Smart-BEEjS

Human-Centric Energy Districts: Smart Value Generation by Building Efficiency and Energy Justice for Sustainable Living

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Business Models and Consumers' Value Proposition for PEDs

Scenario-Based Foresight regional series of interviews

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Executive Summary

We designed and facilitated a scenario-based foresight series of interviews with the participation of local stakeholders in 8 EU regions with the aim to identify the vision for the energy system in Europe by 2040 and possible pathways to achieve it and hence facilitate PED development. This deliverable will inform D6.4 which is a foresight report that encapsulates the outcomes of the foresight interviews in all regions.

1 Introduction

The deliverable D6.3 titled "Scenario-Based Foresight regional series of interviews" has been completed in September 2021.

The ESRs from each beneficiary had to design and facilitate a scenario-based foresight series of interviews for their region with the participation of local stakeholders, with a horizon of 2040. The aim was to provide scenarios of PED development without the need for subsidies, with the reinforcing power of an inclusive and just, user-driven market.

Initially, this was designed to be a scenario based workshop; however, due to the COVID-19 related restrictions and given the circumstances in 2021, the workshop as such could not take place. Hence the research team redesigned the methodology of the deliverable, adapting to a Delphi-type foresight methodology. Therrefore, two sets of interviews with local stakeholders have been conducted online in all 8 regions by the ESRs: (i) initial status; (ii) vision and feaiibility path. Hence, while the aim of the exercise has remained unchanged, the data collection method was altered to fit on the restrictions due to the pandemic.

2 Template of Analysis

2.1 The Delphi method

The Delphi method is an iterative process to elicit judgments or other subjective opinions in relation to the future (Linstone and Turloff, 1975). It is appropriate when there is incomplete knowledge about a problem or phenomenon (Adler and Ziglio, 1996; Delbeq et al., 1975) and helps to improve our understanding of such problems along with their challenges, opportunities and solutions or to develop forecasts (Skulmoski et al., 2007). In other words, it is used to investigate what does not yet exist (Czinkota and Ronkainen, 1997).

It is a well-known, mature and very adaptable research method that is extensively used by scholars across several domains, from medical research to management, community projects, and government policy. It is appropriate to problems that do not allow precise analytical techniques to be applied but would rather benefit from subjective judgments of individuals on a collective basis (Adler and Ziglio, 1996). Hence, it has been widely used as decision-aiding forecasting tool (Rowe & Wright, 1999).

Hence, along with interviews as a method for primary data collection, which is widely used in conducting qualitative research where researchers are interested in gaining insights into or understanding of opinions, experiences, processes, behaviours, or predictions, our methodology was appropriate to achieve the goal of our deliverable.

2.2 Our Approach

The regions where the Delphi-type interviews have been conducted include Portugal (Lisbon), Italy (North Italy/Bolzano), Great Britain (Nottingham), Germany (Ruhr area), the Netherlands (Amsterdam), Austria (Vienna), Switzerland (North Switzerland/Basel) and Spain (Canary Islands). We conducted two rounds of foresight interviews by all ESRs between March and September 2021 with different groups of local stakeholders. The aim of the first round was to identify the current state of the energy system including challenges and opportunities that are typical for the regional context. The outcome of this round has also been used to inform deliverable D3.4. The second round of the foresight interviews aimed at identifying the vision 2040 on the future energy system and possible pathways to achieve it.

The main groups of stakeholders that have been targeted are:

- Policy-makers, local authorities, regulators
- Business sector, industry representatives
- Technological experts, researchers
- Citizens' groups
- Environmental NGO's, energy justice networks

The themes underpinning the interviews were derived based on the perspectives of the WP3, WP4, WP5, and WP6 and in an iterative manner. The ESRs from all WPs discussed collaboratively and identified themes that create a holistic picture of the regional energy transitions. The themes that arose are:

- Techno-economic obstacles and drivers
- Business models in current and future energy system
- Participation and collaboration
- Equity, energy poverty, fair energy transition

Following the identification of the themes, interview questions were developed to align with these themes and achieve the objective of the deliverable. Similarly, to the development of the themes, the questions were developed in an iterative manner and finalised after consulting within the Smart-BEEjS consortium. Finally, guides for the interviews helped the ESRs to navigate through the questions in a semi-structured manner depending on their local context priorities and stakeholder. The guides are included in the Appendix A1.

