Sustainable Buildings: Market Value And Market Share

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Research paper

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THE HOLISTIC LOOK AT THE BUILDINGS OVER THEIR LIFE CYCLE AND THE IMPLEMENTATION OF THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT ARE TWO MAIN TRENDS, WHICH COULD BE OBSERVED IN THE REALTY MARKET AND IN THE CONSTRUCTION SECTOR IN RECENT YEARS. Environmental concerns and social well-being are beginning to influence the property markets and the pricing of properties. Users and owners of properties already begin to consider benefits and risks associated with ownership and using sustainable buildings. This fact is beginning to reflect in the increasing share of sustainable buildings on the realty market. Is their market value different in comparison with common properties? It is necessary to combine knowledge and experience from economic field with technical experiences and knowledge of social issues and relation to environment within assessment of sustainability buildings. Sustainable buildings are mostly more resistant to obsolescence. Their service could be cheaper, they may offer higher quality of life and they might increase the owner image. This can reflect in higher market value of sustainable buildings in comparison with conformal buildings. This paper deals with application of basic appraisal methods in terms of sustainable building assessment, especially with difficulties how to argue their higher value. This paper summarizes the market share of sustainability buildings in the Czech Republic on example of family houses.

Keywords

market value, appraisal, sustainability, whole life costing

Sustainable building

Definition of sustainable building

How to define the concept of sustainable real estate, respectively sustainable construction? It can be found large number of definitions of sustainable development or sustainability in literature and Internet. The most frequently cited definition is that used in the Report of the World Commission on Environment and Development [1]. The Commission defined sustainable development as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development lies in the balance of economic and social development, provided protection of the environment. Sustainable development and sustainable construction are characterized by three pillars, which are

the quality of the environment (both, internal and external), economic efficiency and economic constraints, and social and cultural context [2].

The main objectives of sustainable design are to avoid resource depletion of energy, water, and raw materials, prevent environmental degradation caused by facilities and infrastructure throughout their life cycle, and create built environments that are liveable, comfortable, safe, and productive. Fundamental principles are [3, 4]:

- optimize site/existing structure potential,
- optimize energy use (reduce load, increase efficiency, and utilize renewable energy resources),
- protect and conserve water (reduce, control, and/or treat site runoff, use water efficiently, and reuse or recycle water for on-site use, when feasible),
- use environmentally preferable products (materials that minimize life-cycle environmental impacts such as global warming, resource depletion, and human toxicity),
- enhance indoor environmental quality (day lighting, ventilation, moisture control),
- optimize operational and maintenance practices (reduce whole life cycle cost).

Whole life cycle costing

Several definitions of whole life cycle costing exist. The most basic definition [5] says that whole life cycle costing includes the systematic consideration of all costs and revenues associated with the acquisition, use and maintenance and disposal of a building. Cost data include:

- Initial costs,
- Future costs - maintenance, repair, alteration, replacement, operating costs,
- Demolition costs.

Whole cycle costing provides a basis for contrasting initial investments with future costs (maintenance, repair, alteration, replacement, and operating costs) over a specified period of life cycle of building [6]. It is important realize that operation costs over the life-cycle of a building can be a multiple of the initial construction costs. Building specifications allows the identification of operational costs. Whole life cycle costing anticipate expert to be able to forecast, a long way ahead in time, many factors such as life cycles of materials, component, equipment, future operating and maintenance costs, discount and inflation rates [7].

It is normal practice in building industry to accept the cheapest initial cost and then hand over the building to others to maintain [8]. Low operating cost could supposed be a market advantage. However, the expansion of new project delivery systems such as private finance initiative (PFI) and build, operate and transfer (BOT) will change this practice.

