

A1- HOW TO START A PED

Navigating the complexity



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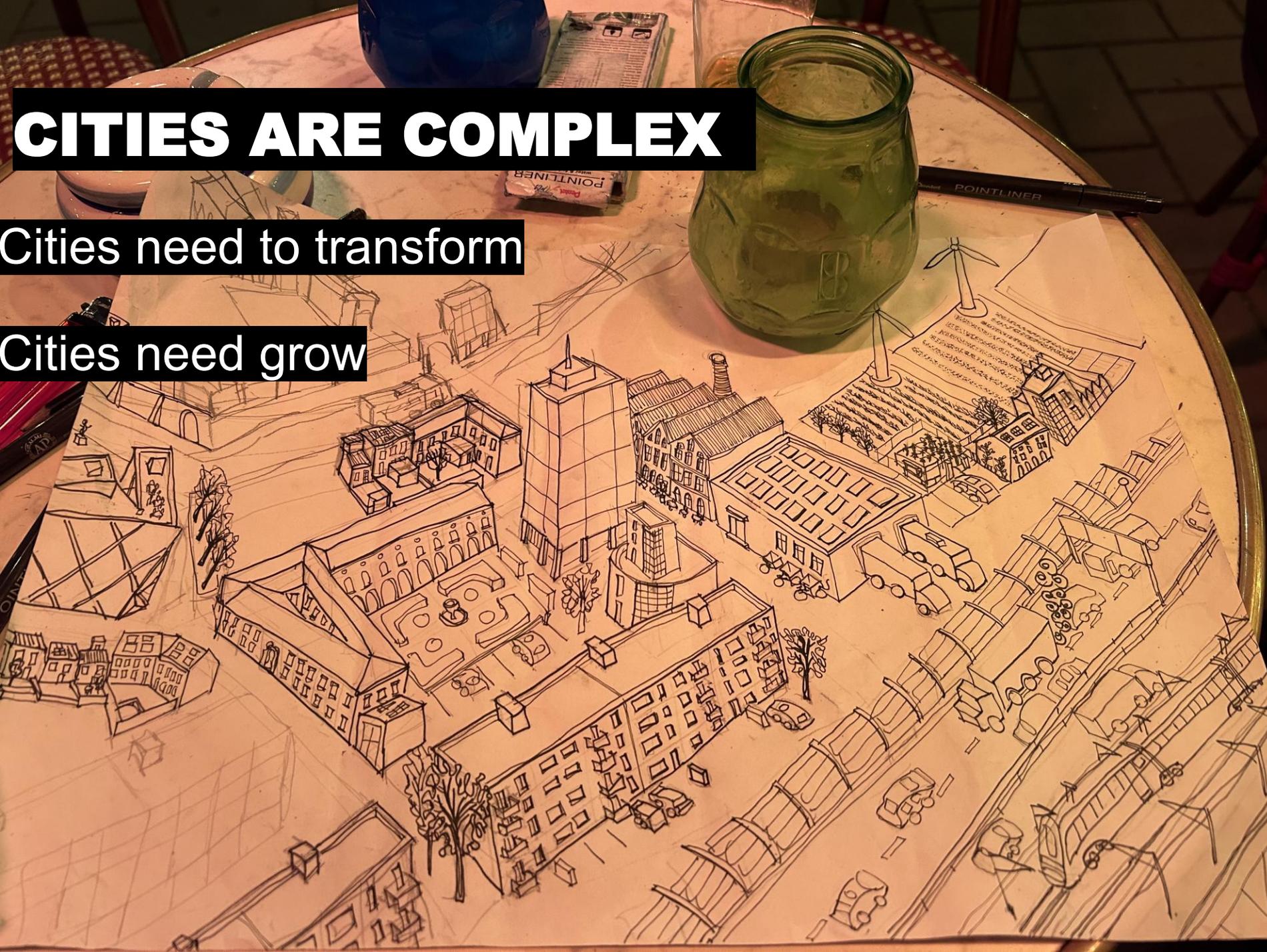
AGENDA

- **Welcome & Introduction**
- **The PED Experience Presentation**
How PEDs offer a framework for energy transition
- **Panel Discussion**
Reflections from ATELIER and external cities on early PED choices
- **PED resources**
 - MOOC
 - PED cookbook
 - Presentation of PED Planning Guide

