

Assessing the impact of Positive Energy Districts: The need for more flexible, comprehensive and transparent methodologies and models

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AmsTERdam BiLbao citizen drivEn smaRt cities



atelier
Positive Energy Districts



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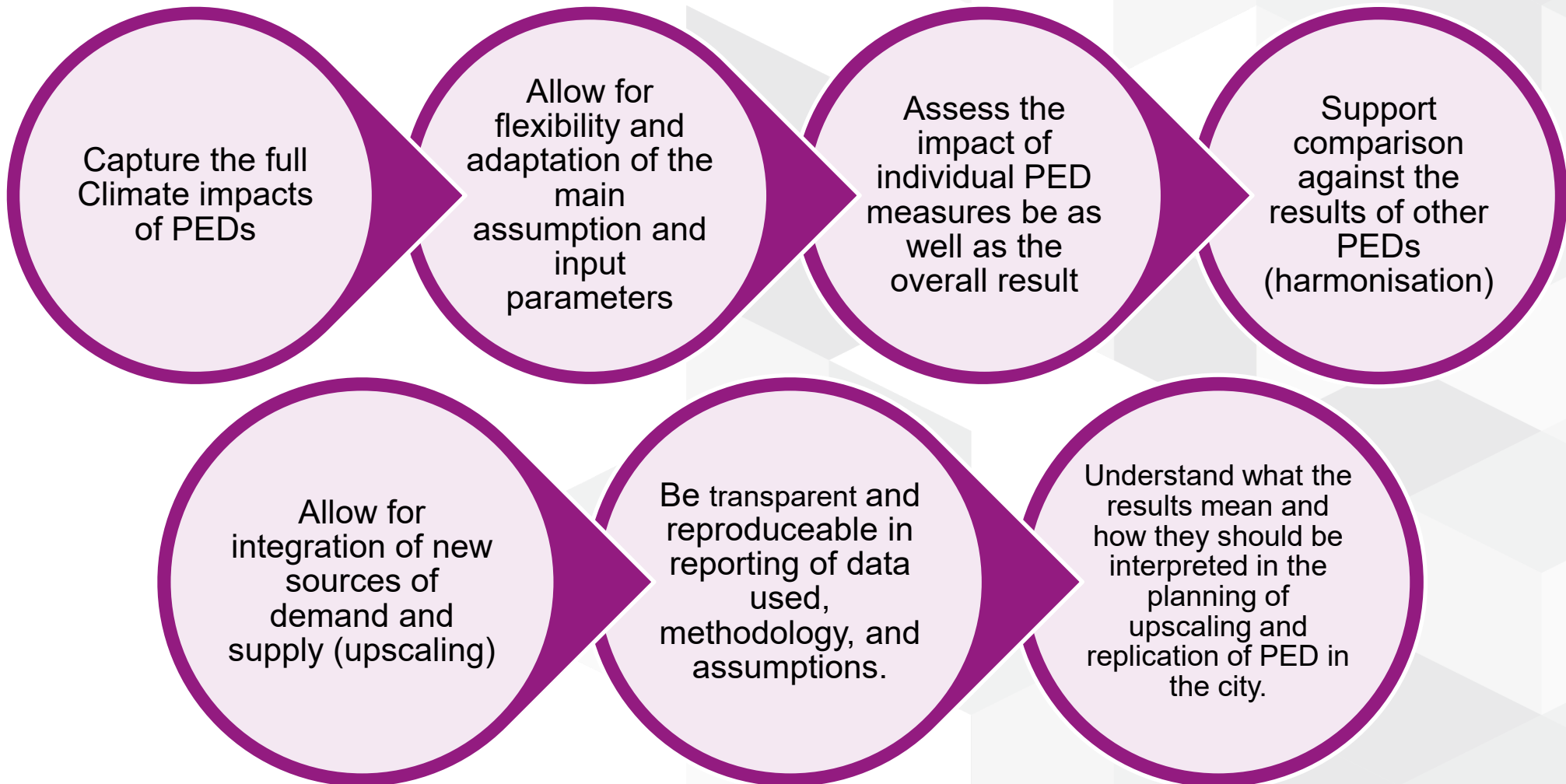
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Assessing the energy performance and climate change impact of PEDs

PEDs are a potential high-impact climate change mitigation action towards a low carbon or even climate neutral city. This implies that the performance in energy and GHG emissions reduction will be assessed.