Value added of sustainable building

Comparing the requirements for the construction of the current laws and requirements for sustainable building, we could see a value-added, respectively higher standard of the sustainable buildings. The lower energy demand not only in use (usually a low energy or passive houses), but also during their construction (materials with lower primary energy consumption are used) flows from more strict requirements for sustainable building compared with conformal buildings. Sustainable buildings are more environmentally friendly, there are made from recycled and recyclable materials, in course of production of these materials lower production of CO_2 is achieved. Some of these materials are able to absorb the CO_2 produced by the use of buildings (wood-based structural elements). Philosophy of a healthy environment within the building determines the use of such materials which are potentially not harmful (e.g., elimination of materials containing formaldehyde). Environmentally preferable materials have a reduced effect on human health and the environment and contribute to improved worker safety and health, reduced liabilities, reduced disposal costs, and achievement of environmental goals. The indoor environmental quality of a building has a significant impact on occupant health, comfort, and productivity. Among other attributes, a sustainable building maximizes day lighting, has appropriate ventilation and moisture control. Additionally, consider ventilation and filtration to mitigate chemical, biological, and radiological attack. The emphasis placed on economic efficiency for sustainable buildings leads to lower life cycle costs, which is achieved by improving the maintainability, adaptability, durability and, of course, a lower demand for energy consumption or use of alternative energy sources. The following text discusses the possibility of including added value of sustainable buildings in appraisal of their market value.

Appraisal

It is well known that the value of property is affected by the situation in the relevant market segment, the supply and the demand for a type of realty, stability or, vice versa, market volatility, the competitive environment, expectations and anticipated changes, trends, types and size of risk, economic, social, demographic and physical effects [9]. All relevant factors should be analyzed and evaluated with regard to the purpose of appraisal.

To determine the market value of the property these basic methods are typically used:

- Comparative method,
- Cost method,
- Income method.

Essentially, only comparative and income method can be used to include added value of sustainable buildings in appraisal of their market value.

The Comparative method

The comparative method is used where there are comparable transactions involving properties with characteristics similar to those of valuated property. The skill of the expert is to make adjustments to reflect the differences between the comparable properties and property being valued [10].
It is clear that the comparison method can be used for the market value indication in the case we have information on sales prices and parameters of comparable properties. The expert usually faces two problems:

- difficulty to find comparable sustainability properties (with characteristics of sustainable design) and
- difficulty to identify and measure the sustainability physical characteristics and attributes of valued property as compared with comparable properties.

Comparison can be based on the descriptions of buildings, building documentation, power plant certificates, and if not available, on expert's own assessment, which should result from knowledge of the sustainable development principles.
Let us consider a hypothetical case - expert is addressed to undertake the valuation of energy-efficient house built of green building materials (environmentally friendly). Furthermore, assume that the expert is able to apply the comparison method to ensure only the data on properties that are energy efficient and are built from conventional building materials. Even in this case, it is possible to use the comparison method - energy efficiency and building materials are subject to only one factor in comparison - the physical characteristics of property, i.e. technical factors. The expert should include the issue of sustainability even in cases where there are no available data on the real estate application for direct comparison.

The Income method

The income method is used to value income-producing vacant possession property with the potential to produce a rental income and owner-occupied commercial property that could be let to produce a rental income. This method considers in today's terms the net cash flow that a property will produce currently and in the future. Cash flow is discounted at present value [10].
The market rent (for the determination of the potential gross income), the operating costs (for the determination of the net operating income), and the capitalization or discount rate are major inputs in using the income method. Sustainable design features of the property may affect all three input parameters.

Operating costs

Sustainable design structures can significantly reduce the operating costs and this leads to higher net operating revenues. Operating costs are defined [9], for the purposes of property valuation, as the cost required operating the property, ensuring the achievement and maintenance of effective gross income. These are real estate tax, property insurance, the cost of delivery media (electricity, gas, water, heat, hot water, sewerage, telecommunications), the cost of removal and disposal of waste, cost of operation of technical equipment (heating source and preparation hot water, ventilation, air conditioning, lifts, transformer stations, substations, alternative energy sources, etc.), maintenance and repair, periodic inspection and preventive checks of technical equipment, cleaning costs, costs of property management.
The items of expenditure settled by the property user (or tenant) are mostly affected by sustainable design (cost of heating, cooling, lighting, water usage, etc.). These items, however, the calculation of net operating income does not include. However, the implementation of sustainable design can result in reduced costs of maintenance, renewal, and the building administration. These items are paid by the owner of the property and are included in the calculation of the net operating income of the property.
Sustainable design of structures affects the achievable rents from the valuated property. For an expert may be difficult to justify higher rents for sustainable properties, it is almost impossible to find a comparable property.

