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Mapping of Existing Partnerships and Networks in Aalborg East

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MAPPING OG EXISTING PARTNERSHIPS AND NETWORKS IN AALBORG EAST

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Aalborg University, Denmark

2025



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Table of contents

1. Introduction.....	0
2. Methodology.....	1
2.1 Stakeholder engagement framework.....	2
3. Five steps of engagement.....	3
3.1 Identification.....	3
3.2 Mapping.....	9
3.3 Prioritisation.....	11
3.4 Planning.....	14
3.5 Engagement.....	15
4. Stakeholder perspectives.....	16
4.1 Aalborg Municipality.....	16
4.2 The Port of Aalborg.....	19
4.3 Business Network 9220.....	20
4.4 Himmerland Housing Association.....	22
4.5 Summary.....	25
5. Conclusions.....	28
References.....	30

1. Introduction

The aim of FLEXPOSTS (FLEXible energy POSitivity districtS) is to develop effective and replicable strategies to enhance the process of establishing Positive Energy Districts (PEDs). WP5 investigates how a PED can be established in the demo site Aalborg East in Aalborg, Denmark. The aim of this report is to map and analyse the existing partnerships and networks that exist in the Danish case of Aalborg East (D5.3). First, we present some of the key arguments for stakeholder engagement when planning PEDs, the importance of utilising existing partnerships and networks, and the framework that we have utilized when planning our research. Second, we present the stakeholder engagement strategies and the initial thoughts that guided the analysis. The framework itself is divided into five steps, which form the basis of project. Third, we analyse perspectives presented by the key stakeholders during semi-structured interviews, the results are then briefly summarised and discussed. In conclusion, we find that the stakeholders generally have amenable views towards Positive Energy Districts; they express the most interest in the potential of PEDs to form the basis of new networks and a platform for knowledge-sharing that can assist in establishing new business relations and help frame the work that is being done in relation to a sustainable transition. We also found great interest in a general PED certification as it would provide a more approachable framework as well as new branding opportunities for the stakeholders. This will also provide the foundation for the future work on establishing a business model and an implementation strategy for Aalborg East (D5.5). This report, Mapping of existing partnerships and networks in Aalborg East, is the third report (D5.3) in WP5 on implementing a PED in Aalborg East. An overview of the reports that will be published about turning Aalborg East into a PED is presented below.

Textbox 1: Reports in WP5 – Demo Site Aalborg East

D5.1: Local energy balance assessment

D5.2: Barriers and potentials for implementing PEDs in Denmark

D5.3: Mapping of existing partnerships and networks

D5.4: Future energy scenarios in Aalborg East

D5.5: Business models and implementation strategy in Aalborg East

2. Methodology

Engaging stakeholders in Positive Energy Districts (PEDs) is key to fostering inclusive, resilient, and energy-efficient urban spaces (Campos et al. 2022; Derkenbaeva et al. 2022; Hearn et al. 2021; Nguyen and Batel 2021). Furthermore, PEDs can be seen as an innovation process that is embedded in a local network of organisations and individuals – such as residents, local stakeholders, and community members – who either influence or are influenced by this transformation (Cheng et al. 2022). As such, stakeholder engagement strategies become an important part of PED development as a process of both identifying transitions paths that suit the local context but also assist in identifying potentials and synergies (Maiullari et al. 2022). Understanding local dynamics and how to manage different actors and potential stakeholders in the PED development process is an important part of further developing the PED toolkit, and according to Marcon Nora et al. (2023) this field of research should be further developed through additional case studies. Additionally, stakeholder engagement is an important tool for local capacity building and knowledge exchange between actors that otherwise might not engage with one another – which should lead to the establishment of more informed decision-making instruments (Maiullari et al. 2022).

In short, the importance of involving the relevant stakeholders in the implementation of PEDs is continuously stressed in the PED literature; in fact, the involvement of stakeholders has been highlighted as one of the biggest success factors for the implementation of PEDs (Bossi et al., 2020). The stakeholders will not only provide important local knowledge and different perspectives into the process in accordance with FLEXPOSTS' transdisciplinary approach, but their engagement is also important for developing a local governance capacity, e.g. a public-private partnership, that can take on and promote the PED-agenda in the demo sites beyond FLEXPOSTS' lifespan. Continued stakeholder engagement is crucial for establishing a permanent network working towards the sustainable energy transition in the demo site. This report is centred on the mapping of the existing partnerships and networks within the demo site and an analysis of their relative positions to PEDs and relations to the concept (D5.3) – for a more in-depth view into stakeholder engagement perspectives please refer to the FLEXPOSTS methodological guideline (D3.1) (Olesen et al. 2025).

2.1 Stakeholder engagement framework

The stakeholder engagement framework that was used in the process of mapping the existing partnerships and networks has been developed and outlined in a report earlier in the project, the FLEXPOSTS' Methodological Guideline for PEDs (D3.1). The general points are based on the guide released by The Carbon Trust (2018), for the sake of brevity, they have been summarized in the following:



Figure 1: Five steps of stakeholder engagement (The Carbon Trust 2018: 7)

The approach follows five distinct steps of 1) identifying the relevant stakeholders in the project; 2) mapping the stakeholders and their relations to the project and each other; 3) prioritisation of the identified stakeholders according to perceived importance for the success of the project; 4) planning a more concrete stakeholder engagement strategy, establishing who to involve, why, where, and how; 5) engaging the stakeholders and revising plan to better suit the newly expressed needs of the stakeholders. In the following chapter each individual step will be further expanded in turn to show the work that has been carried out.

3. Five steps of engagement

A general introduction and overview of the case area has been omitted from this report and can instead be found in the previous report in the series: D5.2: Barriers and potentials for implementing PEDs in Denmark (Olesen and Nedergård Steffansen 2025). In short, Aalborg East was chosen because of its perceived latent potentials, both in terms of available space for new development, should this prove necessary, and refurbishing of existing material. Aalborg East is a mixed-use neighbourhood home to both industry and private housing, which further increase the opportunities to fully develop the area into a PED.

3.1 Identification

The initial three steps (identification, mapping, and prioritisation) were carried out very early in the project to get a working understanding of the actors within the area. Figure 2 presents a list of the key stakeholders identified in Aalborg East.

FLEXPOSTS' Methodological Guideline for PEDs (D3.1)

Aalborg East is a mixed-use neighbourhood with already established networks and links between various local stakeholders, the primary example of this is the Business Network 9220, with the stated mission of looking to establish “cooperation, trade and synergies between the many businesses within the area”. The area was also the focus of a research project looking into potentials of industrial symbiosis, which has resulted in continuous collaboration between stakeholders in the business community.

Despite many different local initiatives and high cohesion within the area, there is no formalized strategy for synergising these initiatives. Therefore, a PED network and strategy could contribute to linking the various projects in the area. Five stakeholders were initially identified to help create an overview of local stakeholders' interests, needs and potential contribution to the design and implementation of a PED strategy. A description of the five main stakeholders can be found in Figure 3.

The primary objective of the FLEXPOSTS project, is to investigate the PED feasibility of Aalborg East and is not itself a PED development process but is laying the foundation for future work. This necessitated an exploratory approach in which the mapping initially relied on presumptions made by the project team about each local actor's strategic potential - these presumptions have since been substantiated through work carried out in the area. Generally, the focus has been on identifying actors that have already carried out extensive energy renovations, play an important role in the (local) energy supply, or are expected to hold local power to influence future projects - in opposition to engaging with stakeholders of an active PED development process. In other words, the focus in identifying these actors has been on their potential in assisting a PED development process as well as their expected interest in being/becoming a stakeholder in the future.