Having finalised the themes and the interview schedule, an invitation letter with brief information on the interview purpose was sent out to possible participants. Once they agreed for participation, a detailed description of the research purpose was provided in the participant information sheet (PIS) – see Appendix A2. Fully informed consent was requested from each participant before conducting interview. These documents were translated by each region for non-English speaking participants. Participants were asked to confirm their consent by return email and the ESRs were also asking the participants at the beginning of the interviews to confirm again their consent verbally and that they are happy to participate.

The interviews were conducted online due to COVID-related restrictions. The default platform for the online meetings was MS Teams. However, participants with no access to Teams used Zoom but all data were stored in in the password-secued MS Teams channel of the Smart BEEjS project. When permission for recording in consent form was given, interviews were recorded and saved on the Smart BEEjS project, password protected, Teams archive. The audio recordings were saved together with the consent form in an anonymised manner in a folder of the project's MS Teams folder during the time of the study. Once the transcripts were available, the audio recordings were destroyed.

Anonymisation at the time of transcription was achieved by using pseudonyms to protect participant's identity will be applied. The codes combine an abbreviation of the region and stakeholder group of the interviewee to facilitate the analysis. This pseudonym was assigned to the participant in the consent form, which allows the participant to know the unique code that is assigned to them. Later reports will be fully anonymous without identifiers and no identity shall be identifiable from the way of writing. A separate document was created to link participants' names and the pseudonyms used in the transcription in order to find which interview data need to be destroyed in case in case a participant would ask for their data to be withdrawn (within 3 weeks from the interview). The document with the key is stored securely at the Smart BEEjS project password protected Teams channel. Anonymised data is used under the NTU Data Management Policy and will be deposited in the NTU Data Archive. The data will be retained for at least 10 years, in accordance with NTU data management policy, but only in fully anonymised form. This anonymised information will be made available under UK and EU Open Data policies. Any confidential data, beyond the identities of individuals and their organisation, will be redacted, if there are any.

In total, the ESRs conducted 74 interviews. The outcome of these interviews and the deliverable itself will inform the foresight report (deliverable D6.4).

3 Conclusion and Outlook

Deliverable D6.3 required the ESRs from all beneficiaries to design and facilitate a scenario-based foresight series of interviews for their region with the participation of local stakeholders with the aim to identify the vision 2040 for the energy system in Europe. The ESRs conducted a total of XX interviews in all 8 regions to achieve the objective of this deliverable as well as D6.4 which is a foresight report which encapsulates the outcomes of the foresight interviews in all regions.

It is worth acknowledging that the Delphi method has some general limitations. It is significantly dependent on the willingness of experts to participate and the response rates of each round. Hence, the motivation of experts is essential (Goluchowicz and Blind, 2011). Another weakness of Delphi is that participants may unintentionally or deliberately promote desired outcomes or attempt to influence future decisions (Dajani et al., 1979).

Still, Delphi is a popular qualitative forecasting technique that has been applied to a wide variety of problems in different fields. Its sustained popularity is based on its several strengths as a planning, forecasting, and decision-making tool, drawing upon the expertise of a panel of experts (Gupta and Clarke, 1996). Indeed, it relies on experts who bring knowledge, authority, and insight to the problem (Gutierrez, 1989) in order to provide a structured approach to efficiently elicit responses in regards to scenarios and forecasting (Woudenberg, 1991). Additionally it can capture a wide range of interrelated variables and multidimensional features which is the case in most complex problems (Ray and Sahu, 1990). Finally, applying the Delphi-type interviews method allowed us to document observations and opinions of the experts, while avoiding the issues of face-to-face interaction, such as group conflict and individual dominance (Rowe and Wright, 1999) and hence achieve the objective of this deliverable.

