

Optimized Technology Sets for nearly Zero-Energy Buildings (nZEBs)

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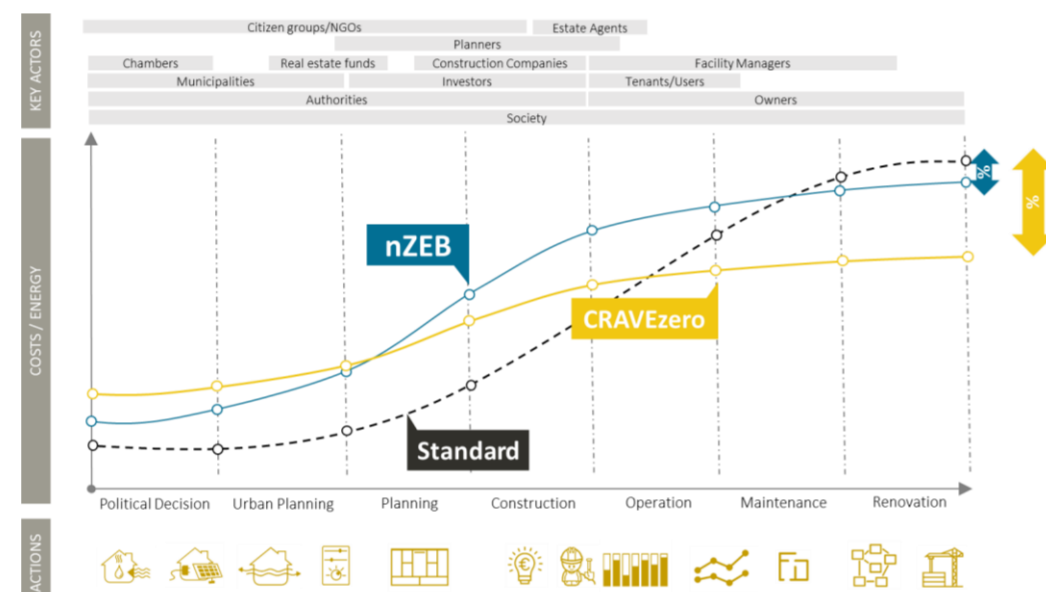
ABOUT CRAVEZERO

- CRAVEzero refers to Cost Reduction and market Acceleration for Viable nearly zero-Energy buildings
- The main goals of CRAVEzero are:
 - Identifying and eliminating the extra-costs for nZEBs related to processes, technologies and building operation
 - Promoting innovative business models taking into account the cost-effectiveness for all the stakeholders

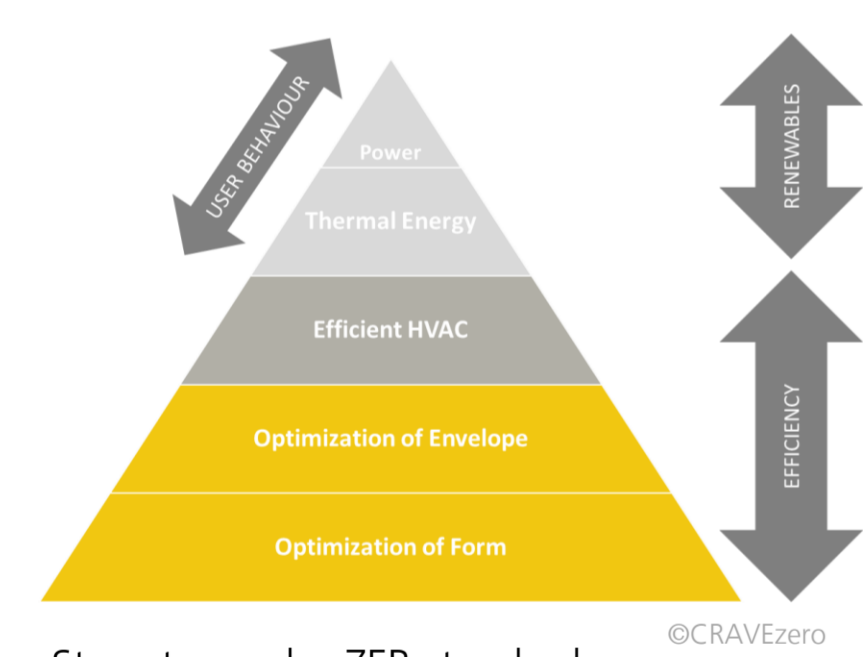
NEARLY ZERO-ENERGY BUILDINGS PROCESSES

To optimize nZEB planning activities at different levels, from urban and spatial planning to the building's detailed design

- The buildings technical quality and the comfort standard have to be achieved within project specific budget limitation
- Nearly zero-energy buildings increasingly become active participants of our energy supply infrastructure



CRAVEzero approach for cost reductions in the lifecycle of nZEBs.



Steps to reach nZEB standard.

- Each building has its unique process, where architects often start from scratch, develop the building and carry out cost-optimal performance analyses including the potential for using renewable energy
- A clear connection between building performances and the related costs is essential for ensuring the clarity of the process.