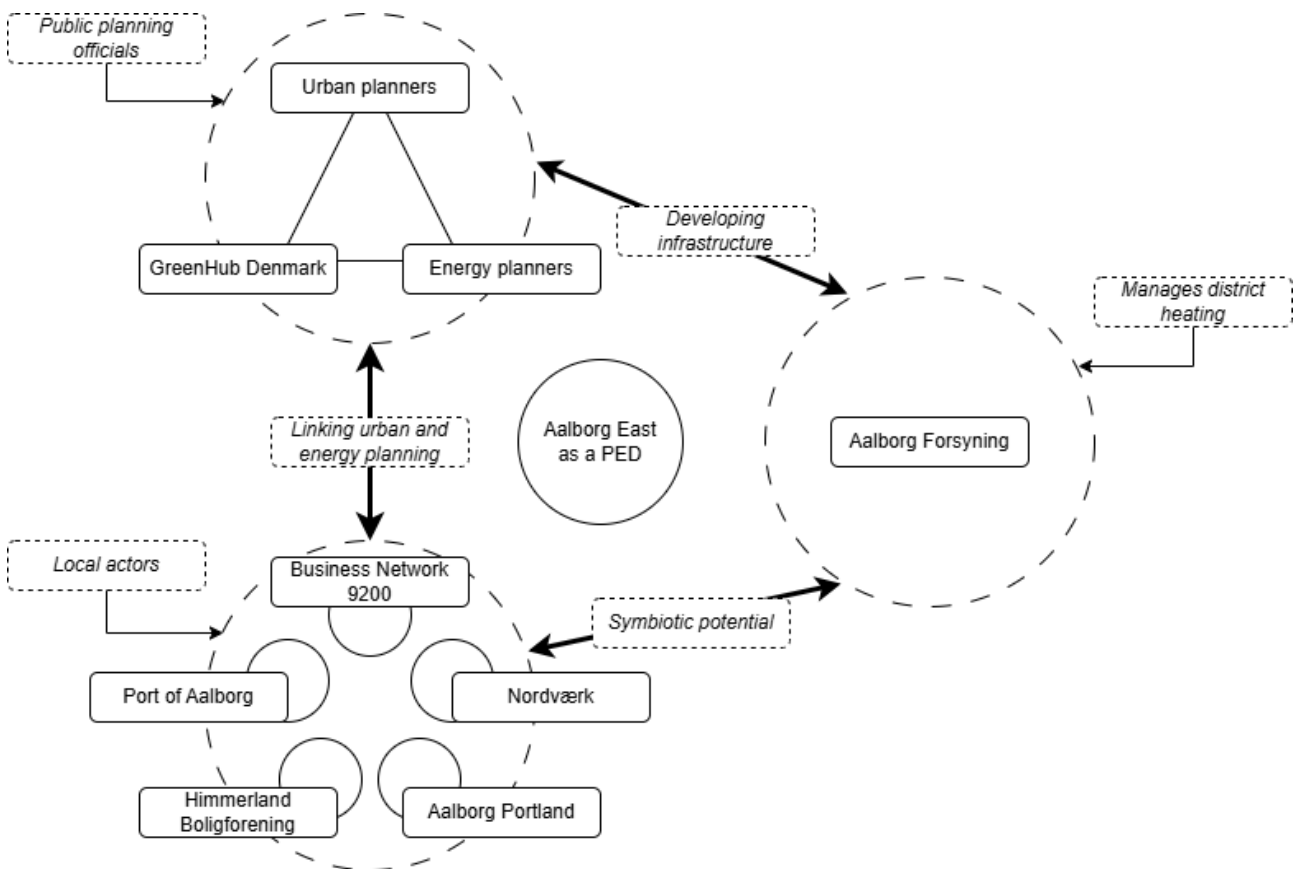


Figure 2: Initial mapping of the relations between the different stakeholders in the Aalborg East demo site.

An initial identification process was carried out by the research team to establish an overview of the actors within the area. This was done from the perspective of Aalborg East and further developed from three topics: Relevant public authorities, local actors with strategic potential, and infrastructure managers. Figure 2 presents an initial understanding of both their expected roles and potentials in relation to each other. Having established an overview of the different actors and their apparent potentials in relation to each other, the next step was to further develop an understanding of the key actors.

- Aalborg Utility (Aalborg Forsyning) is a collection of distribution companies owned by Aalborg Municipality. The utility company is located on the opposite shore of the Limfjord Sound meaning it is not situated within the Aalborg East demo site. However, the utility company manages the infrastructure and oversee distribution of district heating, cooling, gas, and water, discharging wastewater, and providing energy consultancy services within the municipality (Aalborg Utility 2025). Additionally, it is described as a multifunctional utility company with over 225,000 consumers that is working on transitioning to a sustainable future, phasing out fossil fuels for a fossil-free district heating system by 2028. They are also consolidating operations in the 100- hectare Nobis Park, creating a test centre for sustainable energy solutions. As such, the utility company is seen as a key actor and future stakeholder of a PED because of the implications this will have on the local infrastructure and broader system.
- The Port of Aalborg is a self-described multi-modal logistics hub and business park located in the northeastern corner of Aalborg East (Port of Aalborg 2025). The Port is actively engaged in sustainable business development and an active participant of the previously mentioned industrial symbiosis project (Industrial Symbiose Nord). It is Denmark's leading inland port, it prioritizes sustainability, engaging in green initiatives and partnerships to reduce environmental impact and promote economic benefits, while aiming to make Aalborg a green capital. The port is looking to expand the business park aspect of its operations and is actively investigating sustainable avenues (Port of Aalborg 2025).
- Himmerland Housing Association (Himmerland Boligforening) is a non-profit housing organization in Aalborg with approximately 7,000 rental units. The housing association have a sustainability policy emphasizing energy reduction, renovation, and biodiversity. Its ambitious Green Hub House project aims to reduce urban housing's climate impact by 75% through innovative building practices. Himmerland Housing Association is the largest housing association in Aalborg East, and in 2016 it published a report detailing its work with renovating 1,100 residential units as part of an effort to energy optimize the affordable housing area

Kildeparken. This process finished in 2020 and provided Himmerland Boligforening with substantial experience on redevelopment efforts, energy optimization strategies for the housing sector, public involvement and capacity building, and their potentials in working with the sustainable transition (Engberg & Buch 2016).

- Nordværk is a prominent waste management company in Northern Jutland. It has a waste incineration plant and recycling centre located in the southeastern part of Aalborg East. It is collectively owned by seven municipalities in Northern Jutland and operates two waste incineration plants, one of which is in Aalborg East (Nordværk 2025). Its most notable project, Nordjyllands Ressourcepark (North Jutland Resource Park), located in Aalborg East, aims to handle waste from multiple municipalities in an environmentally friendly manner, emphasizing resource utilization and waste reduction. Nordværk's role as a heat and electricity producer located within the premises of the demo site makes its inclusion important for the development of a PED.
- Business Network 9220 (Erhvervsnetværk 9220) is a network with a total of 238 unique membership companies, according to their membership list (March 2025) (Business Network 9220 2025a). It is an active network fostering collaboration and trade among businesses in Aalborg East, while contributing to the green transition and promoting sustainable business development. With a vision to actively engage in business policy considerations and form collaborations with relevant organizations, the network aim to create attractive conditions for companies in the area. The business network is made up of several sub-groups, each with their own theme - one of which is centred on energy and environment issues. The business network has an immense presence within the case area. It is actively working towards sustainable business development, local development, and increase social responsibility (Business Network 9220 2025b).



