Smart-BEEjS

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

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Socio-economic factors & Citizens' practices, enabling Positive Energy Districts

Advisory report on accelerating PED Design

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Executive Summary

In this report, we investigate the issue of silo thinking in the development of Positive Energy Districts (PEDs) as testified by stakeholders and propose recommendations to overcome silo thinking to achieve better collaboration between and within stakeholder groups. Involving all relevant stakeholders is argued to be essential to effectively reach PEDs and to include vulnerable as well as often overlooked groups in the process (Sareen et al., 2022). However, silo thinking can prevent or hinder the collaboration between stakeholder groups and within a stakeholder group. Thus, we identify silo thinking and best practices to overcome them, from stakeholder interviews conducted as part of a separate report (Derkenbaeva et al., 2022). The analysis focuses on three types of silo thinking – **institutional silos**, **silos of representation**, and **administrative silos** – and how to overcome them. In addition to the best practices suggested by stakeholders, additional perspectives to overcome silo thinking are proposed by the authors of this report.

In interviews with stakeholders from Amsterdam, the Canary Islands, and Lisbon metropolitan area, the following issues of silo thinking are identified:

- Institutional silos between citizens, who want to consume renewable, affordable, and community-based energy, and large companies, who are concerned with efficiency and profit
- Silo of representation of citizens about the impossibility for businesses to come out of their profit-driven practices
- Silo of representation about citizens' knowledge and willingness to participate in PEDs projects that make citizens feel less empowered to collaborate as an equal partner with the government or large businesses
- Administrative silos that hinder the government's financial support of cross sectoral energy transition efforts such as housing retrofit projects

To overcome the identified silos, we recommend:

- Structural change by the national government providing a legal framework and incentives for local government and companies to engage more with citizens and small businesses during the development of PEDs
- The use of intermediary organizations that can facilitate communication and collaboration between government sectors and between stakeholders
- Intergroup communication that allows citizens and small businesses to acquire more information and voice their demands, breaking from misrecognition and exclusion from such discussion as the development of PEDs.

1 Introduction

Positive Energy District (PED) is a district built or retrofitted to produce more renewable energy than it consumes while maintaining a high quality of life for its residents. It is part of a European initiative that aims to build 100 PEDs by 2025. As pointed out by Sareen et al. (2022), programmes such as PEDs require collaborative governance. Collaborative processes integrate top-down and bottom-up initiatives, allowing cooperation that makes use of formal and informal personal and organisational networks (Sareen, 2022). Such processes consist of a number of activities, competencies, and tools to engage different stakeholders, allowing them to cooperate together and to allocate roles, resources and responsibilities. In addition to processes and functionalities, researchers (Nguyen & Batel, 2021; Sareen et al., 2022) have emphasised that successful PED design also requires consideration of how PEDs might have implications for fairness and the exclusion of sections of the population. Some issues include the socio-psychological implications on people's daily lived experiences, such as the disruption in people-place relations (Batel, 2020, Trentelman, 2009, Manzo & Perkins, 2006, Grossman, 2019).

Therefore, research and policies on PEDs have been advocating for a human-centric approach that prioritizes fairness and inclusiveness during the design, development, and implementation of the PEDs and their related activities (Nguyen & Batel, 2021). This requires resolving barriers related to financing, regulations and collaboration across different areas of the energy system. Collaboration between divided administration teams in local government or between traditional and non-traditional stakeholders such as small businesses and citizen groups could be challenging due to divergent goals and misconceptions. Such a divide between groups is often conceptualised as silo thinking. Silo thinking is defined as "the pursuit of one individual or group's interest or objectives without considering or recognising others' viewpoints and interests inside or outside of the organisation, discipline or community." (Yoo et al. 2020). Based on a previous literature review on the socio-economic and psychological factors related with silo thinking, we found that silo thinking is hard to break due to the lack of experience and motivation for collaboration on the part of stakeholders and the lack of effective coordination systems between them. Breaking silos will contribute to "preparing the ground" for successful PED governance processes and functionalities (Sareen, 2022). In other words, being aware of and overcoming silo thinking might contribute to a more democratic and inclusive process of policy-making at the local level of the energy system (Yoo et. Al, 2022, Devine-Wright, 2010).

