

# Innovations in Residential Complexes

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The construction sector is the biggest industrial employer in Europe, gathering 3 million enterprises of which 95% are SMEs acting in local markets and in a highly regulated environment. Within construction, the building sector is the largest economic sector. The legacy of the crisis is far reaching, particularly in this sector which is very dependant on public procurement and financing.

Innovations for sustainable buildings design and refurbishment are crucial for the competitiveness of companies operating in the construction sector which faces the pressure to reduce levels of carbon emissions from existing and new buildings to zero. Approval of more restrictive standards and costs and the raising of the political and social awareness with respect to energy efficiency make necessary a transformation of the construction sector to answer the new market demands. Innovation shall be the driving force of this change.

Firstly, some results of innovative projects for the construction industry carried out by the Technology & Innovation Division of ACCIONA will be shown. Innovations are developed in four main research areas: new materials for improved energy efficiency, optimized construction processes for reducing CO2 emissions, Energy Efficiency as a holistic science and Information & Communications technologies supporting the whole life cycle: design, construction, O&M and disassembly.

In a second part, the integration of some innovative but commercially-available technologies will be presented as a real-case application. ACCIONA is the promoter of the first zero-emission residential complex in Barcelona (Spain). The residential complex will be self-sufficient in energy consumption thanks to a holistic design, considering the most innovation and cost-competitive technologies. The project is based on three pillars: consumption savings, self-production with renewable energy and energy efficiency. Self-sufficiency will be achieved through the inclusion of photovoltaic systems and biomass energy consumption.

To achieve the balance of zero CO2 emissions, demands for heating, cooling and electricity will be covered from state-of-the-art biomass production systems which will be built on the very location of the building. Besides, 30% reduction in energy consumption will also be achieved by these means.

In spite of the higher investment needed for the buildings' construction, payback period is estimated in ten years. Real-estate development is based on public-residential dwellings on rental. This business model allows combining energy efficiency with economical efficiency.

Finally, it will be shown how to transform technology into business taking into account current and future political and normative scenarios.

Within policy-making circles, the focal point on energy efficiency over the past decade has increased substantially. This focus has resulted in multiple roles being played by the public sector, namely in:

- Setting energy efficiency targets
- Implementing policy measures to support energy efficiency scale up in the private sector
- Leading by example; implementing energy efficiency measures internally to prove the case for energy efficiency and to provide an example to the private sector
- Building international momentum through the creation of international platforms

The energy efficiency market uptake will not be reached without an actual involvement of the private sector. To date, the private sector only has played a role both in implementing energy efficiency measures as an internal cost-reduction and pursuing business opportunities through financial mechanisms. Only through the implementation of a holistic approach based on technology, design, construction and operation will be possible to develop a real energy-efficiency market in the construction sector.

In ACCIONA the creation of added value through energy efficiency is being developed two-fold: on the one hand, ACCIONA has set up an ESCO company within its industrial group. ACCIONA Energy Efficiency, as an ESCO, has the mission to provide a broad range of comprehensive energy solutions in order to provide energy services to the owners, taking care of the initial investments and guaranteeing the maximum efficiency on the payback of the investment; on the other hand, ACCIONA through its research technological centre develops the technology for energy efficient buildings, which it is implemented through the construction division on building and district project for our clients, and provide the energy services to the final clients through its ESCO company.

Combining both strategies ACCIONA has been able to turn energy-efficiency into a profit-making scheme.