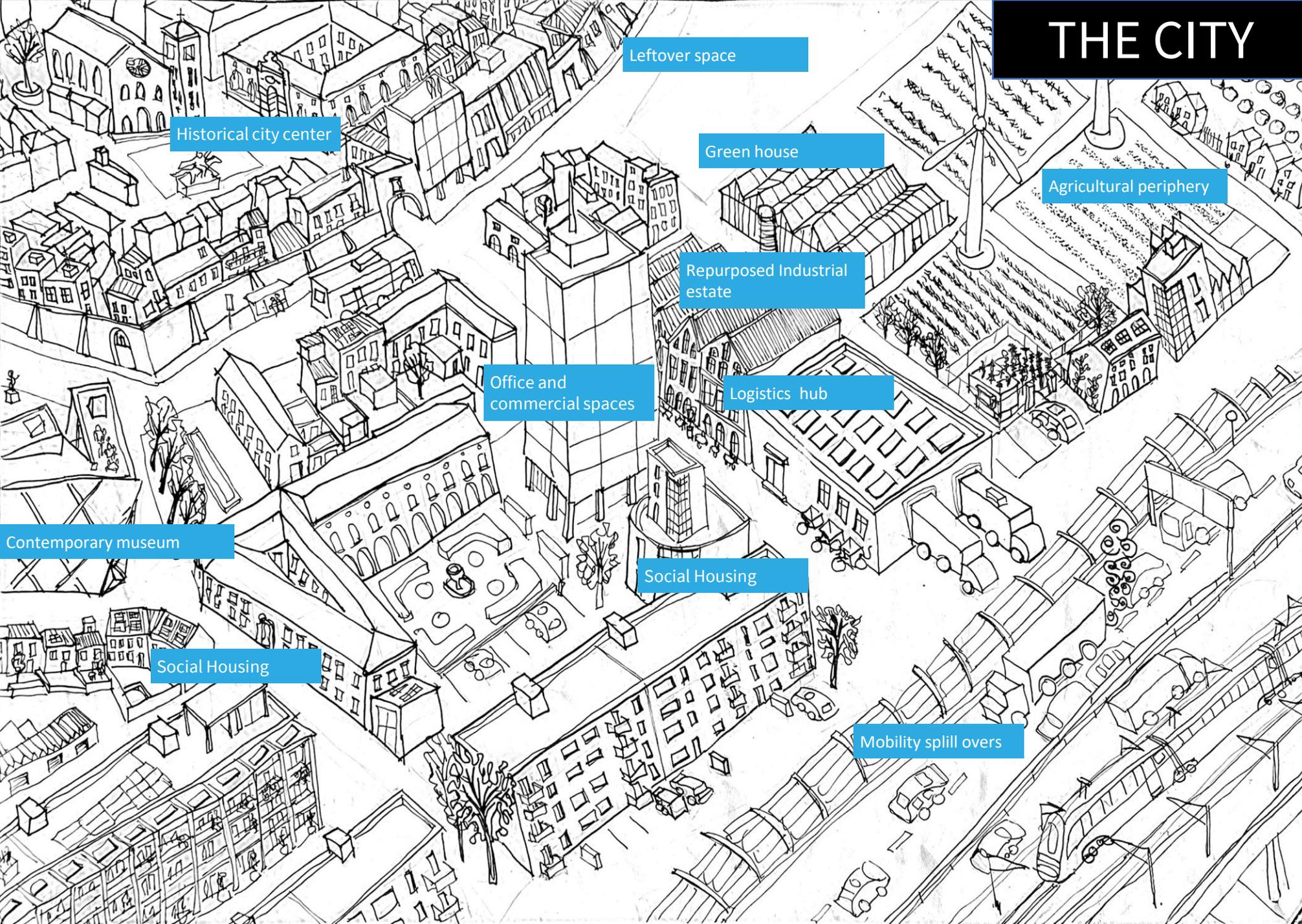
CITIES ARE COMPLEX

Cities need to transform

Cities need grow



THE CITY



Leftover space

Historical city center

Green house

Agricultural periphery

Repurposed Industrial estate

Office and commercial spaces

Logistics hub

Contemporary museum

Social Housing

Social Housing

Mobility spill overs

What is the role of PEDs in Energy transition?

