

# Goals and relevant aspects of a common PED definition

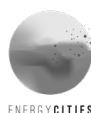
Integrative working document as part of Cities4PEDs WP2 | Nov. 10th 2021

# **Goals and relevant aspects of a common PED definition**



### Disclaimer:

The document you are looking at is the draft version of the PED definition, intended as a working document and subject for discussion within the broader community working on the energy transition. This document was further sharpened during the intensive working sessions of the Cities4PEDs Deep Dive on 5 to 8 October 2021. The insights from these international meetings within the consortium of Brussels, Stockholm and Vienna were then processed and are now ready to be shared with other European cities to take a first step in structuring recurrent strategies and tools for the development of PEDs.



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# Introduction

*Several European countries joined forces to create 100 Positive Energy Districts (PEDs) by 2025 as part of its Strategic Energy Technology (SET) plan. To that end a broad framework definition was proposed to describe what PEDs are.*

*“Positive Energy Districts are energy-efficient and energy-flexible urban areas which produce net zero greenhouse gas emissions and actively manage an annual local or regional surplus production of renewable energy. They require integration of different systems and infrastructures and interaction between buildings, the users and the regional energy, mobility and ICT systems, while optimizing the liveability of the urban environment in line with social, economic and environmental sustainability.”*

*This gives a first idea of the objectives and the way in which such a PED can be realised. But in order to apply the definition to a concrete local context and move toward an operational and mobilizing definition, it is necessary to make its various aspects more concrete.*

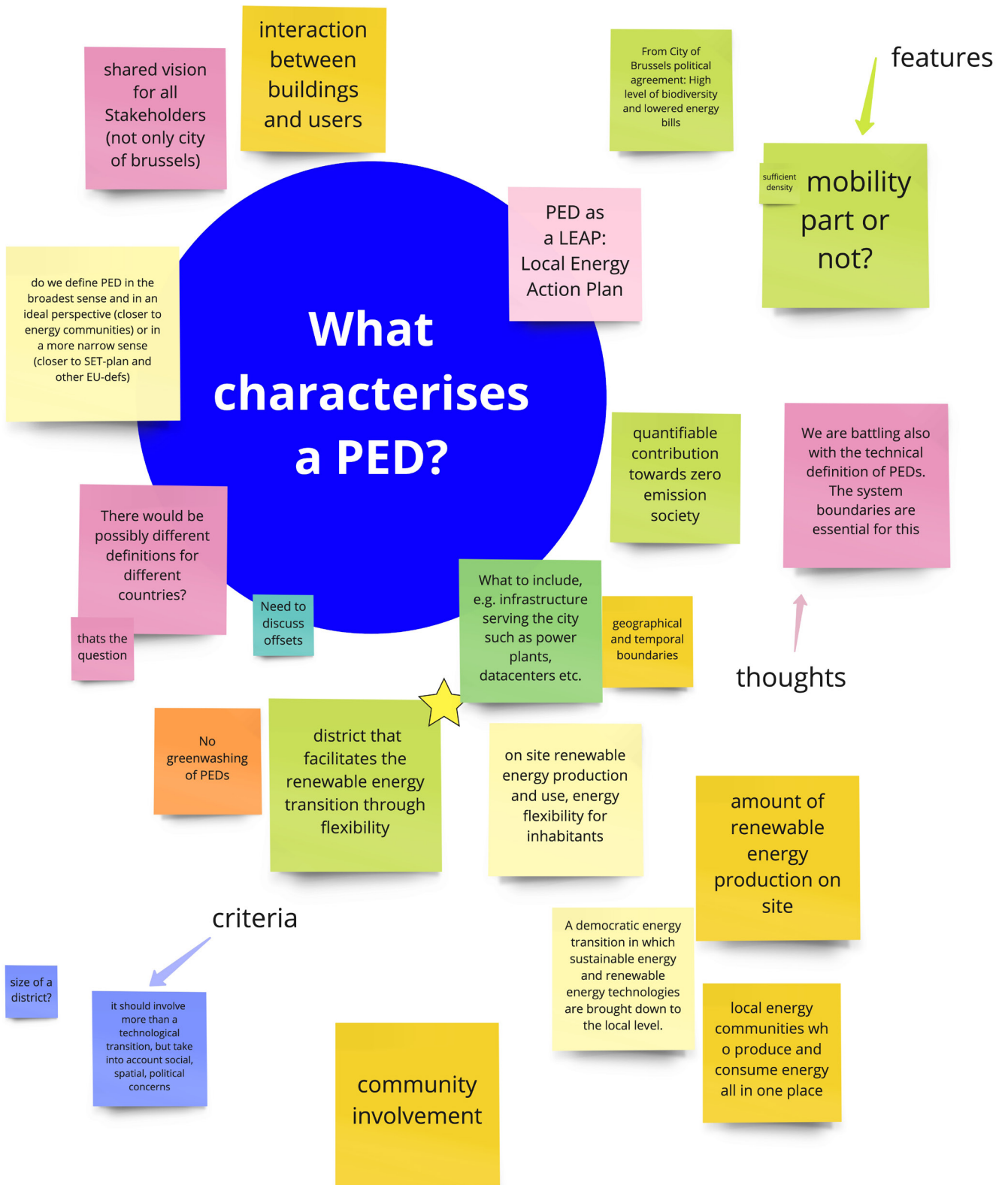
*Cities4PEDs is one of the four research projects from the first JPI Urban Europe Pilot Call focusing on PEDs. The consortium consists of municipalities, experts, research institutions and civil society organisations from Brussels, Stockholm and Vienna. With this consortium we aim to contribute to a unified PED definition on a European level from the perspective of our own local contexts.*

