

Integration of energy efficiency and LCC into property valuation practise

- Transforming green features into values -

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With the Europe-wide introduction of the energy certification for buildings (Energy Performance of Buildings Directive, EPBD, 2002 // with implementation in most member-states starting just 2009) the accurate assessment of the thermal quality of buildings becomes increasingly important for property valuation. The energy certification is a means to predict the energy efficiency of a building and hence energy costs and the overall long-term investment quality of the building. In face of rising and volatile energy costs this can be regarded as a very substantial information for investors, tenants and building owners and potentially will influence their market behaviour: Values and rents of buildings with a high thermal quality will potentially increase, those buildings of a poor thermal quality are likely to decrease. To what extent this new situation will influence the market is not fully clear at present, but appraisers have to take this fact into account in the valuation process. To analyse these issues the “Intelligent Europe programme” supports the IMMOVALUE project which was an initiative by Dr. Sven Bienert (KPMG) and other member organizations of the project. Moreover the project aims to identify and integrate life cycle costs of a building in the property valuation process. Our first results focus mainly on energy efficiency and give a picture of how measurements of energy efficiency and LCC as well as other aspects of sustainability and green building in general could be included in the practice of property valuation and how the introduction of the energy certification for buildings will change the real estate market.

KEY WORDS: Energy certificate, energy efficiency, sustainability, property valuation, green value, directive 2002/91/EC, climate change, LCC

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1 Introduction and research question

“Climate change is the most severe problem that we are facing today - more serious even than the threat of terrorism”, wrote Sir David King, chief scientific adviser to the British Government in a guest editorial for the journal *Science* (King, 2004). Globally, the ten hottest years on record have occurred since 1991, and in the past century, temperatures have risen by about 0.6°C (Folland, 2001). Natural disasters such as floods, storms and hurricanes, droughts, hail or mudslides are no longer phenomena which happen anywhere in the world but an increasing number of world’s population is directly faced to these threats.

One main reason for the climate change is the growth of greenhouse gas emissions in the last decade. The global concentration of CO₂ in our atmosphere today for instance, exceeds by far the natural range over the past 650,000 years. According to the IPCC Special Report on Emission Scenarios (SRES), by the end of the 21st century, we could expect to see carbon dioxide concentrations of anywhere from 75% to 350% above the pre-industrial concentration (NCDC, 2007).

In order to work against this development, the United Nations ratified the Kyoto Protocol in 1997. According to this protocol, the so-called developed countries (except the U.S.) commit themselves to reducing their collective emissions of six key greenhouse gases (CO₂, CH₄, HFCs, PFCs, N₂O, SF₆) by at least 5% against 1990 level over the five-year period 2008-2012 (<http://ec.europa.eu/environment/climat/kyoto.htm>). Due to the fact that the buildings sector accounts for approximately 40% of the energy requirements and offers the largest single potential for energy efficiency, the European Parliament and the Council of 16 December 2002 passed the Energy Performance of Buildings Directive in 2002 (EPBD, 2002) additionally to the Kyoto Protocol.

One standard of the directive 2002/91/EC deals with the introduction of an **energy certification** for buildings. It reflects the building’s energy efficiency and therefore supplies an overview about the building’s energetic standard for prospective buyers, tenants, owners and occupiers. These energy certificates affect a majority of buildings and will be required whenever a building is constructed, rent or sold. With the introduction of this certificate buildings’ energy efficiency becomes transparent and even laypersons can compare the energetic quality of buildings. Due to this new transparency a shift of consumers’ awareness is expected which leads to an increasing demand for energy efficient buildings. The long-term goal is to substitute buildings of a poor thermal quality and enhance the energy efficiency of the buildings in the EU.

The **LCC concept** is well developed and life-cycle-cost analysis (LCCA) methodologies and tools are available in order to support designers’ and investors’ decisions. However, the LCC approach is far from being a standard concept in building design or real estate development and has not yet been introduced to property valuation praxis.

International valuation methods as well as national standards known in European countries were developed long before energy efficiency, energy certificates or LCC were discussed. However, even in the latest version of the International Valuation Standards (IVS 2007) the aspect of energy (efficiency) is hardly mentioned. In the revised EVS due for publication in 2009 there are also no connections to the above mentioned topics.

Therefore, appraisers find it hard to account for new developments and market-driven aspects like energy efficiency and LCC or other “Green features” within their calculations and valuation reports. The most **important barriers for an integration** of property valuation and energy performance certificates resp. LCC are as follows:

- ⇒ Energy certificates and energy efficiency have a **strong technical and facilities-management oriented basis**, but the economic aspects – which would be useful for property valuation – seem to stand on a much more fragile foundation. Therefore a lot of appraisers tend not to pay sufficient attention to assessing the accurate energy costs and in some cases still ignore the presence or absence of energy efficient characteristics of the appraised building.