PEDs offers a framework to guide cities towards

Decarbonization

Energy Resilience

Addressing grid congestion

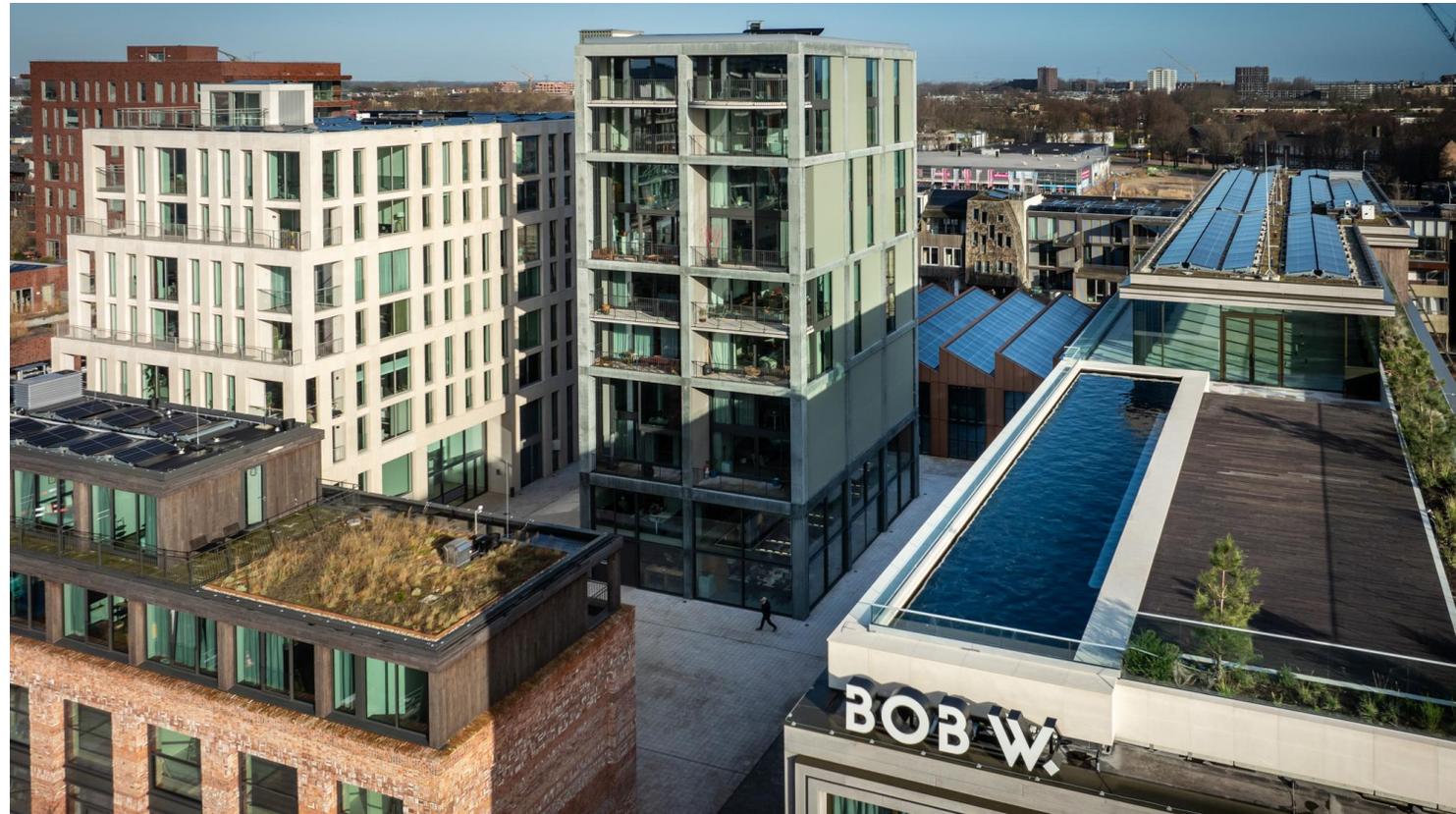
Renewable integration

Heat transition

Energy Poverty

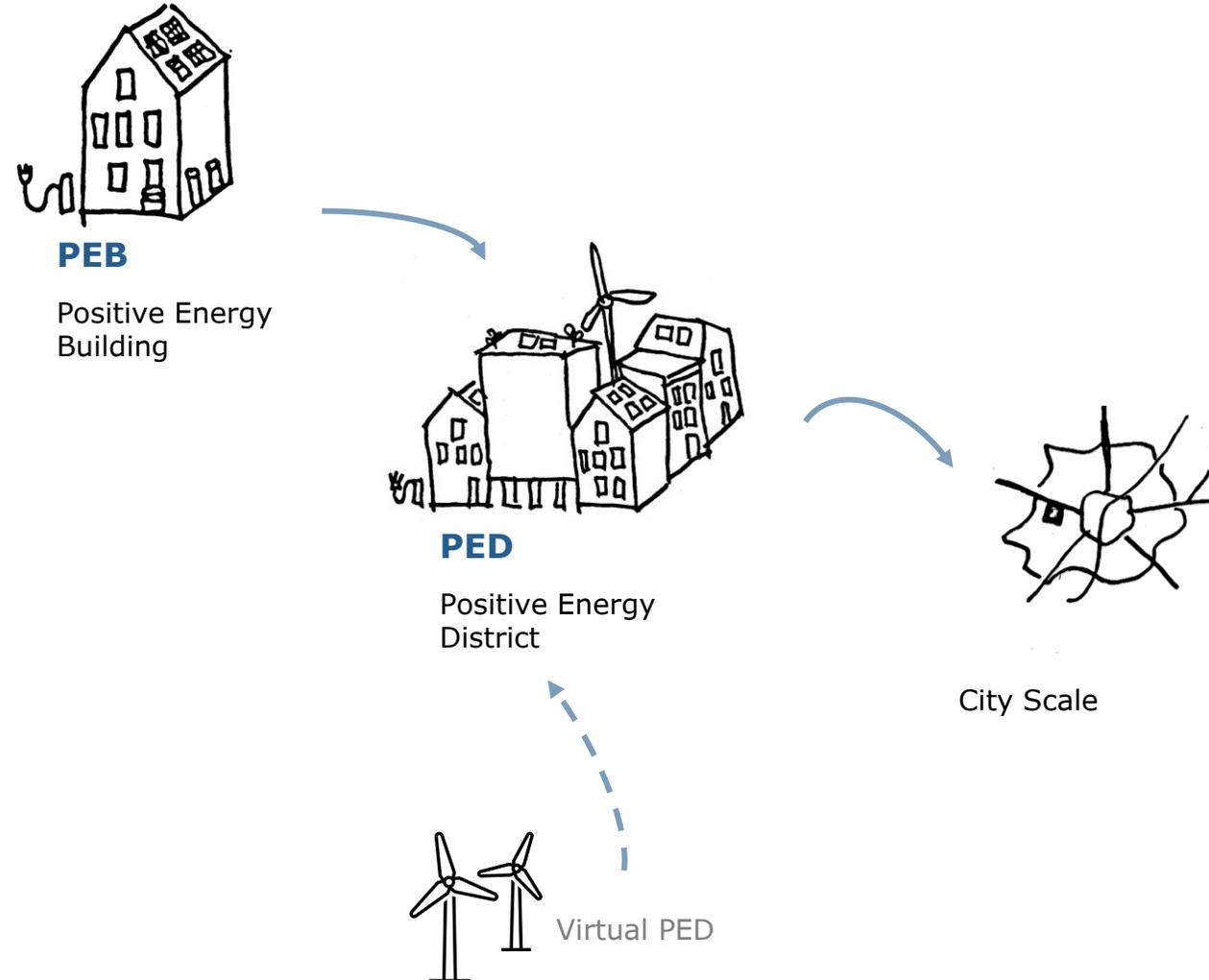
Energy Justice

And much more



Different scales, different benefits

Positivity can be realized in different scales



Yet reality is more complex than what we expected....

An effective PED requires the collaboration with Multiple actors and domains.

PEDs function best as adaptive context-sensitive transition tools



AMSTERDAM

Energy Grid



Flexibility



Smart EV
Charging



Battery



Thermal
Storage

Efficiency



Energy management
systems

Production



Heat
Pumps



Solar

BILBAO



Flexibility



Thermal
Storage

Production



Solar PV



Geothermal

Efficiency



Energy management
System

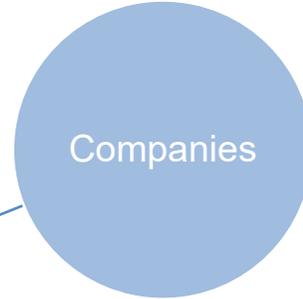


Building
Efficiency

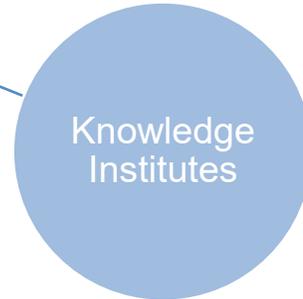
STAKEHOLDERS AND COLLABORATION



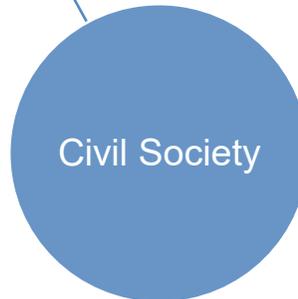
- Innovation
- Energy
- Mobility
- Planning



- Service providers
 - Heat
 - Electricity
- Developers and landowners



- Technological
- Legal
- Electricity & heat,
- Business models



- Existing active communities and organizations
- Building/Neighbourhood organizations and representatives