Figure 3: The key stakeholders in the Aalborg East demo site (Olesen et al. 2025: 33).

In addition to the five stakeholders outlined above, it is also worth highlighting the importance of Aalborg Municipality, which as the local public administration is responsible for urban development and energy planning at municipal and neighbourhood level. It is also worth mentioning GreenHub Denmark, which is a public-private partnership within the Aalborg Municipality dedicated specifically to promote a sustainable transition in Aalborg Municipality, as well as the North Jutland Region. GreenHub Denmark is also a partner in the FLEXPOSTS project.

In addition to the stakeholders outlined above, it is worth highlighting a few significant projects, which have taken place or are currently being developed in Aalborg East. At the moment, a new, state-of-the art hospital is being built in the southern part of Aalborg East. Near the hospital, there is also an ambition of developing an industrial area with companies and initiatives related to life science, health care etc., to create a symbiosis with the new hospital.

To highlight some of the key initiatives in Aalborg East focusing on energy and resources it is worth mentioning Industrial Symbiosis, where 60 companies and representatives from different industries work together to optimize their flow of resources to lower their costs and minimize the amount of waste they generate (Industrial Symbiosis North 2025). Additionally, the Port of Aalborg has a strong focus on wind energy with some of the largest manufacturers in the world located in Aalborg East thus creating a hub for the entire value chain for the wind sector. The port is also looking into developing a test and demonstration site for Power to X-technology like green hydrogen, carbon capture utilization and storage, and possibly e-fuels.

A lot of renewable energy is required to contribute to the activities mentioned above and here, Aalborg Utility is a key player together with other private developers. Although not directly located in Aalborg East, the main power plant is located just across the Limfjord Sound less than two kilometres from Port of Aalborg. The utility company has ambitions of phasing out its last coal-fired section in 2028. Meaning that the energy mix will be more diverse and will contribute to greener profile in all of Aalborg and by extension Aalborg East. Aalborg Utility and the waste incineration plant Nordværk are working on the project FjordPtX to produce hydrogen that will be converted to sustainable aviation fuel (Nordværk 2024). This process will require a lot of CO₂, which the utility company plans to collect from the cement factory Aalborg Portland - once again highlighting the latent potentials of industrial symbiosis in Aalborg East.

Aalborg East has a history of collaboration among key organisations on sustainability. Initiatives have previously been organized in the Miljø++ partnership (Kørnov et al. 2020) with participation from Aalborg Municipality, Aalborg Utility, Aalborg University, the Port of Aalborg, and the 9220 Business Network. Now, the Business Network 9220 and in a larger scale the network for sustainable business development in Northern Denmark (NBE) are key fora for sustainability initiatives.

In summary the main potential stakeholders for Aalborg East have been identified as: Aalborg Utility, the Port of Aalborg, Himmerland Housing Association, Nordværk, and the Business Network 9220. Focus has been put on these five local actors based on their local relevance and since they represent a broad variety of key actors in Aalborg East and are some of the main drivers when it comes to initiating projects related to the green transition. In addition, both Aalborg Municipality and GreenHub Denmark have been identified as important stakeholders, who can play a significant role in promoting the PED agenda in Aalborg East. Currently many of the identified stakeholders

collaborate or are engaged in various projects and initiatives seeking to promote a sustainable transition (primarily within the demo site).

Aalborg Municipality adopted a Sustainable Development Goal Strategy in 2021 and a Climate Plan in 2022 (Aalborg Municipality, 2021, 2022). In both strategies, Aalborg Municipality commits the national ambitions of a CO₂-reduction by 70% (compared to 1990) by 2030 and CO₂ neutrality by 2050. The development of a PED is not specifically mentioned in any of these strategies, and it is currently only Aalborg University and GreenHub Denmark, that are actively promoting the idea of Positive Energy Districts within Aalborg Municipality and Aalborg East.

3.2 Mapping

The next step in the outlined methodology is the mapping of the identified actors and stakeholders. Table 1 illustrates how the local actors have been assessed according to two categories: 'Stakeholder benefits of the FLEXPOSTS project' and 'PED development potentials of engagement'. These categorisations help establish what the stakeholders could potentially gain from the FLEXPOSTS project specifically and a more general PED development process, as well as outline why each stakeholder would be important to include in PED development. GreenHub Denmark has not been included in the table, as the organisation is a project partner in FLEXPOSTS. Understanding the expected potentials of each actor and their benefits from contributing to the project is an important step in guiding and supporting the future work.

In summary, this serves a dual purpose: FLEXPOSTS is expected to help the different stakeholders in overcoming their individual barriers (or at least gaining a deeper understanding of them) and to link their work with others outside their organisational sphere. On the other hand, this will provide a better understanding of how each local actor could contribute to the development of a PED, while also serving to ground the research and help qualify the results of the investigation.

Table 1: Mapping and categorisation of stakeholders

Stakeholder	Stakeholder benefits of the FLEXPOSTS project	PED development potentials of engagement
<i>All stakeholders</i>	<ul style="list-style-type: none"> • <i>Contribute to the narrative about Aalborg East</i> 	<i>Acquire local knowledge and anchor new initiatives in existing strategies</i>
Business Network 9220 / individual businesses	<ul style="list-style-type: none"> • Give momentum / attention to what is happening (and provide an overview) • Work with the experienced barriers (e.g. excess heat) • Develop generic business models (e.g. solar panels) 	Qualify barriers and business models
Aalborg Utility	<ul style="list-style-type: none"> • Link between urban and energy planning 	Anchor new initiatives in existing strategies
Aalborg Municipality (urban planning department and energy planning department)	<ul style="list-style-type: none"> • Link between urban and energy planning • PED can contribute to their planning, organisation, thinking across silos 	Anchor new initiatives in existing strategies
Himmerland Housing Association	<ul style="list-style-type: none"> • Work with experienced barriers • New ideas based on the PED concept 	Qualify scenarios
Port of Aalborg (including business area)	<ul style="list-style-type: none"> • Work with experienced barriers • New ideas based on the PED concept 	Qualify scenarios
Nordværk	<ul style="list-style-type: none"> • Work with experienced barriers 	Qualify scenarios

3.3 Prioritisation

Following the mapping, the actors were prioritized according to an assessment of each stakeholder's perceived 'importance for (a successful) implementation' and their potential 'Interest in PED' - both ranging from low to high. The framework by which they were assessed is outlined in Figure 4, outlining the general approach to stakeholder prioritisation.

