In general, social cohesion within the student group as a whole is relatively strong, characterised by a shared student identity. There are strong opportunities for student participation, including for example; student societies, student groups, informal friend networks, campus sports teams. The University campus is characterised by lots of 'collision spaces' for interaction, including library, catering venues, campus bars *etc.* From a student household perspective, a considerable percentage of the UCC student body comes from middle class relatively high-income families. The socio-economic profile of students can be closely linked with equity issues. Access to certain professions remains restricted to higher socio-economic groups, for instance. University is culturally a middle-class institution, inherent challenge for students from working class backgrounds (re: points of reference *etc.*)

From Table G and Figure G, economics / governance pathway elements most in need of innovation and policy focus include International trade, globalisation, policy orientation, institutions and consumption & diet. Sustainability pathway elements, of level of local control (subsidiarity) and environmental policy, were identified in University student cohort for the economics / governance dimension.

Table G: Economics / governance pathway element characterisation - University student cohort

Pathway Element	Local Description	Corresponding Pathway
Growth (per capita)	Medium	SSP2: Middle of the road
Inequality	Uneven moderate reductions within community	SSP2: Middle of the road
International trade	High, with regional specialisation in production	SSP5: Fossil-fuelled development—Taking the highway
Globalization	Strongly globalised, increasingly connected	SSP5: Fossil-fuelled development—Taking the highway
Consumption & Diet	Uneven consumption across social-strata	SSP4: Inequality—A road divided
Environmental Policy	Improved management of local and global issues; tighter regulation of pollutants	SSP1: Sustainability
Policy Orientation	Toward development, free markets, human capital	SSP5: Fossil-fuelled development—Taking the highway
Institutions	Increasingly effective, oriented toward fostering competitive markets	SSP5: Fossil-fuelled development—Taking the highway
Level of Local Control (Subsidiarity)	High	SSP1: Sustainability

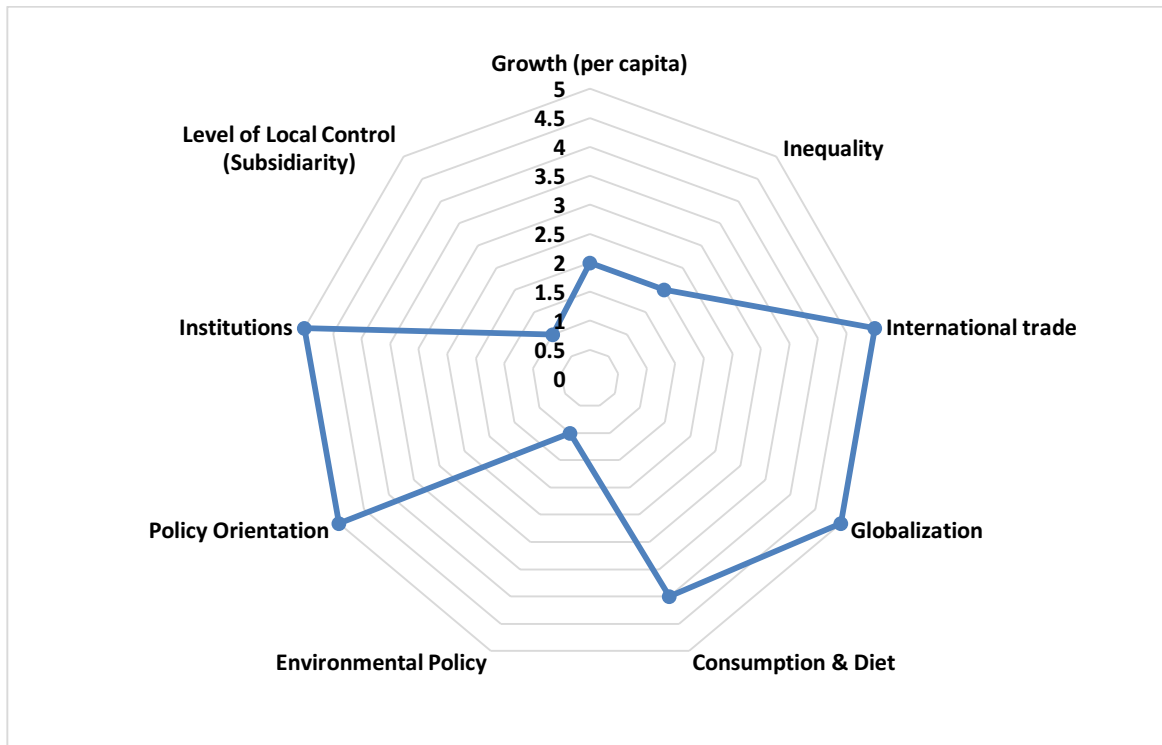


Figure G: Spider-diagram of economics / governance pathway characterisation – University students

The wider economic picture in Ireland has shown strong growth in the post-recession era. University College Cork (UCC) has increasing numbers of international students, as well as increased links with China. The University’s strong international links are developed from considerable research income and international collaboration initiatives and projects. Visiting students, lecturers and students from overseas, as well as a range of opportunities for overseas experience for the local student body mean that the UCC community (including staff and students) have a strong international outlook.

