

CONSIDERING BUILDING ENERGY AND ENVIRONMENTAL PERFORMANCE FOR REAL ESTATE VALUATION

Maricel PALAMARIU, Prof.PhD., University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania, mpalamariu@gmail.com

Adrian DREGHICI, Eng., SC Tialco SRL, Romania, adrian_dreghici@yahoo.com

Ildiko TULBURE, Assoc.Prof.habil., "1 Decembrie 1918" University of Alba Iulia, Romania, ildiko.tulbure@gmail.com

Abstract: *In our country issues concerning real estate tenure, registration and inventory are still not yet well clarified. Therefore, information about housing stock in order to get localities systematization is needed. The real estate valuation offers the required information about buildings technical inventory and characterization.*

Furthermore, in the European context related to buildings energy performance, Romanian authorities try to promote measures to increase the buildings energy performance by designing new buildings with low energy consumption, by thermal rehabilitation of existing buildings and by correct information of the building owners / administrators through the energy performance certificate, improving the built-up urban framework and environment protection.

Building energy performance should be taken into consideration in real estate valuation. This could improve building affordability for customers, and also improve the dwellings energy performance despite the potential increase in value on the real estate market.

Keywords: *real estate valuation, building energy and environmental performance, energy certificate*

1. Introduction

The real estate valuation aims at inventorying the real estate in localities, in order to acquire the systematic knowledge of the housing stock and to provide the necessary documentation for locality systematization [1].

The technical inventory of buildings is not limited to the indication of the total number of buildings and their assessment, but it is also important to carry out a technical characterization of the building [1].

In our country, real estate valuation is made by certified evaluators, according to specific laws and rules contained in the methodological valuation guide of the National Association of Authorized Evaluators in Romania (ANEVAR). Indicated methodology is according to international valuation standards (EVS) published by the International Valuation Standards Council (IVSC) [2], [3].

The valuation reports are prepared in accordance to the current valuation standards and information provided by the real estate market. In order to assure a reliable sustainable assessment regarding the real estate market, the most important condition for it is to be transparent [3].

Valuation methods are based on specific assumptions and considerations. The choices made should be mainly motivated in the valuation report based on information obtained from the real estate market. These motivations are intended to increase the quality of the valuation

report. When drawing up the valuation report, the certified evaluator shall comply with the following conditions: considering current valuation standards, accuracy, consistency and transparency of the report [3].

In the last time a multitude of valuation methods have been developed, considering certain specificities and indicators, such as property tenure, technical and physical characteristics, land use category, location, zone type, topography, access etc. [2], [3].

2. Assessing Building Energy Performance

The purpose of the buildings energetic assessment of is to promote measures to increase the buildings energy performance by taking into account external climatic conditions, location, interior comfort requirements, energy performance requirements, improving urban aspect of localities [4], [5].

Issues related to the assessment of the buildings energy performance are regulated under the Directive 2010/31/UE of the European Parliament, regarding buildings energy performance, published in the Official Journal of the European Union, series L no. 153, 18 June 2010.

Increasing buildings energy performance is followed especially when designing new buildings by assuring a low energy consumption or when considering existing buildings by their thermal rehabilitation as well as by correctly informing building owners / administrators through the energy performance certificate. It is to be mentioned that all these actions do represent actions of major public interest in the context of energy saving in buildings, improving the built-up urban framework and environmental protection [4], [5] assuring in this way the most debated urban sustainability [6].

Building energy performance is actually stating the energy consumed or estimated to be consumed in order to meet the needs of the building normal use, which mainly includes following processes: heating, hot water preparation, air conditioning, ventilation and lighting. The energy performance is determined according to an accurate calculation methodology [4], [5] and is expressed by one or more numerical indicators that are calculated by taking into account several technical, energetic and environmental aspects, presented in Figure 1:

- thermal insulation;
- building technical characteristics;
- technical characteristics of corresponding installations;
- design and location of the building in relation to external climatic factors;
- exposure to the sun;
- influence of neighbouring buildings;
- own sources of energy production;
- other factors, including the building indoor climate, which influences its energy needs.

The energy performance certification is playing an important role in the building assessment, especially in the case of demonstrating the building energy performance in front of potential buyers or tenants, in the case of the sale or rental of single-family houses and apartments in residential buildings or in the case of developing certain commercial and industrial activities to be carried out in the respective building [4], [5].

With regard to global debates concerning existing possibilities for shaping sustainable cities it is important to consider the multitude of already available residential buildings which should be evaluated with regard to their energetic performance, so that the overall energy consumption would consistently decrease. The vision is to succeed in the near future to get the best possible buildings energy performance as a most relevant aspect with regard to

achieving urban sustainability [7]. A building with almost zero energy consumption is a building with a very high energy performance. The energy requirement for such buildings is almost zero or very low. The needed energy can be covered from conventional sources or recently the possibility is given to cover the needed energy form renewable energy resources.

This is including renewable energy produced on-site or nearby, meaning by this the energy obtained from non-fossil, renewable energy resources such as: wind, solar, geothermal, hydrothermal and ocean energy, hydraulic energy, biomass, waste gas, and biogas). [4], [5]

The building energy performance is expressed mainly by the following performance indicators (Fig. 1) [4], [5]:

- the energy class;
- total specific energy consumption;
- CO₂ equivalent emission index.

