

REHVA Task Force working plan

Office buildings' EPC common scale

1 BACKGROUND

The EU member states (MS) have implemented national energy performance certificate (EPC) schemes to enable simple assessment of buildings' energy performance. However, national EPC frameworks vary significantly, making comparison of energy of buildings located in different MS difficult. The EPBD article 11 states that "the Commission shall, by 2011 ... adopt a voluntary common European Union certification scheme for the energy performance of non-residential buildings". Such a currently not existing scheme would allow measuring how well are targets met. The energy performance comparison is even more complicated due to variations in climate, building parameters, occupancy, thermal comfort and indoor air quality.

Currently, comparing energy-efficiency of office-buildings in different locations requires a studying location relevant literature, knowledge of local energy certification scheme and/or energy simulations/calculations. A comprehensive parametric analyzing the most energy-efficient and cost optimal office buildings solutions in all climates of the EU using standardized input data would pave way towards a common EU energy certification scheme for non-residential buildings required by the EPBD. It would be useful for comparing the strictness of local nZEB requirements in the EU and measuring progress towards meeting the energy-efficiency improvement targets.

Existing REHVA report related to the topic is:

- Report No.4 - REHVA nZEB technical definition and system boundaries for nearly zero energy buildings

The EPB standards will be utilized when preparing this report.

2 OBJECTIVES

The main objectives of the Task Force (TF) is to illustrate office buildings' energy use in different climates and energy performance levels, develop an energy performance scale and investigate the strictness of nZEB requirements in selected European countries. More specifically the objectives are:

1. Illustrating the cost optimal level of main energy uses of office building depending on the climate
2. Developing energy performance scale in climates studied for nZEB, cost optimal and conventional performance levels based on ISO 17772-1:2017 input data and ISO 52000-1:2017 primary energy factors and methodology
3. Contrasting nZEB requirements and EC nZEB recommendations with developed energy performance scale in studied European climate zones and countries

4. Comparison of measured energy use of case study buildings and modelled energy use with European and local methodologies in order to test ISO 17772-1:2017 input data consistency for energy calculations.

3 TASKS

To reach the objectives of the TF the following steps will be taken:

1. Gathering data of nearly zero energy office building case studies from European countries if possible that represent different building sizes and shapes, are well described and have detailed measured energy use available
2. Parametric study using energy simulations of the buildings with cost optimal solutions in various climates with European methodology and selected local methodologies of Europe
3. “Redesign” of buildings to meet local nZEB requirements
4. Assessment of suitability of the European and local methodologies for simulation based office building design
5. Assessment of strictness of nZEB requirements in selected countries.

The TF members are expected to provide information about their local conditions regarding the calculation methodologies, energy performance requirements and investment costs. The calculations and analysis of collected data will be conducted by the nZEB research group in Tallinn University of Technology as part of their research projects, however TF members are also welcome to do analysis when it suits their activities.

Tentative content of the report

1. Principles of calculating cost-effectiveness according to EPBD
 - Primary energy
 - Net present value
2. Input data to energy calculations/simulations from EPB standards
 - Indoor climate parameters
 - Occupancy and schedules
 - System efficiencies
3. Energy calculations/simulations from national methodologies
 - Indoor climate parameters
 - Occupancy and schedules
 - System efficiencies
 - Energy performance requirements
4. Calculation examples of cost-optimal levels in different climate zones
 - Investment costs in different climate zones
 - Example 1
 - Example 2
 - Example 3
 - ...

Reporting

Online REHVA report of app. 80 pages.

4 MEMBERS OF THE TASK FORCE

REHVA experts and supporters joined with the task force:

Martin Thalfeldt martin.thalfeldt@taltech.ee, chair

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Invited members from U-CERT project

Invited members from ALDREN project

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5 WORKING METHODS

Emails, Skype, WebEx. Face to face meetings only in connection with other REHVA meeting or other events.

6 SCHEDULE

Gathering measured energy use of case study buildings 6/2019

Gathering information about local energy calculation methodologies 6/2019

Parametric study based on simulations 12/2019

Assessing the suitability of the European and local methodologies 3/2020

Development of the proposal for energy performance scale and calculation methodologies 6/2020

First draft of report 9/2020

Final draft for review 12/2020

Published report 4/2021

7 FUNDING

Mainly by the individual members and their organisations. Analysis conducted with the funding of existing relevant project e.g. the research grant of Martin Thalfeldt. Other member provide input about their local conditions and from previous work.

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