

Does neglecting embodied emissions hinder meeting the target?

- The focus is often on the use phase and operational energy
- LCA accounts for both embodied and direct emissions
- Transforming existing buildings inevitably results in embodied emissions

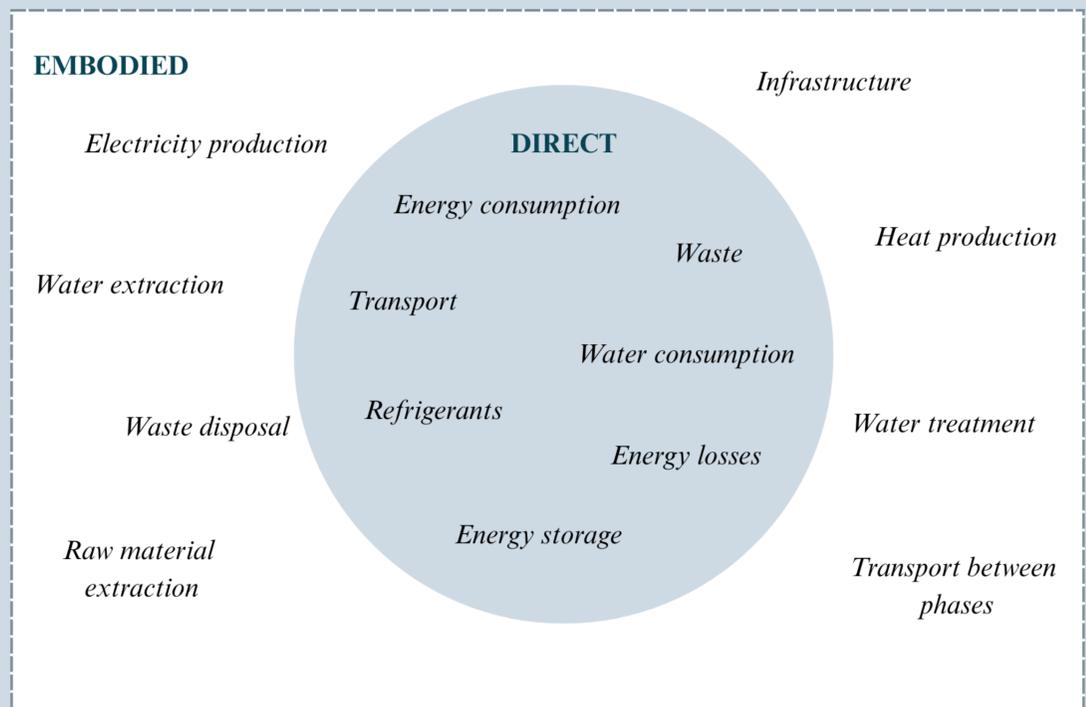


Fig. 1. System boundaries of Positive Energy District

Introduction

The **building sector** is among the largest contributors to global energy consumption and greenhouse gas emissions (GHG).

Positive Energy Districts (PEDs) have emerged as a key model for driving the transition toward more sustainable, resilient, and affordable urban settlements.

PEDs embody **self-production, self-consumption, and zero emissions**, offering a transformative approach to urban energy use while **addressing social inclusiveness, stakeholder engagement, and economic considerations**.

Life Cycle Assessment (LCA) is widely used, recognized by the scientific community, and is an essential tool for thoroughly evaluating the environmental impacts of buildings.

Results

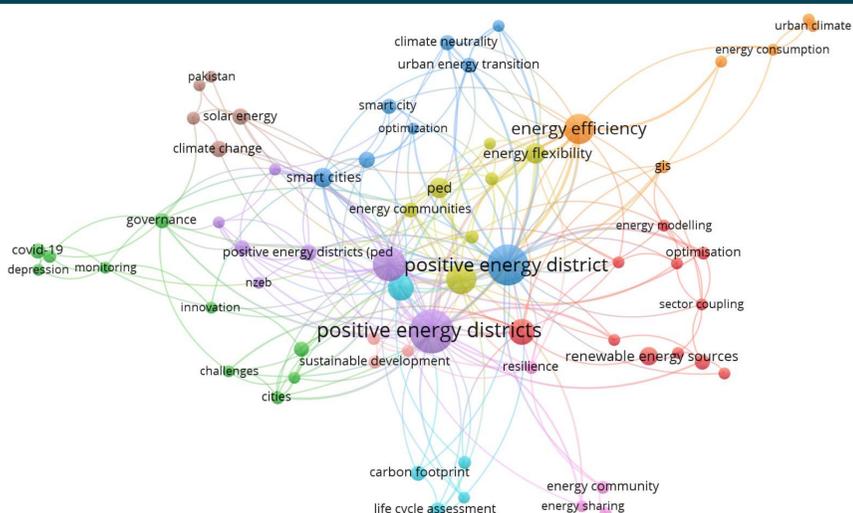


Fig. 2. Co-occurrence of author-specified keywords

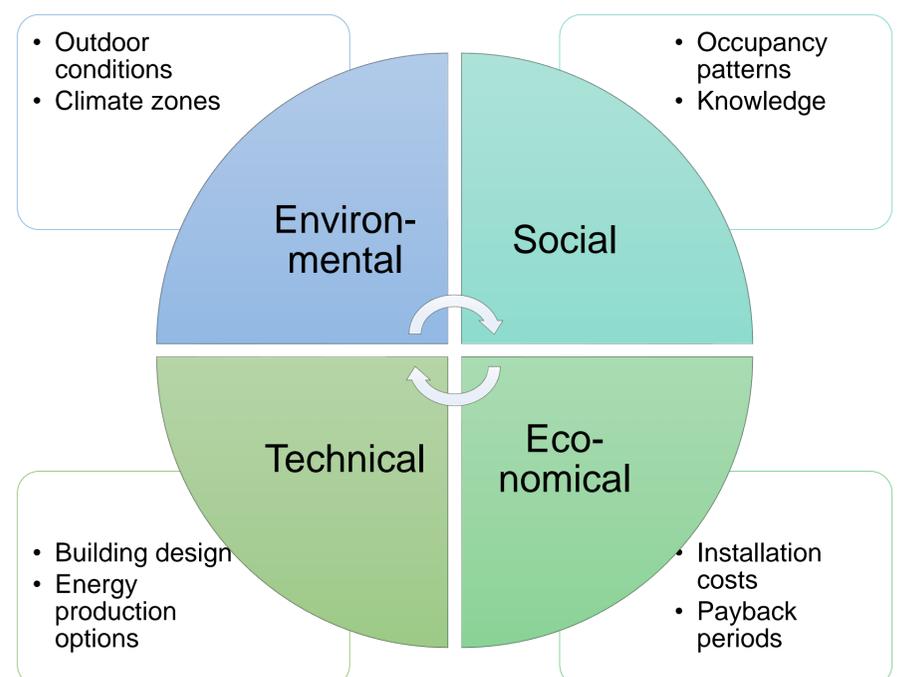


Fig. 3. Limitations for PED implementation

While PEDs strive to balance energy production and consumption, the **complexity of their life cycle impacts** presents significant challenges in fully eliminating emissions.

By narrowing the scope and adapting the core principles of existing methodologies for **smart cities**, it is possible to develop guidelines for performing LCA in the context of PEDs.

Defining **system boundaries and a functional unit** are only the initial steps in developing guidelines for conducting LCA on PEDs

Acknowledgment

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