

Status of implementation of CEN EPB standards in Croatia



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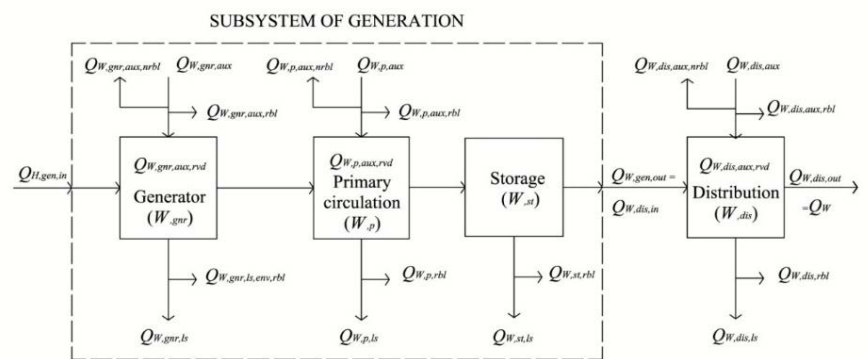
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Energy performance calculation in Croatia

Croatian methodology for calculation of energy performance of buildings is largely based on the first set of CEN EPB standards (ed.2008). As these standards were proved not to be unambiguous enough for direct use, the national calculation methodology was developed in 2011. in the form of so-called Algorithms (Figure 1) by the University of Zagreb. Five Algorithms¹ are written as a spreadsheet ready ‘array’ of formulas with the accompanying text describing sources for input parameters and connections with other parts of calculations.

The Algorithms were initially employed for energy certification of buildings purposes. Later in 2014. they were referred to in the Technical regulation. Since then, the Algorithms have been also used for verifying the minimum requirements on energy performance (i.e. for obtaining building permit), for assessing the feasibility of alternative systems and for reporting the cost optimal levels of minimum energy performance requirements.

DOMESTIC HOT WATER SYSTEM



HEATING SYSTEM

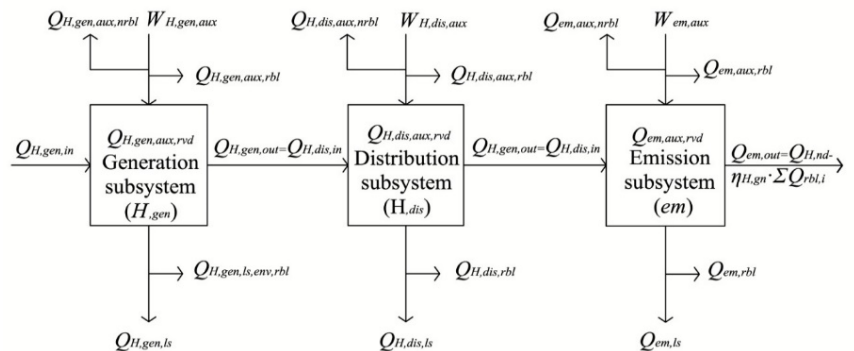


Figure 1. Division of space heating and DHW system into subsystems with input/output variables for calculations from Algorithms.

The list of standards used in Algorithms is provided in **Table 1**. Calculations of energy need for heating and cooling are based on the simple hourly method from EN ISO 13790. Calculations of most technical systems energy requirements are performed at monthly time step. A separate hourly calculation procedure was developed for humid air treatment in air handling units (AHU), as the corresponding EN standards provided

only tabulated values. The procedure enables calculations for arbitrary indoor and outdoor conditions and a variety of AHU air treatment schemes (**Figure 2**).

The Algorithms were implemented (y.2017.) in the public (free) software MGIPU Energy Certifier (**Figure 3**) for energy performance assessment of nine types of buildings. The software is verified by

Table 1. CEN EPB standards (2008) referred to in Technical regulation and/or Algorithms.