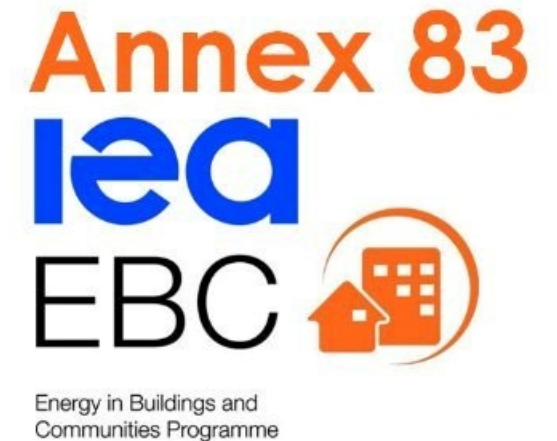
- Building Energy Specification Table (BEST)
 - EU Formal Requirement
 - Origin: Energy Performance of Buildings Directive (EPBD)
 - Typically considers only “building-bound” demand sources
- Beyond BEST – Alternative approaches needed.

Assessing the energy performance and climate change impact of PEDs



Annex 83: Positive Energy Districts

The aim of the International Energy Agency's Energy in Buildings and Communities Programme (IEA EBC) Annex 83 – Positive Energy Districts is to create a shared in-depth **definition** and to develop the **key concepts** of PEDs, explore and develop the **methods** and **tools** needed to support the **planning** and **decision-making** process and understand the **technologies** related to the realisation of Positive Energy Districts.



