Potential business models for Positive Energy Buildings

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Background: EXCESS-project

- EXCESS is about FleXible user-CEntric Energy poSitive houseS
- How nearly-zero energy buildings can be transformed into positive energy buildings (PEBs)?
- Five years, starting in 2019
- 21 partners from 8 countries
- 4 demos in 4 climate zones

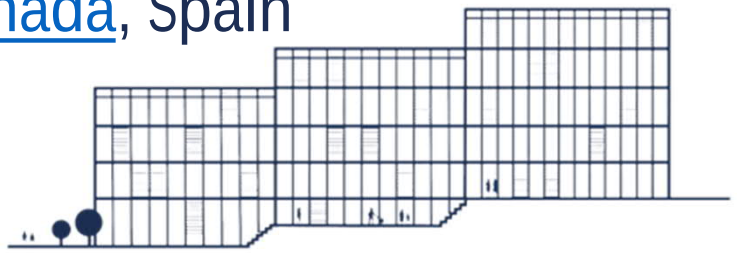
EXCESS Demos

- Former industrial complex in Graz, Austria

- Apartment building in Helsinki, Finland

- Social housing complex in Hasselt, Belgium

- Multi-apartment block in Granada, Spain



PEB definition for EXCESS

Positive Energy Building:

- an energy efficient building
- produces more energy than it uses via renewable sources, over a time span of one year.
- high self- consumption rate
- high energy flexibility
- high quality indoor environment maintaining the comfort and well being of the building occupants.
- able to integrate the future technologies like electric vehicles to maximize the onsite consumption and share the surplus renewable energy.

PEB definition for EXCESS

EXCESS defines a positive energy building (PEB) as an energy efficient building that produces more energy than it uses via renewable sources, with high self- consumption rate and high energy flexibility, over a time span of one year.

A high quality indoor environment is an essential element in the PEB, maintaining the comfort and well being of the building occupants. The PEB is also able to integrate the future technologies like electric vehicles with the motivation to maximize the onsite consumption and also share the surplus renewable energy.

PEB business models – why and what?

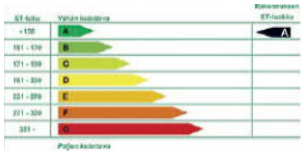
- Technologies exist
- Integrated concepts are emerging
- Well-designed business models:
  - recognized as a crucial element needed for a wider roll-out of PEBs
  - seem to be largely missing

➢ This presentation highlights potential business models & their contribution to the different PEB elements

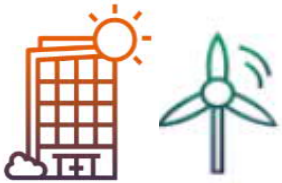
Sources of information

- Literature review
- Discussions with stakeholders:
  - interviews and workshops during EXCESS project
  - co-operation in IEA Annex 83

Elements for value proposition in PEB BM

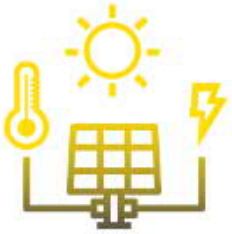


- Energy efficiency
- Renewable energy technologies integrated into the building or site

