Analysis of the Influence of Energy Performance of Buildings on the Romanian Real-Estate Market

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CLIMA 2010 "Sustainable energy use in buildings"

Energy efficient/green/sustainable buildings

energy efficienCY

green

sustainable

ASHRAE Standard 189.1P:

“a high performance green building is a building designed, constructed and capable of being operated in a manner that increases environmental performance and economic value over time, seeks to establish an indoor environmental performance that supports the health of occupants, and enhances satisfaction and productivity of occupants through integration of environmental-preferable building materials, and water-efficient and energy efficient systems”

Impact of rating systems on the U.S. market.

N. Miller, J. Spivey, A. Florance (2008)

- ✓ rental premium (Energy Star) 2.8%; LEED 0.3%;
- ✓Energy Star buildings - increase of 5.76% on selling prices;
- ✓LEED certification - increase of 9.94% on selling prices.

F. Fuerst and P. McAllister (2008)

- ✓11.8% rental premium for green buildings;
- ✓ 31% sale price premium for LEED;
- ✓11.4% sale price premium for Energy Star.

P. Eichholtz, N. Kok, J.M. Quigley (2009)

- ✓ 6% rental premium for Energy Star.

Impact of energy efficiency on the European market. Residential buildings.

S. Banfi, M. Farsi, M. Filippini, M. Jakob (2008)

- ✓ 3% of the standard case price for having an enhanced insulated façade;
- ✓ 8 % of the standard case price for having a ventilation system in new buildings;
- ✓ 13 % percent for having energy-efficient windows in old buildings.

M. Salvi, A. Horejájová, R. Müri (2008)

- ✓ 7% premium energy efficient single family houses;
- ✓ 3.5% premium energy efficient for freehold apartments.

Improving the market impact of energy certification by introducing energy efficiency and life-cycle costs into property valuation practice

KPMG

ENERGIE MARKT ANALYSE

fh KufsteinTirol UNIVERSITY OF APPLIED SCIENCES

SINTEF

Intelligent Energy Europe

Valuation

VALUE - "The estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion."

The European Group of Valuers' Associations

How should energy efficiency be included into property valuation practice?

✓type of property: residential, commercial, industrial

The European Group of Valuers' Associations

✓ valuation approach:

income approach

sales comparison approach

cost approach

RICS

✓ available market information

Appraisal Institute

Professionals Providing Real Estate Solutions

Valuation by sales comparison approach

The sales comparison approach is based on the idea that identical houses should have identical prices.

This approach requires data concerning transaction prices of highly comparable and recently sold or currently for sale properties to estimate the market value of the subject property.

Calculation steps in valuation:

✓ investigation and analysis of market data in order to extract quantitative information;

✓ estimation of the degree of similarity or differences between the subject property and the comparable sales by considering various elements of comparison;

✓adjustments are applied to derive an indicated value for the subject property.

Energy Saving Potential

$$(ESP)_j = (E_{demand})_j - (E_{\text{ref}})_j \quad \text{[kWh/m}^2\text{.year]}$$

Romanian Energy Performance Certificate

Postal code Registration Locality: 507010

Registration number for Local Council: 008218

date (d d m m y y): 020207

Energy certificate

Building energy performance

Energetic note: **59,2**

Calculation methodology for the energy performance of the building elaborated applying Law 372/2005

	Certificated building	Reference building
High energy efficiency		
A		
B		B
C		
D		
E	E	
F		
G		
Low energy efficiency		
Annual specific energy consumption [kWh/m²year]	430	180
Equivalent emission factor CO_2 [kg_{CO_2}/m²year]	85	40

Annual energy consumption [kWh/m²year] for:		Energetic class: Certificated building	Energetic class: Reference building
Heating:	240	D	B
Domestic hot water:	110	E	C
Air conditioning:	-	-	-
Mechanical ventilation:	-	-	-
Artificial Lighting:	80	E	C
Annual energy consumption, renewable energy sources [kWh/m²year]:	0		

Administrative information:

Building address: .....
Building category: .....
Height regime: .....
Year of construction: .....
Building's energy certificate elaboration purpose : .....
.....