Material consumption likely to be highly influenced by socio-economic status of family for individual University students. On food, the University student cohort does not necessarily have an ecologically aware diet, with limited emphasis on environmental aspects of food. However, on campus food is locally produced and there are poly-tunnels on campus which produce food on-site. More broadly, students generally have low overheads and expenses, with disposable income directed to socialising, hobbies *etc.* UCC do provide strong leadership on green campus issues, including sustainability aspects. There is close involvement of student population with management on the campus sustainability agenda. UCC was the first green flag university world-wide as well as the first ISO 50001 certified University evidencing a strong degree of leadership from the host institution. The University has appointed a sustainability officer. Notwithstanding efforts on sustainability, policy orientation reflects the UCC mission, in turn dictated by Government policy. University governance takes account of student voice and most issues are devolved to local levels. Students have input and voice at various levels of governance and the UCC Student’s Union is influential on campus.

From Table H and Figure H technology / environment pathway elements most in need of innovation and policy focus include ‘energy technology change’, ‘carbon intensity and energy intensity’. Sustainability pathway elements identified in the University student cohort for the technology / environment dimension include ‘fossil constraints’, ‘environment’ and ‘land use’.

Table H: Technology / environment pathway element characterisation - University student cohort

Pathway Element	Local Description	Corresponding Pathway
Technology Development	Medium, uneven	SSP2: Middle of the road
Technology Transfer	Medium, uneven	SSP2: Middle of the road
Energy Tech Change	Diversified investments including efficiency and low-carbon sources	SSP4: Inequality—A road divided
Carbon Intensity	Uneven	SSP3: Regional rivalry—A rocky road
Energy Intensity	Medium	SSP4: Inequality—A road divided
Fossil Constraints	Preferences shift away from fossil fuels	SSP1: Sustainability
Environment	Improving conditions over time	SSP1: Sustainability
Land Use	Strong regulations to avoid environmental trade-offs	SSP1: Sustainability