*As a consortium, we consider a PED as follows: it is the process of transformation or implementation of a neighbourhood by means of instruments, tools, methods, collaborations, etc. towards ambitious objectives on the level of a positive energy balance, energy efficiency, energy flexibility, integration between systems and infrastructures, integration between users, liveability, social sustainability, economic sustainability, environmental sustainability, etc. The definition is therefore twofold: it concerns both the process of transformation or implementation and the framing of the objectives themselves. In our research, we will examine both aspects. In the PED Atlas, based on a series of relevant cases, methods, tools, instruments and collaborations needed to operationalise PEDs are investigated and structured. In the present document, objectives, criteria or targets are centre stage. Both cannot be viewed in isolation: it is therefore crucial that we continue to compare and contrast the two during the whole research process. Ultimately, both documents will be combined into a PED Guide (Dec. 2022).*

*Therefore, in this working document we will discuss the reasons why it is important to make the criteria of a Positive Energy District more concrete (“Why common PED criteria”). Then, we make a series of observations that will serve as input for determining actual criteria and indicators of a PED definition (“Which aspects should we take into account”). And finally, we will identify how as a consortium will contribute to the development of those PED criteria and assessment methods (“How do we continue working on this”).*

# 1. Approach

In order to develop the criteria for a common PED definition, a collaborative process was drawn up. In recent months, within work sessions with the whole consortium, an outline of the goals and relevant aspects were screened, discussed and sorted out. In this sense, the importance of a PED definition was underlined by the partners, in both the social and process aspects as well as in the technical side. This was developed further by setting up two different workgroups around these two specific sides of the PED definition: the technical aspects and the process and social aspects. In this way it was possible to use everyone's expertise as efficiently as possible and have a more in-depth way of working on these specific aspects of the definition. The technical focus group, was able to start working on the nitty-gritty of the definition. Meanwhile other partners outlined the way in which the definition should and could also include social dimensions and a step-by-step approach in becoming a PED, that also enables local processes of transformation. New to that, partners within our consortium joined the EU discussions and EU alignment task force on the PED definition. We harvested reactions to a first written version of this document. And next, we will discuss the content of it further during the Deep Dive on the 5-8th of October 2021.



## 2. Why common PED criteria?

The question we start with is: why do we need a more concrete definition? In the end, every contribution made to the energy transition is a step in the right direction, and it is up to each country or city to draw the lines for such a policy.

Then, why is it necessary to set criteria that are the same for the whole of Europe?

