



Nearly Zero-Energy Buildings: Best Practices from Intelligent Energy Europe

Promoting Integrated Energy Design and SEAPs among European Communities

The Integrated Energy Design (IED) concept is vital for a successful implementation of nearly zero-energy buildings (nZEB), involving different professions on achieving energy performance requirements since the very beginning of the design process of a building. The IED approach is used as a starting point to promote nZEBs within Sustainable Energy Action Plans (SEAPs) and within other municipal energy roadmaps such as Climate Alliance and e5-communities in Austria. Such SEAP development has been initiated within the frame of AIDA, a project co-funded by the European Commission. The project supports building professionals and local authorities all over Europe in designing nearly zero-energy buildings. AIDA offers action tailored to these target groups, such as study tours to innovative buildings, best practice-learning from operational [success stories](#), presentation of innovative design software and active support for municipalities.

Several meetings and contacts with local authorities and consultancy companies were performed in Spain, Italy, Greece, Austria, Hungary and UK to spread the nZEB idea among European Communities. An overall number of 13 buildings were committed to be retrofitted or to be constructed following nZEB principles. As a result of this experience, a guideline to promote nZEB within SEAPs (or other roadmaps in absence) has been developed. This guide is also focused on including acceptance criteria to be accomplished over all building construction stages.

<i>nZEB action summary</i>	<i>Main original SEAP fields</i>				<i>Added fields by the AIDA project</i>	
	Estimated costs per action/measure (€)	Expected energy saving per measure (MWh/y)	Expected renewable energy production per measure (MWh/y)	Expected CO2 reduction per measure (Tn CO2/y)	Payback period (y)	Abatement cost (€/kg CO2 saved)
<i>SEAP measures</i>						
<i>Class A retrofitting measures</i>	43.548,14	48,61	0,00	17,46	3,24	0,77
<i>RES system measures</i>	23.900,00	0,00	14,00	3,78	7,15	0,88
Overall nZEB action	67.448,14	48,61	14,00	21,24	4,67	0,68

Including nZEBs in SEAPs: Energy and CO₂ savings, on-site renewable energy production and costs for the municipality are the main issues to be addressed; example of a Spanish municipality, ©AIDA

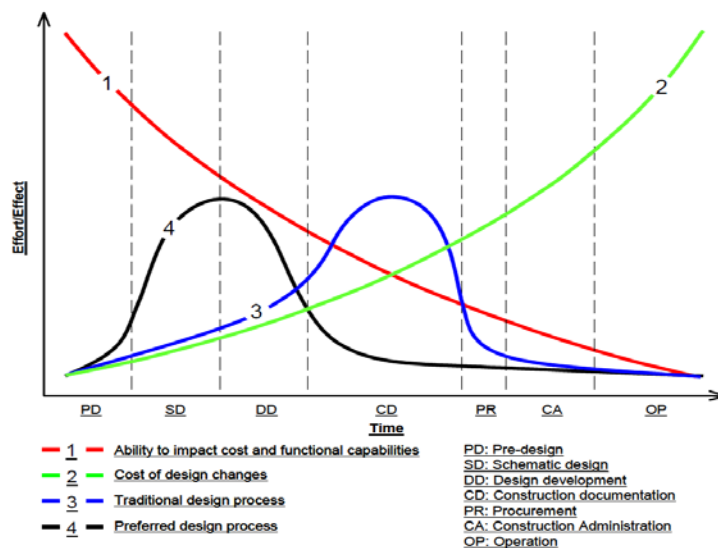


SEAPs allow for an easy integration of actions to promote nZEB, although a close cooperation between local authorities and consultancy companies responsible of the SEAP development is needed. Jordi Cipriano from the Spanish AIDA partner CIMNE is working for more than 15 years with local authorities and municipalities. Mr. Cipriano about the challenges: *“This approach is a clear example on how the Integrated Energy Design concept can be adapted to the initial stages of sustainable urban plans. However, these experiences also shown that the concept of nZEB is not known by the majority of local authorities. Bigger efforts of dissemination are needed and solving some uncertainties such as financing mechanisms and guarantee of commitment at long time scale are also urgent to fulfil the EU 20-20-20 commitment.”*



Jordi Cipriano, head of the Building Energy and Environment Group of CIMNE, Barcelona, during the interview, ©AIDA

This prior mentioned Integrated Energy Design concept is key for a successful implementation of nZEBs. The IED is a multidisciplinary, collaborative process that analyses the whole building process and integrates different aspects and knowledge during all phases of development of the building. The ultimate goal is the achievement of the performance targets defined by the customer (e.g. null energy balance, high internal comfort, economy, functionality, aesthetic impact, etc.) through a collaborative process for determining the most advantageous solution. The IED work team consists of contractors, architects, engineers, constructors, sponsors and users, whose specific expertise, if effectively integrated, allows defining, analysing and evaluating different design solutions and their possible interactions. The choices are taken through a participatory decision making process. Thanks to the IED process qualitative, economic, functional and aesthetical aspects of a wide range of design solutions can be taken into consideration to find the optimal building solution. IED is an iterative process with feedback loops.



Traditional design and the integrated design process

(Source: Collaboration, Integrated Information, and the Project Lifecycle in Building Design, Construction and Operation, article by the Greater New York Construction User Council, 2004)





The elementary school of Lajen/Laion, South Tyrol, a nZEB in an Alpine region and a shining example for the new Sinigo School in Meran/Merano, ©AIDA

In addition to SEAPs, AIDA is supporting more than 25 municipalities all over Europe in developing nZEB design tenders and feasibility studies via the IED approach. For instance, EURAC, Italian AIDA partner, has proven that IED even succeeds in the mountainous regions of the South Tyrolean Alps. EURAC supported the municipality of Meran/Merano in preparing the tender documents for their new elementary school building in Sinigo. Close collaboration with the municipal representatives assured the introduction of energy performance requirements, appropriate methods for the energy balance calculation, energy award criteria, and other necessary specifications in the public tender. Giulia Paoletti, architect at EURAC, about the IED performance requirements: *“The Sinigo School in Merano requires 40% of its total primary energy consumption from renewable energy sources and a maximum of 20kg/m²a of CO₂-emissions. In addition, electricity shall be supplied by PV.”* Further information on Integrated Energy Design in municipal practice can be found in a recently published AIDA report.

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