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Added value of sites suitable for sustainable office development

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Abstract: Valuations of real estate are widely used for various purposes and it relied always upon the financial and other markets. Valuation methodology is based on the operation of the free market economy and the real estate properties. The issue of certified properties is relatively new in the field of real estate valuation and is not sufficiently explored. Certified buildings are preferred by major corporate tenants with international field of activity who often have ethical rules for sustainable development. Therefore, certified properties are attractive to international commercial real estate investors who have higher purchasing power and are willing to pay a higher purchase price. Sustainable property certification is an element affecting the market value of the property. The purpose of this presented research is to quantify the impact of property certification on the value of office properties in Prague and subsequently to determine the impact of sustainability certificates on the market value of the land by using basic valuation techniques. The outcome of the project could be used by real estate valuation experts as a guideline to consider the future project certification and its impact on the land market value.

Keywords: Real Estate Valuation, Sustainable Office Development, Residual method, LEED, BREEAM

1 Introduction

In recent years, the trend of foreign capital inflows has been apparent. International investment groups invest primarily in premium real estate, even after assuming lower yields. Premium office properties often achieve sustainability certification by LEED or BREEAM, which are well known to international investors and tenants in domestic markets. It is not usual for the Czech's valuers to examine closely the impact of the sustainability certificate of an object on the market value. Most of the commercial properties are valued using the income approach. Operating costs are generally transferred to the lessee and therefore, not directly entered into the calculation of the market value of the property. The topicality of the issue lies in the fact that the impact of building certification on the value of a property is not sufficiently quantified. The aim of the research is to quantify the added value of sites suitable for construction of office properties with sustainable certificates. The outcome of the project could be used by real estate valuation experts as a guideline to consider the future project certification and its impact on the site market value. Correct market value determination is essential for every commercial developer, real estate investor, or project financing bank.

The benefits of certified buildings are addressed in a large number of published articles. Today, sustainability in real estate is firmly anchored in society, policy and in the minds of people. Green buildings have added value to real estate in several areas which has an impact on the market value. In many markets, green buildings are perceived to be of better quality and many of today's large tenants are willing to pay extra for green premises. For these tenants, renting green spaces is an opportunity to demonstrate their commitment to sustainability, thereby attracting the best employees and increasing productivity (RICS 2013). Because of this reason, green buildings can generate higher rents per unit and thus increase the revenue from its operations (Appraisal Institute 2013).

Energy saving is one of the most obvious and significant benefits of green buildings. Saving energy reduces operating costs and thus helps to increase net yield, which has a positive effect on the value of the property.

The added value of a green building is also reflected in risk mitigation for owners and banks providing financing.

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In the risk assessment process, it is necessary to take into consideration the fact that green buildings can have added value in a more stable yield, higher resilience to consumer preferences, ever tightening requirements for sustainable construction and the impact of rising energy costs. By reducing the risk of investment, the yield is compressed and the value increases. Another effect of less risk is better bank financing when green buildings are constructed (Appraisal Institute 2013).

Sustainability has evolved into a competitive factor due to its positive economic, ecological and social impact. Fröch explains (2015) that this represents an advantage for investors, owners and users at the same time. All the above-mentioned factors have led to the establishment and increasing recognition of sustainability certificates. The aim of sustainability certificates is to transparently and publicly detail the sustainable features of a building as well as to create economic advantages for property developers and investors.

Although there are many certification systems worldwide, the most widespread and used in practice are the two systems namely LEED by U.S. Green Building Council (2019) and BREEAM by BRE Global (2017). Both assessment systems have a long tradition abroad. Behind their origin there are scientific organisations supported by the commercial sphere.

Although the sustainability of buildings is addressed in many scientific publications, the author is not aware of any literature devoted to the added value of sites suitable for construction of office properties with sustainable certificates to a similar extent as in this article.

2 Methodology

According to the International Valuation Standards (2018) there are two main approaches to the valuation of development property. These are the market approach and the residual method. Obtaining comparable evidence of development land values is very difficult. Each site will differ widely in location, possible use determined in zoning plan, size, permissible density of development, restrictions, technical infrastructure and so on, making adjustments to the standard value per comparable unit almost impossible. The residual method is used to value the development sites and existing properties that have potential to be redeveloped (Sayce et al. 2006) and, in many cases it is the only possible way to determine market value of undeveloped land.