Useful area: ..... m²
Developed built area: ..... m²
Building internal volume: ..... m³

The calculation program used: _____ , **version:** _____

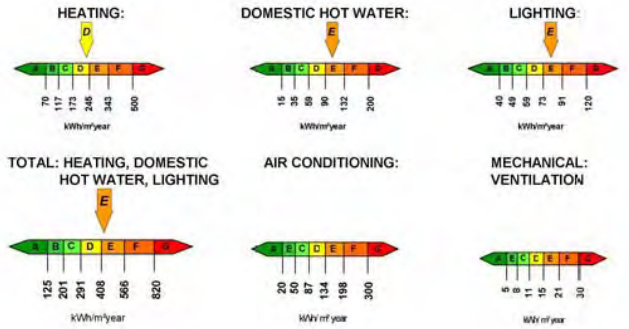
Information about the energetic auditor of the building:

Specialization (c, i, ci)	Name and surname	Series and Nr. of the attestation certificate	Nr. and date of the registration certificate from the auditor register	Signature and auditor stamp
.....	.....	.....	.....	.....

Building energy certification is elaborated taking into account the building total energy consumption. The total energy consumption is estimated using a thermal and energetic analyse for the building and for the building's installations.
The energetic note takes into account penalties for irrational use of energy.
The validity period of the Energy Certificate is 10 years starting from the releasing date.

INFORMATION ABOUT EVALUATION OF THE ENERGY PERFORMANCE OF THE BUILDING

- **Energy classification grid for the building taking into account the specific annual energy consumption**



- **Energy performance of reference building:**

Specific annual energy consumption [kWh/m²year] for:		Energetic note
Heating:	85	94,4
Domestic hot water:	45	
Air conditioning:	-	
Mechanical ventilation:	-	
Lighting:	50	

- **Given penalties for the certificated building and the reasons for this penalties:**

P_0 = 1,45 – as given below

• Dried basement, no access to the installation	p_1 = 1,01
• Building entrance door does not have automatic closing system and during the disusing it is often left open	p_2 = 1,05
• Windows/doors in good state but with infiltrations	p_3 = 1,02
• At least half of the regulation valves of the radiators aren't working	p_4 = 1,05
• The cleaning/washing of the heating installation was made more than 3 years ago	p_5 = 1,05
• The heating columns do not have separation valves and draining valves	p_6 = 1,03
• The internal coating is partially missing	p_7 = 1,05
• The exterior walls have condense stains	p_8 = 1,02
• The building doesn't have an organized ventilation system	p_{12} = 1,10

- **Recommendation regarding reducing the utilization costs by improving the energy performance of the building**

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Added value generated by the ESP

$$V_{ESP} = MAR \cdot ESP \cdot (P_E) \cdot \left(\frac{(1+i)^t - 1}{(1+i)^t \cdot i} \right) S$$

V_{ESP} - added value generated by Energy Saving Potential [€/m^2];

MAR - market adjustment rate [-];

ESP - annual Energy Saving Potential [kWh/m^2.year];

P_E - price of the unit of energy [€/kWh];

t - remaining economic life-time of the building [years];

i - discount rate [-];

S - surface area [m^2].

Case study. Thermal retrofitted building.

	Comparison elements	Subject Property	Comparable assets		
			A	B	C
1	*Value of non-retrofitted comparables calculated by classic methodology* [€]		51 154	52 732	51 484
2	***Estimated value of the subject property using non-retrofitted comparables within the classic methodology*** **[€]**	**51 484**			
3	E_{demand} [kWh/m².year]	142.17	266.83	275.14	264.34
4	E_{ref} [kWh/m².year]	142.17	137.37	136.03	138.25
5	*ESP* [kWh/m².year]	0	129.46	139.11	126.09
6	*t* [years]	25	25	24	24
7	*S* [m^2]	67.34	75	74	74
8	V_{ESP} [€]	0.00	2 760	2 888	2 617
9	*Calculated values of non-retrofitted comparables by using ESP method* [€]		53 914	55 620	54 101
10	***Estimated value of the subject property using ESP method*** **[€]**	**54 101**			
12	***Estimated value of the subject property using retrofitted comparables within the classic methodology*** **[€]**	**54 932**			

Comparing to the calculated value of the subject property by using retrofitted comparables within the classic methodology, the estimated value of the subject property using non-retrofitted comparables within the classic methodology is 6.2% lower. If the ESP method is applied, this rate decrease at 1.5%.

Conclusions

- ✓**The analysis of the real-estate market indicate that residential sellers/buyers appreciate that thermal retrofitted buildings value more than non-retrofitted ones. Their willingness to pay for added value generated by energy performance is correlated both with the willingness to save operation expenses and with the willingness to have a modern, healthy, comfortable property.**

- ✓**The present method improves the calculation of the estimated value of a thermal retrofitted property, when only non-retrofitted properties are available as comparable properties.**

THANK YOU FOR YOUR ATTENTION!

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