

THE VALUATION PROCESS OF GREEN BUILDINGS IN THE CONTEXT OF URBAN DEVELOPMENT

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Abstract: *Green buildings tend to become more and more present on the real estate market, being a less invasive solution for the environment, and at the same time providing people with a healthier environment to live or do their daily activities.*

Green buildings, due to lower bills, the pleasant ascent and intake to improve quality of life and increase productivity, have proved to be more attractive on the real estate market, both for sale and for rent. For this reason it is necessary to know their specific elements, which may have an influence on the market value, as well as the particularities of the valuation process of this type of building.

Keywords: *green buildings, environment, valuation process*

1. Introduction

A green building is a building that, in its design, construction or operation, reduces or eliminates the negative impact and can create a positive impact on our climate and natural environment. Green buildings preserve valuable natural resources and improve our quality of life. [1]

Specific elements of green buildings

Any building, regardless of its destination, can be included in the category of green buildings. It can be designed or redesigned as green building, a residential building, office space, public institutions or any other structure that is characterized by the following features:

- Efficient use of energy, water and other resources;
- Using renewable energy, such as solar energy;
- Measures to reduce pollution and waste and facilitate re-use and recycling;
- Good indoor air quality;
- Using non-toxic, ethical and sustainable materials;
- Consider the design, construction and operation environment, taking into account the quality of life of the occupants at all stages;
- A design that allows you to adapt to changing environmen.[1]

In addition to these elements, each country or region may impose other characteristics specific to this category of constructions based on environmental conditions, traditions and specific cultural characteristics.

Regarding the construction of new green buildings are many solutions such as:

- Use of materials that do not harm the environment and ensure a longer life of the building;

- Consider the elasticity of components in the design and construction of the infrastructure and construction itself to ensure a safe space for people in the context of alarming increase in natural disasters;
- Flexibility in space planning and planning of the buildings, which involves the design of multi-functional building spaces;
- Solutions to ensure the health and well-being of the occupants of the building, and in this regard, biological materials for construction and fitting out, as well as solutions for ensuring clean air in the interior;
- New standards and certifications have been but in place and are being reviewed on a regular basis to ensure a healthy and safe living environment for people who integrate into the environment without harming them.

As far as old buildings are concerned, there are solutions for them to be converted into green building, and in this respect the following measures are envisaged:

- Reducing energy consumption and using alternative energy solutions to ensure energy needs;
- Protecting water resources by managing drinking water and waste water reuse solutions;
- Reducing the amount of waste by using a much more managed quality of more durable materials and implementing waste reuse solutions resulting from demolition;
- Ensure a healthy and enjoyable environment through better ventilation solutions by avoiding the use of harmful chemicals and materials by providing natural light in as many and longer spaces as possible by soundproofing solutions, and thermal;
- The contribution made by each person to provide green spaces for relaxation, aesthetics and as a solution to reduce pollution.

2. The current national and international situation with regards to green buildings

If in the past the green buildings were associated with very high costs for their realization, making them practically a whim of luxury customers, now opening up to them becomes more and more pronounced being increasingly seen as an integral part of the future, from the sustainable development plans of cities.

At national level, Romania is a country in the beginning as far as green buildings and their construction are concerned, but important steps have been taken to promote modern methods in energy-saving architectures that ensure the environment and user comfort at the individual and collective level. There are currently a significant number of buildings that hold green building certificates, making Romania a regional leader from this point of view.

Recently built office buildings and commercial spaces are mostly certified by LEED and BREEAM international standards, but residential buildings complying with the standards of green buildings are being built in a very small proportion. Of the total of about 200 green buildings in Romania, only 21 are residential buildings, totaling 6000 units of real estate. The first green residential project was completed in 2012 and the company that implemented it continues its activity in Cluj-Napoca. In Bucharest, the first certified green buildings was built in 2014 and the developer replicated the first 4 green houses for another 56 units and aims to

build the first green community in Romania by building a complex of 400 green houses. Since European Union regulations provide the constructions of green houses only since 2020, Romania will align with these regulations and expect an improvement in the residential real estate market on this segment, with financial support from local administrations already in Cluj-Napoca, Timișoara, Dej and Iași for those who build green buildings. No such projects have been done for public buildings.