- ⇒ The majority of valuers agree that the best estimate of value is looking at the market participants' willingness to pay. However, although building energy certification will most probably influence transaction prices and rents, **actual market preferences regarding energy efficiency are not well understood** until today and evidence of premiums or discounts are rare.
- ⇒ Since valuers extensively consider billing histories to be satisfactory for the use in the valuations, another problem arises. **Meaningful comparisons can be made only if existing energy cost figures are standardized.** The normalization of existing energy bills to account for different occupancy levels, weather conditions, operating hours, etc. has indeed become a standard procedure in the energy performance contracting business, but this knowledge has not yet been transferred and adapted to the specific needs of property valuation. In property appraisal practice therefore professionals often use average energy-cost figures as default data input in their calculation. The resulting overall capital values thus do not reflect the existing differences between properties with above average energy consumption and those which are highly efficient. The separation between the tenants and owners portion of low energy costs are also not well understood.
- ⇒ Furthermore energy certificates and energy efficiency in general will be slightly different across all EU-member states, which make it even harder to identify one common approach.

The barriers described above can be translated in **challenges which set the trace for the work contents** of the proposed action:

- ⇒ How will building energy certification and energy efficiency in general change the market in the sense of the investors' and tenants' willingness to pay for thermal-energetic quality?
- ⇒ How can property valuers process results stated in energy certificates? In other words, which methods and results of existing live cycle cost and energy efficiency evaluation systems are applicable or relevant for property valuation?
- ⇒ How can existing valuation methods measure the impact of energy efficiency? Which adaptations and guidelines need to be developed to properly include these aspects when carrying out valuations in practice?

Very limited research has been carried out concerning the linkage between green features like the above mentioned and property valuation.²

2 Aim and Status of the IMMOVALUE-Project

This background given the project aims at **securing and intensifying the market impact of energy performance certificates and life-cycle cost (LCC) approaches** by strengthening the **link between energy performance of buildings and property valuation**. This is reflected in the following specific objectives:

- ⇒ preparing methodologies and useful guidelines for the daily property valuation business thus ensuring that energy efficiency and LCC aspects are properly included in the calculations carried out to derive market values.
 - Collecting and assessing property valuation approaches with a focus on identifying the “leverage points” for an integration of energy respectively LCC related indicators;
 - Reviewing different approaches of energy performance certificates in Europe and trying to find common indicators which are suitable for an integration into property valuation methodologies;
 - Drawing an overview of existing and future LCC approaches, including national differences, and selecting those common indicator that might fit for an integration in to property valuation methodologies;

² Myers/Reed, 2008, p.298

- Based on these results draft a common methodological solution for an integrated appraisal approach.
- ⇒ Testing the drafted methodologies in pilot projects and getting support from key actors and decision makers in the real estate business.
- ⇒ Finally communicating and disseminating the project results to the customers of valuers which are mostly financial institutions, banks and real estate companies.

The main output of the proposed actions are guidelines for revised standards of property valuation integrating energy performance and LCC aspects, which may serve as basis for further work in the relevant standardisation and training organisations for property valuation such as RICS, IVSC and TEGoVA.

The project was started in October 2008 and will be terminated in Spring 2010. The current status is the end of review of existing energy certificates in different states and the review of existing LCC approaches as well as the assessment of valuation methods with respect to possible linkages to LCC and energy efficiency.

3 Objective and structure of this paper

This paper is intended as a contribution to intensify the discussion about the integration of “Green features” into property valuation and give some first insights on our project status focussing on fundamental basics, the income approach and energy efficiency.

4 What is a “Green value”

A **Green Building** is a property “that uses resources efficiently, reduce waste and provide superior indoor air and other qualities.”³ A **Green Value** is the net additional value obtainable by a green building in the market⁴ compared to a non-green peer group.

So the Green value is an integral part of the overall market value. Both parts can only theoretically be separated– like in the case of building and land value which both make up the overall property value and can also not be separated.

Market value according to RICS and IVSC is 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 a proper marketing wherein parties had each acted knowledgeably, prudently, and without compulsion.

The Null-Hypothesis that there is no connection between green-attributes and property value can already be proved as being wrong. There are already some market results available showing that there is an impact of green features which means that there is an added value in some cases:

- ⇒ Rick Nevin and Gregory Watson found that people pay 10 – 20 US \$ more for homes for every 1 US \$ in annual fuel saving,⁵
- ⇒ Sales were higher in Wal-Mart stores where artificial light has been removed through skylights where daylight was used,⁶
- ⇒ LEED certified properties proofed in a study that they have on average:⁷
 - 8-9 % reduction in operating expenses,
 - 3,5 % higher occupancy,

³ RICS, 2005, p. 2

⁴ RICS, 2005, p. 2

⁵ RICS, 2005, p. 2

⁶ RICS, 2005, p. 2

⁷ U.S. Green Building Council, 04.2008

- (therefore) 3 % increased average rents,
 - (therefore) 7,5 % increased market values.
- ⇒ Reduction in operating expenses might be up to 85 %,
- ⇒ Investment cost for Green buildings are in the case of LEED certified properties approx. 0,66 % higher than others (in case of LEED Gold:2,2 % and LEED Platinum: 6,8 %),
- ⇒ ENERGY STAR certified buildings have a \$2.38 rent premium and 3.6 percent higher occupancy. Moreover ENERGY STAR certified buildings sell for an average of a \$61 per square foot more than non-ENERGY STAR buildings.⁸