The residual method is a hybrid of basic valuation approaches. The combination of income and cost approach is used for commercial properties. Moreover, it is necessary to consider a large number of valuation assumptions for determining the residual value correctly. The residual method is based on a simple economic concept – that the value of the land is calculated as a surplus remaining after all estimated development costs have been deducted from the estimated value of the completed development (Wyatt 2007).

As International Valuation Standard (2018) defines, this is based on the 'Gross Development Value (GDV)' of the completed project and the deduction of development costs and the developer's profit to arrive at the residual value of the site. Figure 1 shows the base equation of the residual method:

Following the above equation the added value of a site suitable for construction of office property with sustainable certification will be determined as a difference between the residual value of certified and noncertified property.

3 Key inputs and assumptions of the residual method

3.1 Gross development value

In the first place, it is necessary to determinate the GDV. The best and most reliable way to determine the GDV and the impact of certification on the market value is to analyse the real estate market transactions made under market conditions.

3.1.1 Office transaction sample

Restrictive conditions should be set to obtain a sufficiently meaningful sample. Therefore, the following assumptions are made and used:

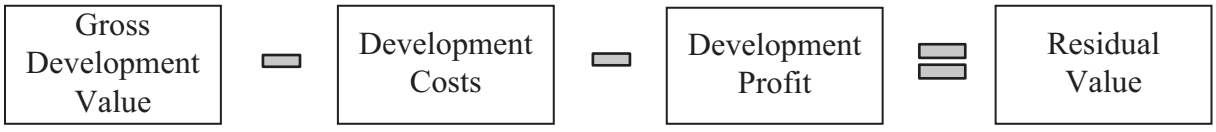

Fig. 1: Base equation of the residual method (*source*: International Valuation Standard 2018). GDV, gross development value.

- Offices located in the wider centre of Prague – outside the historical centre.
- Classified as Class A Office (Golden 2013).
- Transactions between January 2018 and June 2019.
- Buildings with dominant use as offices without significant impact of retail premises.
- At the date of sale, the buildings were mostly occupied.
- Information on sales price is publicly available.

Publicly available information sources, such as the cadastre of real estates, business newspapers and press releases of investment funds, were used to obtain information on realised transactions of office buildings corresponding to the above parameters. The selected office transactions are shown in Table 1. The properties with LEED or BREEAM certification are written in green.

The abovementioned 20 real estate properties meet the selected parameters, of which 10 have LEED or BREEAM certification at some level, and 10 properties are non-certified. An appropriate comparable basis should be chosen for the comparison of transactions. For office buildings, the price per square metre of lettable area is commonly used as the most appropriate comparable unit. The unit prices should be adjusted to achieve the objective and conclusive comparison.

3.1.2 Unit value adjustments

Value adjustment by using coefficients is commonly used in the real estate valuation practice to determine the market level – the indirect comparison method (Sayce et al. 2006). The comparable unit is always related to the comparable parameters against which the adjusted unit is always rated as worse (correction coefficient >1) or better (correction coefficient <1). For office buildings, the following parameters have been chosen:

- Locality
- Age of the property and technical condition
- Transaction date – adjusted according to Cushman & Wakefield office snapshot (2019).

There are other parameters commonly used in the comparative method for office unit price adjustment are technical and technological equipment, tenant structure,

Tab. 1: Selected sample of office transactions in Prague

No.	Property	Locality	Sustainable certificate	Date built (refurbished)	Transaction date	Transaction price [mio. €]
1	BB Centrum Villas	Prague 4	None	2002	1Q/2018	16
2	Oregon House	Prague 5	None	2005	1Q/2018	27
3	Metronom	Prague 5	BREEAM	2015	2Q/2018	93
4	Visionary	Prague 7	LEED	2018	2Q/2018	68
5	Explora Business Centre	Prague 5	LEED	2012	2Q/2018	53
6	Hadovka	Prague 6	None	1999	2Q/2018	50
7	Polygon	Prague 4	None	2004	3Q/2018	26.5
8	Nestle	Prague 4	None	2006	3Q/2018	25.5
9	Rosmarin B. Centre	Prague 7	None	2012	3Q/2018	40
10	Prague Marina	Prague 7	None	2009	3Q/2018	33
11	Forum Karlín	Prague 8	None	2014	4Q/2018	53
12	Florenc Office centre	Prague 8	BREEAM	2018	4Q/2018	51
13	Palác Karlín	Prague 8	None	1999	4Q/2018	54
14	City West B1	Prague 13	None	2009	4Q/2018	69
15	Trimaran/City Element	Prague 4	LEED	2018	1Q/2019	110
16	Waltrovka	Prague 5	LEED	2018	1Q/2019	250
17	Rustonka	Prague 8	LEED	2019	1Q/2019	165
18	Crystal	Prague 3	BREEAM	2015	2Q/2019	50
19	Main point Pankrác	Prague 4	LEED	2018	2Q/2019	118
20	Palmovka Open Park	Prague 4	BREEAM	2018	2Q/2019	80