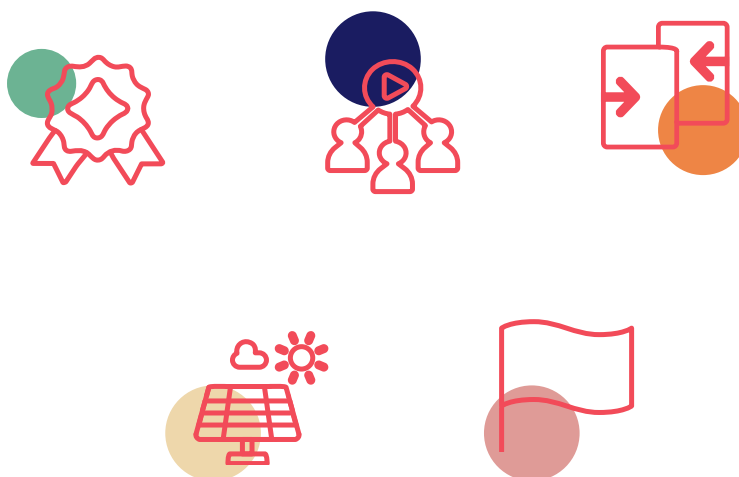
From the perspective of city administrations and politics, the need for such a unified definition is underlined. In fact, it will be a tool that allows and pushes for high-quality implementations at the district level and serves as a lever for capacity building by including indications on the development process and a defined step-by-step approach.

At the same time, and because it is a Europe-wide definition, it should make PED projects comparable transnationally. It therefore allows for the measurability of the set targets, and further for the connection of district targets to the supra-local (regional and rational) targets. Coming from different geographical backgrounds, and not wanting to exclude PEDs based on their location, the definition should be applicable in different types of areas, such as urban and rural areas, and existing as well as newly built areas. In order to achieve this, it is important that the definition enables the collaboration of relevant actors and stakeholders to have a broadly supported PED with more chances of success, and covers all relevant phases of a PED development, from setting up the process until after realisation.

***“These goals include components regarding ambitions, measurability and comparability, spatial differentiation, and technology.”***

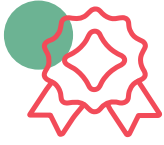


In the following pages, the goals for common criteria for a definition are further illustrated:



## The PED definition should allow and push for high-quality implementations

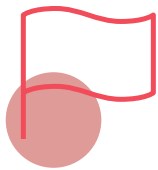
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*The more sharply defined criteria for a PED should allow districts to push for high quality transformations and developments. In order to achieve the ambitious targets by 2025, 2030 and 2050, our neighbourhoods will have to meet far-reaching requirements. The PED criteria provide a framework for cities and their partners to make this quality measurable. On this basis, cities and others can award a PED label and encourage PEDs financially, legally, etc.*

## The PED definition should translate national or regional goals to a district level

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*The framework of PEDs will allow the translation of European, national and regional targets into measurable objectives at the district level, which will then lead to a feasible project scale. In this way, the often vague, large-scale objectives are broken down into achievable projects. The criteria should therefore take into account the specific national or regional objectives.*

## The PED definition should make PED projects comparable transnationally

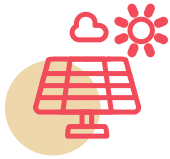
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*One of the main reasons for a shared definition on an EU scale is that local, context-specific aspects of neighbourhoods can be compared. We can measure whether neighbourhoods perform high in comparison to each other, but also this can allow to build a basis for exchange at the European levels on learning and success factors around the PEDs implantation, initiating process of acceleration. To do so in a meaningful way, we need to go beyond a “one-size-fits-all” approach.*

## The PED definition should make PED projects in different contexts comparable

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*It is very difficult to compare the development of neighbourhoods in different contexts. In rural areas, for instance, much more open space is available for energy production via wind, whereas in inner-city neighbourhoods, more energy is needed and far fewer options exist. The shared criteria for a PED definition would allow the deployment of these different contexts to be compared in a meaningful way.*

## The PED definition should enable cities and stakeholders to initiate and engage in the cooperation towards PEDs

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*A shared PED definition can also be very mobilising towards a broad group of stakeholders. A European definition provides a framework for a process of cooperation and stimulates local commitment. It is a recognition that can attract different actors to participate and it gives the process a degree of credibility.*