This report aims at raising awareness and providing practical tools for local policymakers and developers/practitioners to identify and overcome silo thinking in the process of designing and developing inclusive PEDs. In the next section, the report provides a background of common types of silo thinking contextualised in PEDs, namely institutional silos, silos of representation and administrative silos, and reasons why it is essential to overcome them. Section 4 describes and Section 5 analyses three diverse case studies (geographically diverse and in relation to their socioeconomic characteristics[1][1]), conceptualising the types of silo thinking that can be identified in these cases. Three types of silos and best practices to tackle them were identified in the cases as most relevant to policy makers and practitioners.

[1] Three case studies across the EU at the level of large metropolitan or regional area - Lisbon, Amsterdam and the Canary Islands. The case studies were part of a more extensive study within the Smart-BEEjS project (MSCA-ITN *Grant Agreement No 812730*) that collected data from interviews with local government, business, expert and citizen groups from eight regions in Europe.

2 Background: Forms of collaboration for designing inclusive PEDs

The successful implementation of PEDs requires the involvement of multiple stakeholders at different governance levels (local, regional, national, and European). Such endeavours require the momentum and demand for change, the technological knowledge, change in physical infrastructure, accommodating regulations, and favourable economic incentives. As such they can be considered under the framework of multilevel governance (Marks, 1996). This framework requires diverse forms of collaboration, that might be hindered by silo thinking. Three collaboration-related processes are highlighted in our work, playing a key role in the design and implementation of PEDs: Collaboration between community, business, and government; Government efforts to involve citizens; Mission-oriented approach by government layers. Each of these processes faces a primary type of silo thinking (Yoo et al., 2020):

2.1 Collaboration between community, business, and government

Knowledge and momentum for large-scale projects for energy transition require the experience of grassroots organisations (e.g. citizens-led energy communities), niche specialised small and medium enterprises and the collaboration with the local or national government (Hisschemoller & Sioziou, 2013; Hargreaves et al., 2013). For example, the regulatory framework for integrating innovative community-level initiatives and the activities of small and medium enterprises, developing niche business models that address the needs for peer-to-peer energy provision across a district (Campos et al., 2020). Institutional Silos hinder such types of collaboration. Institutional silos refer to the difficulties in collaboration between different stakeholders, such as small businesses, NGOs and public officials. Collaboration between these stakeholders may originate from their attitude toward innovation, lack of opportunities to network, different organisational practices and different priorities in goals. For example, small businesses working on community-level energy projects lack opportunities to collaborate with the government (Hisschemöller & Sioziou, 2013). In contrast, government officials may be slow to incorporate innovative business practices into their energy initiatives (Campos et al., 2020).

2.2 Government efforts to involve citizens

Designing successful PEDs requires local knowledge and experiences from citizen participants to adapt designs to the local context. Government can collaborate with citizens by involving them in co-creation, which will help build trust and make the government more readily available to encourage citizen participation. Such efforts are hindered by the Silo of Representation (Fiske et al., 2002; Devine-Wright, 2010). Silo of representation refers to the misconceptions or biased beliefs that stakeholders hold about each other or themselves that prevent them from interacting with one another or making them interact passively (Yoo et al., 2020). Such silos might exist because of how stakeholders perceive other stakeholder groups (government officials vs citizens and vice versa) or the perception that such processes are time-consuming, delaying decisions and projects (Devine-Wright, 2010). These perceptions come from limited communication, prejudice, and past experience. An example of this is the perception that all citizens will react with NYMBYism to energy projects that disrupt the aesthetics of their neighbourhood, when in fact, each locality has different reactions to and concerns about these projects (Islar & Busch, 2016).

2.3 Mission-oriented approach by government layers

, at the same time, clarity of responsibility and processes across the different layers of governance and the requirement of resources and capabilities across the same layers of governance. Therefore, PEDs require vertical coordination within the government, where the national government may provide incentives or set regulations to establish common goals and provide technical or fiscal support for local action (Homsy & Warner, 2015); and horizontal coordination to bring together the expertise across sectors of the government (Knieling, 2016). Such approaches often face administrative silos (Schout, 2001; Bedsworth & Hanak, 2013). Administrative silos refer to the barriers to collaboration between different administrative bodies within the government. Differences in goals and the higher costs of initiating and maintaining collaboration tend to drive the silos between different government bodies. For example, local governments are more likely to implement initiatives related to locally-owned facilities such as waste management than projects related to regionally- or nationally-managed sectors such as transport or energy planning (Bedsworth & Hanak, 2013). Such a tendency implies the reluctance or difficulty felt by local governments to collaborate with other levels of the government.