STAKEHOLDERS AND COLLABORATION

Knowledge Institute Presence

Research is often impractical



Citizen Engagement

Lack of interest and structures

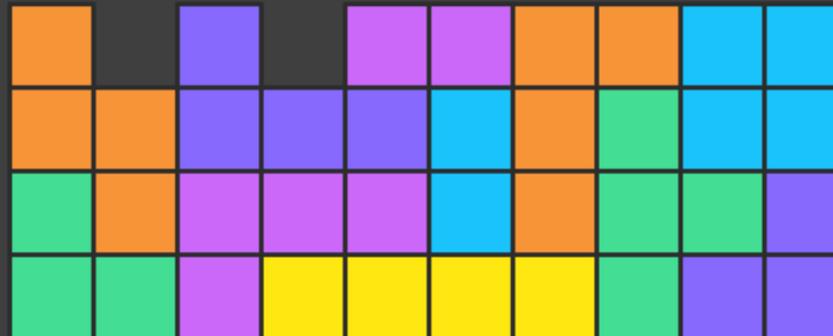
Civil Servant Alignment

Departments lack coordination

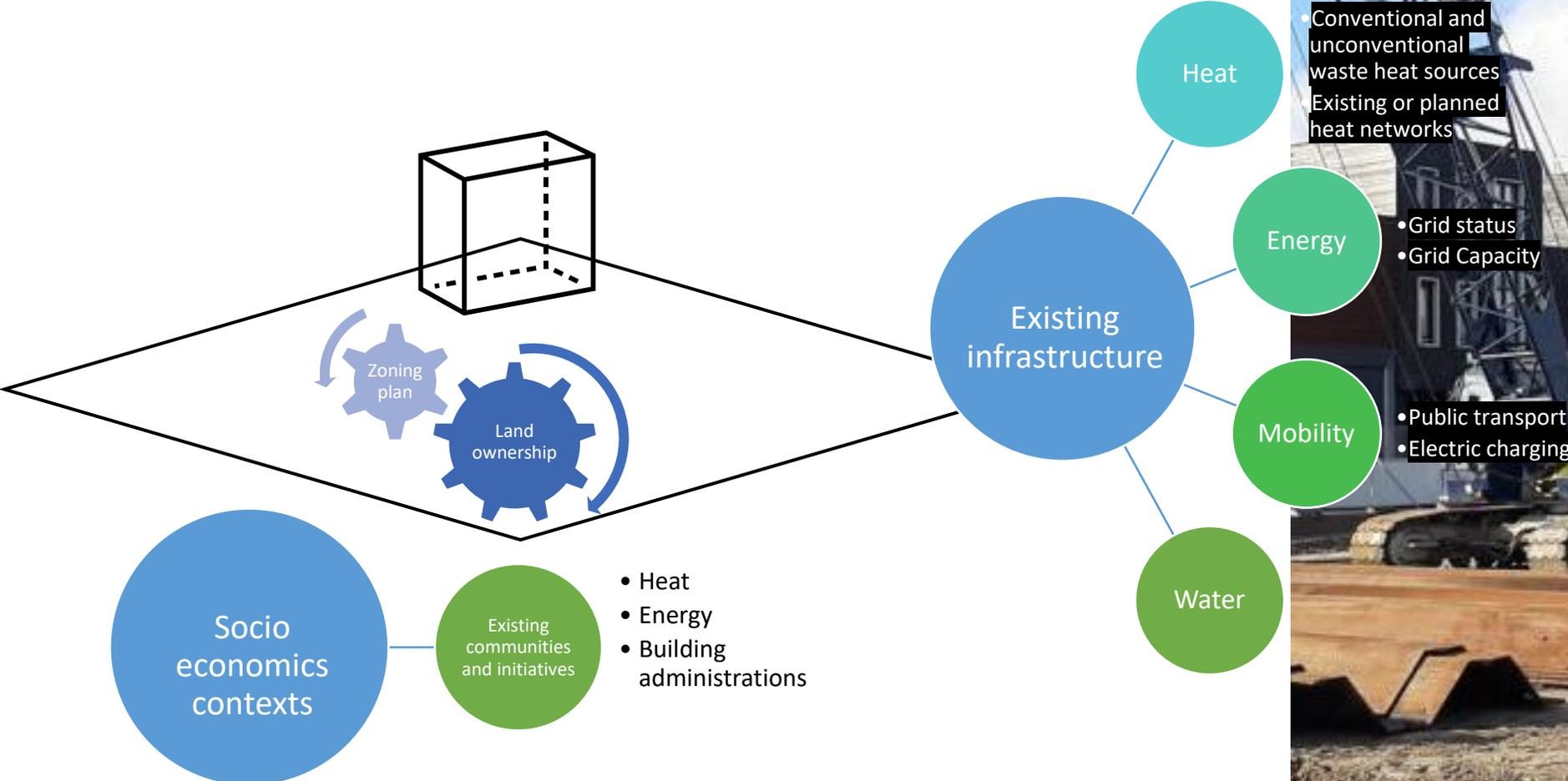


Developer/Tender Process

Complex procurement procedures



SITE SELECTION /SELECTED SITE



• Conventional and unconventional waste heat sources
 Existing or planned heat networks

• Grid status
 • Grid Capacity

• Public transport
 • Electric charging



TECHNOLOGY SELECTION

There needs to be space to test new technologies

Sometimes it does not go as planned.

Performance benchmarks.

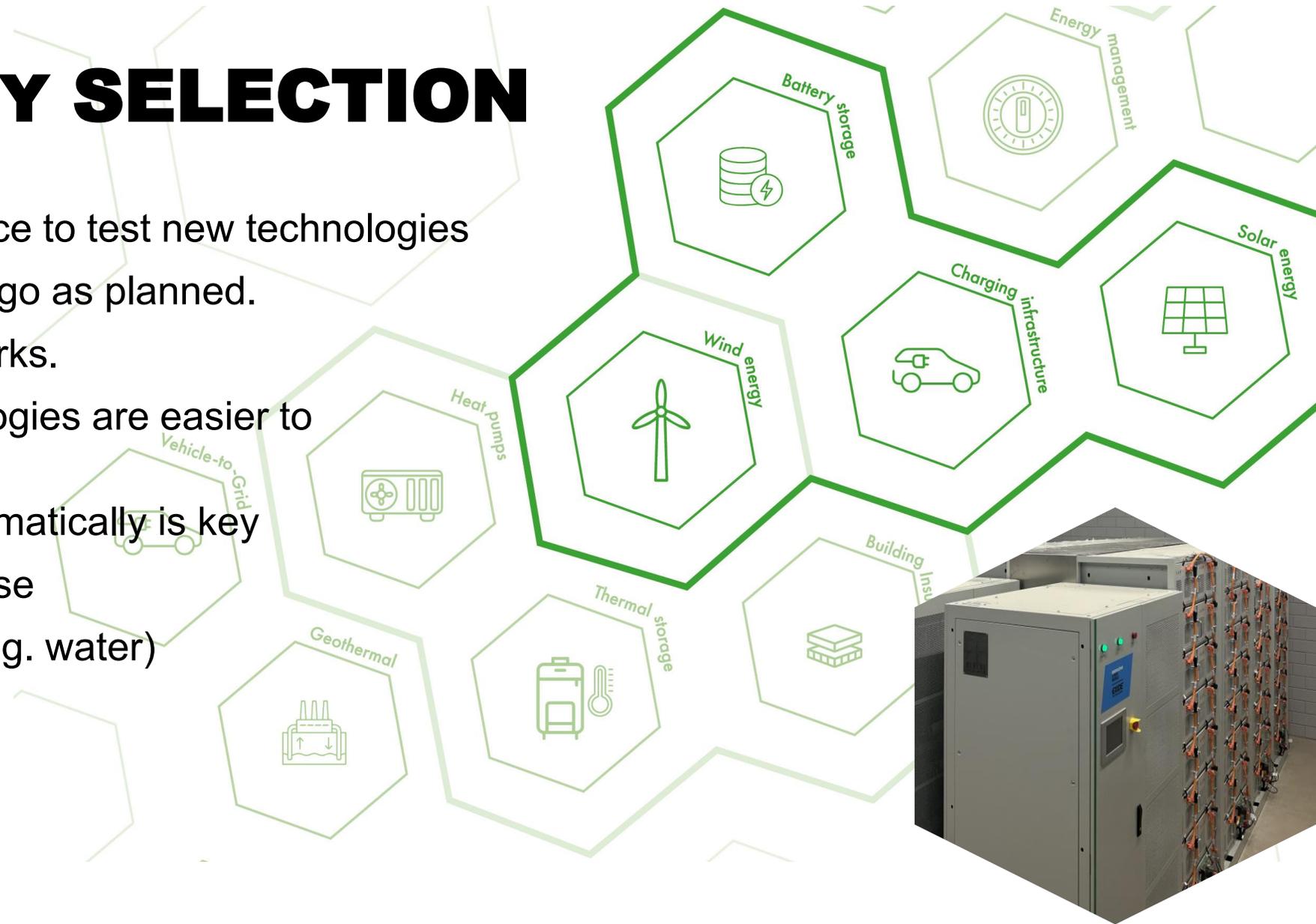
Already tested technologies are easier to implement

Integrating these systematically is key

Relates to business case

Context possibilities (e.g. water)

EMS



PANEL MEMBERS



Almos Papp
CITY OF BUDAPEST



Andrea Borska
CITY OF BRATISLAVA



Dirk Ahlers
NTNU



Sovantania Kauv
DUT

Framework 3.0 (DUT)

What are Positive Energy Districts?