### 3. Which aspects should we take into account?

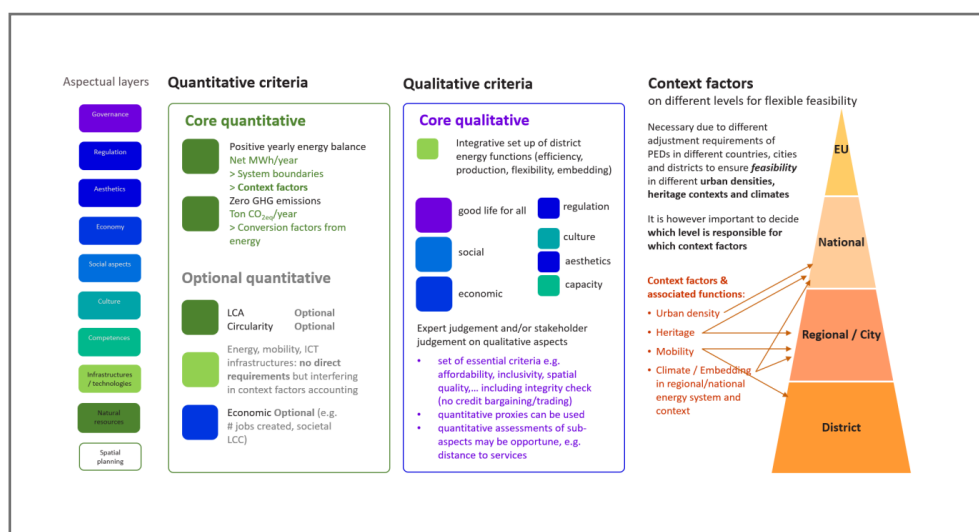
*After identifying the reasons why a shared definition is important, we have the ambition to capture these objectives in an operational definition. This poses a number of challenges. Before actually taking the step towards operationalisation, we map out eight key observations. On the one hand, these facilitate a refining of the constituting parts of the definition, on the other, they clearly frame the focal elements and open questions we would like to test during this project.*

*Therefore, where possible, we already include the views of the Cities4PEDs consortium. In other places, however, we state open questions that should be considered either within the consortium or at a higher level.*

## Observation 1: Different types of criteria

The targets of PEDs are not only energy-related, but also aspire to maintain or improve the quality of life for those who live or will live there (“liveability of the urban environment in line with social, economic and environmental sustainability”) and are situated on a process level. Values, (moral and organisational) principles and visions of the PED initiative should be made explicit at the onset; imposing a greener future on end-users (local residents) that do not understand or share the same concerns will fail to obtain the necessary buy-in. A PED target should therefore be defined both quantitatively and qualitatively – and take a stand on an ethical level: **what kind of neighbourhoods do we want to build through PEDs?**

It can be considered easier to define and assess energy criteria, because they can mainly be determined in a quantitative way, and because this has already been subject of previous research. The social and process criteria require more work and discussion. For example: KPI’s should include procedural aspects, more notably on when and how to involve end-users, how to set common objectives and who carries the cost. We show below the suggestion made by the EU definition alignment task force to divide the proposal into quantitative and qualitative parameters (although we prefer to make the division into energy-technical, social and process criteria). Subsequently, we also show the inputs 3E gave in the context of WP6: Monitoring for Cities4PEDs to translate these parameters into indicators. Both are not yet complete or finalised, but show the search for a diversity of types of criteria that go beyond the purely technical definition.



PED Framework Development Working proposal by Han Vandevyvere, Simon Schneider, Dirk Ahlers, Shima Goudarzi, Annemie Wyckmans – 07.07.2021, including contributions by Vicky Albert-Seifried, Gerhard Stryi-Hipp and the virtual board. Further updated 03.09.2021 by Han Vandevyvere. for the projects Cities4PEDs.

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## Observation 2: System boundaries

There are different ways to measure the energy balance of a district. Depending on which system boundaries you use, the value of the PED changes. In order to be able to compare PEDs with each other, it is crucial to make agreements about which energy will or will not be included. We observe that there is a tension between (1) an ambitious definition of PED criteria that includes as much energy as possible and is thus as correct as possible, and (2) the definition of PED criteria that are assessable within the limits of currently available data and calculation models.