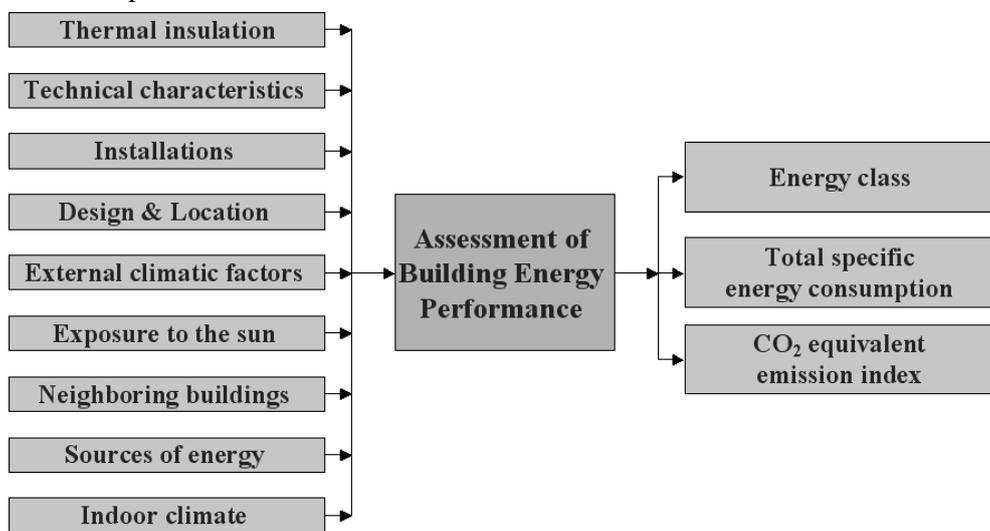


Fig. 1. Assessment of building energy performance by considering several technical, energetic and environmental aspects

The data and assumptions used to calculate the cost optimal levels of minimum energy performance requirements and their results regarding the energy performance valuation are included in the national energy efficiency plans and transmitted to the European Commission by the Ministry of Regional Development and Public Administration, at intervals not exceeding 5 years [4], [5].

To increase the energy performance of buildings is a very valuable strategy in order to reduce the energy consumption. In this regard several initiatives have been debated at several levels and the Ministry of Regional Development and Public Administration aims to take into consideration a series of measures, such as [4], [5]:

- initiating information and education programs for building owners / administrators and considering other information dissemination possibilities through all media, concerning different methods and practices that allow increasing the energy performance, introduction of alternative energy systems, and information on the available financial instruments, including the use of funds obtained by initiating and developing green investment schemes;
- initiating and promoting policies and programs to increase the number of buildings with almost zero conventional energy consumption, during 2014-2020;

- initiating and promoting programs for the installation and operation of renewable energy production systems in buildings.

3. Building Energy Performance in Real Estate Valuation

Because of the growing interest in building energy performance and efficiency, several regulations have to be enacted, such as imposing constraints on the building energy consumptions [8]. A major enhancement to deal with the energy saving issue is represented by the Government Decision 432/2010 regarding the initiation and development of green investment schemes, with subsequent modifications, following actually to implement the European Directive 2010/31/EU.

Most recently, trying to meet the increasing consumers' demand for market transparency, in European countries the Decree-Law 63/2013 has introduced the legal obligation to include energy-related information within real estate advertisements. The data which are to be exhibited refer to the global energy performance index and the consequent energy label, as they are reported in the mandatory energy performance certificate [9], [8].

The provided data are useful to investigate the relationship between the energy performance of housing and the expected selling price by owners. Such a relationship between real estate prices and building energy performances still has no functional form – linear or not – or magnitude [9], [8].

It is important to explore the relationships among building energy performances, the prices in the real estate market, the costs in the construction sector and the provision of affordable dwellings (Fig. 2) [10], [11], [8].

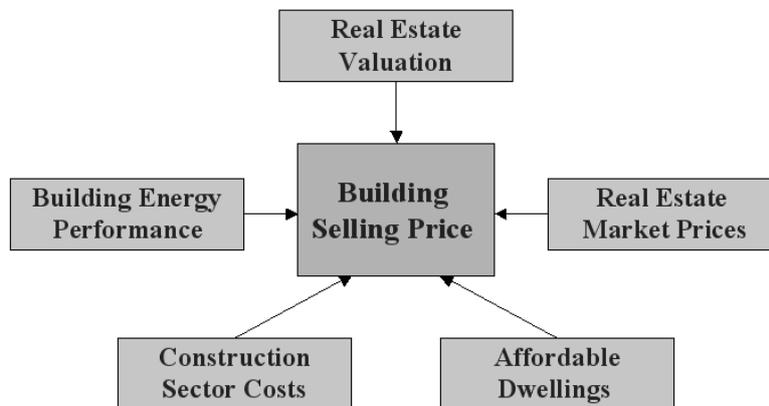


Fig. 2. Indicators for establishing building selling price

Lately, Romanian lenders have started to consider energy costs, but only as it relates to information for the customers and not the energy performance of the building. Lenders / owners are legally required to include detailed energy costs estimates that reflect energy performance alongside other major household expenses when assessing customer affordability or performing any real estate transaction. It may also have the consequence of increasing the value of more efficient homes, which would have lower energy costs and improve its affordability for customers. On the other side it may also offer an opportunity for lenders to extend mortgages to improve the dwellings energy performance due to the potential increase in value [4], [5], [12].