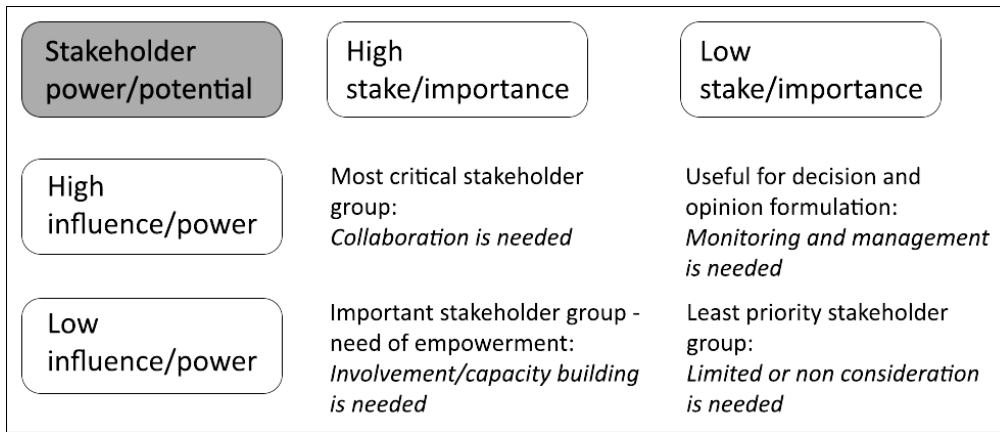


Figure 4: Classification of stakeholders according to relative importance and influence. Adapted from Kørnøv (2007: 731)

Table 2: Prioritisation of stakeholders in Aalborg East in terms of developing towards a PED.

Stakeholder power/potential	High stake/importance	Low stake/importance
High influence/power	Port of Aalborg Business Network 9220 Himmerland Housing Association	Aalborg Utility Aalborg Municipality
Low influence/power	GreenHub Denmark Nordværk	

Table 2 presents the results of applying this framework to the previously identified actors in the demo site. It is important to note that stakeholder placement is ultimately arbitrary as no analysis

has been made, but rather a mapping a ranking of the value of each actor’s potential participation. The prioritisation made at this stage provided an initial overview of how the research team planned to engage with the actors as outlined in sections 4 and 5. This prioritisation will also provide the foundation for future decision-making as it provides a more qualified identification of which stakeholders to focus on for future processes.

The results of this initial process can be further grouped in a graph according to four archetypes to provide a more visual understanding of their relative positions towards PED as shown in Figure 5. The reasoning for their each of their individual placements will follow.

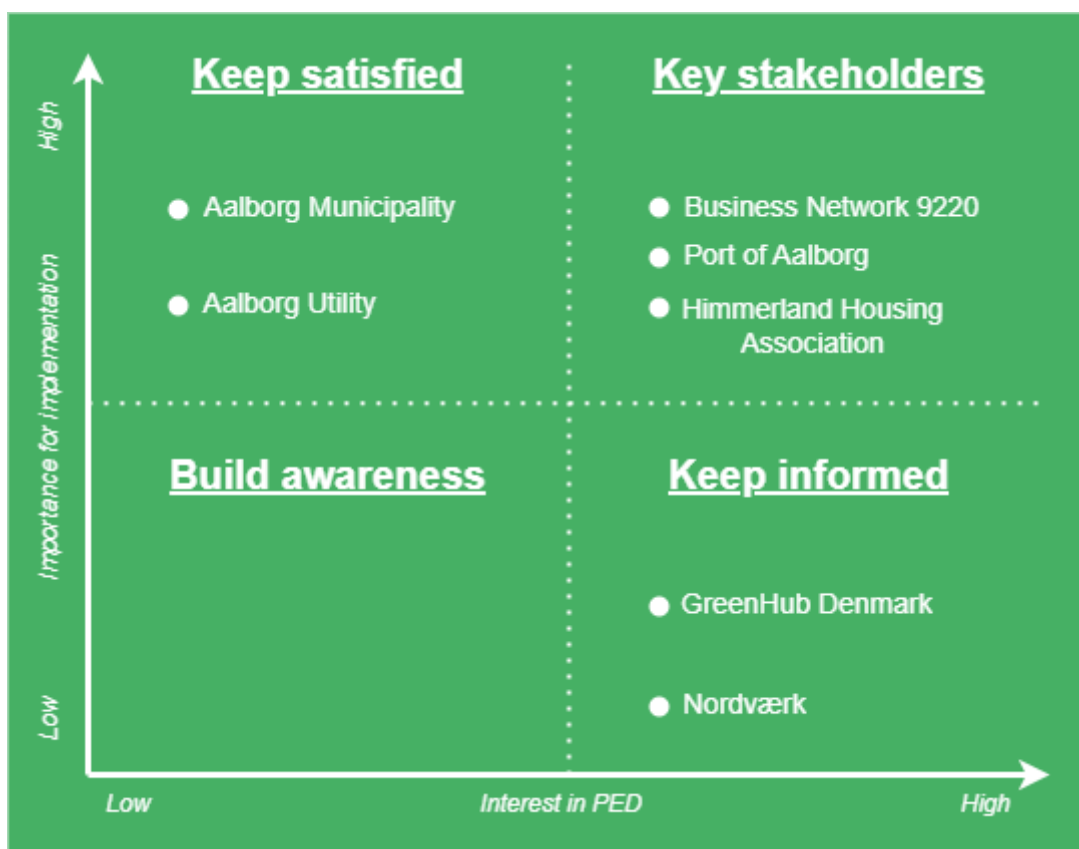


Figure 5: Stakeholder prioritisation grid and grouping according to archetype.

Aalborg Utility and Municipality have been placed in the “Keep satisfied” quadrant with respect to their roles as public authorities. Their importance has been deemed high, due to their potential power to assist or deter a PED development process. Aalborg Municipality has been placed in low interest due to their primary focus on the municipal level and limited attention towards highly

specialized local development projects such as PEDs; similarly, Aalborg Utility has been placed as low interest as their primary goal is a transition of the entire energy system rather than subdivisions of the energy grid, as exemplified by a PED - in general their scope is significantly broader than the district level.

The opposite end sees GreenHub Denmark and Nordværk in the “Keep informed” quadrant as the importance of their direct involvement is seen as lower, but their interest in a potential PED development quite high. GreenHub Denmark lacks direct institutional power compared to the municipality and have therefore been placed lower in terms of importance, however their interest appears higher, both since it is an active participant in the FLEXPOSTS project, but also because it is primarily concerned with establishing new relations and supporting innovative projects. Nordværk has been placed in this quadrant as well as their production and consumption patterns are expected to be less flexible than other similar stakeholders in the area, but they still play an important role in supplying excess heat to the area and could hold interest for future project potentials.

The Business Network 9220, the Port of Aalborg, and Himmerland Housing Association have all been placed in the “Key stakeholders” quadrant owing to their local positions and potentials to influence the PED development process: The Business Network 9220 holds high influence in the area and can assist the PED development process through its extensive network, making them potentially quite important in terms of implementation; similarly, the Port of Aalborg has been placed here owing to its role as a business park and consequent potential to influence current and future businesses in the area. It is also a considerable energy consumer, which both raises perceived importance and interest. Lastly, Himmerland Housing Association falls into the same group because of their ability to directly influence their building stock in Aalborg East, and a known high interest in participating in innovative projects - mirroring many of the previous arguments.

The lower left quadrant “Build Awareness” has been left blank as the work carried out in the prior steps, Identification and Mapping, sought to exclude the less influential and relevant actors, and rather focused on establishing which actors could be potentially interested and important for the development of a PED within the demo site.