But even if there are some examples for green-features that lead to an added green-value there are still a lot of obstacles. Since markets shifted not gradually towards sustainability but fairly fast in some cases, market data is in most regions still limited. Even though Australia and maybe also America could be looked at as a positive exception, still experts claim that even in these markets relevant data is rare (For e.g. “Green Star” in Australia was introduced in 2000 and now already accounts for approx. 30 % of the new commercial buildings. In the US already 10 % of all commercial buildings are to some extend sustainable⁹).

It is essential to understand two fundamental aspects before discussing green-values:

- 1) **Appraisers make no market:** Since the appraiser doesn’t “make” the market; he is looking for market evidence that could be used for his valuation. So speculating what might happen in the future and trying to price in something that has not yet happened is not useful – in Austria some colleagues felt it might be appropriate to add a value-premium to a property just because the energy certificate or a LEED-certificate in place, which has of course nothing to do with proper valuation.
- 2) **Cost is not Value:** “Green cost” doesn’t necessarily lead to a “Green value” and vice versa. This means that a sustainable property with identical cost to construct (and acquire the land) and identical LEED certification etc. can still have a totally different added value, just because the willingness to pay revealed by consumers in different markets might vary substantially. Therefore evidence from other markets concerning price variations might not be relevant anywhere else.

But if one digs a little bit deeper more profound problem or better say pitfalls can be isolated.

5 Fundamental problems when “Putting a value on green”

Concerning the correct integration of green attributes into property valuation we identified three major obstacles.

The first problem we call (1) “**Limit of System**”. The appraiser is just focussing on the assets value which is reflected in the present value of future benefits for the owner of the site. Hence social welfare in general is not relevant. If a LEED-certified property f has just sourced its construction material in the neighbourhood it will get credits for this aspect since transportation was limited and pollutions likewise. For the purpose of a property valuation it is irrelevant if the identical material came from the same town or from Africa. Therefore a lot of features that are associated with “Sustainability” and “Green” can not be relevant to the appraiser as long as there is no internalisation of positive or negative external effects. This internalisation can just be carried out by policy makers through regulations, penalties, subventions, tax structures etc. Therefore all social intangible aspects which do not meet these needs are not (and should not be) reflected in property valuation results.

Second we identified the problem called (2) “**Limit of Focus**”. Again intangible values are the core of this barrier. Looking at the following RICS figures, one problem might be that the green industry fails to address the most important benefits in a transparent way. Too often energy cost savings for example are communicated instead of productivity gains for the tenant:

⁸ CoStar Group, 2008

⁹ Bowmann/Wills, 2008, pp. 4ff

- ⇒ **Energy costs** account for approx. **1 % of all business operating costs** of an office tenant,
- ⇒ **All real estate costs** account for approx. **10 % of all business operating costs** of an office tenant,
- ⇒ **Staff costs** account for approx. **85 % of all business operating costs** of an office tenant.

All of the benefits for the user of the property can only have a positive impact on real estate values if tenants show a higher willingness to pay (rent) which will only be the case if they understand that their internal productivity or other aspects might outweigh the additional occupational costs compared to a non-green building by far.

The first two above mentioned aspects are not very often addressed in discussions concerning the integration of green features into property valuation since they do not really focus on what the appraiser can or must do. While the first aspect will only affect values when policy makers take action, the second aspect of intangible benefits to tenants is indeed a real estate industry task for better communication but it must be addressed by agents, landlords or developers and not primarily by appraisers.

The third problem we identified is called **(3) “Limit of Practise/Evidence and Methods”** and this area focuses on aspects the valuation industry itself must change. Therefore this field of research is also the core topic of this paper. The question is if the fast market shifts can be translated into the traditional valuation methods and input figures. Furthermore market data is still very limited and comparables are rare.