At European level, there are several cities that are aware of the importance of implementing measures that are reflected in the quality of people's lives and have adopted urban plans that envisage the development of sustainable buildings. This category includes the cities of Copenhagen, Stockholm, Oslo, Frankfurt, Amsterdam, London, Paris. Copenhagen aims to become the first city without carbon dioxide in 2025 and that's why buildings in this city are built so their energy consumption is very close to zero.

At international level, the United States, Canada and China are remarkable for the large number of green buildings. In February 2018 in the USA over 65000 LEED certificates were issued, of which approximately 35% are office space and only 5% residential destination [7].

Current internationally recognized energy performance certifications are the LEED (Leadership in Energy and Environmental Design) Green Building Certification System, designed in 1998 in the USA, to be the most widely used. Buildings receive the LEED certificate, depending on their performance and credits, there are various grades such as Platinum, Gold, Silver or Certificates. In Romania, an example of a certified building LEED Gold was the Nokia factory in Cluj.

European certificates Building Research Establishment Environmental Assessment Method (BREEAM) are a widely used assessment method for certifying green buildings. The assessment certificate is issued by an authorized organization, through trained evaluators, within the United Kingdom Accreditation Service (UKAS).

DGNB (Deutsche Gutesiegel Nachhaltiges Bauen) certificates were set up in 2009 and developed by the German Board of Sustainable Constructions (DGNB) in partnership with the Ministry of Urban Transport, Construction and Urban Design (BMVBS). The certification of buildings is similar to LEED certification, meaning that depending on the obtained score, there are varying degrees of bronze, silver or gold.

Another example of certificates are those in Australia, GREEN STAR, launched in 2003 by the Green Building Council. Certificates are rated with 9 green star categories (management, indoor environment quality, energy, transport, water, materials, land use and ecology, emissions, innovation).

MINERGIE certificates were launched on the market in 1998, in Switzerland, and Minergie – P standards (Minergie – ECO și Minergie – PECO) were set up over the years, for buildings with very low heat consumption.

HQE (Haute Qualité Environnementale) certificates are a standard used in France. Sustainable development is the principle underpinning the development of green buildings. ASSOHQE (Association Pour la Haute Qualité Environnementale) is in charge of evaluating projects for certification.

Legislative framework at national level

In 2011, the European Commission presented the “Energy Perspective 2050”, a document that aims to increase energy efficiency by reducing greenhouse gas emission by up to 80%, the deadline being 2050.

The main directives where energy efficiency is regulated are: Directive no.2012/27/EU on energy efficiency, Directive no. 2009/28/EU on the promotion of the use of energy from renewable sources and Directive no. 2010/31/EU on the energy performance of buildings.

The obligation of each EU Member State is to set one or more national targets for the energy performance of buildings. The completion of these objectives is based on the establishment of medium and long-term strategies for redirecting investments for the renovation of the national fund for residential and commercial buildings in the public and private spheres.

According to Art. 4 of Directive 2010/31/EU each Member State shall, through public administrations, renovate annually 3% of the total area of buildings in order to meet the minimum energy performance requirements.

Romania promotes energy performance through mandatory quota systems based on green certificates and current laws, directives and orders:

- Law no. 372/2005 on the energy performance of buildings
 - republished in the Official Gazette no. 451/23.07.2013, following the last amendment brought by Law no. 159/2013, which entered into force on 19.07.2013;
 - Order no. 157/2007 updated on 30.08.2011 for the approval of the technical refulation “Methodology for calculating the energy performance of buildings”;
 - Order no. 691/1459/288/2007 – Methodological norms on the energy performance of buildings;
 - Order no. 1590/2012 which modifies Part 3 of Norm C 107/2005 (Normativ C 107/3) concerning the thermo-tehcnical calculation of building elements of constructions, namely: calculation of thermal energy performance of building elements of constructions;
- Directive 2010/31/EU on the energy performance of buildings, consisting of:
 - Commission Delegated Regulation (EU) no. 244/2012 from 16.01.2012 supplementing the Directive no. 2010/31/EU of the European Parliament and the Council on the energy performance of buildings by establishing a comparative methodological framework for the calculation of cost-optimal levels of requirements minimum energy performance of buildings and their elements;
 - Regulation Enforcement Guide no. 244/2012;
- Government Emergency Ordinance no. 18/2009 on increasing the energy performance of housing blocks; modified by Government Emergency Ordinance no. 63/2012 (in force as of 27.11. 2012);
- Order no. 163/2009 for the approval of the methodolical norms for the application of Government Emergency Ordinance no. 18/2009; deadline for updating these implementing rules - 27.11.2012,according to art. VII of Government Emergency Ordinance no.63/2012;
- Order no. 69/2010 thermal rehabilitation of dwelling buildings financed by subsidized interest bank loans;
- Order of the Government Decision no. 736/2010 approving the methodological norms for the application of Government Emergency Ordinance no. 69/2010;

- Order no. 1937/2010 approving the framework model of the Convection on the payment of subsidized interest;
- Order no. 2179/2010 approving the various Convections required for the implementetion of Government Emergency Ordinance no. 69/2010. [2]

3. The importance of green buildings for smart cities and sustainable urban development

The emergence of negative climate change has led to adoption of environmental protection measures, and studies that have highlighted the effect of pollution on human health have led to the adoption of measures to reduce pollution in order to protect them.

In this context, the green building concept is in suport of both goals, reducing pollution, fitting well into natural environment and providing people with a pleasant environment with health benefits over the long term.

Sustainable urban development implies a form of economic growth that also meets the current needs of urban society on short, medium and long term, which takes into account future generations and does not endanger them in any way.

Smart cities are the future solution for sustainable urban development, capable of providing solutions for traffic, pollution, agglomeration problems by providing intelligent operating systems for city-related facilities. If in 1900 only 13% of the world's population lived in cities, the percentage has now exceeded 50% and is expected to grow to 70% by 2050 [8], therefore it is necessary to find solutions for the management of agglomeration, without affecting the quality of people's life. A smart city has smart buildings, smart infrastructure, education to support and develop it, and gives people mobility and a pleasant environment to work and live. In the first of the listed components green buildings fit.

4. Problems encountered in the real estate market in assessing green buildings

The definition of *green* concept is a starting point in terms of residential buildings with a high energy performance. Even if a property meets all the conditions to be considered a green building, the evaluator has the role of determining exactly the specifications that lead to such a statement. Some elements that need to be considered when conducting a Property Inspection are those proposed in Table 1. Evaluators should carefully examine each area to obtain reliable values about green buildings and make a fair contribution to building an appropriate database. At the international level, there are voices who claim that valuers develop values based on the prices reported by the market. The market is the one that determines the prices paid for this type of property. The most common problem in assessing green buildings is the dependency of the valuator on the real estate market (a lack of data means a lack of support for the contribution of green building attributes).

Table 1 Extract from Inspection Checklist – Specific elements of green building

Electricity efficiency	Estimated consumption of electricity/year
Insulation	
Building envelope	
Windows	
Lighting	
Appliances used to reduce energy consumption	<input type="checkbox"/> Dishwasher <input type="checkbox"/> Refrigerator <input type="checkbox"/> Washing machine <input type="checkbox"/> Other
Energy source	<input type="checkbox"/> Propane <input type="checkbox"/> Electric <input type="checkbox"/> Natural Gas <input type="checkbox"/> Other.....
Water heater	<input type="checkbox"/> Solar <input type="checkbox"/> Heating pump <input type="checkbox"/> Reel
HVAC system and related equipment	Thermostat / Temperature controller? <input type="checkbox"/> Yes <input type="checkbox"/> No Auxiliary heating source? <input type="checkbox"/> Yes <input type="checkbox"/> No Floor heating? <input type="checkbox"/> Yes <input type="checkbox"/> No Electric car charger? <input type="checkbox"/> Yes <input type="checkbox"/> No
Quality of the indoor environment	<input type="checkbox"/> Ventilation system with heat recovery <input type="checkbox"/> Moisture monitoring device <input type="checkbox"/> Other
Water efficiency	<input type="checkbox"/> Water recovery system <input type="checkbox"/> Gray water reuse system <input type="checkbox"/> Other
Cost of utilities/year	
Solar photovoltaic system	
Ownership of the system	<input type="checkbox"/> Owner <input type="checkbox"/> Hired <input type="checkbox"/> Other
Specifications	System sizekw Oldani Energy produced kWh Source of energy estimation produced Manufacturer Guarantee of panels years