### *Energy services (demand)*

*After discussing and evaluating with the consortium partners the crucial ingredients for the PED, it was agreed that the following elements should be included in the energy balance on the demand side. These elements have been divided in two categories:*

- *Building operation (including space heating and cooling demands, ventilation, de/humidification for buildings, domestic hot water, common electricity demand and service electricity demand).*
- *User demand (plug loads and domestic / office appliances), except for uses that provide services beyond the district (hospitals, schools, industries through their products).*

*The inclusion of Mobility into the system boundaries of the PED is still under discussion. On the one hand it seems relevant to include mobility due to positive aspects of retrofitting and density of urban areas visible compared to green field developments. On the other, starting from two clear strands as user demand and building operation could enhance the definition of more clear targets, while mobility remains very broad and difficult to be included. Nevertheless, It should still be possible to include mobility as a national addition to a common definition with the means of context factors as described below. Embodied energy of construction, components and consumer goods will NOT be included due to foreseen difficulties with data availability. Neither will the energy demand for leisure mobility (e.g. airplane journeys) be included into the energy balance. Several methods to evaluate energy consumption such as monitoring, computations, bills, simulations, standards, or statistical data might be used to establish the requirements. The method to assess the energy is an open question that should be answered in the next steps.*

### *Energy services (supply)*

*Furthermore, the partners' collaboration led to define that the following elements should be included in the energy balance on the supply-side: (1) On-site electricity production; (2) On-site heat and cold production. Moreover, important is that on the supply-side all the onsite potential for local energy production from a renewable source are included, that would otherwise NOT be utilized or exploited if the district wasn't there, this counts for Electricity (PV, solar thermal, wind power, hydro power), as well as Heat/cold (ambient heat, geothermal energy, solar thermal, biomass heating, waste heat). There remains debate on which onsite renewables fall under the category of waste heat: e.g. in Stockholm (and Sweden in general), waste heat from industrial processes has already become a commodity rather than a mere waste product. These aspects are pushed towards the methodological side of linking the district balance target to the regional and national climate goal.*

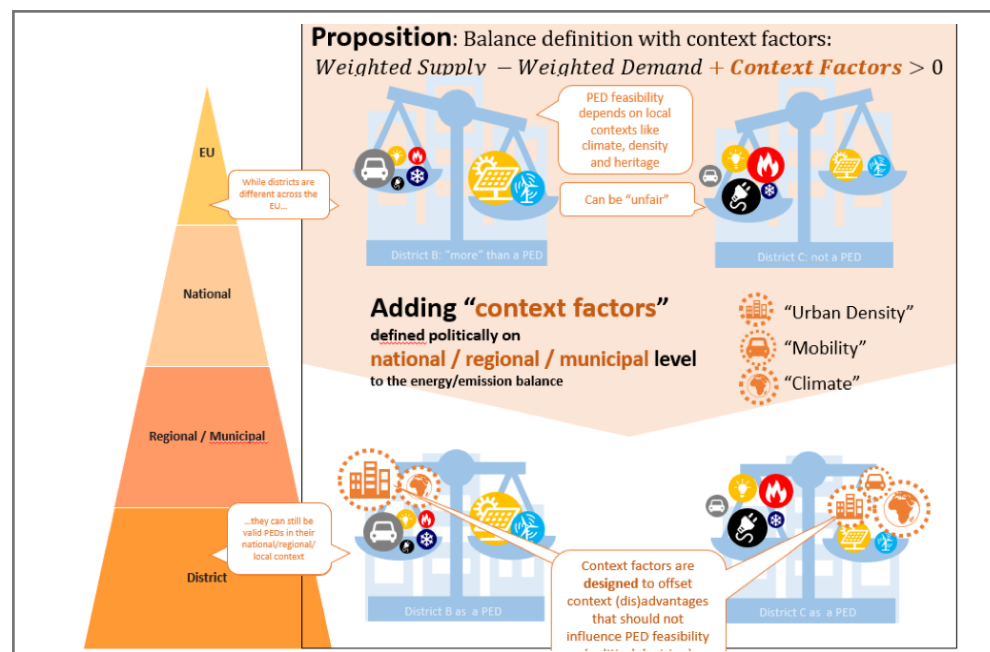
### Observation 3: Context factors

Some districts can be transformed into PEDs more easily than others. In order to maximise districts' potentials as much as possible, but also to give a fair chance to PEDs that have to deal with more difficult conditions, it is necessary to take contextual factors into account. They serve as "counter-weights" in the balance to allow districts in different contexts to be compared to each other and have a "fair" chance to become a PED. Examples of these context factors can be: urban density, the required performance of a PED in the national energy system, inclusion of mobility, flexibility, climate, heritage etc.

