WORKSHOP PROJECT 61

HEAT PUMPS IN POSITIVE ENERGY DISTRICTS

Heat Pumps in Positive Energy Districts – Experiences, Opportunites and Perspective

Introduction and sessions

Workshop 2026-05-26, IEA HPC 2026 Vienna

Carsten Wemhoener

Project/Annex 61 - Participants and Scope

- **Participating countries**
  - 6 countries
    AT, CH, DE, IT, JP, US
  - 14 Institutions
  - 10 Monitoring Projects
  - Duration September 2022 – June 2026

- **Scope of Project 61**
  - Heat pump (HP) solutions for building clusters and positive energy districts.
  - Focus on small neighborhoods of up to 25 buildings.
  - Focus on residential and office buildings
  - Focus on new builds, evaluation of the potential for renovations

Overview IEA HPT Project 61

1 State-of-the-art analysis

- Definition and Frame-work for HP in PED
- Technologies and HP-concepts in existing PED
- Legal & policy regulations/barriers
- Boundary conditions for system analysis
- Cross-country compa-rison of HP in PED

2 Generic HP systems

- Generic HP system from individual building to district level
- Top-level integration categories & detailed system concepts
- Archetype PED for new built, mixed use and retrofit context
- Technology evaluation and description

3 Techno-econo-mic analysis

- Detailed analysis of favourable integration concepts
- System modelling and validation
- Design and control studies of larger centralised HP
- Storage integration and energy flexibility potentials

4 Case studies and Monitoring

- Case studies for HP integration in clusters and districts
- Evaluation of HP per-formance in real operation
- Identification and appli-cation of optimisation potentials
- Validation data for simulation models

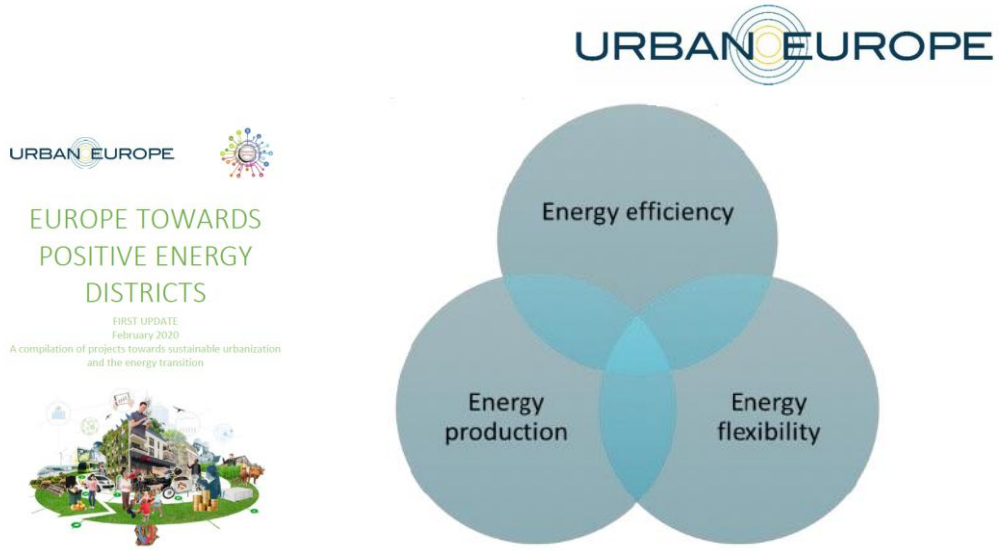
State of Definition PED

EU-Definition/Framework of PED

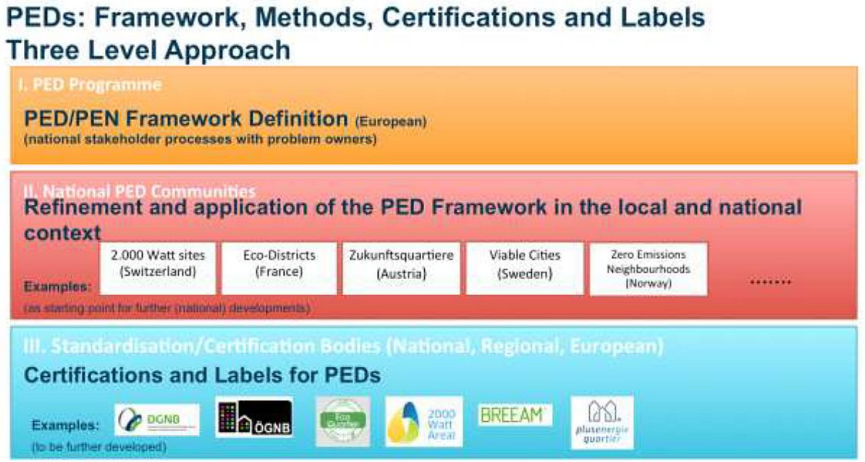
"Positive Energy Districts are energy-efficient and energy-flexible urban areas or groups of connected buildings which produce net zero greenhouse gas emissions and actively manage an annual local or regional surplus production of renewable energy.