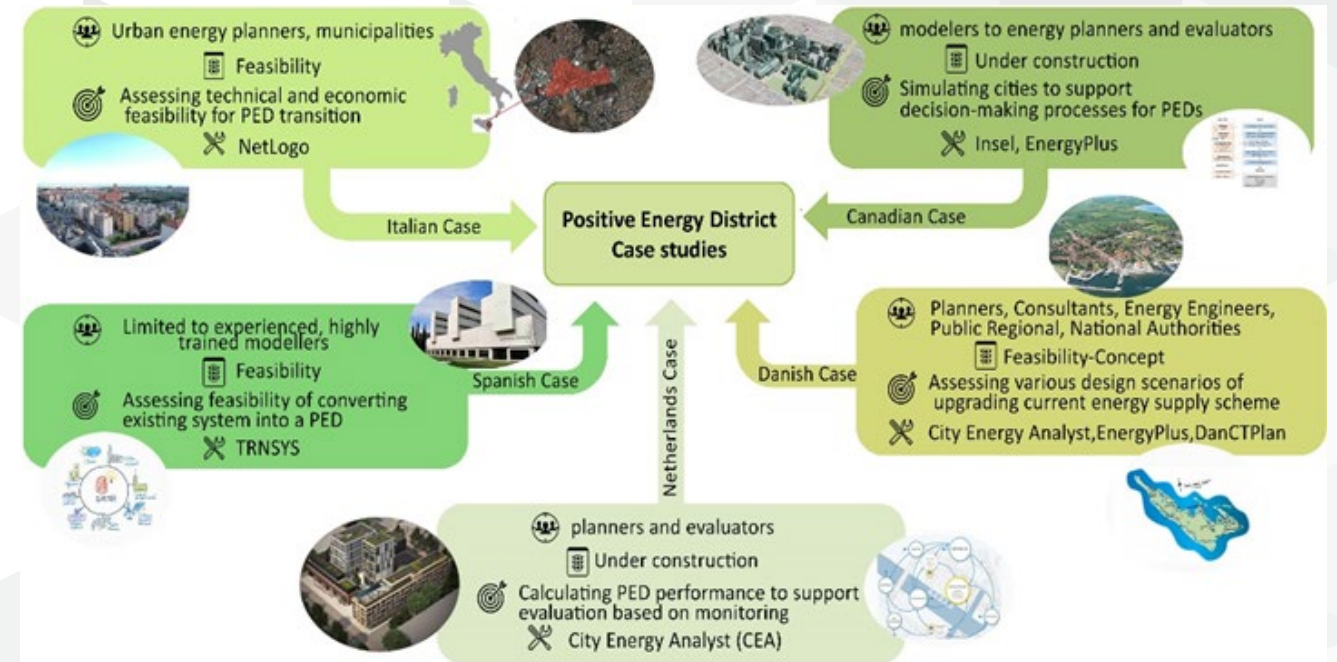
ATELIER & Annex 83

ATELIER project partners shared their knowledge and experience on Positive Energy Districts in various conference papers as part of their involvement in Annex 83.

- *Belda, A. et al. (2021) 'Reviewing challenges and limitations of energy modelling software in the assessment of PEDs using case studies', Conference Paper, pp. 1–11.*
- *Bottecchia, L. et al. (2021) 'Fundamentals of energy modelling for Positive Energy Districts', Conference Paper, pp. 1–10.*

Reviewing challenges and limitations of energy modelling software in the assessment of PEDs using case studies

- Five case studies from Europe (4) and Canada (1)
- Mix of PED and towards PED projects
- Application of different approaches and tools in the assessment of PEDs
- Source - IEA EBC Annex 83 members focusing on development of methods, tools and technologies for realizing PEDs



Case study overview illustrating:



Target Audience



PED Status



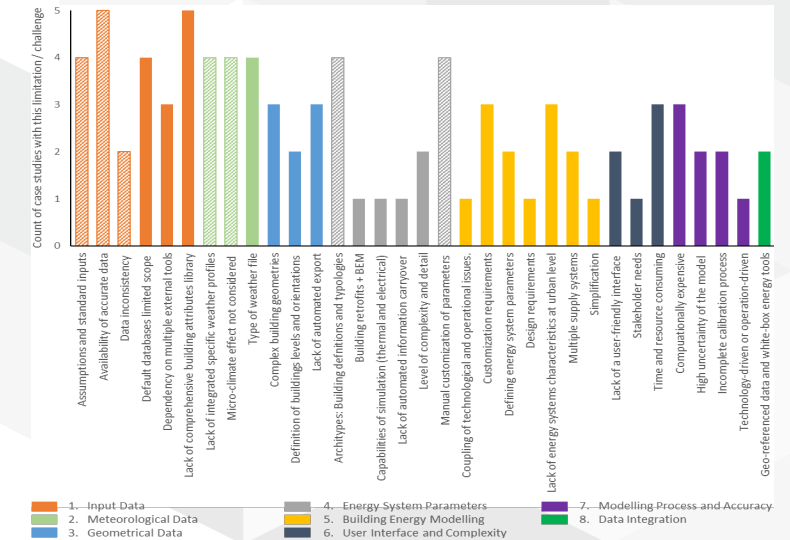
Modelling Objective



Modelling Tool

Limitations and Challenges

- Lack of accurate input data and information on building attributes
- Need for multiple tools and external sources for PED cases modeling
- Complex data collection and integration process
- Limitation in multiple supply systems modeling
- Use of default and generic parameters affecting accuracy
- Need for manual inspection, modification and deletion of objects and components