occupancy, length of lease contracts, operating costs etc. (Enever et al. 2006). However, these parameters have already been eliminated by sampling, or may be assumed to be directly related to the property certification.

Unit transaction prices were adjusted by coefficients considering location, age and transaction date. Using the coefficients, the comparative basis of the market price was achieved, which is characterised by an office building whose construction was completed in 2015–2019 at the date of transaction in Q4 2018. The unit price adjustment is shown in Table 2.

After transaction prices adjustment, the levels for individual characteristics have been unified and the transactions can be compared with each other to determine the added value of property certification in its market value. The above table shows that the LEED or BREEAM certification significantly affects the market value and increases it by 21.4%. Considering the tolerance caused by the comparative method, it can be stated that the unit market value of certified office properties is on average 15–25% higher than the market value of non-certified properties.

3.2 Development costs

In the previous section, it was stated that the property certification causes increase in the unit market value by approximately 15–25%. It is necessary to realise that the certified properties also involve higher development costs. The development costs include construction costs (CC), other CC (soft costs [SC]) and financial costs.

3.2.1 Construction costs (CC)

The CC is the costs of all works required to complete the project to the defined use in the best manner. The CC depend on the type and phase of the construction project and include the CC (new object, reconstruction, utilities, landscaping, etc.), costs of ecological disposal, liquidation of environmental burdens, demolition and off-site work. The best option how to determine the CC is a valid construction contract. If the contract is not available, the price indicators can be used to determine the CC.

Tab. 2: Unit transaction price adjustment

No.	Object	Date built (refurbished)	Price per unit	Adjustment			Final adjustment	Adjusted price per unit
				Locality	Age	Transaction date		
1	BB Centrum Villas	2002	2,000 €	1.10	1.10	1.07	**1.30**	2,590 €
2	Oregon House	2005	1,929 €	1.20	1.10	1.07	**1.41**	2,725 €
3	Metronom	2015	2,735 €	1.10	1.00	1.02	**1.13**	3,077 €
4	Visionary	2018	3,009 €	1.00	1.00	1.02	**1.02**	3,077 €
5	Explora Business centre	2012	2,512 €	1.10	1.05	1.02	**1.18**	2,967 €
6	Hadovka	1999	2,000 €	1.10	1.20	1.02	**1.35**	2,700 €
7	Polygon	2004	2,512 €	1.00	1.10	1.02	**1.13**	2,826 €
8	Nestle	2006	2,500 €	1.20	1.10	1.02	**1.35**	3,375 €
9	Rosmarin Business Centre	2012	1,702 €	1.00	1.20	1.02	**1.23**	2,089 €
10	Prague Marina	2009	2,426 €	1.00	1.10	1.02	**1.13**	2,730 €
11	Forum Karlín	2014	2,524 €	1.00	1.05	1.00	**1.05**	2,650 €
12	Florenc Office centre	2018	4,636 €	1.00	1.00	1.00	**1.00**	4,636 €
13	Palác Karlín	1999	3,396 €	1.00	1.20	1.00	**1.20**	4,075 €
14	City West B1	2009	2,828 €	1.20	1.10	1.00	**1.32**	3,733 €
15	Trimaran/City Element	2018	4,365 €	1.00	1.00	0.98	**0.98**	4,270 €
16	Waltrovka	2018	3,125 €	1.10	1.00	0.98	**1.08**	3,363 €
17	Rustonka	2019	4,459 €	1.00	1.00	0.98	**0.98**	4,363 €
18	Crystal	2015	3,472 €	1.00	1.00	0.91	**0.91**	3,173 €
19	Main point Pankrác	2018	4,453 €	1.00	1.00	0.91	**0.91**	4,070 €
20	Palmovka Open Park	2018	3,077 €	1.00	1.00	0.91	**0.91**	2,812 €
Uncertified property average adjusted unit price								2,949 €
LEED or BREEAM certified property average adjusted unit price								3,581 €