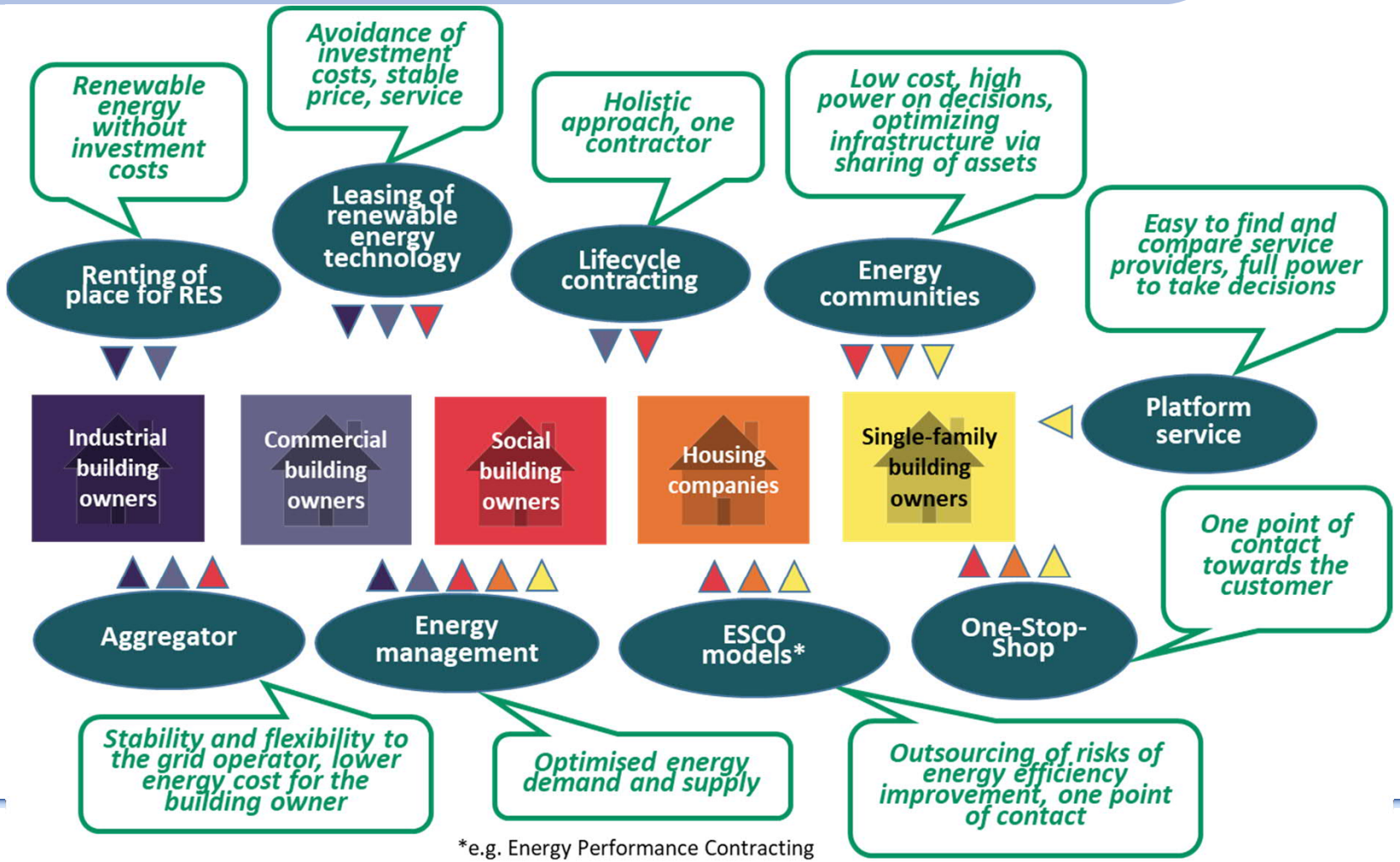


- Optimization of the energy demand and supply during the operational phase > flexibility towards the energy grids

- Ability to maintain the quality of the service (e.g. indoor environmental quality)

