Chapter 1
Definition of nZEB Renovation Standard

Szymon Firląg
Warsaw University of Technology, Poland

ABSTRACT

The aim of the chapter is to present existing definitions of building renovation to nearly zero energy building (nZEB). The EU buildings stock has low energy efficiency and is responsible for the biggest energy consumption. This chapter describes first of all the legal background in EU and general definition of nZEB renovation. In the next part, country-specific definitions are cited. Most of them are setting requirements for primary energy demand. The example of Poland is used to show the possible process of defining the nZEB renovation standard.

INTRODUCTION

The existing buildings are responsible for as much as 40% of the EU's final energy requirements, and over one third of carbon dioxide emissions (BPIE, 2014). About 75% of buildings are energy inefficient and, depending on the Member State, only 0.4-1.2% of the stock is renovated each year (EPBD, 2016). Furthermore, Europeans spending 90% of their time indoors, it is therefore important that energy renovation supports healthy indoor climate of buildings (BPIE, 2014).

Acceleration of the cost-effective renovation of existing building can improve energy efficiency of whole the EU. It is at the same time the easiest and fastest way of gaining energy savings. The main objective of this chapter is to present possible requirements for cost-effective renovation standard. It is also shown on the example of Poland what is the renovation market and how the scale of renovation can be improved.

Legal requirements for renovated building are described in the Energy Performance of Buildings Directive (EPBD, 2010) and the Energy Efficiency Directive (EED, 2012). According to the EPBD (Article 9), Member States should also develop policies in order to encourage the renovation of buildings to Nearly Zero Energy Building (nZEB) levels. So far the nZEB requirements established by the European

DOI: 10.4018/978-1-5225-4105-9.ch001

Commission only address directly new buildings to be constructed from 2020 onwards. For the purpose of the EPBD, the following definition of nZEB applies: *'nearly zero-energy building' means 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 sources, including energy from renewable sources produced on-site or nearby.* No mandatory requirements have been introduced for nZEB renovations. According to the Energy Efficiency Directive (EED, 2012), Article 4 Member States should establish long-term strategies for mobilizing investment in the renovation of national buildings stocks. The Article 5 EED sets a 3% annual renovation target for buildings owned and occupied by central government. Also the package "Clean Energy for All Europeans", published by the European Commission in the November 2016, recognizes the important role buildings renovation as a way of fulfilling the "Energy efficiency first" role.

GENERAL nZEB DEFINITION FOR BUILDINGS THAT UNDERGO MAJOR RENOVATIONS

The definition of major renovation process in case of building is described in the EPBD Directive (EPBD,2010): *'major renovation' means the renovation of a building where:*

1. The total cost of the renovation relating to the building envelope or the technical building systems is higher than 25% of the value of the building, excluding the value of the land upon which the building is situated; or
2. More than 25% of the surface of the building envelope undergoes renovation.According to COHERENO project report (COHERENO, 2013) the general definition on nZEB renovation can have one or more of following characteristics:
    a. *The energy performance of the building after renovation fulfils the nZEB requirements for new buildings as they are defined at level of the EU MS and regions or/and*
    b. *The primary energy consumption of the building after renovation is reduced by 75% as comparing to the pre-renovation status or/and*
    c. *Potentially an additional primary energy minimum requirement of not more than 50-60kWh/(m^2year) energy consumption (GBPN, 2013) for heating/cooling, domestic hot water, ventilation energy consumption of auxiliary building's systems and*
    d. *Potentially an additional minimum requirement for renewable energy share (proposed to be at least 50% of the remaining energy demand of the building as it is suggested in (BPIE, 2011) taking into account the nZEB definition from EPBD and*
    e. *Potentially an additional minimum CO_2 requirement of no more than 3kg CO_2/(m^2year) as it is suggested in (BPIE, 2011) based on the needs to meet the long-term decarbonisation goals for residential and services sectors as resulted from the EU 2050 Roadmap for a low-carbon economy.*

Country-specific definitions are using one or more of the listed requirements.