Energy performance is currently still remaining a lower priority when seeking to purchase a dwelling compared to other motivating purchasing factors, such as neighbourhood,

commute, local schools, access to services. Higher energy performance ratings were associated with higher purchase price and from this reason has been not as a foremost followed assessing criteria when making the transaction [12].

For housing a certificate is required when a dwelling is constructed, rented or sold and must provide a rating of its energy performance and CO₂ emissions as well as must provide a set of recommendations for energy performance improvement. The European Directive 2010/31/EU requires that the methodologies used to estimate the ratings are based on a general framework set out in the EPBD (The European Energy Performance of Buildings Directive). [12], [4], [5].

4. Conclusions

From the presented issues regarding the buildings energy performance became clear that when designing new buildings or when considering existing buildings a relevant issue is connected to the energy consumption related to the considered building, what is possible to be rated by his energy performance certificate. On the other side in the newer debates regarding assuring urban sustainability buildings energy performance should be taken into consideration in real estate valuation. These aspects can lead to improving building affordability for customers and to improving the dwellings energy performance as well as to the potential increase in value on the real estate market. In the real estate valuation several hardly quantifiable aspects should be taken into account, which consideration is still pretty difficult because of not having yet a general accepted method on how to consider hardly quantifiable entities in such transactions. On the other side connected to be current debates regarding environmental protection and assuring an urban sustainability, there is a major interest for possibilities of energy saving in buildings, improving the built-up urban framework and environmental protection. The building energy performance is actually stating the energy consumed or estimated to be consumed in order to meet the needs of the building normal use what is referring to heating, hot water preparation, air conditioning, ventilation and lighting. The energy performance is determined according to a calculation methodology and is expressed by using certain indicators, which are calculated by taking into account several quantifiable aspects from the technical, energetic and environmental field. When considering the possibility of carrying out a holistic estimation of buildings energy performance actually several aspects have to be taken into account, some of them being hardly quantifiable aspects, such as exposure to the sun, influence of neighbouring buildings, own sources of energy production and building indoor climate. Future works should clarify possibilities of taking into consideration such hardly quantifiable aspects as well, in order to improve the overall building energy performance.

5. References

1. Boş, N., Palamariu, M., *Considerations on the Elaboration of Real Estate Records in Romania*, RevCAD 21/2016, Aeternitas Publishing House, Romania, 2016, pp. 11-22
2. Sandulache, G., Proca, G.E., *Land's Valuation. Case Study*, RevCAD 22/2017, Aeternitas Publishing House, Romania, 2017, pp. 231-236
3. Lacatusu, D., Dabija, A.N., Onose, D., *Valuation of Specialized Properties-Submerged Lands*, RevCAD 21/2016, Aeternitas Publishing House, Romania, 2016, pp. 67-72
4. *Hotărârea Guvernului nr. 432/2010 privind initierea si dezvoltarea schemelor de investitii verzi, cu modificarile ulterioare, Romania, 2010*

5. *Legea nr. 156/2016 pentru modificarea si completarea Legii nr. 372/2005 privind performanta energetica a cladirilor, Monitorul Oficial, Partea I, nr. 543/19.07.2016, Romania, 2016*
6. *Palamariu, M., Tulbure, I., Land-Use Planning Strategies for Shaping a Sustainable City. In: Proceedings of the 16th International Multidisciplinary Scientific Geoconference, SGEM2016, 30.06-06.07.2016, Book3, Vol. I "Geodesy and Cartography", ISBN 978-619-7105-56-3, Albena, Bulgaria, 2016, pp.: 287-294*
7. *Tulbure, I., Sustainable City in Romania –from Vision to Reality. Proceedings of the Conference "Sustainability 2014: Future Urban Development at Different Scales", 05. - 09.05.2014, Karlsruhe, Germany, 2014*
8. *Bonifaci P, Copiello S., Real estate market and building energy performance: Data for a mass appraisal approach, doi:10.1016/j.dib.2015.11.027, Data in Brief 5(2015), pp.1060-1065*
9. *Fabbri K., Tronchin L., Tarabusi V., Real Estate market, energy rating and cost. Reflections about an Italian case study, Procedia Engineering 21(2011); pp.303–310*
10. *Copiello S., Bonifaci P. Green housing: toward a new energy efficiency paradox? Cities 49(2015); pp.76–87*
11. *Copiello S., Achieving affordable housing through energy efficiency strategy. Energy Policy. 85(2015), pp. 288–298*
12. *Hamiltona, I., Huebnera, G., Griffiths, R., Valuing energy performance in home purchasing: an analysis of mortgage lending for sustainable buildings, Procedia Engineering 145(2016), pp. 319 – 326*