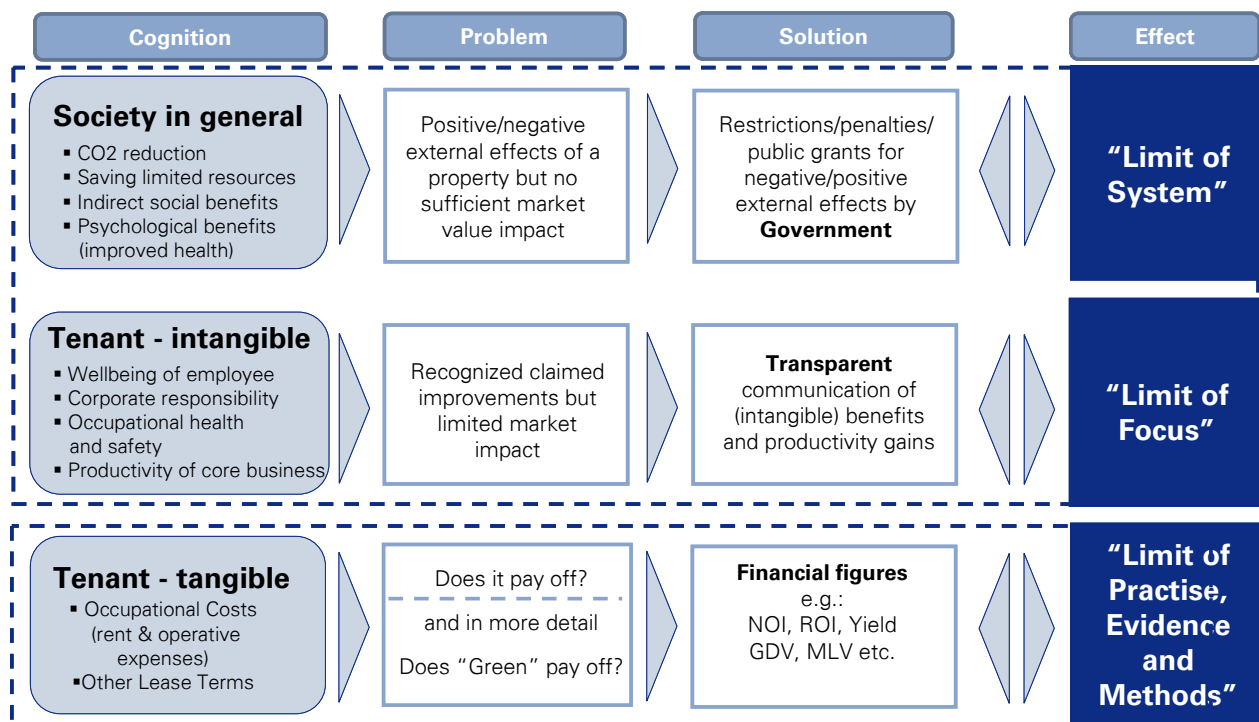


Figure 1: Obstacles for a full integration of green features

Other authors already pointed out yet another obstacle when it comes to the introduction of energy efficiency and green features into the property industry. The most relevant aspect is probably the “vicious circle” which will be described just briefly. Although it might be regarded as obvious that a low energy building is more desirable than a conventional building, and indeed that it is worth paying more to build or rent a low energy building, that view is not necessarily held by those whose business it is to invest in commercial buildings. It is a fact that the issue of energy is still underestimated in a lot of cases. These were among the findings of a major investigation of the views of stakeholders in the property business in the UK (Wilberforce, 2006/ Pett et al., 2004). Energy efficiency has become an important issue in real estate economy but is still caught to some extent in a “vicious circle” (Wade et al. 2003). The introduction of energy certificates as well as the green discussion in general and sustainability initiatives give all market participants a new impulse as it offers the chance to break this vicious circle. It is also the task of the valuer to improve the communication and understanding of all

stakeholders within this industry by providing transparent reports.¹⁰ The authors' point of view is that there has been a break through in most developed countries for green-property-features and that we already left the stages of early adaptors. The benefits for all market participants are becoming more and more transparent and therefore the vicious circle will eventually disappear.