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Appendix A.

A1. Interview guide

The interview

Introduction, Participant Information Sheet (PIS), Consent form:

- Introduce project,
- Introduce aim of the interview,
- Reflect findings of first activities,
- discuss PIS and Consent form – any questions?
- individual identification code and data storage,
- voluntary, no right and wrong answers,
- Confirmation.

The first part of the interview – the vision making:

Start recording

Explain the first task (example)

<Energy system is a complex system… identify your vision (as a representative of your stakeholder group) of the regional energy system for 2040. …express yourself through other ways than talking. … interactive drawing exercise. … to show …roles, interaction of different stakeholders, technologies, policies and decision-making, and money or other value streams.**>**

Introduce Jamboard to the participants

Repeat the question

What is your vision of the future energy system for 2040 and how to achieve it? Could you draw a picture on how you envision the future energy system (and the role of energy communities[1]) using the tools of **Jamboard** and guide me through your thinking and reasoning please? **Elements** such as: interaction of stakeholders, energy use, energy production and where it is coming from, how energy is distributed etc. could be part of this picture that represents your vision. Ask to show the **interaction, the relation**, etc by drawing arrows.

Transition from Visioning to Questions

Create a link between exercise and next part of the interview depending on your first part of the interview. For instance:

< Thank you, for your insights. ….**>**

Second part of the interview – Questions to enhance the vision:

Note: Be explicit about what you ask, but do not ask leading questions. Refer to vision (picture).

WP4 (Techno-economic drivers)

<You have presented your different technologies in your vision. Energy efficiency in buildings might also be a techno-economic driver to achieve the 2040 climate goals.**>** (Create a link! This sentence needs to be individually structured according to participant's vision)

what are the plans and how it is intended to carry them out.

1) In your opinion, what are the ways to achieve adequate **building-stock efficiency in terms of finance, technologies**, and timing to reach 2040 climate neutrality?

a. time scale for building renovation/ milestones? Does rate need change?

b. payment for renovation - Who and how? Social housing vs private development – stakeholders involvement

c. Where focus: envelop efficiency such as insulation vs. active energy management/ What typology of energy exchange?

d. next steps to move from building to district level?

e. potential challenges?
f. best solutions to balance the energy flow within the district?
g. connections of buildings?

WP6 (Business models)
<…financial aspects…it is likely to require high investment costs or technology solutions that are not yet financially sustainable. …to imagine a subsidy-free future where business models may need to transform to remain financially viable.**>** (Create a link! This sentence needs to be individually structured according to participant's vision)
2) For the vision you have described before, how could it become **economically sustainable**, is there a way to achieve this **vision in a subsidy free way**? Please elaborate your answer.

- **Financial streams:**

Are you aware of … current, successful financial opportunities to be used in the future?
responsibility and source of financial resources- who? Where?
public subsidies vs. private initiatives?

- How can business models help?

Technology adoption in households -affordability
Household energy consumption -help reduce but still being financially sustainable

WP3 (Collaboration)
<… different stakeholders involved, that interact and need to collaborate ….**>** (Create a link! This sentence needs to be individually structured according to participant's vision)
3) For a successful local energy transition towards your vision, **which stakeholders (that you consider) should collaborate** and what are the **means for their collaboration**?
a. which types of stakeholders involved? What facilitates their roles?
b. what means of collaboration e.g. workshops and seminars for citizens, local government helpdesks, co-creation projects?
c. what actions for more active and inclusive citizen engagement?

WP5 (Reduction of energy poverty)
<… energy consumption behaviour …Policies to change behaviour must also be carefully design not to impose undue burden on the vulnerable and energy poor. … as many of them already under-consume. **>** (Create a link! This sentence needs to be individually structured according to participant's vision)
4) Considering your vision, what **changes in energy behaviour** (decision-making on energy consumption, technology adoptions, investments) are necessary to support it? What **policies** could **facilitate behavioural change**? How can the **energy vulnerable be included** in these policies without being negatively affected?
a. good examples of policies -> improvement for future?
b. current policies: embodied energy use vs. mainly direct energy use?
c. transport poverty?