*In a principle, context factors are correction terms that offset differences of a system from a baseline based on an effect that should not be jeopardizing the achievability of PED. A context factor is thus a function of a given effect indicator that returns an energy offset, which incidentally evaluates to zero at the baseline configuration. Well-defined context factors establish a level playing field for districts aspiring a PED status in varying contexts. The downside is that more and more complex context factors are needed if one wants to increase the dimensions over which projects should be comparable but are actually not (density, climate, heritage, etc.). It is also important to decide which level (district, urban, regional, national, EU) is responsible for which context factors.*

From: Towards a European PED definition, Alignment Core Group PED definition and integrated approach: EERA JPSC PED modules, SET Plan Action 3.2 PED Programme/DUT PED pillar, COST Action PED-EU-NET, IEA EBC Annex 83, UERA PED WG, PED-related SCC01 projects, H2020 SCC01 TG Replication, SCALE, Smart Cities Marketplace  
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It is crucial to politically define context factors at the appropriate national/regional or municipal level in accordance with their respective climate goals. They should not be devised on a project-by-project basis as is seen fit.



Adding "context factors" to the assessment of the core quantitative criteria of a positive energy balance: Schematic overview (FHTW)



#### Observation 4: Newly-built vs. existing districts

While it might be possible to design a context factor to offset the effects of heritage and the limits of energy savings and onsite renewables in existing neighbourhoods, it is also the process for a newly-built versus an existing neighbourhood that is inherently different. The implementation of a PED in existing neighbourhoods might not take place in only one go, but a step-by-step approach need to be foreseen. In this sense, the transformation time is stretched, and it seems logical to establish working targets, that accompany the local transformation of the neighbourhood. Both newly-built and existing districts will need long-term monitoring, either to (1) guide the phase of becoming PED, and/or to (2) guarantee and follow up the PED status after the delivery of the developed project. The question will be how we can set criteria for a PED definition and a monitoring model that steers this transformation process.

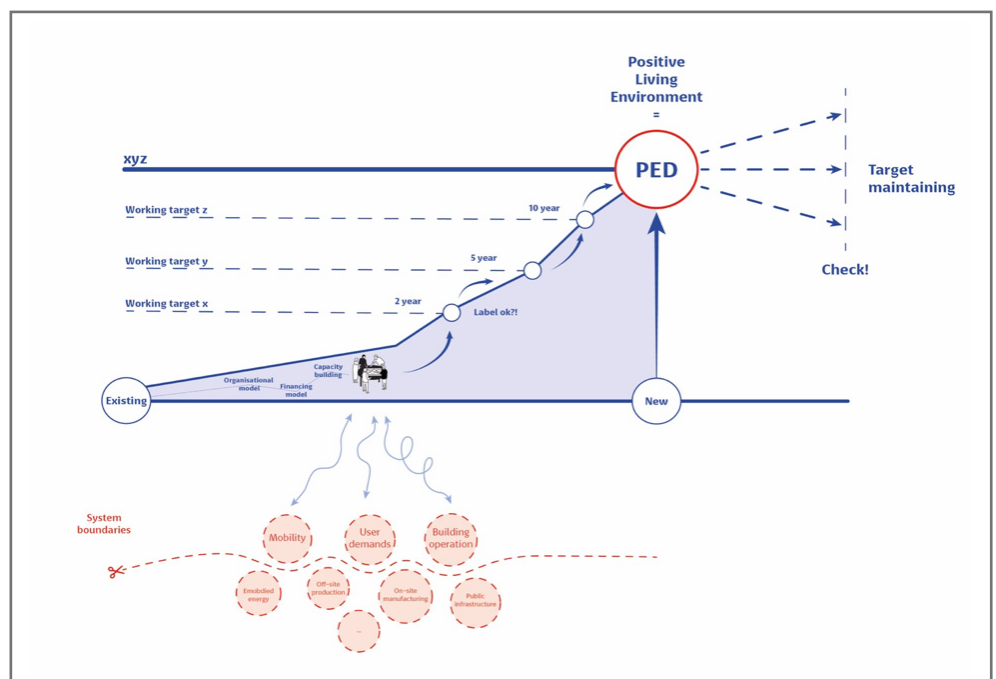


Diagram from the social/process focus group with the concept of phased "definition" with intermediate targets and a monitoring model that is driving the transition of becoming a PED