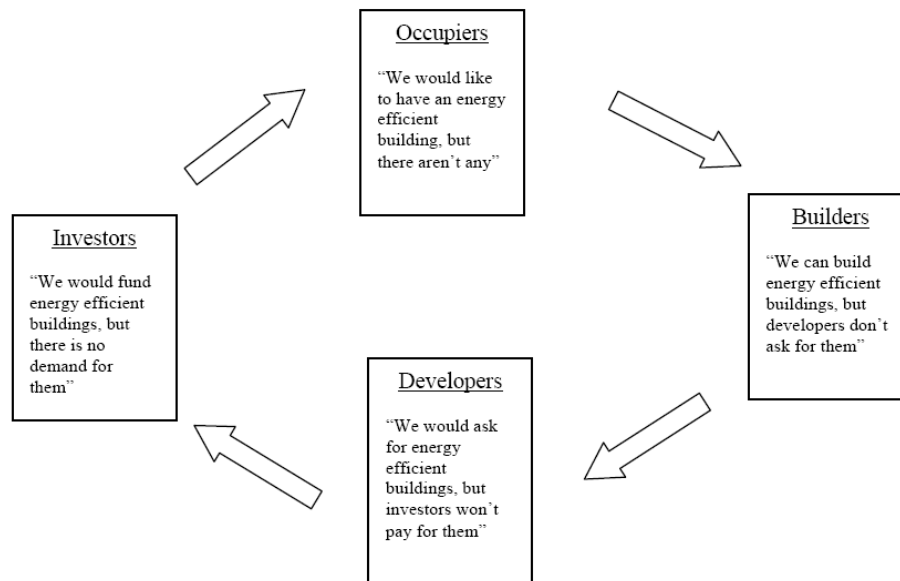


Figure 2: Former “vicious circle” of energy efficiency in real estate economy

Source: Wade *et. al.* 2003

6 Energy certificates for buildings

6.1 The first page of the energy certificate

The core of the energy certification is the pictorial representation of the buildings' specific demand of heat (HWBBGF, Ref per sqm). The buildings' annual demand is the amount of heat that has to be provided to keep the temperature of the heated rooms on the required level (OIB, 2007) and applies to the heated gross floor area related to a standard climate (3400 degree days). The demand is categorized in energy efficiency classes “A++” to “G”: “A++” indicates a highly efficient building of no or a very low heat-consumption, while class “G” marks a very high heating energy consumption of more than 250 kWh/m²a, respectively. The following figure shows the 9 energy efficiency classes of the Austrian energy certification.

Class	HWB _{BGF, Ref}
A++	≤ 10 kWh/m ² a
A+	≤ 15 kWh/m ² a
A	≤ 25 kWh/m ² a
B	≤ 50 kWh/m ² a
C	≤ 100 kWh/m ² a
D	≤ 150 kWh/m ² a

¹⁰ Myers/Reed, 2008, p.300

E	$\leq 200 \text{ kWh/m}^2\text{a}$
F	$\leq 250 \text{ kWh/m}^2\text{a}$
G	$> 250 \text{ kWh/m}^2\text{a}$

Table 1: Categories of the efficiency levels (Austrian Version)

The specific heating energy demand of the corresponding building is indicated by a black rectangle on the right hand side of the energy efficiency classes (see following figure).

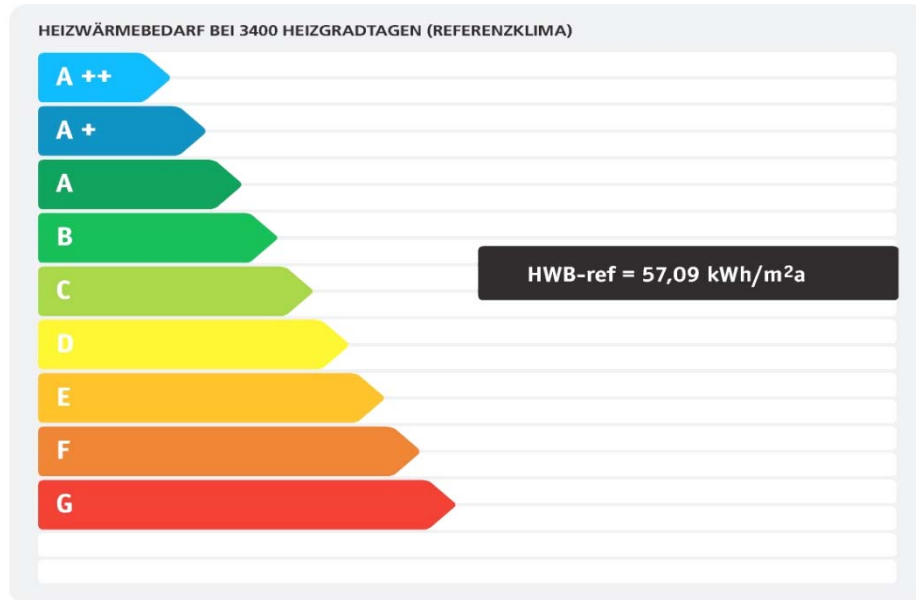


Figure 3: First page of energy certification (Austrian Version)

6.2 The second page of the energy certificate

Since the first page of the Austrian energy certification just gives a very general overview of the energy efficiency, page two contains detailed key figures which describe many energy-relevant aspects of a building. Additionally to the heat-demand according to the standard climate (3400 degree days) a second key figure displays the heat-demand on basis of the building's local climate. Moreover other key figures for instance indicate the energy demand for hot water supply, technical equipment, cooling and lighting are displayed.

6.3 Appendix of the energy certification

The third part of the energy certificate is an appendix which contains information about calculations, qualities of the building components and the software used for the calculations. Moreover older buildings are energetically evaluated concerning their weak-points and possible improvements.

6.4 Summary of findings for property valuation

- ⇒ More transparency is given.
- ⇒ Different approaches in each EU member country.
- ⇒ Technical/qualitative output with no clear and quantitative/EUR link to valuation.

7 Property valuation approaches

7.1 General remarks

RICS, the Royal Institute of Chartered Surveyors, is the most sophisticated and accepted organization for real estate valuation within Europe. Strong ethical standards, a high level technical background as well as profound market knowledge are required to pass the exams and become a Chartered Surveyor (MRICS). RICS has in every European country subsidiaries with members who are just about all in senior or top-executive positions in the industry. RICS strongly promotes standard setting to secure a high quality level of the work carried out by their members. RICS is participating in the TEGoVA initiative for the EVS 2009 and played also an important role when the IVS 2007 were published by the IVSC. RICS is currently one of the most active organizations concerning topics like “energy efficiency” and “sustainability”.