3 Methods and procedure

The three case studies analysed for this report are chosen because they cover different geographical areas. Specifically, they have different potentials for energy generation from a diverse set of renewable energy sources, which is an essencial component of PEDs, and different weather conditions, which are critical for thermal comfort and lighting services. They are located in Northwest Europe, South Europe, and a remote islandic region (an EU Outermost Region[2]). The three case studies have furthermore, historically different types of governance structures, with the islandic region presenting unique characteristics and challenges of insularity and isolation from the main energy grid and an autonomous governance structure.

The data to be presented and analysed below was provided by 21 semi structured qualitative interviews (7 for each case study); carried out online between February and September 2021, considering various COVID-19 restrictions. There were two rounds of interviews, the first on the current situation of the energy system and the second on the vision for a low carbon energy future. Participants of the three regions belonged to four different stakeholder groups: local government/policymakers, business, expert/researchers and NGO/citizen groups. Questions revolved around four key topics - collaboration and inclusivity, technical and economical configuration, policies for energy poverty, and business models for non-subsidised PEDs in the future (Derkenbaeva et al., 2022).

The data was interpreted in order to achieve the following two research objectives: 1) to identify if and what silos were present in the three case studies from the stakeholder's perspective; 2) if there were ideas or best practices to overcome these silos.

[2] Outermost EU Regions present distinctive characteristics and challenges, recognised by the Treaty of Functioning of the European Union (articles 174 and 349 of the TFEU).

4 Results

4.1 Amsterdam

4.1.1 Institutional silos in involving citizens

Stakeholders in Amsterdam identified silos that exist between NGOs or other community level projects and citizens. It was stated that it takes time and effort when involving citizens in community energy projects. A participant said "*The important group is the people who live in certain neighbourhoods who you want to work with, or where you live in, and who you want to collaborate but you don't have the phone number usually, and you don't have the name*"

(Source: Participant1-1-1)

4.1.2 Best practices to overcome difficulty in involving citizens according to stakeholders

Stakeholders suggested that personal contact with potential participants of community energy projects is the way to overcome the difficulty in getting citizens involved. Meeting and talking to citizens allow NGOs or leaders of community energy projects to raise awareness and understand which aspects of energy transition projects are valuable to citizens, such as having a voice in determining how the electricity they consume is produced and safeguarding affordable power prices. Also, through these networking activities, project leaders are able to identify local community leaders who can help in further expanding the network and recruiting interested participants. However, in this process the absence of government departments is notable (a type of Administration Silo). A participant illustrated this point by saying:
"*But my experience is that if you go to the places where those people are together which can be a school or a playground or a church, or a community centre – stuff like that, it's rather easy to find people who want to collaborate. … And from that one percent, that's at least my theory, you can find another nine percent who want to follow you. And with those together, you have about ten percent of a community which is able to engage one hundred percent of the total community*.

(Source: participant1-1-1)

4.1.3 Silos of Representation in businesses' perception of citizens' and citizen groups' reliability

Stakeholders pointed out the unequal footing that citizens are on when they are involved in energy projects, or when they communicate with energy companies. This can be interpreted as a type of silo of representation of citizens. The perception of businesses as citizens being less capable in successfully delivering energy services for themselves derives from the opinion that citizens lack of expertise and commitment compared to big companies.

4.1.4 Silos of Representation in citizen's perception of large businesses

According to participants from Amsterdam, large businesses were perceived as mainly working for profit and, thus, aligning their goals towards the wider society's demand for energy transition is a substantial change. Large companies and utilities were singled out as needing to do more to support energy transition, and were expected to move actively on supporting the decentralisation of the energy system. A participant illustrated the difference of perception between business and citizens, saying, "*Big companies come from a different angle, think big and want to go fast, want to make money and it's a totally different state of mind than the locals have in mind. They want to talk to their neighbours, think small and don't have to make a profit out of it*".