They require integration of different systems and infrastructures and interaction between buildings, the users and the regional energy, mobility and ICT systems, while securing the energy supply and a good life for all in line with social, economic and environmental sustainability."

Implementation by "100 PED in Europe by 2025"



source: JPI Urban Europe



HP Integration options

Decentralised HP on individual building level

Project 61 Monitoring and Simulation

Collective heat source system of the HP

Decentralised HP on individual building level

Increasing HP integration in district

Centralised HP for cluster and district supply

Electric connection of buildings only

Semi-centralised solution – combination of central and decentralised HP

Workshop Programme

10:00 – 10:05	Welcome & Opening Remarks	C. Wemhoener
Session 1: Monitoring and simulation of HP in PED		
10:05 – 10:20	Monitoring and assessment “toward” PED “Campagne Innsbruck”	F. Ochs
10:20 – 10:35	Monitoring and assessment “toward” PED “Papieri Cham”	C. Wemhoener
10:35 – 11:00	Interactive Panel Discussion I: “Experiences & Opportunities of HP in PED”	Panel/all
11.00 – 11.10	PED in DUT Partnership	E. Pasic
11.10 – 11.40	Coffee Break	

Workshop Programme

Session 2: Concept comparison & specific technologies

11:40 – 11:55	Techno-/economic analysis on HP concepts in districts	F. Bockelmann
11:55 – 12:05	Asphalt collector	E. Haslinger
12:05 – 12:15	Mine water storage	L. Oppelt
12:15 – 12:25	Dual source HP integration	M. Dongellini
12.25 – 12.50	Interactive Panel Discussion II: “Challenges & Perspectives of HP in PED”	Panel/all
12.50 – 13.00	Concluding remarks	C. Wemhoener
13.00	Lunch Break	

Interactive Panel Discussion I

Part 1: Experiences & Opportunities of HP in PED

Who is in the room:

Academia/Research

Manufacturers/Utilities

Planners/Designers/Consultants

Building companies

Others

Interactive Panel Discussion I

Part 1: Experiences & Opportunities of HP in PED

Panel: What are your experience with PED?
What is the experience and spread of PED on national level?

Audience: Who has experience with PED?

Who has monitoring experience in districts?

Interactive Panel Discussion I

Part 1: Experiences & Opportunities of HP in PED

Panel: What are the most important features of PED?

Panel + Audience:

What are the experiences in PED Planning?

Which System solutions/technologies are applied?

Interactive Panel Discussion I

Part 1: Experiences & Opportunities of HP in PED

Panel: How is the role of PED in urban areas assessed?

Panel + Audience:

What balance is applied for PED? What is included, what is excluded?

Workshop Programme

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Interactive Panel Discussion II

Part 2: Challenges & Perspectives of HP in PED

Panel: What are the advantages of heat pump integration on district level?

Panel + Audience:

- **What are the efficiency potential of heat pump in districts?**
- **What are the challenges for the application of heat pumps in districts?**

Interactive Panel Discussion II

Part 2: Challenges & Perspectives of HP in PED

Panel: Which HP integration would you recommend?

Panel + Audience:

- **What are the arguments for a central integration?**
- **What are the arguments for a decentral integration?**

Interactive Panel Discussion II

Part 2: Challenges & Perspectives of HP in PED

Panel + Audience:

- **How do you assess the future perspectives of heat pump application in districts?**
- **What are the key technologies for districts and the urban energy transformation?**
- **What is the role of energy flexibility in future**

Conclusions and perspectives

- PED concepts can be very ambitious for dense urban areas
- HP are a key component due to unique features and
- Both building envelope performance and on-site energy production have to optimised
- PED is rather a vision than a reality, but can be useful as planning objective
- Energy flexibility can be a third dimension in the PED concept
- Currently, not too many incentives, but demand and markets is developing
- Integration of electric mobility can yield large storage capacities

Conclusion

- **Thank you for your attention and contributions**