3.4 Planning

The fourth step, the planning process was built around two pillars of engagement activities: Exploratory interviews with the identified key actors with the aim of uncovering their expectations of a PED development process, and larger workshops with more diverse stakeholders involved in broader discussions on topics regarding PED development. The results of these workshops were published in part in the previous report (Olesen & Nedergård Steffansen 2025), while the results of the exploratory interviews will be unfolded in Chapter 4 of this report. An outline of the general strategy follows:

- Explorative semi-structured interviews with main stakeholders
 - Build awareness and explore interests
 - Identify potentials and barriers

- Seminar/workshop with Business Network 9220 and the Port of Aalborg
 - Build awareness and explore interests
 - Identify potentials and barriers

- End of project seminar with all stakeholders
 - Feedback on implementation strategy and business model
 - Dissemination of project results

The interviews that were conducted were aimed at supplementing the inputs from the workshops and have investigated the general interest in implementing a PED in Aalborg East. In addition to the key stakeholders, Aalborg Municipality was included to get the perspective of the public authority in charge of planning for the area:

- Aalborg Municipality, Urban planning department
- The Port of Aalborg, Greener business development and sustainability
- Himmerland Housing Association, head of development
- Business Network 9220, chairman of the network

The interviews were carried out as semi-structured interviews with an interview guide centred around four key topics: 1) introduction to the topic of PED; 2) mapping of current praxis, sustainability strategies, and perceived barriers; 3) interest in PED as a concept and potential value

that they see in it; and 4) future platform necessary for their continued and expanded work with sustainability as well as which role they see themselves playing in the work ahead. Key points from these interviews will be expanded in section 4.

The use of the semi-structured interview method allowed the interviewers more freedom to guide the conversation to where the interviewee had the most to say on the topic. This also allowed more leeway in discussing the matters of PEDs as not all interviewees were expected to hold considerable information on the topic beforehand. The questions and interview guides were adjusted for the individual interview but overall adhered to the general structure presented earlier. Desk research, including document analysis, was used to gain basic understanding of each interviewee beforehand and to complement the findings.

The interviews were recorded with the permission of the interviewees and subsequently transcribed and coded. This report is based on four interviews and as such additional interviews with a broader range of actors are recommended for a more complete picture. All quotes have been verified by the interviewed persons and approved for use in this report.

3.5 Engagement

The fifth and final step of engagement aims to retain the continued relation with the actors that have already been involved in the project. One of the explicit aims of the FLEXPOSTS project is the establishment of a PED network that can continue and sustain the work that has already been carried out. This means identifying and engaging actors that can play a key role in the further support of a PED network. This has been one of the key criteria in the selection process of initial interview subjects, as they were thought to have the most influence in terms of establishing a PED network or pushing a PED narrative, as well as a vested interest in PED development itself.

Here the Port of Aalborg and Business Network 9220 are seen as especially interesting; the former for its role as a business park in which it has a say in the future development of local industry and their organisation within the area; the latter for its role as a currently existing network that deal with topics similar or tangential to PEDs. Acquiring the support of these entities especially would allow PED ideas to diffuse into the area of Aalborg East and potentially gain a foothold for future support and development. The other two actors are less localised and thus have different benefits for a PED network: Himmerland Housing Association is an interesting actor to engage both given their role in

the area as a primary developer and their experiences with decreasing consumption that could be recontextualised in a PED setting; the municipality (as well as the Business Network 9220) similarly holds the potential to move beyond the current setting of Aalborg East and share the experiences gained here with other parts of the city (or country).

The goal of this step is to build on the existing networks and relations in Aalborg East and develop these further to formalise a PED-network and build up a capacity that can implement a PED in Aalborg East. In this way the stakeholder engagement strategy provides the foundation for a future PED development process - by establishing a networking and sharing knowledge the idea is to build momentum and empower local actors to push for a PED independently anchoring the development within the area.

4. Stakeholder perspectives

In this section we present the results of the interviews with the selected stakeholders and analyse their perspectives. The structure of the interviews followed the outline presented in Chapter 3 and the findings are framed in relation to two key questions, 1) What are the stakeholders' attitudes towards PEDs? and 2) How do they understand their role in a sustainable transition? As previously outlined, the purpose of conducting these interviews was two-fold: First, to uncover how the stakeholders have been working with the sustainable transition, their plans for the future, and how they can contribute to PED development, and second, to increase their awareness of the PED concept in order to establish a foundation for the creation of a PED network in the area and whether PED could be a good fit for their future endeavours.

4.1 Aalborg Municipality

Alongside the key stakeholders, Aalborg Municipality was chosen for interview due to their ambitions of reducing CO₂-emissions by 70% in the period 1990-2030 and becoming CO₂-neutral by 2050 (Aalborg Municipality, 2022).¹ To achieve these goals, Aalborg Municipality is working strategically to reduce energy consumption, increase the share of renewable energy, and phase out

¹ Emissions from Aalborg Portland have not been included in this calculation (Aalborg Municipality, 2022)

the use of coal, oil, and gas. This includes among other things that the power plant *Nordjyllandsværket* will close its coal-fired boiler by 2028. There are thus clear potential synergies between Aalborg Municipality's ambitions of promoting a sustainable transition, and the idea of developing Aalborg East into a Positive Energy Districts, although this ambition is not part of the municipality's current strategy.

The district level was seen as especially beneficial in terms of aligning the PED concept with the work that is currently being carried out at the municipality.

"I think [working with districts] makes a lot of sense because [...] within local planning we typically only work with projects. In other words, a very small area. When we have been working with neighbourhoods it has been centred on identity and collected development. [...] And that opened up for discussions of where we want the development and which special considerations to make. So, I definitely think, it is a good scale to be working on. [...] In this way [a district scale] becomes a way to make [planning] more approachable." (Interview Aalborg Municipality)

This mirrors findings in previous research (see Mattsson et al. 2023) where this intermediary level is also highlighted as one of the main benefits of PEDs. It was further noted that for the planning department to fully engage in PED development, however, the concept would need to be more strictly formalised and politically mandated. Without this direct involvement Aalborg Municipality primarily sees itself as having a facilitating role, in which it primarily guides and supports the private sector.

"If a developer presented us with this idea [of PED] then we would of course think it was incredibly interesting and would contribute, engage in dialogue, and try to understand the concept. But our task would still be to create a plan according to the rules there are and what the planning law gives us mandate to. So, at most we could be a facilitator [...] as long as we cannot or make demands regarding it." (Interview Aalborg Municipality)

As no PED development process has been initiated yet they are more restricted in terms of what they can do preferring to retain a facilitating role in which they can support emerging projects. Tying back into the value the municipality sees in PEDs, this also lends credence to its potential as an object of a networking organisation that can help articulating the degree and type of support the municipality is expected to supply, adding on that:

“They [private actors] are the ones who must invest, they are the ones who need to establish business, and they are the ones who should bear the risk. We are the ones who create the frames for how the private sector can act. It is an important interplay where we have distinctly different roles.” (Interview Aalborg Municipality)

The planning department being more rigidly bound by their framework would have less flexibility to initially push for the development of an independent PED compared to the private sector and must rely on outside momentum in this case. In this way the private sector is expected to carry the risk of newer developments, while the municipality aims to ensure and protect the public’s interest. This delineation of roles is crucial, especially when considering the broader context of energy policy and urban planning.