TECHNOLOGIES IN NEARLY ZERO-ENERGY BUILDINGS

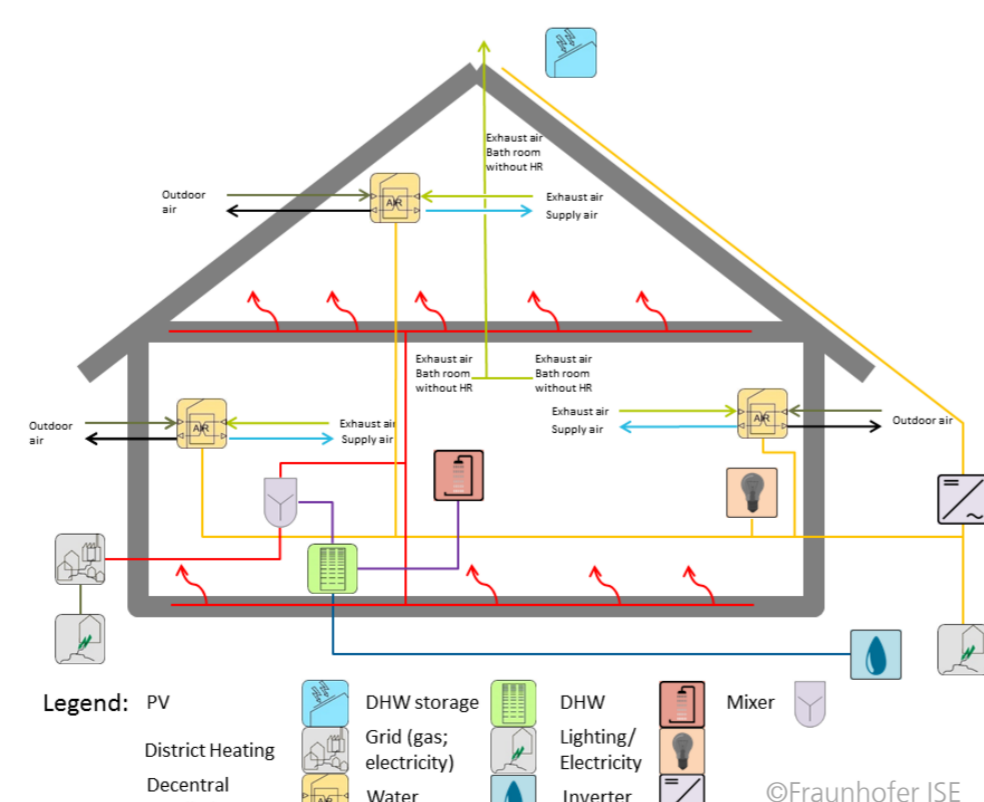
There are different types of strategies and technologies to decrease the energy demand of the building to be realized as nearly zero-energy building

- Active technologies
 - Heating systems, cooling systems, ventilation systems and storage
- Passive technologies
 - Building envelope, natural ventilation, night/ free cooling, shading technology and daylighting
- Renewable energies
 - Photovoltaics and solar systems

CRAVEZERO CASE-STUDY- BRUSSELS BUILDING

There are 11 different cases-studies in CRAVEzero project in 4 different climate regions, one of them is "Brussels" building in Central Europe

- This building includes all types of active technologies except cooling systems as it is a residential building
- There is a source of renewable energy by installing a 38.82 [kWp] PV system