Energy need calculation	
1.	HRN EN ISO 13790:2008 *)
2.	HRN EN 15603:2008
3.	HRN EN 15217:2008
4.	HRN EN ISO 6946:2008
5.	HRN EN ISO 13370:2008
6.	HRN EN ISO 13789:2008
7.	HRN EN ISO 14683:2008
Conv. tech. systems calculation	
8.	HRN EN 15316-1:2008
9.	HRN EN 15316-2-1:2008
10.	HRN EN 15316-2-3:2008
11.	HRN EN 15316-3-1:2008
12.	HRN EN 15316-3-2:2008
13.	HRN EN 15316-3-3:2008
14.	HRN EN 15316-4-1:2008
Altern. tech. systems calculation	
15.	HRN EN 15316-4-2:2008
16.	HRN EN 15316-4-3:2008
17.	HRN EN 15316-4-4:2008
18.	HRN EN 15316-4-5:2008
19.	HRN EN 15316-4-6:2008
20.	HRN EN 15316-4-7:2008
Ventilation systems calculation	
21.	HRN EN 15241:2008
22.	HRN EN 15242:2008
23.	HRN EN 15243:2008
Lighting	
24.	HRN EN 15193:2008

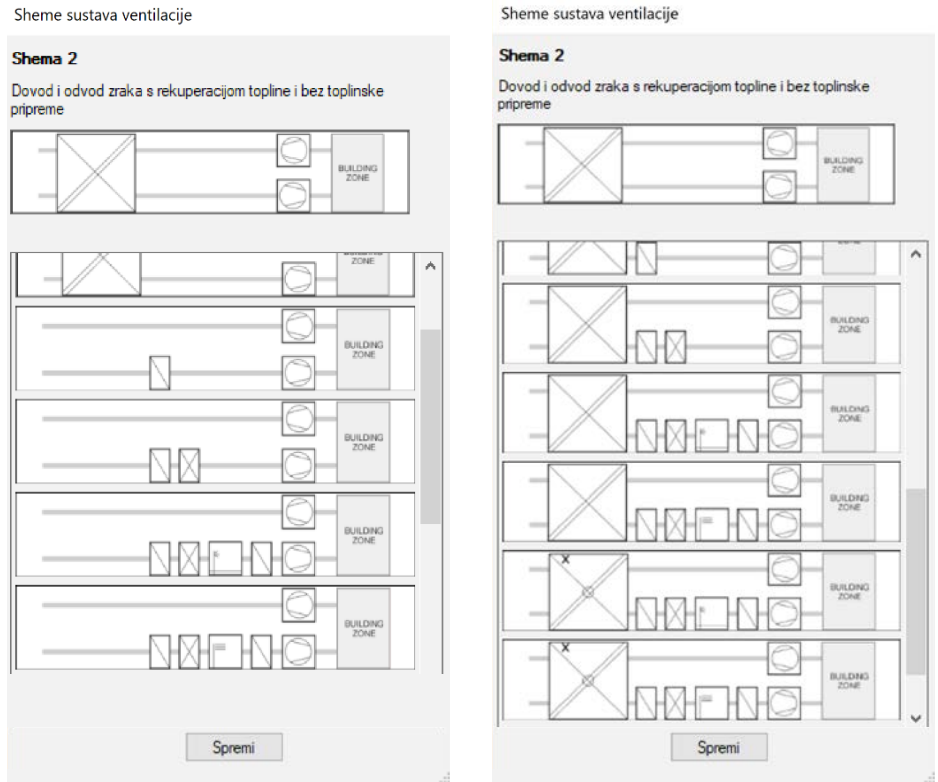


Figure 2. AHU air treatment schemes available for assessment in Algorithms/MGIPU Energy Certifier software tool.