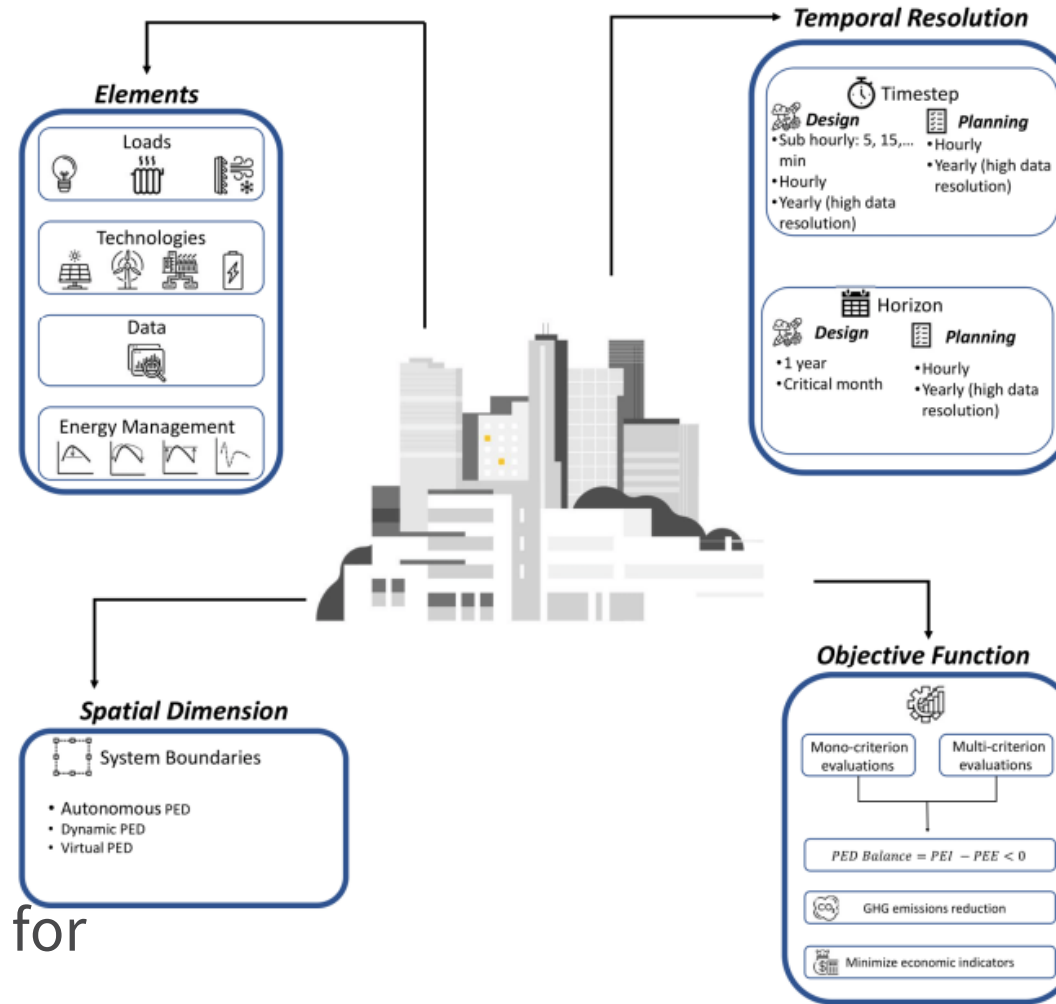


Fundamentals of Positive Energy District

The identified must have

- 1) Elements
- 2) Temporal Resolution
- 3) Spatial Resolution
- 4) Objective Function

All these aspects are crucial for allowing an effective and complete modelling of PED.



Conclusions

Demonstration cases such as those in ATELIER, with its two Lighthouse Cities in Amsterdam and Bilbao, provide valuable experience and data on Positive Energy Districts.

This work provides a starting point for critical thinking and future research on the challenges and limitations that urban planners and energy specialists face when assessing PEDs.

The IEA ANNEX 83 will create an inventory of technologies with techno-economic data and data templates to help modelers in the design and planning phases of PEDs.

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