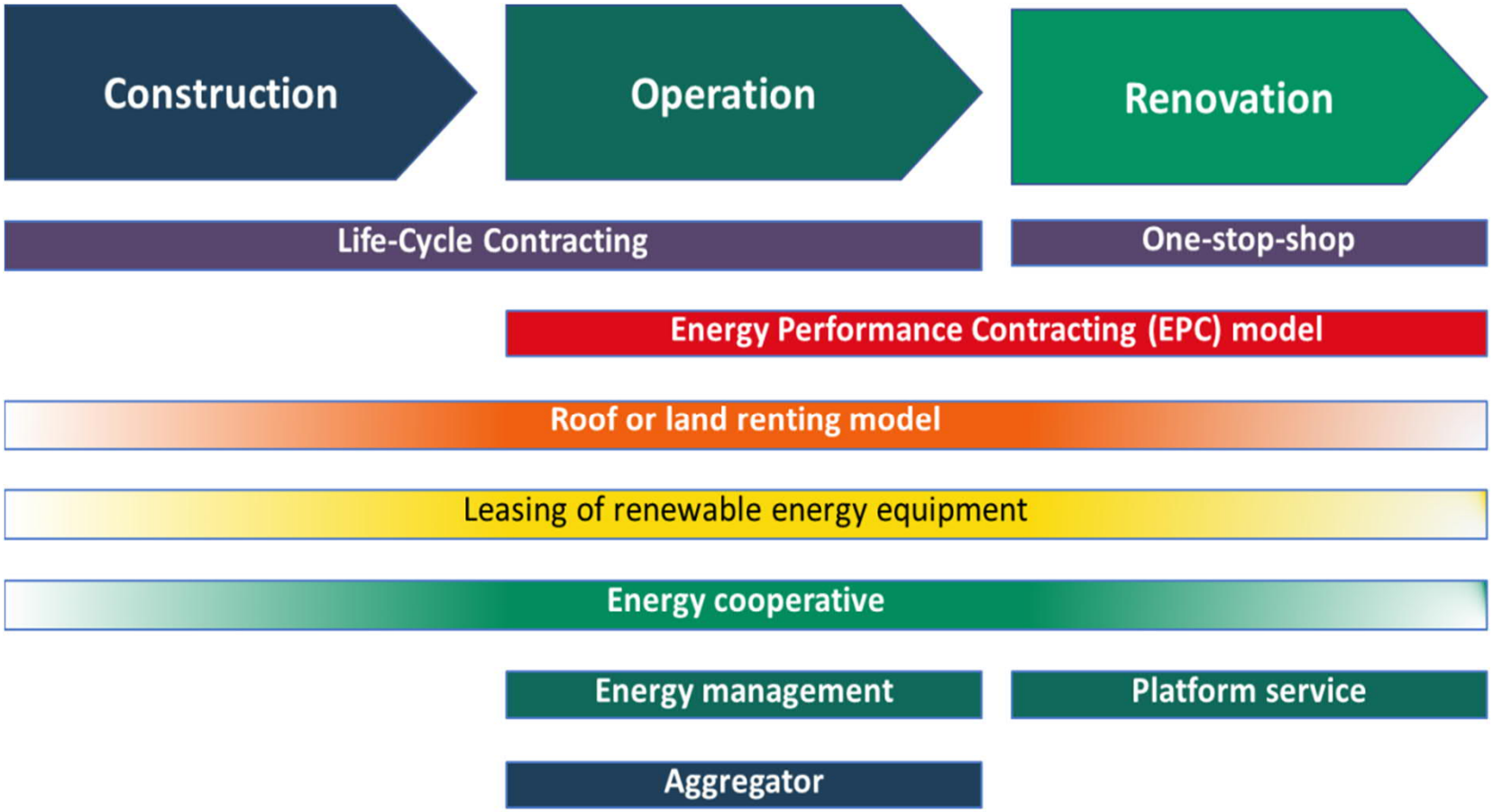


Business model approaches



*e.g. Energy Performance Contracting

Life-cycle phases of BMs



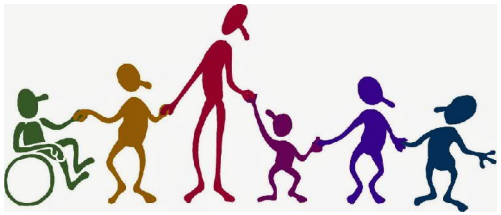
Source: Rehman H U, Lara García, V, LLorente Yoldi J L, Cantalapiedra M, Allaerts K, Diriken J, Gumhalter M, Ramschak T, Ala-Juusela M, Lavikka R and Heimonen I 2022 Chapter 5 Technical implementation, in *Positive Energy Buildings Concepts, Challenges and* R, Rehman H U et al *Opportunities* ed Lavikka, R.

New models

- Pay-Per-Service business model, where the customer pays for the outcome rather than for the equipment or energy
- Community based model, where the energy services are handled by energy communities.

Business conditions vary by country

- Regulations
- Socioeconomic conditions
- Building traditions
- Climate
- Availability of renewable energy



Challenges and new opportunities

- PEB is a complex system, requiring a lot of knowledge on different fields and companies with new skills.
- An integrator would be needed to take full advantage of the renewable potential and other benefits offered by the PEB concept.
- Current immaturity of the regulations
- More understanding needed about the real needs of the customers or their willingness to pay for the services.
- Affordable structures and the contractual arrangements for the provision of the service need to be developed.
- What could be gained by enlargement of the scope on district level?

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