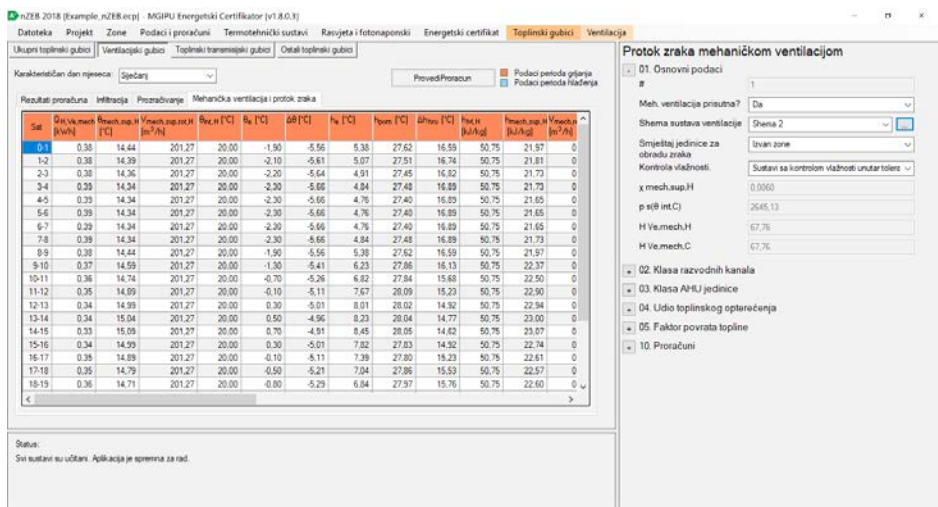


Figure 3. Example of the air treatment calculations in MGIPU Energy Certifier.

*) Simple hourly method

the University of Zagreb and it is primarily intended for energy certification purposes. The Ministry of construction and physical planning (responsible for EPBD implementation) plans to extend applicability of the software for other legal purposes (energy permit) by introducing climatic data for more geo locations.

Following the release of MGIPU Energy Certifier, a few commercial software packages based on Algorithms extended their calculations from only energy need ($Q_{H,nd} / Q_{C,nd}$) to technical systems energy uses and included additional climatic data for more geo locations. There is no formal obligation to verify commercial software, but they are in most cases verified informally against the public software.

New EPB standards prospects in Croatia

The new set of CEN EPB standards (ed. 2017)² was implemented in the national standardization system shortly after the formal vote. Introduction of nZEB (nearly Zero Energy Buildings) calculations imposed a need for more accurate/sensitive calculation methodology with hourly time step. There is relatively strong opinion about this need among the experts and policy makers involved in EPBD related legal actions.

Therefore, the new set of CEN EPB standards is considered for adoption in the national regulation/method-

ology as soon as an appropriate and verified calculation tool is available on the market.

The Ministry of construction and physical planning is in favour of development of a common EU open source kernel, following the recent initiatives communicated between the member states representatives within the Concerted Action EPBD V³. The Ministry is not going to finance any new calculation tool (software) based on the new EPB standards.

The general impression is that there is a lack of knowledge/skills among engineers regarding EPB calculations, only energy certifiers are obliged to enrol the training courses. This is true especially in cases of more complex buildings and technical systems (e.g. buildings with more zones, different heat sources, alternative systems, etc.) as well as in the case of nZEB calculations. To accelerate implementation of the new (2017) set of EPB standards a 'user friendly' software shall be provided to engineers and energy certifiers to facilitate the performing of the overall calculation procedure. The calculation has been generally considered by the mentioned experts and policy makers to be too complex since the first release of the CEN EPB standards (and Algorithms). The next step forward in adopting the new CEN EPB standards is also work on describing the national calculation method according to Annexes A of the EN ISO 52000 series, which is about to be initiated. ■

References

- 1 <https://mgipu.gov.hr/pristup-informacijama/zakoni-i-ostali-propisi/podrucje-energetske-ucinkovitosti/algorithm-za-izracun-energetskih-svojtava-zgrada-objavljen-15-svibnja-2017-u-obveznoj-primjeni-od-30-rujna-2017/8930>



- 2 For the total set of CEN EPB standards see: <https://epb.center/documents/>.
- 3 The Concerted Action EPBD (CA EPBD) addresses the Energy Performance of Buildings Directive (EPBD). It aims to contribute to the reduction of energy use in European buildings, through the exchange of knowledge and best practices in the field of energy efficiency and energy savings between all 28 European Union Member States plus Norway. See www.epbd-ca.eu.