It can be assumed that the CC of a certified building is higher than the costs of a building without certification. The area of construction cost difference between certified and non-certified constructions is not sufficiently explored and no relevant technical article has been found on this topic. According to Vamosi (2011), the LEED certification causes the increase in the CC by up to 30%. This increase is due to the need for high technological equipment, higher complexity in implementation and higher design costs. For the purposes of this model, we will assume that the CC of a certified property is 30% higher than the CC of a property without certification.

3.2.2 Soft costs (SC)

As RICS define (2019) the SC include costs of specialised professions, marketing and other necessary costs. These costs are mainly the following:

- **Professional fees** – These fees include the costs of project studies, stages of project documentation and the costs of obtaining statutory permits and approvals. The level of professional fees depends on the complexity of the project and is usually calculated as 5–10% of CC (Wyatt 2007). According to Vamosi (2011), the costs of green design entail a higher workload and are therefore usually 1–2% higher.
- **Project management** – These include the professional and project management costs that would be reasonably incurred by participants at various stages through to the completion of the project. The level of project management fee depends on the complexity of the project and is usually calculated as 5–10% of the CC (Wyatt 2007). Based on a discussion with an energy expert specialising in green properties, the costs of the certification process are around 20,000–40,000 € per object.
- **Marketing** – The costs of marketing may be entered as an estimated figure. Proper marketing is a part of the market value definition. Under normal circumstances, it is appropriate to allow for the costs associated with corresponding marketing and to cover items such as advertising, opening ceremony, brochure design and production. Marketing is usually calculated as 2–4% of CC (Wyatt 2007).
- **Letting fees** – Letting fees include the costs of legal services associated with the lease and services of real estate agents who arrange the lease of the future property. The letting fee is usually calculated as 10–20% of the estimated rental value (Wyatt 2007).
- **Property disposition fees** – These fees include the costs of legal services associated with the sale and services of real estate agents who arrange the sale of the future property. These fees are usually calculated as 1–3% of the GDV (Wyatt 2007).

3.2.3 Financial costs

Financial costs represent the costs of finances for the project through to the completion of the project, including any period required after physical completion until the sale of the property. The traditional assumption is that the development and site purchase are financed using 100% borrowed money (Sayce et al. 2006). The amount of the financial costs depends on three key inputs – interest rate, duration and amount borrowed. The interest rate is usually constant throughout the whole project. The duration is usually divided into three separate periods where the amount of the loan changes in each period – the interest during the building permit process, the interest during the construction period and the interest over void period. The investment in green construction may be perceived by banks as less risky, so a lower interest rate for certified property of 0.5% is assumed.

3.3 Development profit

The level of development profit depends on the type of property and is related to the level of risk associated with achieving the expected return on capital value after the physical completion of the project. The development profit is the reward for initiating and finishing the development and depends on the length and type of development, size and level of competition for the site, and whether it is pre-let or sold before the construction is completed (Enever et al. 2010). The level of developer profit is the know-how of each developer operating in the real estate market. For their valuation, the appraisers usually use the level of the developer´s profit based on the information provided by the developer and have only limited ability to assess its adequacy. Development profit is normally related either to the costs of the development or to the completed development value; typically, this might be 20–25% on total costs, or 15–20% on GDV (Baum et al. 2006). The acquisition costs are equal to the residual value and represent the maximum amount that should be paid for the site.

4 Added value of site suitable for sustainable office development

The value of land is based on the possibility of its use. In order to determine the added value of property certification for a site intended for a construction of an office property, the above methodology should be applied based on specific examples. The site in the wider centre of Prague was chosen as an example, allowing the construction of an office building with a lettable area of 15,000 m^2.

The GDV is based on the research described in Section 3.2. The CC was taken from the author's internal database. Other valuation assumptions are described in the previous sections. Table 3 shows the market value calculation of the site by using the residual method for two variants – a LEED or BREEAM certified property and a property without certification.