“We are working on new guidelines for energy, so in this way it is part of the planning work that we do. And that helps framing the planning that can be done on these areas. But when we are discussing Aalborg City, then it has not been designated as an energy production area, so we do not look into it in this context. [...] [In urban planning we focus on] the physical setting and it is not a prerequisite for approval of a local plan that there is a special kind of energy production.” (Interview Aalborg Municipality)

The above quote highlights the central dichotomy of Positive Energy Districts; urban planning does not directly deal with matters of energy planning and energy production as cities are generally planned for different purposes. It also shows how energy is becoming increasingly relevant for urban planning practices despite the lack of specific requirements in local planning. The different emerging narratives of energy efficiency of cities, such as PEDs, that deal with urban planning of energy production means that outside pressures are growing. It was also questioned whether cities and urban development should be at the centre of discussions of renewable energy production:

“Then you would have to investigate how big the areas would have to be, and is it even the best solution to produce energy within the cities where people live? [...] It can quickly become quite expensive if everything must be placed on roofs, but it can also be more efficient. So, it is a trade-off between efficiency and economy. But it would be incredibly handy if there were a way to promote this [type of development]. Some of the industries have substantial roof area and if they had

more incentives to place solar panels there, then they would be able to contribute to production.” (Interview Aalborg Municipality)

This perfectly encapsulates the ongoing PED discussions by raising concerns of urban transformation for the sake of energy production as well as the key aspects that make PEDs interesting being the opportunity to locate energy production closer to the demand promoting energy efficiency through local development and optimised usage of space (within cities).

4.2 The Port of Aalborg

The Port of Aalborg’s interest in PEDs stems from a desire to be a frontrunner for the sustainable transition as it would allow the port, as previously outlined, to strategically expand its business park. However, the port feels limited by current legislative and economic barriers and find it difficult to be innovative in their development – as legislation for ports is seen as somewhat conservative and restrictive. One of the that they have tried to innovate on was the business park aspect where they initially tried to be very ambitious in their selection of new partners, but realised that they had to broaden their scope for it to be financially viable:

“We expected that [the business park] should be a laboratory where you could establish a circular economy with industrial symbioses, and we would pick companies based on how they fit in. But we, in part, could not make enough guarantees [...] This is just to illustrate that development went slow and then someone came by that did not quite fit – based on our ideal model [of a company] – but then we figured that maybe they fit regardless. Because our business has to run too.” (Interview Port of Aalborg)

The Port of Aalborg found that it could not carry the economic burden of establishing their ideal business park without compromises. Utilising PEDs would be one way of potentially simplifying this work as it would allow them to draw on more local resources. In other words, the Port of Aalborg is trying within its means to push for new development but are subject to market costs and need to manoeuvre within the scope of what is profitable.

“If [energy] becomes too expensive, if it costs a third to run a diesel generator, how do you get people to change? [...] You could say that we have the will – or maybe rather the wish to – but we have the skills to make it happen, but how is more

unknown... [...] and I am sure our marketing department would think [PEDs] are fantastic, especially if it could lead to us getting a declaration stating that this is a positive energy district – but it is important to ensure that it does not just become green washing. That is the recurring challenge.” (Interview Port of Aalborg)

Gathering development under a PED umbrella and creating localised incentive structures could be one way of alleviating the individual costs of the transition, while also providing a common goal to work towards. In general, the Port of Aalborg saw great potential in the way PEDs could be leveraged to support their current work. This way they hope to be able to use PEDs as a storytelling tool that can both help attract new businesses to their local business park but also help with opening new avenues of experimentation.

“If we can build a story where this is a place that contributes positively, that it is Aalborg East that is making sure that Aalborg [in general] is climate neutral. Because it is out here that we produce the energy, and it is simultaneously a nice place to be – and that is also why the port is located out here. Image-wise, I think that could be important.” (Interview Port of Aalborg)

The Port of Aalborg is currently exploring the possibility of establishing an energy community in their business park as this would be one way of ensuring that their efforts align with broader sustainability goals – also connecting to the previous point of Aalborg Municipality of moving energy production closer to demand. Developing the entire Aalborg East into a PED was seen as a possible continuation of their own work, especially in terms of establishing and selling the story of the good development.

4.3 Business Network 9220

The Business Network 9220 holds a similar perspective to the Port of Aalborg. They are primarily concerned with protecting their members and helping them find new business cases that can be both financially stable and help further the sustainable transition. However, it was also found that as a network it tries to keep a long-term perspective that allows it to consider new developments on a different scale from its individual members. Following increased demand for expanding student tracks at the largest private school in Aalborg, the network engaged in more strategic discussion of urban planning.

"We are engaged in the commercial development in [Aalborg East] trying to understand how much available space there is and what options the municipality has in terms of securing areas [for projects]. [...] So, we joined the debate and made the argument that from the network's perspective, a new school should be built in Aalborg East since that is where the jobs are, where the university is, where the new hospital is, and generally where the development is headed." (Interview Business Network 9220)

While different from strictly energy usage and production, this remains interesting from a PED perspective as it highlights how discourse surrounding local development can be influenced by network organisations. It also helps cement the network's importance through their local engagement and potential to sway other actors in the process of developing a PED within Aalborg East. Expanding further on this point, a big driver behind having this long-term perspective is to help their members develop so that they can retain a competitive edge through knowledge-sharing:

"And some of these future subcontractors - who today do not even see themselves as subcontractors for that specific industry - they need to get out there and see what is happening." (Interview Business Network 9220)

And for this purpose, the concept of Positive Energy Districts was deemed especially interesting. Spreading knowledge of PEDs and establishing a network of local actors could then be expected to help drive a PED development process and establish initial momentum for the project.

"Positive energy districts could be killing two birds with one stone so to say - to integrate sustainability and business development." (Interview Business Network 9220)

PEDs could play a pivotal role in providing an arena for discussing future supply chains and establishing new business cases for the network's members. However, in line with the sentiments of the planner at Aalborg Municipality regarding private sector risk-taking, the network sees challenges in motivating private investors without proper incentives:

"If you ask the government [about who needs to push for more sustainable development] then the private sector should carry the brunt of the weight - and that is one of the reasons there is not much happening now; how do you convince private actors to invest in common property? [...] and that is impossible to answer,

but on the other hand I think the government needs to show clear support one way or another - be it co-investing or developing incentive schemes that make it more attractive for the private sector.” (Interview Business Network 9220)

As with the Port of Aalborg, gathering individual initiatives and supporting them through a PED network could be one way of reframing the issue of common property; Aligning sustainable development efforts under a PED umbrella could make sustainability efforts more engaging for developers as it provides a localised perspective and goal to aim for.

“I think [solving this] requires raising it to a higher level politically, otherwise it will not happen, and for this I think a project like [making Aalborg East a PED] can help to establishing a solid foundation so that you can argue that something needs to be done on the regulatory front.” (Interview Business Network 9220)

This builds further on the point of the private sector having to bear the risk of innovating, establishing that they cannot necessarily do so without the right framework in place. Summarily, the role of the Business Network 9220 role most closely resembles that of the municipality, as one of facilitating knowledge and sharing experiences within the network - while encouraging a strategic long-term development within Aalborg East. Their challenges are more similar to those of the Port of Aalborg as the members of the network are bound by economic feasibility when trying to innovate.