IVSC, the International Valuation Standards Committee, publishes the International Valuation Standards and the TEGoVA, The European Group of Valuers Associations, the European Valuations Standards are the most relevant standard setting organisations for all European based valuers.

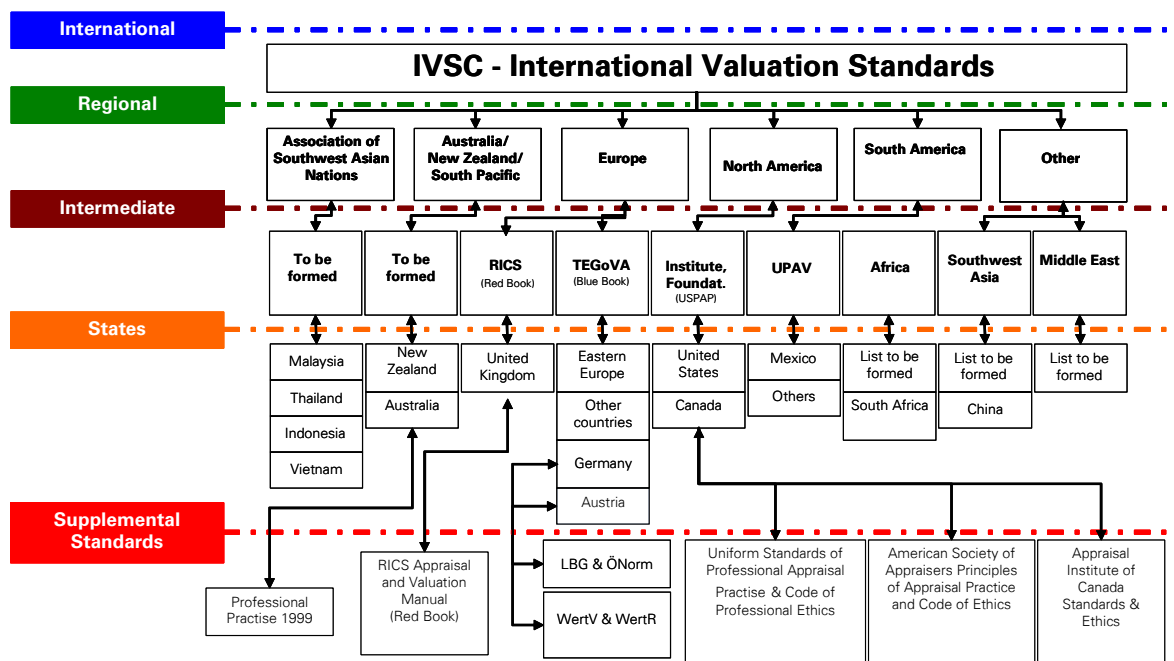


Figure 4: Valuation standard setter worldwide

In the following sections we give a general overview of the three basic approaches for property valuation. Of course, these approaches are applied in several countries in different ways, but all are subsets or variations of the three fundamental methods: income calculation, cost calculation or value comparison. And all approaches forecast future benefits of the property and try to convert this into a present value. Therefore we believe that it is **not appropriate to focus on the development of different approaches to integrate sustainability issues into property valuation on a country level, since the various valuation approaches are in their fundamentals identical.**

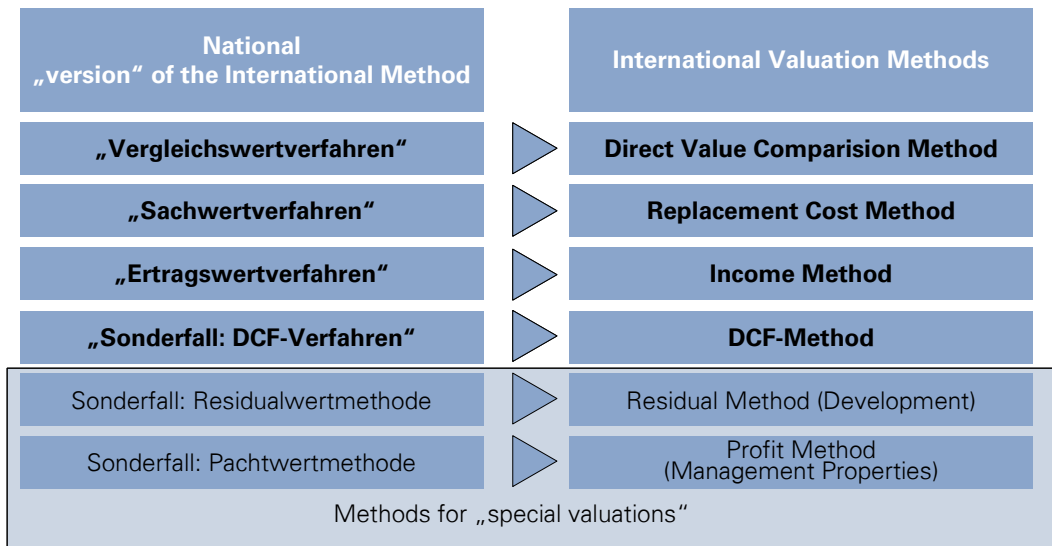


Figure 5: Overview of property valuation approaches

7.2 Income related approaches

The **income capitalisation approach** is applicable to properties for which an active rental market exists. To value an income-producing property, an appraiser estimates the net rental income the property is expected to generate and converts this income into an indication of value by applying a rent multiplier.