A2. Participant Information Sheet and Consent Form

PARTICIPANT INFORMATION SHEET

Co-funded by the Horizon 2020 programme of the European Union

What is the purpose of this study and what is your role?

The present study arises in the context of a Smart BEEjS research project, funded by the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie Actions, Innovative Training Networks, Grant Agreement No. **812730** (for more information about the project see https://smart-beejs.eu/). Your participation, which is highly valued, consists of taking part in an interview which is aimed at exploring future scenarios for the energy transition and the design and implementation of smart cities and communities within the horizon of 2040 and how this vision can be achieved in your region without the need for subsidies, with the reinforcing power of an inclusive and just, user-driven market. This interview is part of a foresight interview series that is conducted by our research team in their corresponding regions, namely Portugal (Lisbon), Italy (North Italy/Bolzano), Great Britain (Nottingham), Germany (Ruhr area), the Netherlands (Amsterdam), Austria (Vienna), Switzerland (North Switzerland/Basel) and Spain (Canary Islands). All participants of the interviews are the potential stakeholders in the creation of these future scenarios such as smart cities and communities in their region. Stakeholders can be private, public, from the third sector or from citizens' groups.

How will the interview be conducted and what will happen with the data and results?

The interview will take around 50-60 minutes, will be conducted through a video call and will be videorecorded if you consent to that and sign this form. There are no expected risks associated to participation in the study. You will not be under any pressure to answer questions or talk about topics that you prefer not to discuss, and you can choose to halt or withdraw from the interview at any point. Participation in this study is strictly **voluntary**: you can choose to participate or not to participate. If you choose to participate, you can stop your participation at any time without having to provide any justification. In addition to being voluntary, your participation is also **anonymous** and **confidential**. The video recording will be transformed into an audio recording that will be used for the transcription and they will be handled only by the Smart-BEEjS researchers and supervisors, in line with data protection principles and our approved research protocol. Once the transcripts have been deposited in the project's password-secured MS Teams archive, the video and audio recordings of your interview will be destroyed. Any quotes that we use will be anonymised,

which means that they cannot be linked to you. We will only keep the research data that would allow others to check and verify our findings. These will be deposited in the NTU Data Archive, which is an archive of research data and will preserve data for at least ten years. Any anonymous data, which could not lead to the identification of either you or your organisation will be publicly available. This will allow anyone else (including researchers, businesses, governments, charities, and the general public) to use the anonymised data for any purpose that they wish, providing they credit the University and research team as the original creators.

You can withdraw your interview data from the study within 3 weeks after your interview by informing us and the data will be destroyed. The data is intended merely for qualitative analysis and academic purposes, such as the project's deliverables and journal publications, but no answers will be analysed or reported individually. Your insights will provide us with important information for our project's deliverables and might be of future use for the individual PhD researches within the Smart-BEEjS project. We will ensure that you and the organisation you work for cannot be identified by the way we write up our findings, however, the stakeholder group you represent will be mentioned in the report.

What are possible benefits?

Although you may not benefit directly from your participation in the study, your answers will contribute to advance the understanding on barriers and pathways for the energy transition in your region, enabling more environmentally friendly societies. Moreover, the findings will be open access and if you are involved in smart city and community/local energy transition design and implementation, your work can directly benefit from such findings. The project deliverables that will summarise the findings of the different regions will be publicly available on our project website: https://smart-beejs.eu/deliverables/. In any case, if you wish, please tell us your contact details and we will send the results once they are available.

Further questions?

I, (name of ESR), will be happy to conduct this interview with you. In case you have any questions, please contact me via xxx or email xxx. Additionally, this study is coordinated by Helen Heinz helen.heinz2019@my.ntu.ac.uk and Erkinai Derkenbaeva erkinai.derkenbaeva@wur.nl who can be contacted in case of any questions or should you wish to share comments. This project is being administered by Nottingham Trent University (Nottingham Business School). NTU is therefore responsible for the conduct of the project, as one of the academic partners of the Smart-BEEjS project.