Why do we need Positive Energy Districts?



Positive Energy Districts are connected urban areas with



How do we realise Positive Energy Districts?



PED SUPPORT RESOURCES



pedlearning.eu

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Learn about Positive Energy Districts

This free learning platform provides materials and a community for professionals who are or want to be actively involved in a PED project and anyone else who is interested in smart city solutions.

PED Learning Community

On this platform you can currently find two courses: The PED Start Guide that serves as an introduction into Positive Energy District, course on PED Business and Stakeholder Ecosystems.

The platform is not just made for sending information. We aim to build a PED Learning Community together with YOU and be able to develop many more online courses and other learning activities. Sign up and become part of the community so we can learn from each other.

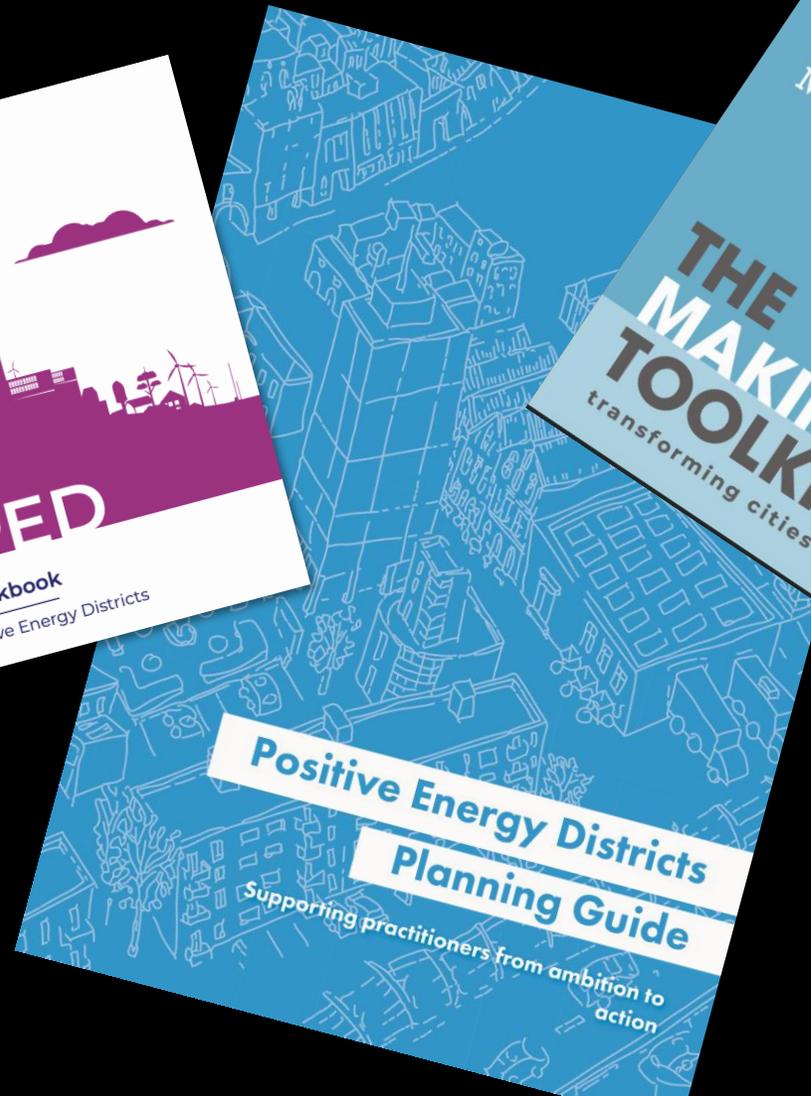


+CITYXCHANGE

How to PED

The +CityxChange Cookbook

Experiences and guidelines on Positive Energy Districts



Positive Energy Districts Planning Guide

Supporting practitioners from ambition to action



Making City

THE MAKING-CITY TOOLKIT

transforming cities with Positive Energy Districts

the PED concept stakeholder & citizen engagement business models & finance

Why a MOOC in ATELIER?

- Massive Open Online Course (MOOC) = online, open, flexible learning
- Scales to many learners worldwide
- Key tool to disseminate ATELIER knowledge on PEDs



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The “PED Start Guide” course