Of course this very basic explanation might get much more complex in practical work when it comes to Discounted-Cash-Flow models or Term-and-Reversion method, but the underlying fundamentals remain the same: One must convert income expected in the future into a present value. Income related approaches are applied for buildings like offices, shopping centres, and residential buildings.

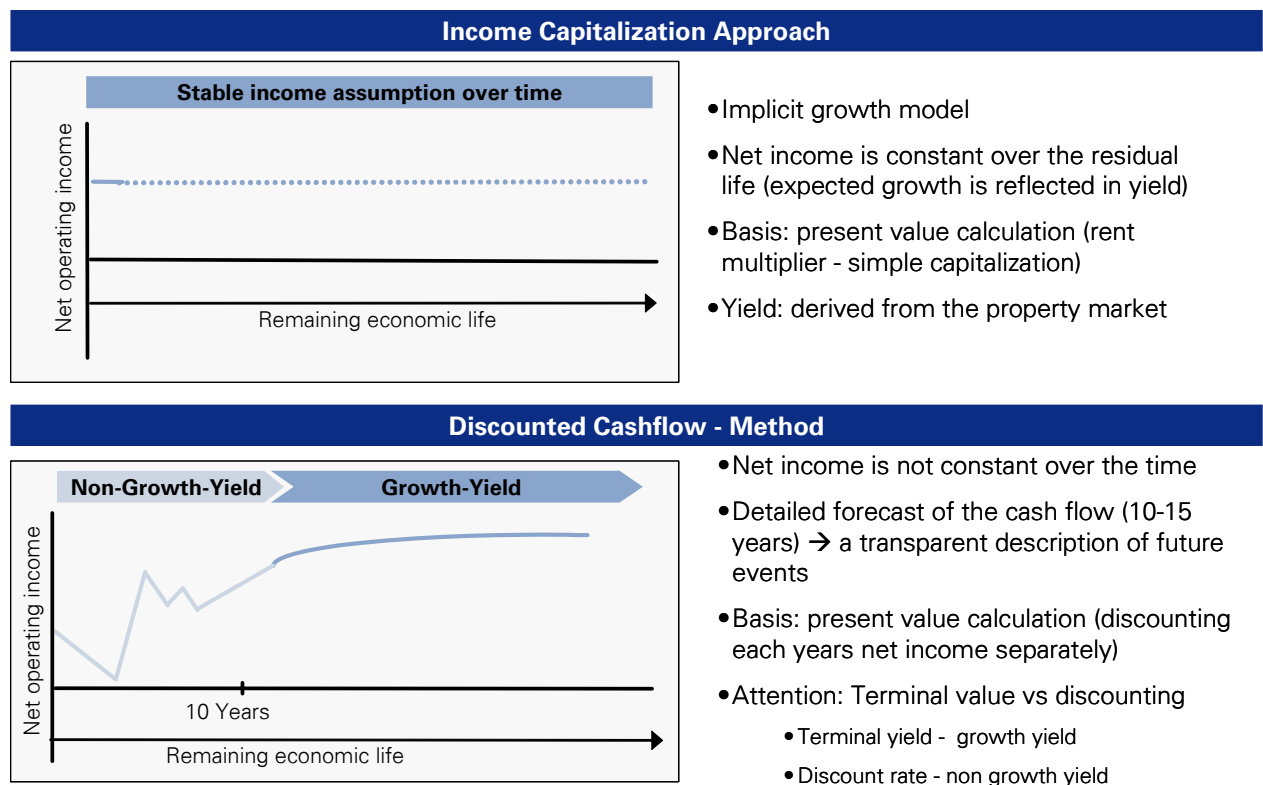


Figure 6: DCF methods vs. income capitalisation approach

Already at this stages the authors would like to point out that **Discounted-Cash-Flow approaches** seem to be an ideal instrument for the integration of just slightly changing parameters within income related valuations. It provides a value estimate by discounting future income and outgoings per period and adds to this figure a terminal value after determination of the holding period, which is typically 10 years. The method is very accurate and transparent because it reveals all assumptions regarding the various input parameters explicitly like:¹¹

- ⇒ Renewal probability and timing
- ⇒ Different growth factors for income and non-recoverable costs
- ⇒ Vacancies
- ⇒ Capital expenses etc.

7.3 Cost related approaches

The effective capital value is the sum of the land value and the total replacement costs of a new building reduced by the accrued depreciation. Cost related approaches are applicable if there are no comparable values and the property doesn't generate any income. Therefore this method is applied especially for the appraisal of special purpose property or for the means of financial statements.