(Source: Participant 1-2-1)

Although part of the perception that businesses only care about profit is a misconception, in more cases, it is true. Therefore, in addition to silos of representation, institutional silos also exist between citizens and businesses.

4.1.5 Best practices to overcome silos of representation and institutional silos between citizen and businesses according to stakeholders

According to the stakeholder interviews, companies have grown more accustomed to communicating and sharing information with citizens who are in need of information for community energy projects. Furthermore, companies are in a position of understanding and adjusting to the needs of their customers, as they can feel consumers' reaction and pressure to the services and products that they offer constantly. A participant said, *"I don't think the current utility companies will be there in 2040, I think their [role] will change quite a lot. Also with the upcoming local energy markets, their role is decreasing ... but then in return, [their role] will [change to the] role of [what] they call the Aggregator"*.

(Source: Participant 1-2-2)

Balancing the goals of businesses and citizens however, municipalities might be a key mediator. Government policies that subsidise energy consultations ensure that the lack of knowledge does not prevent citizens from choosing more sustainable energy options, assisting citizens in making their house or community more sustainable.

4.2 Canary Islands

4.2.1 Institutional silo from big companies' monopoly

Despite their central role in providing technological solutions, big energy companies are traditionally hard to collaborate with for either small businesses or local government who demand big companies to change their unsustainable practices. It is said that due to power asymmetry in the market created by big companies' monopoly, companies are able to keep their inefficient energy model.

"We've seen that they [Endesa – biggest energy distributor in Gran Canaries occupying 80% market share] don't have incentives to do anything different. They haven't done it, they could have made a transition from fuel and diesel to gas in the nineties or in 2000s, 30 years after the fuel motors were installed. […] they didn't want to do it because they would lose market share from the renewal energy. You know the renewal energy here is distributed to local producers and mainland per users there are many, many companies."

(Source: Participant 2-2-1)

4.2.2 Best practices and visions of collaboration with big companies according to stakeholders

Participants from Canary Islands advocated for building a culture of collaboration instead of competition in business practices. Beside changing the mindset, this culture of collaboration could be empowered through networks. For example, Institute of Technology Canary Islands (ITC) takes the role of coordinating collaboration between stakeholders on the basis of specific projects. In doing so, a top-down pressure from European regulatory framework is reported to be effective to force local authorities and big companies to engage with citizens and communities in the development of PEDs as it is said to allow the future human-centric energy system to emerge.

4.2.3 Silo of representation about citizens

In contrast to the usual silo of representation that downplays citizen's willingness to participate in the energy project, participants from Canary Islands claimed that citizens are generally perceived as having knowledge and willing to participate, but lack the means and financial resources to realise their active role in energy cooperatives and communities. According to them, citizens are expected to have a more active role in the future energy market through being prosumers or being involved in energy communities or energy cooperatives.

"If they finally manage, I mean the [inaudible] people, to build an own distribution network they would dispatch directly with [inaudible] Electric without passing through Endesa, okay. This would be a revolution."

(Source: Participant 2-2-2)

4.2.4 Silo of representation about local government

Even when there is a push/demand/legalisation for collaboration from the citizen's groups and small businesses, lack of communication with and from the local government creates power distance. As a result, it is noticed in the interviews that citizens' and local communities' lack trust in local government, presenting them as bureaucratic. This could be a sign of silo of representation.

4.2.5 Best practices and visions for citizens and local government collaboration according to stakeholders

Participants concluded that exchanging of clear and consistent information is advisable for the government to build trust with citizens and communities. Citizens could also achieve the appropriate level of collaboration and change their own roles if they have more access to information, dissemination, training, and campaigns. To really shift the power to citizens and empower communities, it is believed that changing the narrative and legal framework is not enough. It needs to be materialised by new resources and means of collaboration provided to citizens.

4.2.6 Administrative silo from citizens and government about energy

According to one participant, energy production and consumption are usually abstracted and disconnected from other activities in life, especially for agriculture production. Hence, to solve the problem of energy system, they demand a rethinking in how energy-water-food nexus is organised.