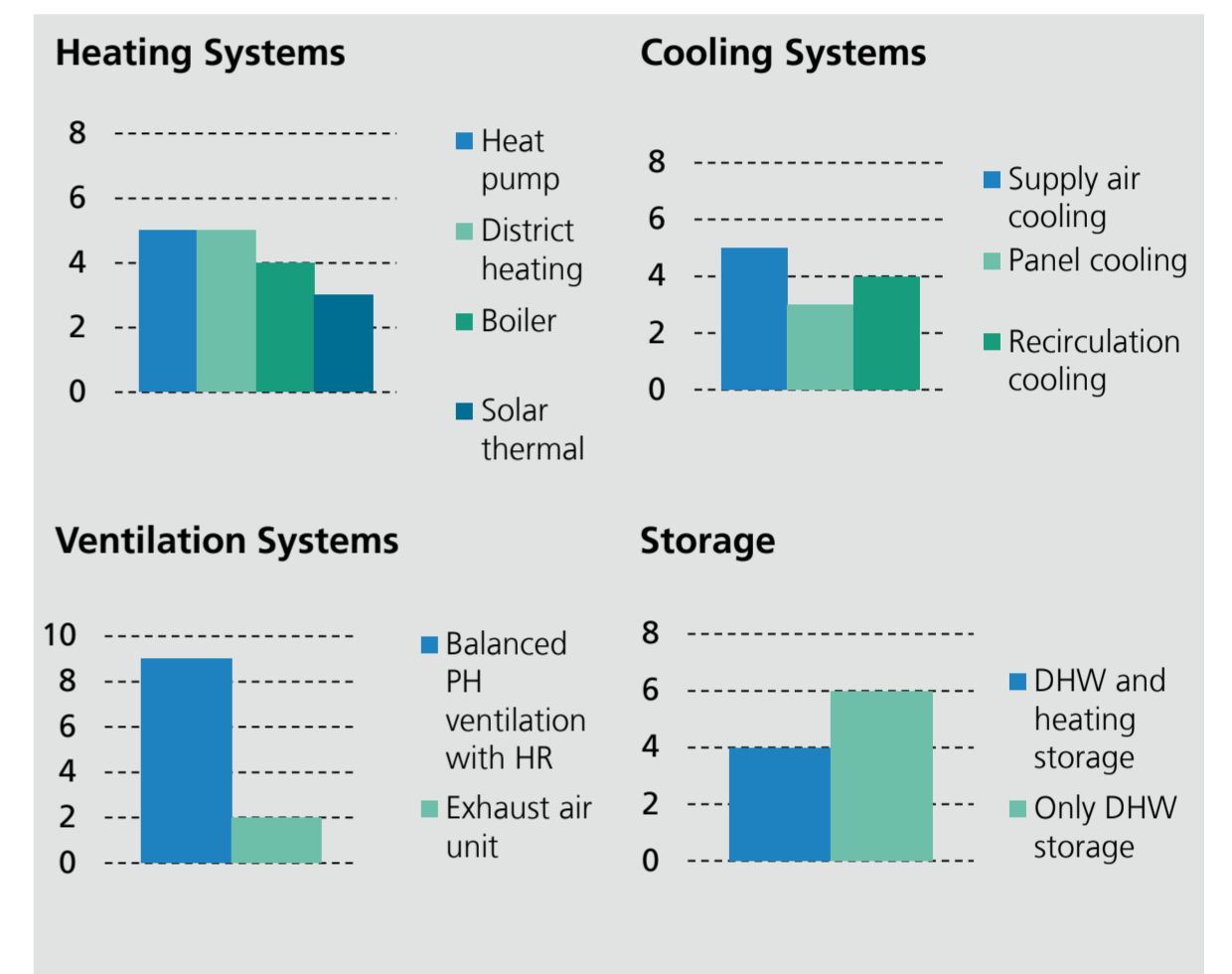


Technologies installed in "Brussels" building - one of CRAVEzero case studies

ACTIVE TECHNOLOGIES IN CRAVEZERO CASE-STUDIES

These are the 4 main active technologies in CRAVEzero case studies

- Heating systems are installed in 10 buildings
- Cooling systems are installed in 6 buildings
- Ventilation systems are applied in all buildings
- Thermal storages are available in 10 buildings



Number of active technology systems in CRAVEzero case-study buildings.

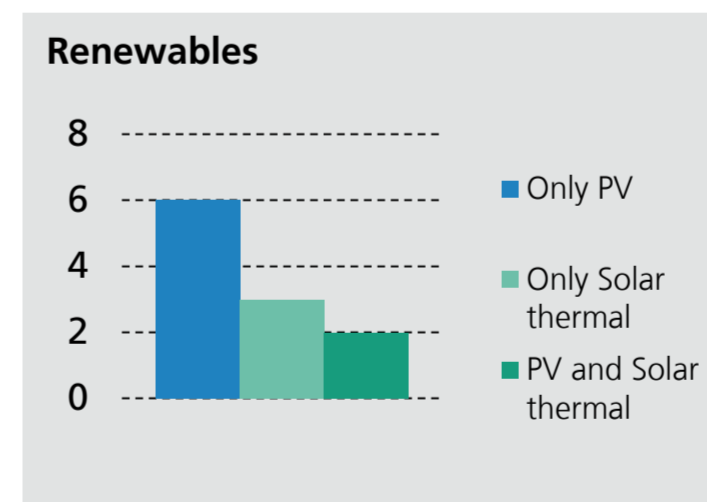
PASSIVE TECHNOLOGIES AND RENEWABLE ENERGIES

For realizing a nZEB the most important measure is to minimize the energy demand. Therefore, an excellent thermal envelope and other passive strategies are essential.



Integration scheme between passive technologies and renewable energies

- Building envelope: by adjusting some parameters like window to wall ratio, glazing and building orientation
- Shading technology: by providing fixed or adjustable external shading to reduce solar gains in summer and increase them in winter
- Daylighting: related to building envelope design; e.g. adjusting window to wall ratio and light-directing blinds to make optimally use daylight
- Passive/Free ventilation: to achieve sufficient air flow rate to maintain comfort temperatures, if possible without fans
- Night cooling: to reduce the peak daytime temperature by around 2° to 3°



Number of renewable energy systems in CRAVEzero case-study buildings.

- Almost all case study buildings apply renewable energies, which are mainly PV and solar thermal systems
- There is only one building without PV or solar thermal systems

PROJECT PARTNERS



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