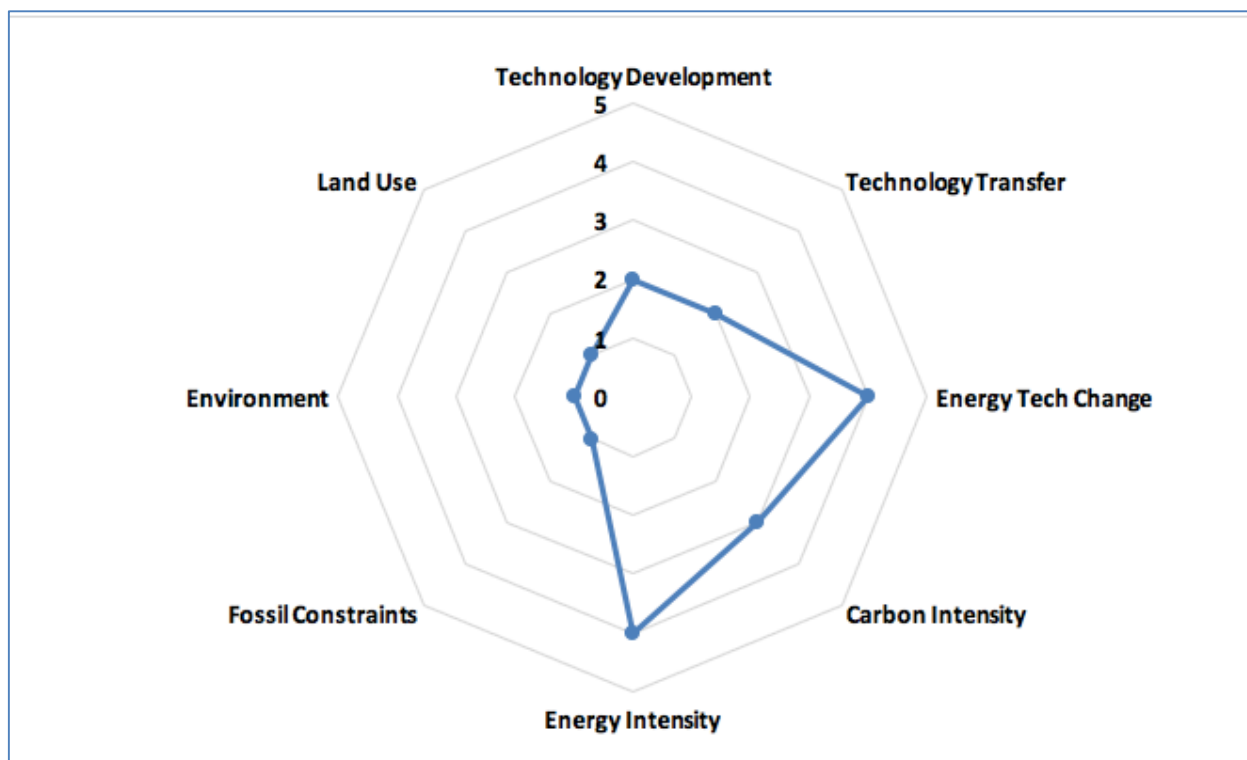


Figure H: Spider-diagram of technology / environment pathway characterisation – University students

Across the University, energy conservation is an area of considerable focus. UCC has conducted world leading research on wave and tidal energy and is currently leading research on biogas as well as innovation on applying social sciences approaches to energy (e.g., The ENTRUST project). There is ongoing expenditure on energy efficiency across the University campus. As a result, the University’s energy consumption and the associated carbon footprint have reduced substantially over the last number of years, with UCC achieving energy conservations targets (set by central government) ahead of schedule.

Despite the slow rate of change, there is a demonstrated preference for a shift away from fossil fuels. The local environment shows improving conditions. University management have a focus on biodiversity on campus, for instance and the river Lee is seen as the centre of the campus. Initiatives such as shared bikes, park and ride as well as considerable green space ensure that the University has strong credentials as a



municipally responsible sustainability organisation. More broadly, the local environment is strongly regulated due to local council and strong University controls.

Summary of University student cohort innovation requirements:

- **Social / demographic:** Urbanisation Level, Urbanisation Type and Equity issues
- **Economics / governance:** International trade, Globalization, Policy Orientation, Institutions and Consumption & Diet
- **Technology / environment:** Energy Tech Change, Carbon Intensity and Energy Intensity

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Appendix 2: Local stakeholder survey

Stakeholder views of energy transitions at community level

Thank you for taking part on this survey which seeks to capture information that will help promote energy system change at community level. Climate change and peak oil issues are compelling governments to take significant action towards securing alternative sources of energy and promoting a cleaner and more sustainable energy system. The main purpose of the survey is to assess the manner in which these changes are perceived and experienced at community level by key local stakeholders and professionals.

This survey is part of the ENTRUST research project led by University College Cork in Ireland.

The survey should only take no more than 4-5 minutes to complete and all the information is treated as confidential and anonymous according to academic guidelines.

1. With which community do you have the closest association? Please tick one

- Dunmanway, Co Cork
- UCC campus, Cork City
- Le Trapeze, Paris
- Vila de Gracia, Barcelona

2. Your gender. Please tick one

- Female
- Male

3. Your age. Please tick one

- 18-24
- 25-44
- 45-64
- 65+

4. Professional practice sector. Please tick one

- Education
- Finance and Banking
- Real estate
- Insurance
- Engineering
- Property Development
- Political representation
- Construction
- Engineering



Other, please state _____

5. How prominent are issues of energy efficiency and sustainability in your working life? Please tick one

- Very High
- High
- Medium
- Low
- Very Low

6. How prominent are issues of energy efficiency and sustainability for your clients/customers? Please tick one

- Very High
- High
- Medium
- Low
- Very Low

7. In your professional experience do you foresee significant changes within the next 20 years in the way energy is produced and consumed in your community? Please tick one

- Yes
- No
- Don't know

8. Are you aware of any local initiatives to promote energy transitions and sustainability? Please tick one

- Yes
- No

9.a. If yes, could you please specify what type of initiatives?

9. Are you aware of any local opposition or resistance to energy system transition initiatives? Please tick one

- Yes
- No



10.a. If yes, could you please specify what type of local resistance?

10. In your professional experience, what are most significant barriers towards implementing energy system change in your community? *please select up to 3 options only*

- Negative public perceptions
- Lack of knowledge
- Political apathy
- Infrastructural obstacles
- Lack of Resources
- Market factors
- Social and community factors

11.a. Please add an additional comment on these barriers you chose:

11. In your opinion are there enough channels for the community to participate and voice their ideas about the future of the energy system?

- Yes
- No
- Don't know

Thank you for your time. For further information on the project please feel free to contact us:

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