"So, what's so complicated with this transition, now I'm talking about water and agriculture, it's everything connected. And we cannot only touch one thing without touching everything else, […] it's complicated because we need to pump less water or at least pump the water at the moment we have more wind and more sun and we have to change our mindset in many areas."

(Source: Participant 2-2-3)

4.2.7 Best practices to overcome administrative silo of citizens and government according to participants

Government's mindset about energy needs to change from the perception that it is a single sector to the idea that it connects with other sectors such as transportation, agriculture and heating/cooling system. The same mindset change needs to be promoted for citizens through training on energy behaviour that adapts to the intermittent nature of renewable energy.

4.3 Lisbon metropolitan area

4.3.1 Institutional silos in retrofitting projects

There are institutional silos in retrofitting projects due to supply chain market and knowledge barrier. There is the lack of expertise in the market, of skilled labour and material. On the other hand, there is no market also because there is a lack of supply of skilled workforce and materials, thus creating a vicious circle.

" I would say that the supply market, the supply chain of the renovation, the renovation supply chain is broken, because, as you were mentioning, there is a lack of expertise clearly, especially for this needed scale of transformation."

(Source Participant 3-1-2)

A further silo is the lack of information and interest by intermediaries in the retrofitting measures and their potential. An example of good candidate organisation that can lead the transformation in multiapartment buildings across the city is the "*empresas de condomínio*".

4.3.2 Best practices and visions of collaboration according to stakeholders

Participants provided a partial solution to break this silo. They suggest a one-stop shop for renovation to break information silos. Moreover, they point out the critical issue of indicators for energy poverty measurement to understand how to allocate public resources and involve public authorities.

4.3.3 Silo of representation: negative connotation of large energy companies

According to citizen group stakeholders, the representation of energy companies appears to be problematic for collaboration. They are seen as uncollaborative or even a "closed circle". This representation might lead to prejudice and barrier from some NGOs or citizen's association to participate if a PED project involves big energy companies.

4.3.4 Administrative silo in horizontal and vertical multilevel governance.

Participants revealed that there is horizontal and vertical disconnection in multilevel governance and spatial planning. At the macrolevel, a silo can be identified in the multilevel governance at the horizontal level between different sectors of the government and in the vertical in the relation between the national policies such as National energy and climate plans (NECPs) and the local policies in the short and medium term. Particularly, it is not defined how the long-term plans of the NECP will be achieved at the national and local level in 2050, nor which milestones needs to be marked between now and 2050, such as what the goals are for the percentage of building renovation each year.

"*so we set targets for the long run [NECP], but it's difficult to see how that can be implemented in the short and medium term. So, how to evolve to that. One thing I've been a bit critic on, is that we rely a lot on the technologies, so thinking- on the technologies, the easy to implement technologies*"

(Source Participant 3-2-2)

Furthermore, participants reveal a horizontal disconnection at the local level in spatial planning. They refer to a lack of communication between the sectors that should design and implement PEDs such as urban planning, environment, and housing. Particularly, the broader urban land development and the mobility seemed to be two sectors disconnected, not communicating with each other and not aligning their interests and objectives.

4.3.5 Best practices and visions of collaboration according to stakeholders

The municipality leadership should be involved and be the champion for leading transformation and drive transformation from within. It should engage a wider variety of sectors, and bring them into the discussion and attempt to change their mindsets, if appropriate.

5 Discussion and recommendation

Interviews with stakeholders revealed that a major form of collaboration affected by silo thinking is between businesses and citizens. The collaboration between these two types of actors was expressed to be a central component in delivering PEDs. However, it was also stated to be substantially affected by silos of representation and institutional silos. A type of silos that the interviews did not explore thoroughly is the administrative silo that may be a cause of exclusive energy policy and development, but it appears in the Lisbon case. We discuss the possible implications of these silos in this section.