CONSENT FORM

Please read and confirm your consent to being interviewed for this project by initialling the appropriate box(es) and signing and dating this form.

1. I confirm that the purpose of the project has been explained to me, that I have been given information about it in writing, and that I have had the opportunity to ask questions about the research.	☐
2. I understand that my participation is voluntary, and that I am free to withdraw at any time within 3 weeks without giving any reason and without any implications for my legal rights.	☐
3. I give permission for the interview to be video-recorded by research staff, on the understanding that the recording will be destroyed once the transcripts have been deposited in the project's archive.	☐
4. I understand that anonymised information will be publicly available for future reuse from the NTU Data Archive and that it will not be possible to identify either myself or my organisation unless requested by me otherwise.	☐
5. A unique participant identification code that will be assigned to you to ensure your anonymity will be in the form: (region abbrev_ stakeholder abbrev).	☐
6. I agree to take part in this project.	☐

If you cannot agree to the above, please discuss it with the researcher(s) (researcher name XXXXXX) as you may be ineligible to participate in this study.
Contact information:

contact details researcher

Your participant identification code is _____

Name of participant:_____Date:_____

Signature: _____

Name of researcher:_____Date:
_____ Signature: ____
_____

About the Smart-BEEjS Project

Energy transition is supported in the EU by legislative developments, such as the Strategic Energy Technology Plan that aims to transfer power to consumers by decentralising the energy eco-system at the local district-level. However, this transition occurrs at a time of increasing wealth inequality, energy poverty, and gender difference. Thus, the long-term vision of the Smart-BEEjS project is **to design transformational pathways** that tackle **Energy Poverty and Justice**, providing evidence and using the decentralised nature of **'Positive Energy Districts'** and **'Networks of Districts'** as the central platform of transformation, whilst recognising the economic, social and environmental challenges faced. Tackling the issue of energy injustice and poverty is an essential pillar for contributing to the **decarbonisation of our economies** without leaving large parts of the population behind.

Behind any decision or intervention – whatever the field of expertise, technological, business or policy – are **people**. Therefore, **the overarching training aim of Smart-BEEjS** is to provide, through a multilevel, multidiscipline and interdisciplinary training platform, a programme to produce the technology, policy making or business oriented **transformative and influential champions of tomorrow**; educated in the personal, behavioural and societal concepts needed to deliver the success of any technological proposition or intervention under the human-centric perspective of energy justice.

The Smart-BEEjS project recognises that the new level of decentralisation in the energy system requires the **systemic synergy of different stakeholders**, who are **inseparable** and interrelate continuously to provide feasible and sustainable solutions in the area of **energy generation and energy efficiency**. They balance attention towards technological and policy-oriented drivers from a series of perspectives:

- **Citizens and Society**, as final users and beneficiaries of PEDs;
- **Decision Makers and Policy Frameworks**, in a multilevel governance setting, which need to balance different interests and context-specific facets;
- **Providers of Integrated Technologies, Infrastructure and Processes of Transition**, as innovative technologies and approaches available now or in the near future;
- **Value generation providers and Business Model Innovation (BMI)** for PEDs and networks of districts, namely businesses, institutional and community-initiated schemes that exploit business models (BMs) to provide and extract value from the system.

In order to introduce cooperation and shared thinking, Smart-BEEjS presents a balanced consortium of beneficiaries and partners from different knowledge disciplines and different agents of the energy eco-system, **to train at PhD level** an initial generation of **transformative and influential champions** in policy design, techno-economic planning and Business Model Innovation in the energy sector, **mindful of the individual and social dimensions,** as well as the **nexus of interrelation between stakeholders** in energy generation, technology transition, efficiency and management.

The overarching aim of the project is to boost knowledge sharing across stakeholders, exploiting a human-centric and systemic approach to design Positive Energy Districts (PEDs) for sustainable living for all.

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