The values of a property also depends on the degree granted by the certification organization, which needs to be specified in the inspection checklist (Table 2). For this purpose, the evaluator should document the specifications that certification organizations take into account when assessing buildings. One of the main problems encountered by evaluators is in the case of comparable properties where, due to the large number of certification organizations, the specifications on the basis of which the energy performance certificates are granted differ. The standardization of these technical specifications would be a simplification of the evaluation process and an appropriate approach by sellers and buyers. At present, there is no database for green buildings in Romania, which for a valuer the finding of some elements of comparison is null. Most green buildings in Romania have a commercial destination or are used as office space.

Table 2 Extract from Inspection Checklist – Certification organizations and awarded degree

Green certificates	USGBC LEED <input type="checkbox"/> Certified <input type="checkbox"/> Silver <input type="checkbox"/> Gold <input type="checkbox"/> Platinum
	BREEAM <input type="checkbox"/> good <input type="checkbox"/> very good <input type="checkbox"/> excellent <input type="checkbox"/> remarkable
	MINERGIE <input type="checkbox"/> Minergie - P <input type="checkbox"/> Minergie – ECO <input type="checkbox"/> Minergie – P-ECO
	Others:
	Comments:

According to RoGBC, more than 200 buildings in Romania have green certificates, the number of green residential buildings with single family destination has increased in the past two years, this means that databases will have more than 10 years behind the development of green buildings. This problem is encountered internationally, publicly available databases are either incomplete or data is erroneous. Some examples of full, non-public access databases are *Home Innovation Research Labs and the US Green Building and Council's green rating databases, US Environmental Protection Agency and Department of Energy's databases, Residential Energy Services Network's database of houses with HERS Index ratings*. The role of the databases is to provide the assessor a basic description. The *green* concept can become deceptive for both the valuer and the buyer in terms of marketing. A possible solution would be to develop a standard set of definitions and instructions provided by a competent authority.

At present, there is no real estate market in the country for residential green homes. What solution should a valuer adopt when it does not have comparable properties in the category of green buildings? According to the Appraisal Practices Board (APB) of the Appraisal Foundation Framework, which issued an advisory guide on the assessment of green buildings, the following points are highlighted:

- Verifying green features, features that define a green building;
- Use appropriate adjustments for market rentals analysis, interviews, secondary data, etc.;
- The recommendation in the valuation process is to take into account localization, water and electricity efficiency, indoor air quality, materials and maintenance works;
- Conducting appropriate market studies.

5. Conclusions

The lack of information for evaluators will continue to be a problem in the years to come.

Builders and certification organizations for green buildings need to educate their customers about the technical characteristics of green buildings in order to understand the differences from an ordinary building. With regard to real estate agents the valuers should make them understand the difference between the market value and the price paid for a real estate.

Certification organizations should make their databases available to state institutions or rating agencies, so the evaluators would have the information they need to support their own views on the estimation of a credible value.

The international trend is to achieve environmentally friendly projects that also provide people a healthy and pleasant living and activity environment that will increase the quality of life particular for urban people, as the predictions show people's tendency to move

to urban areas. Without any measures for sustainable development, population growth in cities will have the opposite effect to the desired namely increasing pollution and decreasing the quality of life.

Green buildings are part of sustainable development projects because the energy consumed by them is zero or close to this value, the materials they build are less polluting and less harmful to people's health, and natural lighting and ventilation will improve quality of people's lives.

Therefore, it is expected that in the future the number of green buildings will grow, creating a bidding real estate market, and the valuation of them is an essential part in the process of trading, renting or insuring.

6. References

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