4.4 Himmerland Housing Association

Himmerland Housing Association mirrored many of these sentiments and they too expressed interest in PED as a networking platform that can help articulate their current frustrations and future needs. One of their key frustrations stems from a higher reliance on their supply chains to change for them to feasibly engage in PED development:

“When starting new developments, we are dependent on the building sector; it has to be mature enough that there is a ready supply of different solutions. We cannot rush out as a singular housing association and make a lot of demands if there is no supply on the market. Then it becomes too expensive to build. So, we are deeply dependent on the entire supply chain moving on and there being competitive solutions that allow us to build and to keep the rent at the level that it should be

in social housing. We cannot just spend 10-20% more on construction than we usually do, we rely on the suppliers and contractors. So, in that case legislation should move the entire sector, but it has been dragging a bit behind." (Interview Himmerland Housing Association)

This also serves to emphasise the point made in the previous interview with the Business Network 9220 of creating new markets and pushing for the sustainable transition now to change supply chains and upskilling members to becoming potential future subcontractors. As a housing association they need the market to move and provide sustainable alternatives at competitive prices as they have less immediate flexibility for their investments.

"It ties directly into what we have been doing right from the beginning; we cannot lift the green agenda alone. That was our first revelation. So, this kind of collaboration [PEDs] are spot on in terms of the policy that we have and the approach that we take to the green transition. And this is especially true for a neighbourhood such as Aalborg East where we have such a substantial investment - our activities out there comprise almost half of our organisation." (Interview Himmerland Housing Association)

Himmerland Housing Association, like the Port of Aalborg, tries to be a frontrunner in sustainable development, but are hindered in being innovative and experimental because of increased costs of sustainable alternatives, e.g. sustainable building materials. As highlighted above, the housing association relies on changing supply chains for its new developments projects to truly change. They are trying to push for this by establishing newer experimental projects, such as the Green Hub House (Himmerland Housing Association, 2025) but cannot scale these experiments up until the system changes.

"A local decision was made that we should adhere to the 2015-standard; low-energy it was called at that time. We were not very well prepared for it, neither as developer or field and it happened over-night. It was a very sudden way of doing the green transition. It came at a time where we were building thousands of student accommodations and then we suddenly had to build something that we in the field had no experience with and that meant the issues were solved by erratically putting solar panels on all the ongoing developments to make the numbers fit. And it made them fit, but we did not think it was a particularly

intelligent approach, so that was why we made it a point to have our own opinion on these matters going forward.” (Interview Himmerland Housing Association)

“We quite quickly realised that there were a lot of problems connected to it; we were investing a lot of money in solar panels, but it did not really come to the benefit of either the buildings or the residents – especially not for the student housing. Because the time at which the energy is produced on these buildings is usually either when the students are doing their studies or are away on vacation. So, it ended up just being electricity supplied to the grid.” (Interview Himmerland Housing Association)

This quote serves to highlight one of the primary objectives of PEDs; to have a fully integrated system where everything plays a role in a localised ecosystem instead of being a more obscure part of a larger system. Reframing the discourse, the energy that is being supplied to the grid can be regarded as beneficial for the district from a PED perspective and thereby could help make it more meaningful in context. Simultaneously, the PED framing should help offset some of the costs of the energy production in the first place – as highlighted in the interview with Business Network 9220. One direct benefit of the housing association’s developments was that the upgraded infrastructure allowed Himmerland to help adjust their tenant’s behaviour as consumers:

“[We] could see if there were some apartments where [energy consumption] far exceeded expectations, then we could simply go directly to the residents and we could provide [them with] access to energy data [...] [which allowed them to] go in and help influence their own consumption.” (Interview Himmerland Housing Association)

However, influencing consumer behaviour is not enough of an incentive on its own for the housing association to keep focusing on PV integration. Here too the core logic of PED development was brought into question, echoing the sentiments from the interview with Aalborg Municipality:

“And that is the crux of it; should [we, as a housing association] have it as a core task to influence [legislation on solar panels] or to produce energy? – we find it a little hard to see the logic in that, it is not really a part of our core tasks. That being said, it does not mean that we have completely abandoned solar panels, we are actively working with them and do have some cases where it makes sense. We have a nursing home in which there is an entirely different activity during the

daytime which gives a completely different relation between production and consumption, which makes it sensible.” (Interview Himmerland Housing Association)

Himmerland Housing Association can then be said to be a strong local actor that holds a lot of potential in changing the energy landscape of the district. At the same time, they see potential in PED as a new framework for their developments as they are limited in how far they can go on their own.

4.5 Summary

The interviewees had very limited knowledge of PEDs prior to the interview. The Port of Aalborg and Himmerland Housing Association had some understanding of PEDs as both organisations had signed a declaration of interest for the FLEXPOSTS application. However, when the PED concept was explained and the potentials that the project team sees in working with it, all stakeholders opened to the idea of investigating it further themselves. Notably they all emphasised opportunities provided by a PED network, as they would be able to engage and share experiences with different sectors than previously. Summarising the findings we find that all actors see some potential in working with the PED concept and especially find that there is a need for something that can help frame their work and gather momentum for new development projects:

1. What are the stakeholders' views on PED?
 - a. Strong potential of the concept, especially as networking opportunity
 - b. Further developments/clarifications of the specifics are needed

However, they also emphasise the need to clarify the potential that the PED holds to change the system - how it can potentially be useful for garnering political support, providing new business cases, and helping supply chains to adapt.

Regarding their roles, it was found that they view their roles within the transition process drastically different:

2. How do they understand their role in a sustainable transition more generally?
 - a. Fundamentally different understandings of what role they can and should play
 - b. Common challenges to realising their self-identified potentials

Common for all is that they want to contribute more to push the transition along but find different roadblocks when they try; most get stuck in legislative and economic barriers (and lack of business case potentials). More generally, they all express interest and see potential value in working with PED as a framework for newer developments. However, some clarity is needed in terms of what is individually expected when being actively engaged in a PED development process.

Figure 6 represents the supposed roles of the different stakeholders as made apparent through both the initial analysis and the addition of the stakeholder perspectives. The figure includes actors that were not interviewed but whose roles in relation to the others remain relevant (more specifically Aalborg Utility, GreenHub Denmark, and private citizens).

From the interviews we found that Aalborg Municipality prefers a facilitating role, in which they provide support for private initiatives and try to assist in new developments within their means. This connects to both the Port of Aalborg and Himmerland Housing Association and their willingness to experiment to further the sustainable transition, but also more specifically to develop a Positive Energy District. The role of the Business Network 9220 is primarily to build capacity for its members, but potentially also to engage as a networking platform for PED development within the area of Aalborg East. Capacity building for PED development is also part of the tasks that Himmerland Housing Association can carry out through local influence on their residents and their consumption patterns.

Slightly disconnected from these points are both GreenHub Denmark and Aalborg Utility - both of whom are absent from the stakeholder perspectives but are still worth mentioning. GreenHub Denmark mirrors the role of Aalborg Municipality with less direct power to mandate specific developments but a high degree of freedom through their role as networking organisation. Aalborg Utility is working on transitioning their supply independently of PED development, meaning that their work should ultimately be a net benefit for the local context of Aalborg East regardless.