The Table 3 shows that the certification of the future-building already has an impact on the market value of the site itself at the stage of project preparation prior to the starting of the works. The sale of a LEED or BREEAM certified office building carries higher GDV but also higher development costs. The residual method commonly used for site appraisal was used to determine the added value of certification. After taking into account all key inputs, it was found that the market value of a site suitable for the construction of office property with LEED or BREEAM certification is higher by 11.4%. Considering the tolerance caused by the residual method, it can be stated that the market value of the site can increase by 5–15% if a certified office property norms and structures are integrated to it.

It is necessary to take into consideration that the current Czech legislation imposes requirements for new construction specifying that all newly built buildings meet the basic LEED o BREEAM certification. In order to consider an object as certified, the future property must at least achieve LEED GOLD or BREEAM VERY GOOD certificates.

5 Conclusion

Real estate is a specific type of asset and each real estate is unique. There may be significant differences between individual office buildings, especially in location, size, design standard, and other key factors that have a decisive impact on the resulting market value. The Czech real

Tab. 3: Calculation of residual value

GDV	**Certified property**		**Non-certified property**	
Unit value	3,581 €		2,949 €	
Lettable area	15,000		15,000	
GDV	**53,715,000 €**		**44,235,000 €**	
Development costs				
CC	Certified property		Non-certified property	
	Unit costs	Total costs	Unit costs	Total costs
Hard costs + fitouts	1,300 €	**19,500,000 €**	1,000 €	**15,000,000 €**
SC	Certified property		Non-certified property	
Professional fees	7% of CC	1,365,000 €	7% of CC	750,000 €
Project management	7.5% of CC	1,462,500 €	7% of CC	1,050,000 €
Marketing	2% of CC	390,000 €	2% of CC	300,000 €
Disposal fees	2.5% of GDV	1,342,875 €	2.5% of GDV	1,105,875 €
Total SC		**4,560,375 €**		**3,205,875 €**
Financial costs	Certified property		Non-certified property	
Interest during building permit process	3.0%	1,077,105 €	3.5%	1,113,540 €
Interest during construction period	3.0%	1,355,667 €	3.5%	1,330,463 €
Interest over void	3.0%	317,251 €	3.5%	304,295 €
Total financial costs		**2,750,023 €**		**2,748,298 €**
Development profit	Certified property		Non-certified property	
Profit on total costs	20% of total costs	8,952,429 €	20% of total costs	7,372,377 €
Residual value		**17,952,173 €**		**15,908,450 €**

CC, construction costs; GDV, gross development value; SC, soft costs.

estate market is becoming increasingly interesting for international investors who want to invest in premium real estate. Foreign investors and tenants often do not have the know-how of local investors and therefore prefer certified properties from the markets. For them, certification is a sufficient indication of quality that ensures higher and stable income and lower-risk levels. These factors contribute positively to the transaction prices of certified buildings. The aim of this work has been to quantify the impact of certification on the market value of the site suitable for construction of sustainable certified office buildings.

From the perspective of an international investor, the real estate market in the Czech Republic consists mainly of Prague. Regional cities are not so interesting for foreign investors and therefore certification is not so widespread. Information on realised transactions of office buildings corresponding to pre-selected parameters was obtained from publicly available information sources. In total, 20 real estate transactions of Class A office buildings were found, of which 10 were LEED or BREEAM certified at some level and 10 were without any certification. After the transaction price adjustments, the levels for individual buildings were unified and considering the tolerance caused by the comparable approach, it can be stated that the market value of certified office properties is 15–25% higher than the value of non-certified properties.

Subsequently, it was examined whether the certification of the building has an impact on the market value of the site. The market value of a land intended for construction is normally appraised using the residual method. Certified buildings have a higher value after completion, but higher costs are also needed to build them. The selected example shows that the value of the site can increase by 5–15% if the developer builds a certified property there.

This research proves that sustainability certification has added value for the site suitable for office property construction. Commercial developers are aware of this fact. Newly built office buildings in the wider centre of Prague are almost LEED or BREEAM certified. On the other hand, none of the buildings built before 2010 were certified, which is also evident from the chosen transaction sample.

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Biography

Josef Kupec, Josef is a combined doctoral student on Czech Technical University in Prague with specialisation on real estate valuation. He has 5 years' experience in real estate valuation and works as an real estate valuation specialist for one of the leading auditor company in Czech republic.

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