- Introductory course on PEDs
- 5 key themes
- From concept to practice

EXPERTS & PROJECT MEMBERS

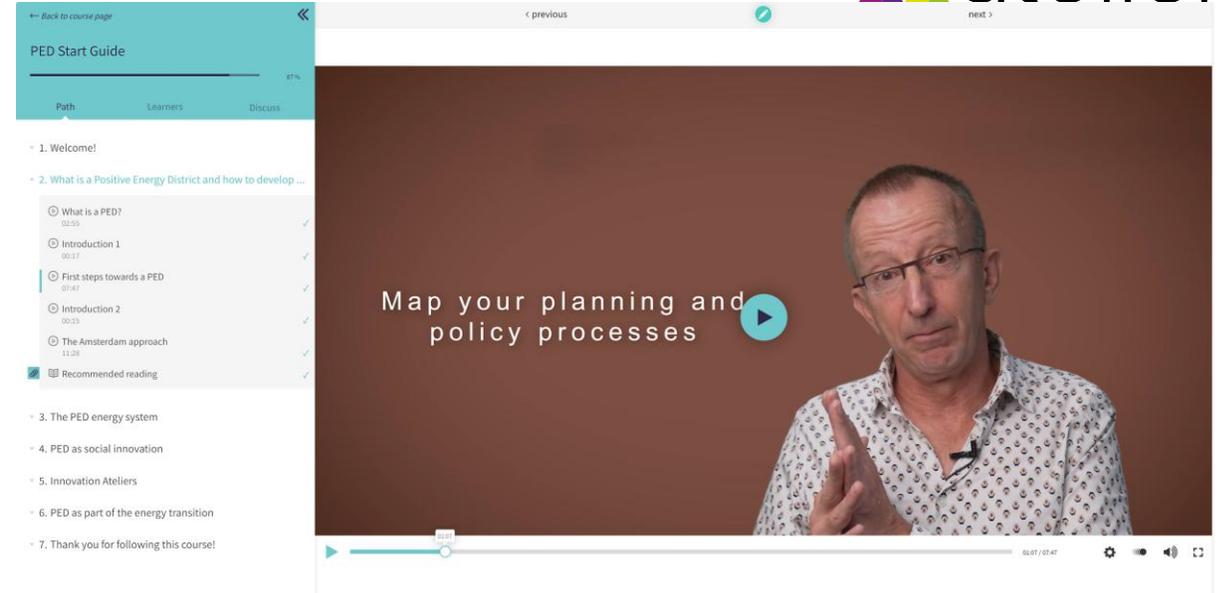
Meet our team

	<p>Frans Verspeek CITY OF AMSTERDAM Frans is responsible for the overall coordination of Smart Cities and Communities project ATELER. He is an internationally acknowledged sustainability expert, successful in project and programme development through complex multi-stakeholder consultative processes.</p>		<p>Han Vandevyvere VITO Han is project manager & senior researcher at EnergyVille. He is expert on sustainable urban development, energy transition of the built environment, low carbon economy, transition management and social innovation.</p>
	<p>Jeroen Brouwer TNO Jeroen is senior research scientist and project manager at TNO. He is expert on project management of large, interdisciplinary and international projects.</p>		<p>Karen Williams AMSTERDAM UNIVERSITY OF AS Karen is researcher Energy & Innovation. She is a sustainability professional with ten years of experience in environmental compliance reporting, building performance analysis, energy, water and waste management.</p>
	<p>Marije Poel AMSTERDAM UNIVERSITY OF AS Marije works on the ATELER project and responsible for this PED Learning Community Platform. Her ambition is to contribute to city development & sustainability.</p>		<p>Mark van Wees AMSTERDAM UNIVERSITY OF AS Mark is project manager and responsible for the ATELER project implementation at the AIAS. He has more than 23 years of experience in energy, climate & environmental research and consultancy.</p>
	<p>Renée Heller AMSTERDAM UNIVERSITY OF AS Renée is professor of Energy & Innovation at the AIAS. She is expert on realization of large innovation projects, feasibility studies, product development and conceptual design in the field of renewable energy, horticulture on built environment.</p>		<p>Rudy Rooth CITY OF AMSTERDAM Rudy is a project manager at the City of Amsterdam. He has worked in the energy sector for more than 35 years. He is leading the local activities in the Amsterdam Lighthouse project ATELER.</p>
	<p>Socrates Schouten WAG Socrates is lead of the Commons Lab at Waag Futurelab, Institute for Technology and Society in Amsterdam. He researches the societal impact of digitalisation and the sustainability transition. In 2018 he published the book 'The Circular Economy'.</p>		<p>Viktória Balla-Kamper AMSTERDAM UNIVERSITY OF AS Viktória is project manager at the Faculty of Technology working on professional education (L&D). Together with Marije, Viktória has initiated the idea of a PED Learning Community and manages this platform.</p>



How the MOOC works

- Open platform: pedlearning.eu
- Self-paced, modular
- Videos, quizzes, discussion



Quiz

question 1/8

What is in the definition of a Positive Energy District? (more than one answer required)

- Energy-efficient and energy-flexible urban areas
- Produce net zero greenhouse gas emissions
- Only use wind and solar energy
- Actively manage an annual local or regional surplus of renewable energy
- Be positive in life in line with social, economic and environmental sustainability

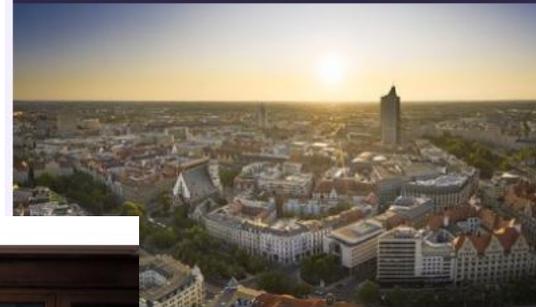
Outlook: what's next?

More content & languages
 Long-term learning hub
 Potential merge with other platform(s)

PED Business Ecosystem and Stakeholder Engagement

Learn more about PEDs with SPARCS in this course

free [Register for free!](#)



PED Planning, Design, and Implementation

Dive deeper with into PEDs with COST Action Positive Energy Districts European Network (PED-EU-NET) Academy Trainers.

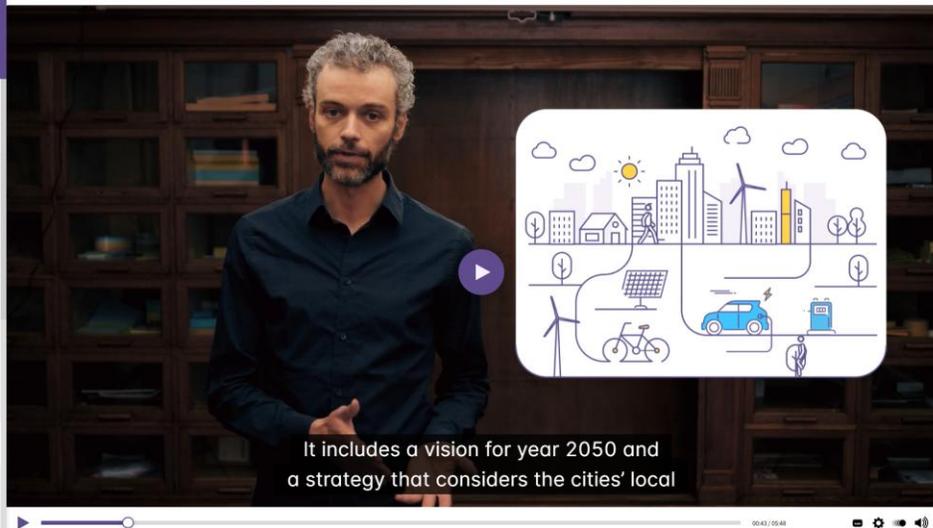
free [Register for free!](#)



PED Business Ecosystem and Stakeholder Engagement

Path | Learners | Discuss

- 1. Introduction to the course
- 2. Anchoring PED in overall city economic development strategy
 - Positive energy districts as part of city development strategy
 - The role of urban orchestrator
 - Setting the goals of PEDs: what are the economic drivers?
 - Spatial planning and PEDs: principles, goals, stakeholders
 - Quiz 1
 - Supporting material 1 - Roadmap Guidelines
 - Supporting material 2 - City Vision Guidelines
 - Supporting material 3 - SPARCS Newsletter Roadmaps
 - Supporting material 4 - Stakeholder Mapping
 - Supporting material 5 - Spatial Planning
- 3. Understanding local stakeholders, their ecosystemic roles and e...