## Observation 5: Co-ownership

The framework of PEDs should stimulate co-ownership of the transformation or implementation between different actors. Co-ownership is a necessary condition to get beyond the point where residents and actors switch to new suppliers without changing their behaviour or joining the transformation (renovation, decentralised production, etc). In addition, the greater the co-ownership, the deeper the energy transition in a PED can be realised step by step. We are further exploring how this can be addressed in WP4: Neighbourhood dynamics.

Especially in existing districts, the aim is to include different actors and users in the transition of becoming a PED, avoiding passive recipient of those transformations, but to let them to be part of the overarching process. Therefore, the crucial step that needs to be taken is to build local ownership and trust. If the concept of co-ownership (meant in a broad sense) would be included in the criteria of a PED definition, this would allow mobilization and engagement of the local users. In fact, once the energy question becomes also a user question, it represents the starting point of potential spill-over effect of positive actions, that would touch upon also other local challenges. If we would not include it, this can open the doors during the PED implantation phase to dynamics of exploitation from third external parties (e.g. installing PV on roofs in a certain neighbourhood and use the energy production somewhere else). For this reason, the notion of co-ownership is crucial for the PED development and definition.

The notion of co-ownership should be looked at in relation to the concept of co-opting, as an initial condition where citizens, users, organisation are informed and agree upon the transformations, actions, processes, etc. This does not mean that everyone present in a potential PED needs to take an active role, but this precondition implies that there should be an agreement and a common understanding. How do we set the target for the co-ownership of the energy transition? Is this different when talking about the transformation of existing neighbourhood and the development of new one?

	WHAT	WHO	TIME	POWER	FUNDING
Notify & Consult	<ul style="list-style-type: none"> <li>- direct letters to neighbours</li> <li>- site notice</li> <li>- advertising in newspapers</li> <li>- organising a forum</li> </ul>	adjacent properties	punctual	advisory	government paid
Community Referendum	<ul style="list-style-type: none"> <li>- agreement of more than 50% of eligible voters</li> </ul>	voting members of the community	punctual	advisory	government paid
Advisory Committee	<ul style="list-style-type: none"> <li>- volunteers meet on a regular basis to provide feedback</li> </ul>	active volunteers	permanent	advisory	Subsidised locally
Neighbourhood Forum	<ul style="list-style-type: none"> <li>- established (with constitution) body of minimum 21 members of the community (open and representative for the area)</li> <li>- local authority is legally required to provide support and assistance and cannot overrule</li> </ul>	active representative group	permanent	binding	Subsidised locally and nationally

Diagram from the social/process focus group with the concept of phased "definition" with intermediate targets and a monitoring model that is driving the transition of becoming a PED

### **Observation 6: Governance**

To implement an energy strategy at the scale of an entire neighbourhood – as opposed to a building or a block of buildings – requires at least some form of organisation at that level. In centrally controlled neighbourhood developments, where the city or another actor controls a large part of the projects in the neighbourhood, this can be rather easy (for example, within the PED Atlas we analyse the concept of a Development Company taking on the role of coordinator). In – often existing – neighbourhoods with a dispersed ownership model, other forms of governance are needed (see for example the idea of an Energy Table or a Coordination Platform in the PED Atlas). Can we set a minimum organisational form as a criterion for a PED? Or can this be included as a clearly identified prerequisite in the PED Guide?

### **Observation 7: Instruments**

Steering PEDs cannot be done without a supporting framework with different tools. For example, in the PED Atlas we see cities using neighbourhood contracts, land selling contracts, public procurements, etc. They are crucial for a coordinated district approach and a qualitative outcome. Without these instruments, there is no PED. They are crucial in supporting the various stakeholders involved in the development of PEDs. Can we set a minimum framework of instruments as a criterion for a PED?