5.1.1 Silo of representation and institutional silo between citizens and big companies

There is a negative impression of large companies in their roles in the energy transition in Lisbon and Amsterdam. According to the stakeholders, most parties involved in community energy initiatives perceived companies to be primarily interested in profit. They thus will not be interested in any goal other than this. Because this is often true, but not always, such a perception could be defined as institutional silos, where goals differ between stakeholders, and a silo of representation, where some companies may be willing to adjust their priorities. One of the most critical implications of the lack of trust towards large energy companies is that some groups of citizens or NGOs will be put off from starting to be engaged with a PED where a large company is involved. Such a lack of trust is reinforced by phenomena such as greenwashing (Aji & Sutikno, 2015). While these concerns might be legitimate, pragmatically, large energy companies may be an essential factor because of their capital, networks and internal know-how, especially if energy cooperatives are not present in a given area or not mature yet. Stakeholders of Amsterdam suggested visions of companies changing their roles to match citizen demand and suggested long-term citizen surveys and consultations where companies and local citizens can build experience in aligning goals. The increasing attention given to Corporate Social Responsibility supports the idea that continued interest and demand from consumers can affect how businesses make choices (Aguinis & Glavas, 2012).

Because the goals of citizens and businesses are not expected to align completely, public authorities are encouraged to continue promoting energy cooperatives and communities or to launch self-consumption initiatives. In the case of Portugal, the barrier is also regulatory because the current legislation prohibits public authority can be part of energy communities. Meanwhile, research has shown that energy communities could help strengthen local cohesion and reduce energy poverty by sharing resources in a social economy based on solidarity (Campos & Marín-González, 2020).

A common silo of representation found in the Canary Islands and Amsterdam is the citizens' perception of their ability to participate in energy initiatives due to their lack of knowledge and expertise, and financial resources compared to companies and the local government. Citizens are discouraged from participating in projects where they have to compete, collaborate and negotiate with experts in the private and public sectors because they expect to talk in an unequal setting. Indeed, the expectation of citizens engaging in technocratic debates of energy projects with other traditional stakeholders is argued to exclude those incapables of participating actively in the energy market and discourage their other meaningful participation in PEDs (Lennon et al., 2019).

Stakeholders from both Lisbon and Amsterdam pointed to the importance of continued involvement in the discussion to increase sharing of information with citizens and listen to their daily energy-related concerns.

5.1.2 Implications of administrative silo on non-inclusive energy initiatives

In Lisbon, there are dramatic concerns over the disconnection between different layers of governments and the lack of intermediate milestones. At the local level, it is called for more demand for different metropolitan departments to work together to make PED initiatives successful.
With stakeholders in Lisbon suggesting financial means as a way to assist the inclusive transition to PEDs, government sectors must collaborate to figure out who benefits from these policies. Although participants did not clearly express concerns about whether PEDs are connected to housing exclusion and gentrification, it was shown that green energy initiatives are increasingly drivers of "green" gentrification (Grossman, 2019). This means that housing may become increasingly expensive because of costly building retrofits or that government support of energy efficiency retrofits may not reach the households struggling with finances who most need it. However, it is challenging to realize such inclusive financial interventions without indicators that help target the appropriate groups of people who most need the support. According to the stakeholders, well-thought-out indicators could help target interventions, especially to retrofit buildings, tackle energy poverty and avoid a further increase in housing prices. The latter is a longstanding problem in the Lisbon area (Allegra & Tulumello, 2020).
It could be said that the absence of indicators is due to the silo mentality between different departments that are not working together and communicating with each other. The cause might lie in the longstanding governance culture in Portuguese multi-level governance and public administration, which is deemed to have strong hierarchical and centralistic governance. It also lacks resources, particularly in terms of welfare, and has coordination quality that is considered "low" and citizen participation considered a "weak" (Madureira, 2018). Therefore, the collaboration between diverse government sectors could help address potential social inequality.

5.1.3 Recommendations

Based on the literature review about silo thinking (Yoo et al., 2020) and collaborative governance (Sareen et al., 2022), and stakeholders' interviews in the three cases presented above, recommendations for overcoming main types of silo thinking could be systematised into three categories: policies and frameworks, intermediary practices and intergroup communications.

