

Building on the NZEB Concept in the EU Defence Sector



Background Description

A nearly zero-energy building (NZEB) is defined as a building that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable energy sources (RES) produced on-site or nearby.

As of today, about 40% of EU Member States (MS) do not yet have a detailed definition of the NZEB in place. About 60% of the MS have laid out their detailed NZEB definition in a legal document, but a few of them emphasise the draft status of the definition, or that the definition might be updated later on; these relevant legal documents are either building regulations, energy decrees and official guidelines, or the national NZEB plans.

National approaches are supported by several EU projects. However, there are no NZEB refurbishment initiatives in military buildings supported by EU projects. This represents a great opportunity for the EU Ministries of Defence (MoDs) and armed forces to contribute to the EU and national energy efficiency and CO₂ emissions objectives and lead these efforts by example.

Aim – Objectives

The overall aim of the Military Nearly Zero Energy Buildings (MIL-NZEBs) Refurbishment Project is to demonstrate the feasibility of, and benefits from, the transformation of existing non-efficient military buildings/site into nearly zero energy buildings/site through the design, evaluation and implementation of effective refurbishment interventions aiming at:

- satisfying realistic return on investment (ROI) and payback period requirements; and,
- contributing at the same time to the energy efficiency, renewable energy and reduction of CO₂ emissions, and the EU and national objectives.

The project is comprised of the following five basic objectives/steps:

- Assessment of buildings/site energy consumption and CO₂ emissions;
- Development of a common framework and a harmonised methodology for the definition of a NZEB concept for military buildings;
- Design and justification of applicable energy efficiency and energy production cost-effective measures towards achievement of NZEB standards;
- Identification of, and application for available EU funds suitable for the public defence sector;
- Implementation of energy efficiency and energy production cost-effective measures.

Project Analysis

The project's core business is to select pilot buildings (one from each participating Member State – pMS) and transform them into NZEB ones, according to each MS respective standards, whilst at the same time, establish (through this process) a bench-marking platform, suitable for every legislative and climatic conditions, across the EU.

Transforming a typical-conventional building into a NZEB one offers an open ground for exploiting all available technologies (RES implementation, energy efficiency interventions, smart metering, small scale smart grids, etc.). It also provides the stimulus for innovative research and state of the art ideas' applications to be implemented; therefore, the opportunity to make the project's funding eligible in different EU funding mechanisms is really clear.

Methodologies

The NZEB concept covers the whole spectrum of project implementation, as it:

- grasps a simple but technically complex idea, and transforms it into concrete scientific design addressing all engineering-related issues (architecture, civil, electrical and mechanical, IT, etc.);
- exploits all available relevant technologies but at the same time gives space to new emerging scientific options, and finally;
- delivers tangible results in terms of rendering existing infrastructure into deeply renovated energy efficient with nearly zero energy consumption and CO₂ emissions.

Overall, the NZEB methodology aims at assisting the development of useful and practically tested guidelines for similar campaigns within the whole EU public domain.

Impact – Expected Outcomes

The outcome of the project would consist of the following elements:

- Dual-use military buildings, deeply renovated according to NZEB specifications which are validated to each pMS;
- Application of existing Commercial Off-the-Shelf (COTS), state of the art or under R&D processes solutions, materials, methodologies and procedures which ensure energy savings and energy efficiency improvement, in fixed infrastructure;
- Training of involved personnel;
- Dissemination of the projects' findings and progress.

The NZEB 'to-be' buildings within the defence sector will blaze the trail for applying a staged (gradual) approach to the refurbishment of old (and sometimes obsolete) infrastructure in the EU MS barracks. This approach will ideally have to be coupled with the Energy Service Company (ESCO) model of performing works within the overall public domain to:

- firstly, avoid large up-front expenditures and reduce the required budgets that must be allocated to MoD's budgets; and,

- secondly, increasing the chances of success in achieving the energy performance / energy saving goals required by the MoDs in the framework of wider energy EU MS's policies by sharing part of the risks with the contractors.

Challenges

The main risks/challenges which are identified, are related to:

- defining a suitably common NZEB framework;
- adopting the cluster approach rather than the building approach;
- prioritising the different energy performance/efficiency improvements plans and methods for buildings;
- establishing the appropriate selection criteria for buildings;
- finding the proper EU funding mechanism;
- ensuring the appointment of a competent monitoring project team; and,
- including training, awareness raising, and education plans as parallel activities to the project.

Opportunities

The potential success of the NZEB concept application will trigger the decision-makers to invest in processes and procedures which guarantee money savings, better working environment and higher awareness of the EU MS's armed forces personnel and ultimately leading (indirectly but clearly) to better resilience and military capabilities enhancement.

The project is eligible for potential funding at the European level, for instance, through the LIFE Programme, the Structural Reform Support Programme (SRSP), the European Regional Development Fund (ERDF), Interreg, the European Social Fund (ESF) and the Cohesion Fund.

Way Ahead

The project could be implemented in the following two phases:

Phase 1: Defence building stock mapping-feasibility study (eligible for SRSP funding).

Phase 2: Renovation of MIL buildings to NZEB standards - implementation, monitoring and validation of results.

This project idea was developed during the second phase of the Consultation Forum for Sustainable Energy in the Defence and Security Sector (CF SEDSS II) and does not entail any future commitment for the EU Ministries of Defence (MoDs) or the EU institutions or agencies. However, it provides the framework for enabling the formation of multi-national collaborations at the European level to help the MoDs to address common defence energy-related considerations and to move towards a defence decarbonised future. The potential of those ideas will be further explored in the context of the forthcoming CF SEDSS Phase III (2019-2023).