Discount rate

The most important input factor, by which we can consider the sustainable character of building, is capitalization or discount rate. Both rents should reflect the risks associated with the valuated property. The basis for determining these rates is analysis of comparable properties, as well as knowledge of relevant market factors and economic indicators. The future development is estimated by the determining of the rate. It is the process of setting interest rates, which enables to conclude all the advantages and benefits of sustainable building in appraisal of the property. For example, lower operating costs and increased user comfort usually leads to increased attractiveness of the property. It results to the lower vacancy, to the lower risk of tenants lose, and thus to more stable cash flow. The use of environment-friendly materials can lead to lower risk of legal processes and penalties.

The market share of the sustainability properties

Building industry could produce sustainable buildings; their economic benefits are known and documented in the literature, but there is only small proportion of sustainable building being design, produced or operated. Good message in last years is that the number of properties, which can be described as sustainable, steadily increases. Major projects are highly publicized, promoted and of course traded. As examples of sustainable buildings in the Czech Re-

public, may be appointed Czech National Technical Library (Prague), Koberovy passive house, CSOB bank Radlice (Prague), Nordica (Ostrava). The Czech Republic Green Building Council is part of a global network of GBCs collectively known as the World Green Building Council. The mission is to create a sustainable built environment through market transformation.

Small projects, low energy family houses, are offered on market frequently and there are a subject of appraisal. For example a total of 8870 houses, of which 4529 with usable area of 100 to 200 m2, including 145 low-energy houses are offered in Central Region of CR (the date of September 1, 2010). The analysis of sale prices of family houses in Prague East District was performed. The results are - the average price per 1m2 of useful floor area of conformal houses is 38,800 CZK, while the average price per 1m2 area of low-energy houses is 40,400 CZK. Market value of low-energy houses is higher by 4.12 %. There were analyzed the family houses of usable area from 100 to 200 m2, land size of 400 to 900 m2, the maximum age of 5 years.

Conclusions

The valuation of sustainable buildings occur several fundamental problems, such as lack of experience, history, and standards, underdeveloped market, lack of knowledge of new technologies, rapid obsolescence of new technologies, technological developments ahead of legislative framework. Within properties valuation it is important to be able to recognize and appreciate the energy efficient construction. But it is important remain down to earth. The sustainable properties have a higher standard; their added-value in comparison with conformal buildings can be observed. Therefore they have higher market value. For certain reasons it is possible to look at cost savings as a source of income. The basic philosophy and rules of valuation are still valid when they modify the specifics of low energy buildings. The possibility of including added value in appraisal of their market value using Comparative method and Income method was discussed. The sustainability buildings market share is still small in Czech Republic, which is illustrated in Table 1. The market value reflects the sustainable parameters of property; this fact is illustrated with the higher average price of low-energy houses (Table 2).

	Conformal Family Houses		Low-energy Houses	
Prague East	38,800 CZK	100 %	40,400 CZK	104,12 %

Table 2: **Sale price of family houses (average price per 1 m²)**

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	Family Houses		Family Houses (usable area 100-200 m²)		Low-energy Houses	
	amount	share	amount	share	amount	share
Central Region of CR	8,870	100 %	4,529	51,06 %	145	1,63 %
Prague East	1,929	100 %	1,117	57,91 %	77	3,99 %

Table 1: **Market with family houses : Central Region of Czech Republic**