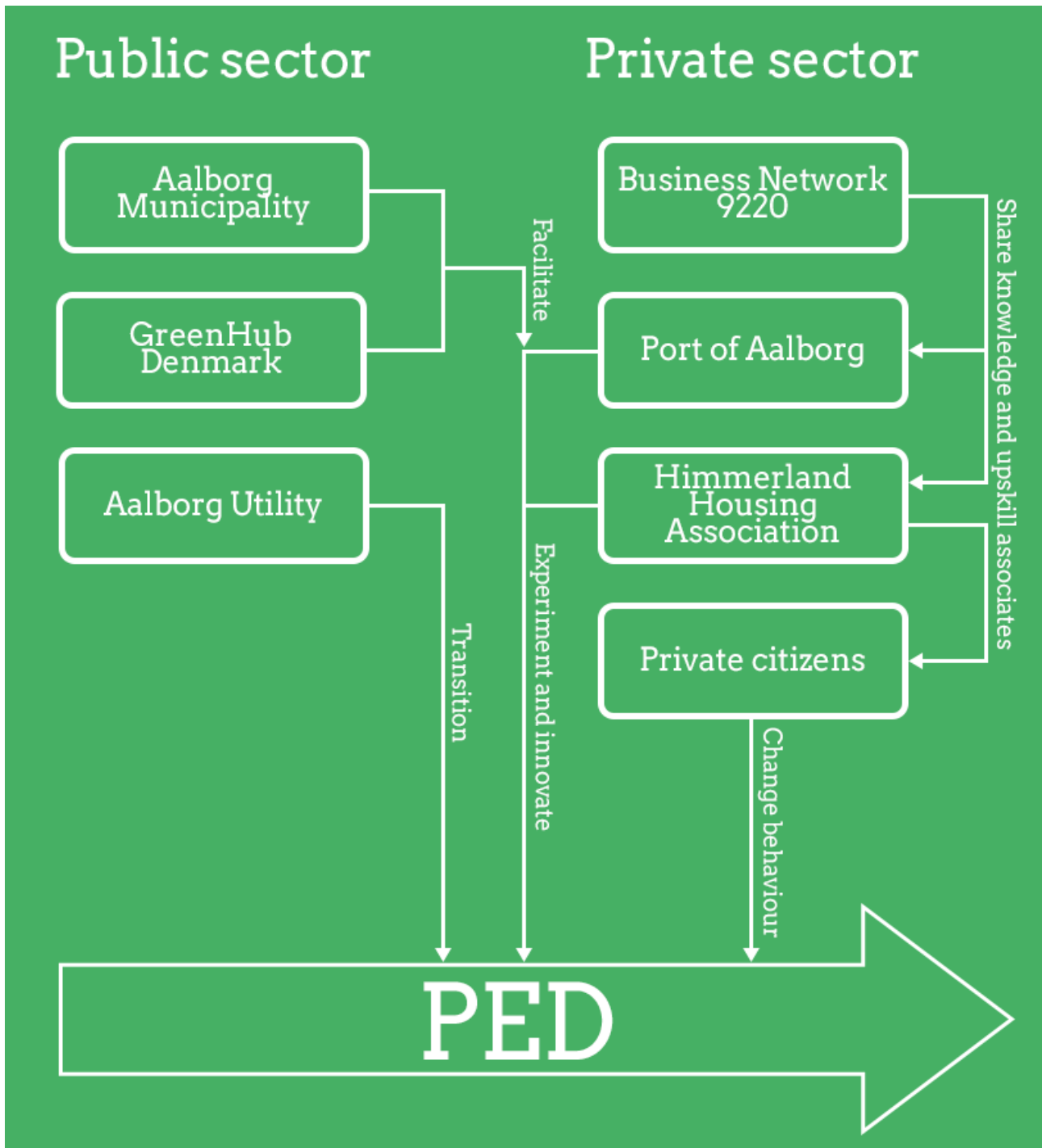


Figure 6. An organisational diagram of the different actors and their objectives in terms of PED development.

5. Conclusions

This report has investigated the stakeholders in Aalborg East and their potentials in relation to a future Positive Energy District development process. The work in this report has been mainly concerned with stakeholders internal to the case area, apart from the planning department of Aalborg Municipality – future research could engage with actors on different levels, potentially investigating national PED sentiments. As presented initially (Chapter 2) a key aspect of stakeholder engagement is to gain a deeper understanding of local dynamics, needs, and potentials to smoothen the implementation of a PED. The aim of this report has been to clarify and expand on the research that has been carried out with the intent of further developing the PED toolkit in the early stages of development. A key finding is that even given little to no prior knowledge of PEDs local stakeholders do find merit in the concept and express enthusiasm in terms of its future potentials.

One of the conclusions of the previous report in the series was that the PED concept in a Danish context runs into several complications with current organisational structures and practices and that it is necessary to clarify who should spearhead PED development (Olesen & Nedergård Steffansen 2025). Shedding more light on this was also a specific goal of this report, and the results here somewhat align with our previous findings. The three private stakeholders whose perspectives were collected for this report all expressed some interest in being frontrunners and proponents of the sustainable transition, with varying challenges between them. The primary barrier they currently see to doing more experimental or innovative work is legislative (see also Olesen & Nedergård 2025), which is similarly mirrored by the public stakeholder of Aalborg Municipality – who lack the mandate to fully support such a process and see it as the private sectors responsibility to push for new innovations, while the municipality facilitates and supports them.

Another finding was the potential of utilising the Business Network 9220 as a platform for spreading the PED concept and building local capacity to support it; Aalborg East's makeup as a very mixed-use neighbourhood with a large variety of industries makes it a compelling case for PED development, as it gives rise to opportunities of industrial symbiosis. This in turn makes it considerably more complex to do substantial stakeholder engagement – as each individual business will have their own priorities for future developments. These can, however, at least to some extent, be pre-empted through their active engagement in a PED network that can help disseminate the benefits of the concept. As pointed out in the interview with the Business Network 9220, getting

the private sector to invest in common property can be a considerable challenge – as they will typically put the highest relevance to economic synergies and business viability.

A key result of the exploratory research has been an increased understanding of there being a lot of somewhat disconnected initiatives gaining and losing ground repeatedly within the area. Considering the large scope of the demo site, this is not necessarily surprising, but in the light of the interviews, we see that the stakeholders express an interest in having PED potentially becoming an umbrella for collecting and organising these initiatives to help them gain and preserve momentum. Additionally, this helps with aligning PED development with the needs in the area and can thereby better assist and contribute to local efforts rather than supplanting them entirely – providing a more nuanced view of how different factors (e.g. social, environmental, economic, technological) interact in the process (Krangsås et al. 2021). Likewise, it was found that the storytelling aspect of PEDs was particularly interesting to the stakeholders – both through its potential to brand the area and attract new businesses, but also in terms of creating a more positive story of the neighbourhood for the sake of the people living there. Highlighting the key points, it was found that:

- a) Lack of knowledge/awareness is a barrier
- b) The PED concept must be adapted to the local context
- c) Ownership of the ambition of a PED is important, and the development requires collective action.
- d) Individual entities struggle with investing in common property.
- e) Reframing the relation to the wider energy system is crucial.

Finally, it can be concluded that one of the most important objectives of a PED, from a stakeholder engagement perspective, must be to assist in recontextualising the current struggles that local actors are facing in relation to the sustainable transition and gather their experiences to build political momentum so that they can develop more experimental pathways and innovative business models.

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