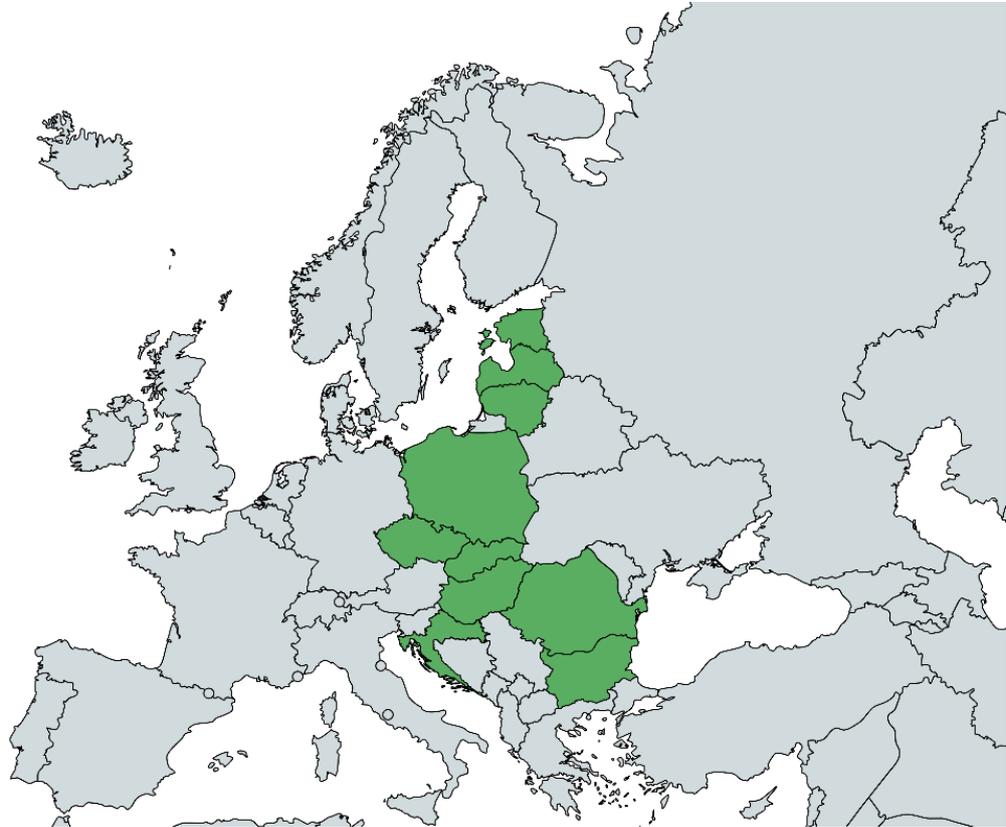


# OVERVIEW AND FUTURE CHALLENGES OF RESIDENTIAL NEARLY ZERO ENERGY BUILDINGS (nZEB) DESIGN IN EASTERN EUROPE

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# **Overview and future challenges of nearly Zero Energy Buildings (nZEB) design in Eastern Europe**

## **Abstract**

In times of great transition of the European construction sector to energy-efficient and nearly zero energy buildings (nZEB), a market observation containing qualitative and quantitative indications should help to fill out some of the current gaps concerning the EU 2020 carbon targets. Next to the economic challenges, there are equally important factors that hinder renovating the existing residential building stock and adding newly constructed high-performance buildings. Under these circumstances, this report summarises the findings of a cross-comparative study of the societal and technical barriers of nZEB implementation in ten Eastern European countries. The study analyses the present situation and provides an overview of future prospects for nZEB in Eastern Europe. The result presents an overview of challenges and provides recommendations based on available empirical evidence to further lower those barriers in the European construction sector. The paper finds that most Eastern European countries are low to moderately prepared for nZEB implementation and especially to the challenge/opportunity of retrofitting existing buildings. Creating a common approach to further develop nZEB targets, concepts, and definitions in synergy with the climatic, societal, and technical state of progress in Eastern Europe is essential. The paper provides recommendations for actions to shift the identified gaps into opportunities for future development of climate adaptive high-performance buildings.

## **KEYWORDS**

renovation, new construction, buildings, energy efficiency, thermal comfort, EPBD, construction quality, cost-optimality.

## **NOMENCLATURE**

AEC, Architectural, Engineering, and Construction;

AC, Air Conditioning;

ACH, Air change per hour;

BEPOS, Bâtiment à énergie positive;

BPS, Building Performance Simulation;

CEN, European Committee for Standardization;

DBT, Dry Bulb Temperature;

DHW, Domestic Hot Water;

EE, Energy Efficiency;

EPBD, Energy Performance Building Directive;

EPC, Energy Performance Certificate;

EUI, Energy Use Intensity;

EU, European Union;

FIT, Feed-in Tariff;

HRV, Heat recovery ventilation;

HVAC, Heating, Ventilation and Air Conditioning;

IEA, International Energy Agency;

IEE, Intelligent Energy Europe;

LCA, Life Cycle Assessment;

MS, Member States;

MVHR, Mechanical Ventilation with Heat Recovery;

nZEB, nearly Zero Energy Buildings;

NZEB, Net Zero Energy Buildings;

OT, Operative Temperature;

PE, Primary Energy;

PEF, Primary Energy Factor;

PH, Passive House;

PMV, Predicted Mean Vote;

PPD, Predicted Percentage Dissatisfied;

PV, Photovoltaic;

RES, Renewable Energy Systems;

SCOP, Seasonal Coefficient of Performance;

SEER, Seasonal Energy Efficiency Ratio;

SFP Specific Fan Power;

SHW, Solar Hot Water;

SME, Small and Middle Enterprise;

VRF, Variable refrigerant flow;

WWR, Window to Wall Ratio;