Policies and frameworks (PF) are structural adjustments to facilitate more collaboration between stakeholders. Literature on multi-level perspective theorises how transformation in innovation processes is not only enabled by incremental niche development but also requires regime change toenergy incumbents from sustaining the status quo – or be path dependent (Geels, 2014). This could mean that policymakers need to provide a legal framework and incentives for local governments and companies to engage more with citizens and small businesses during the development of PEDs (Brisbois, 2019). Another example on the policy side is EU initiatives that provide indicators for energy poverty such as Energy Poverty Advisory Hub (EC website, 2022) or the Recommendations on energy poverty (EC. 2020). There are also examples from the literature of a more holistic and comprehensive approach to residential energy poverty indicators (Marggraff et al., 2021) including tools such as the Energy Vulnerability Index (Gouveia et al. 2019), which combines socio-economic indicators, building characteristics and energy performance. Proponents of this type of solution for overcoming silo thinking, in Lisbon and the Canary Islands, for example, put more emphasis on the traditional power of the central government, assuming local government takes the leading role in connecting with and between stakeholders.

Intermediary practices (IP) refer to sets of solutions to overcome silo thinking that involve new ways of collaboration within an organisation or new coordination bodies between organisations. Some examples are municipal representatives, one stop shop retrofit (Boza-Kiss et al., 2021), or research centres. Studies on system thinking and nexus approach, for example, suggested that integrating goals from different administrative teams and training trans-disciplinary knowledge for administrative staff would help overcome administrative silos (Al-Saidi & Elagib, 2017). The emergence of new coordinators also changes how collaboration should operate. For instance, ITC research centre organises stakeholders based on project not on their expertise; energy cooperatives transform interactions between communities, small businesses, and local government; municipality-aided consultations for citizen's energy project improve collaboration between citizens and businesses as well as citizens and the government. It could be the case that competitor-stakeholders' first-hand experience with new ways of collaboration serves as a fruitful feedback loop to challenge their competitive mindset and cultivate a collaborative one.

I**ntergroup communications (IC)** are crucial in solving institutional silos effectively by paying closer attention to existing silo of representation. This means in cases where stakeholders misrepresent non-traditional collaborators such as small businesses or citizen groups as incompetent, with lack of knowledge or unwillingness to participate, there is a tendency of misrecognition and exclusion of their voices. Seeing communication as a process where different realities are discussed by different stakeholders to create a shared understanding and negotiate their power relations, social representation theory asks us to be aware of under-represented voices and power asymmetry in lay-expert intergroup relations (Castro & Batel, 2008). Following this argument, citizen's demand for transparent information and consistent communication from the local government could open opportunities for a renegotiation of power. It holds the government accountable for their decisions and strengthens their public trust. In addition, consumer's demand for change also re-defines roles of businesses, for example, making them grow accustomed to communication and sharing data with customers, which goes beyond making profit.

Below is the summary table of the findings:

Summary	**Amsterdam**		**Lisbon**		**Canary Islands**	
	Identification of silo	Best practices from participants	Identification of silo	Best practices from participants	Identification of silo	Best practices from participants
Institutional silo	• Difficulty of involving citizens • Regulations causing obstacles for local energy initiatives • Divergent goals of citizens and businesses	• (IC) Companies get in personal contact with potential citizens and snowballing from there	• Supply chain market disruption in the retrofitting market • Lack of knowledge from intermediary actors	• (IP) One-stop shop for retrofit information • (IC) Municipality as champion in engaging different sectors and stakeholders.	• Monopoly obstructs collaboration with big company to facilitate its change	• (IC) Build culture of collaboration not competition • (IP) Research institute as coordinator between stakeholders
Silo of representation	• Negative connotation of big energy companies • Citizens as lack of commitment • Citizens as lack of information and expertise	• (IP) Municipality as mediator and connector, • (PF) Local government subsidizes energy consultation.	• Negative connotation of big energy companies		• Citizen as lack of means and financial resources to become active consumers/ prosumers • Local government as bureaucratic	• (PF) Provide new resources and means of participation for citizens • (IC) Provide transparent information and training to citizens
Administrative silo	• Absence of government departments to relevant local consultations		• Disconnection from municipality departments involved that could be involved in PEDs	• (IP) Dedicate housing department as coordinator	• Disconnection of energy from water, food management	• (IC) Changing mindset of government and citizens on energy matter

Table 1: Summary of results of identification of silos and best practices to overcome them in Amsterdam, Lisbon and Canary Islands

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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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