It includes a vision for year 2050 and a strategy that considers the cities' local



**PED
EU
NET**



SPARCS



+CityxChange: 7 Pathways to PEDs

- “A PED is a process, not a product”
- PEDs driving local strategies
- Collaboration & mindset shift
- 2 fully operational integrated PEDs
- PEDs as stepping stones towards Climate-Neutrality



Dirk Ahlers & +CityxChange Team

NTNU – Norwegian University of Science and Technology, Trondheim



How to PED

The +CityxChange Cookbook

Experiences and guidelines on Positive Energy Districts

<https://cityxchange.eu/knowledge-base/how-to-ped-cookbook/>

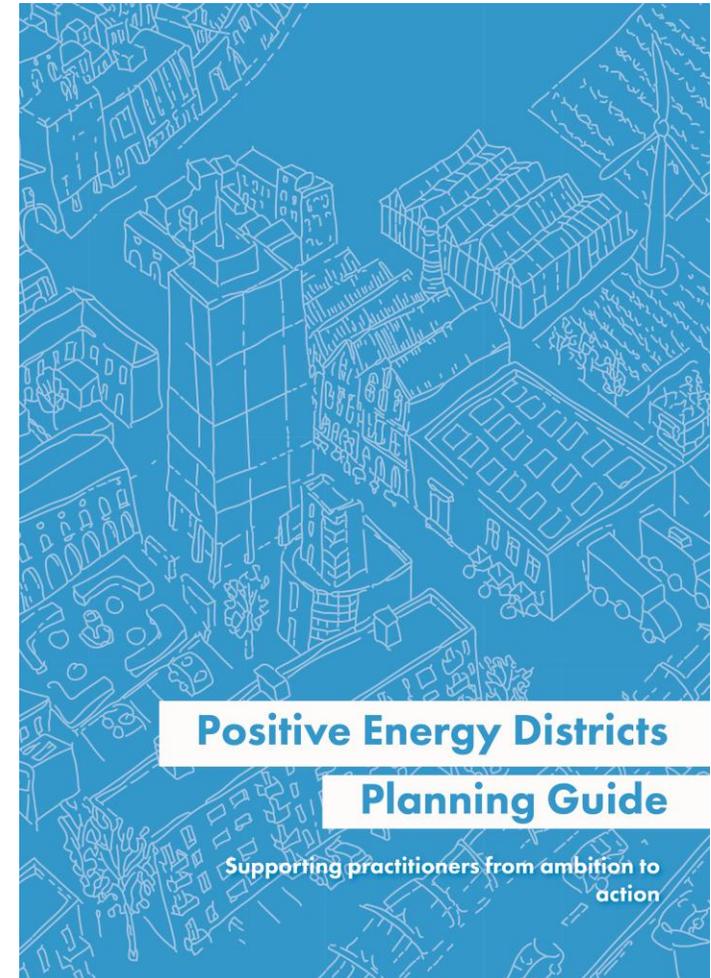


+CITYXCHANGE



Why this guide was developed

From extensive project documentation to a practitioner friendly visual guide



<https://smartcity-atelier.eu/app/uploads/PED-planning-Guide20226.pdf>

The logic of a PED

Setting the basis for the guide

Efficiency – Spreading energy over multiple functions

Flexibility – Using or storing energy when the system can handle it better

Production – Producing energy locally



What is needed for creating a PED?

The Components

The modularity of a PED

There are many ways to make a PED. The goal is simple: combine solutions so the area produces more electricity and heat than it uses. A PED is made of different energy elements, and cities choose the mix that fits their district, local plans and energy system.

The example on this page is only one of many possible configurations. A PED can be built from a wide range of components, and cities can combine them in different ways depending on their district, infrastructure and goals. On page 18 you will find a more detailed overview of the full set of components and how they can work together.



The Stakeholders

Who should be involved?

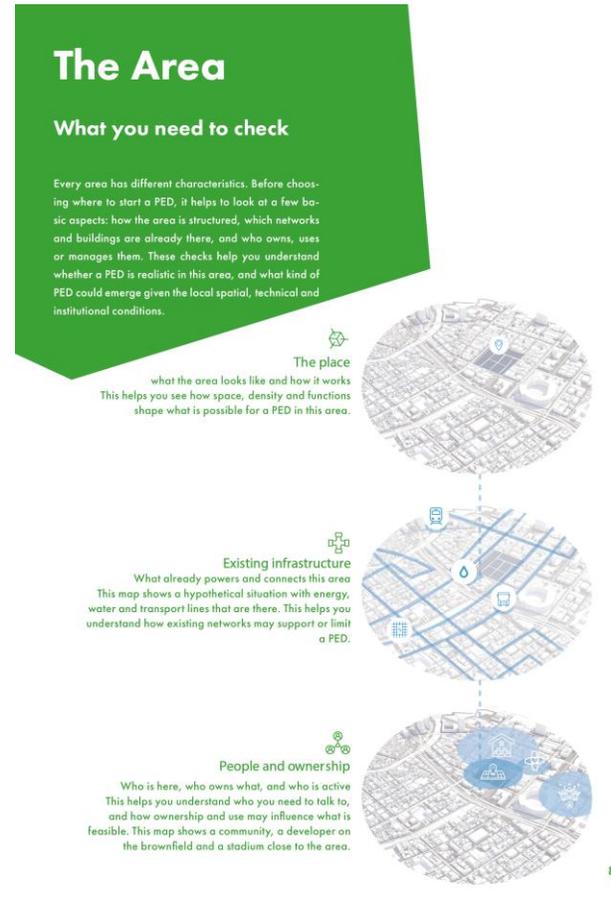
A PED involves a few key groups. Each looks at the area from a different angle and helps shape the final setup, within existing spatial, technical and governance contexts. Land owners focus on what can realistically change on the site. Energy experts look at energy demand, grid capacity and heat options, as well as technical, regulatory and system-related constraints, including existing energy networks and supply strategies. Area planners connect these insights to zoning, public space, timelines, renovation cycles and city objectives. Local users explain their needs, as they live or work in the area and influence how energy is used in daily life.



The Area

What you need to check

Every area has different characteristics. Before choosing where to start a PED, it helps to look at a few basic aspects: how the area is structured, which networks and buildings are already there, and who owns, uses or manages them. These checks help you understand whether a PED is realistic in this area, and what kind of PED could emerge given the local spatial, technical and institutional conditions.