### **Observation 8: Integral approach**

Neighbourhood development is not only about energy, but touches upon many thematic. To what extent can we separate the rollout of PEDs from other challenges, such as affordable housing, public space, inclusiveness, etc.? Or is it crucial to address these issues simultaneously in a holistic, sustainable neighbourhood approach? We observe that there is a tension between (1) not delaying the process of PEDs by other challenges on the one hand, and (2) seizing the opportunity of massive investment in neighbourhoods through PEDs (which may only occur once between now and 2050) to simultaneously realise other objectives. On the other, we observe that there is a distinction between newly-built districts or existing districts where large parts are in the hands of a single party (public housing, housing corporations, etc.): here a reduction in the number of themes is a method of acceleration. In existing neighbourhoods where ownership is fragmented, it appears that energy transition is not the driver of change, and that linking energy transition to other dimensions is a method to increase the involvement of citizens and actors, and thus to accelerate.

## 4. How do we continue working on this?

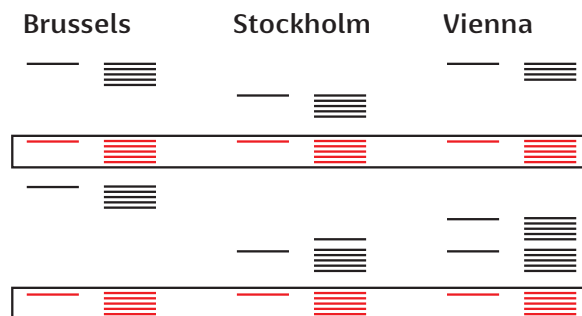
*The presented document provides an overview of discussion points that have already been touched upon within the Cities4PEDs consortium, and questions that are still pending. We are using it as a working document to structure the forthcoming discussions, both within the consortium and with other parties (e.g. other European cities). This means that the content of this document will continue to evolve. We will keep working on it in different ways:*

- We continue the discussion on the observations in the Cities4PEDs consortium (primarily during the Deep Dive on 5–8 October 2021) and together try to sharpen the question and parts of the answer.
- The different cities will each apply (parts of) the question to their own case. Vienna will apply the calculation method they have developed for the Zukunftskquartier to the cases of Brussels and Stockholm in order to sharpen the target at the level of the energy balance (incl. applying system boundaries and/or context factors). In Brussels we will test which social/process factors seem appropriate to evaluate the PED.
- Within WP6 a monitoring model with accompanying measurement indicators will be developed, which will make the discussions on energy-technical vs. social/process criteria more concrete and clear.
- We will take part in the exchanges at EU level and bring our lessons and questions into the conversation with the aim of “weighing in” at the supra-local level from the locally developed experience.
- We will continue to set up the exchange with the analysis of instruments, tools and methods initiated within the PED Atlas to test the criteria and assessment strategy of a PED definition against the process of implementation and transformation. For this we use our WP3 City Instruments and WP4 Neighbourhood Dynamics.

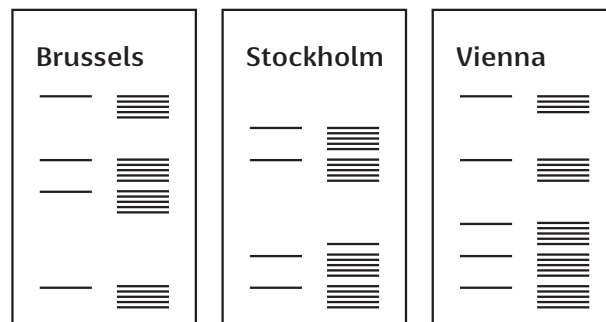
Advice to  
EU task force



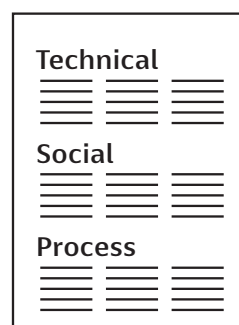
Common criteria  
and indicators



Shortlist per  
city and development  
of (missing) criteria  
and indicators



Catalogue of  
PED criteria  
and indicators



Shared goals and  
observations