The Components

The modularity of a PED

There are many ways to make a PED. The goal is simple: combine solutions in the most promising way identifying how best to use a PED's mix of different energy sources, and other choices the way that fit their district, local plans and energy system.

The examples on this page are only one of many possible configurations. A PED can be built from a wide range of components, and often can combine them in different ways depending on their district, infrastructure and goals. On page 18 you will find a more detailed overview of the full set of components and how they can work together.

The Stakeholders

Who should be involved?

A PED involves a few key groups. Each looks at the area from a different angle and helps shape the final strategy, while creating spatial, technical and governance systems. Lead owners focus on what can realistically change on the site. Energy experts look at energy demand, grid capacity and heat options, as well as technical, regulatory and system-level constraints, including existing energy networks and energy strategies. Area planners connect these insights to zoning, public space, land-use, renovation cycles and city objectives. Local users explain their needs, as they live or work in the area and influence how energy is used in daily life.

The Area

What you need to check

Every area has different characteristics. Before choosing where to start a PED, it helps to look at a few factors: how the area is structured, which services and buildings are already there, and who owns, uses or manages them. These checks help you understand whether a PED is realistic in this area, and what kind of PED could emerge given the local spatial, technical and environmental conditions.

The place
What the area looks like and how it works. This helps you see how spaces, identify and locations shape what is possible for a PED in this area.

Existing infrastructure
What already governs and connects this area. This map shows a hypothetical situation with energy, water and transport lines that are there. This helps you understand how existing networks may support or limit a PED.

People and ownership
Who's there, who owns what, and who's working. This helps you understand who you need to talk to, and how ownership and use may influence what is possible. This map shows a community, a developer or the local authority and a possible start to the area.

3 functions of a PED

Flexibility Production Efficiency

Each colour groups components by their primary role in a PED system

Each example configuration highlights a different balance between efficiency, flexibility and production.

Making it collaborative

A PED is not built by one actor. It grows when the people who shape buildings, infrastructure, heat, mobility and public space work toward the same goals. Collaboration is not an extra step in the process. It is the structure that holds everything together.

Cities work with many different actors: utilities, housing associations, developers, local organisations and municipal departments. Each brings different responsibilities, data, resources and timelines. A PED works when these pieces align and when decisions connect across sectors and scales.

Not every stakeholder has the same motivation or capacity. Prioritise those who are open to experimentation and can contribute to implementation.

Who to involve first?

The first actors to involve are the municipal teams responsible for heat, energy, buildings, mobility and planning. They set the conditions for what is possible in an area: system capacity, renovation strategy, spatial limits and timing.

Next to the municipality, you need the grid operator, the heat supplier and the main landowner or developer. These actors determine the starting point and remove the earliest barriers.

Existing neighbourhoods

Strategic advantages

- Strong social structures and established daily patterns.
- Existing infrastructure can be upgraded.
- Renovation cycles create opportunities to integrate energy improvements.

Strategic challenges

- Fragmented ownership and slow decision-making.
- Existing infrastructure making upgrades technically and organisationally complex.
- Interventions must fit within what already exists.

Focus early on

- Renovation timelines, ownership structures and regulatory requirements for upgrades.
- How existing electricity and heat networks can align with new PED components.
- Early engagement with residents and property owners, as this determines pace and feasibility.

New development

Strategic advantages

- More freedom to integrate heat, electricity and mobility in a coordinated way.
- Clear ownership structures; working with one or a few developers speeds up decision-making.
- Easier to design for low demand and high energy performance from the start.

Strategic challenges

- High upfront investments in network upgrades, heat systems and flexibility options.
- Zoning procedures, planning cycles and development phasing may slow the process.
- Uncertainty about future demand and user behaviour.

Focus early on

- Align spatial planning and the energy concept from the beginning (electricity, heat, mobility).
- Decide who owns and manages energy and mobility assets after completion.
- Financial feasibility: business cases for heat networks, storage and flexibility.

Deepening: Area, modularity, collaboration

Context fit

Understand what is already there: infrastructure, ownership, spatial constraints.

Modularity

There is no blueprint.

Collaboration

Build your core team

Existing neighbourhoods

Strategic advantages

- Strong social structures and established daily patterns
- Existing infrastructure can be upgraded
- Resilient cycles create opportunities to integrate energy improvement

Strategic challenges

- Fragmented ownership and slow decision-making
- Existing infrastructure making upgrades technically and organisationally complex
- Interactions result within what already exists

Focus early on

- Operational benefits, ownership structures and regulatory requirements for upgrades
- Other existing electricity and heat networks can align with new PED components
- Clearly aligned with residents and property owners on the distribution pace and flexibility

New development

Strategic advantages

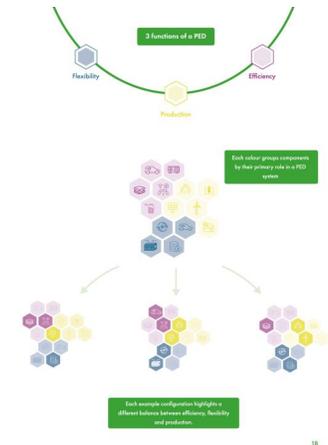
- More freedom to integrate heat, electricity and mobility in a coordinated way
- Clear ownership structure, working with one or a few developers speeds up decision-making
- Easier to design for low demand and high energy performance from the start

Strategic challenges

- High capital investment in network upgrades, heat systems and flexibility options
- Zoning processes, planning cycles and development planning may slow the process
- Uncertainty about future demand and user behaviour

Focus early on

- Align spatial planning and the energy concept from the beginning (electricity, heat, mobility)
- Decide who owns and manages energy and mobility assets after completion
- Financial flexibility: business cases for heat networks, storage and flexibility



Making it collaborative

A PED is built for one actor. It grows when the people who share buildings, infrastructure, heat, mobility and public space work toward the energy goals. Collaboration is not an extra step in the process. It is the structure that binds everything together.

Clubs work with many different actors: offices, housing associations, developers, local governmental decision-makers. Each brings different responsibilities, ideas, resources and attitudes. A PED works when these parties align and other decisions connect energy system and activities.

Use every stakeholder for the same motivation or opportunity: proactive those who are open to experimentation and face possible task experimentation.

Who to involve first?

The first actors to involve are the municipal teams responsible for heat, energy, buildings, mobility and planning. They set the conditions for what is possible for new energy capacity, renovation strategy, spatial limits and so on.

Next to the municipality, you need the grid operators, the heat retailer and the most local owner or developer. These entities determine the heating profile and receive the highest benefits.

Grounded in Practice

Based on lessons from Amsterdam & Bilbao



Grounded in Practice

Based on lessons from Amsterdam & Bilbao



Thank you!