It is often internationally regarded as depreciated replacement cost methods which is not market-based and will be not further looked at in this paper.

7.4 Value comparison approaches

The precondition for this approach is the availability of comparable properties for the derivation of the (subject) properties' value. For the appraisal several adjustments for the individual qualities of the subject property concerning age, date of sale, location, topography, design, contractual matters and other value influencing factors need do be applied. The value comparison method is applicable for land, residential properties, agricultural properties, industrial properties and development land.

In Anglo-American countries this approach is already widely spread and applied in more advanced ways, like using multiple hedonic regression models. In Germany and Austria the method is often applied in an "old-fashioned" way using direct comparison by looking at a minimum of at least five identified comparable transactions that were sold on the open market.

8 Impacts on property valuation

8.1 General remarks

The challenge for valuers is to appraise a new factor like the introduction of energy certificates in an appropriate way. Even if the consequences of the introduction itself are not fully quantifiable at the moment, the integration of this new factor must follow a methodologically sound valuation practice. Furthermore, the energy efficiency of buildings might have a great impact on market values even if the certificates might fail.

Investors already pay increasingly more attention to the Life Cycle Costs (LCC) of a building with special awareness of appropriate (low) operating expenses.

8.2 Possible impacts on income related approaches

We identified five different ways within the income approach which offer possibilities for the integration of the energy certification/energy efficiency. In following figure, which shows the methodology of the income method (Austrian methodology), these five possibilities are marked. We

¹¹ Myers/Reed, 2008, p.304

use the Austrian/German version of the income approach which separates land and building values – since the green features are associated with the building the authors find it more transparent to show the potential integration options this way.

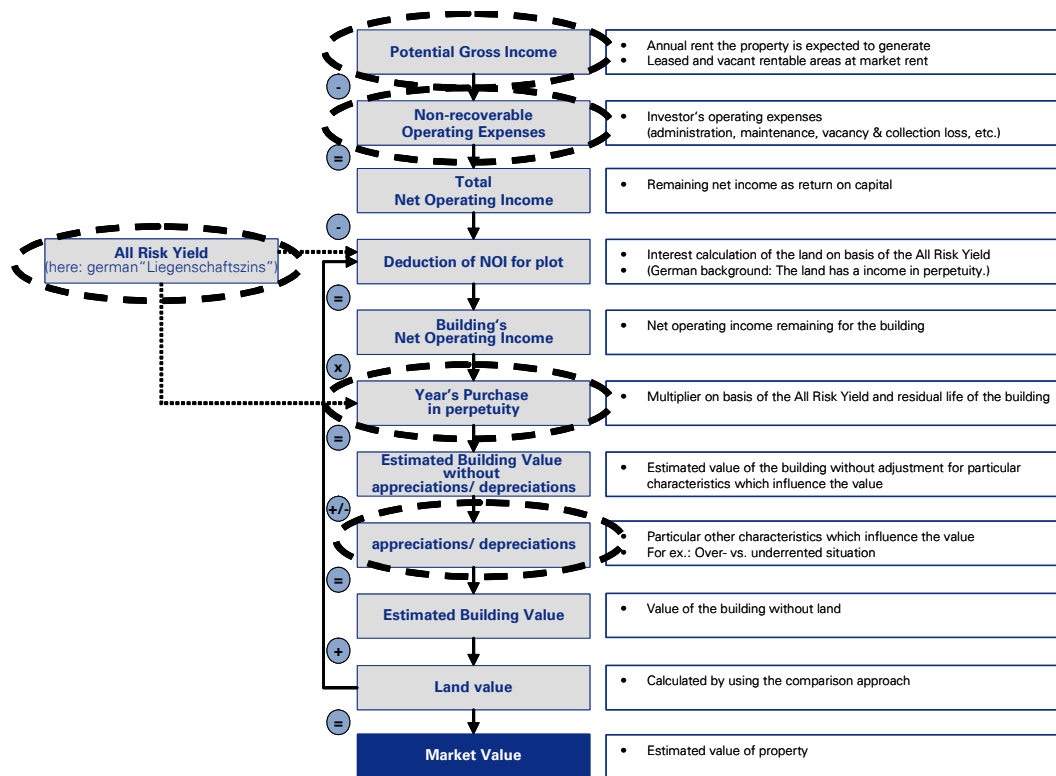


Figure 7: Methodology of the income method (Austrian version)

8.2.1 Adjustment of the potential gross income

Income related approaches discount forecasted revenues. The appraiser is using the estimated rental value (ERV) based on market-data and current rental information to calculate the gross potential income of the asset. The motivation for integrating the energy certification at this point of the valuation process is that the energy efficiency level a building belongs to might influence the tenant's willingness to pay.

First and that will probably be the strongest argument: **If tenants will have to pay a lower energy bill they might be willing to spend the delta on the rent** (here the potential gross income). However one might argue that **tenants will potentially bargain** and that the reduction will just lead to reduced overall occupancy cost for the tenant but not necessarily to a higher rent for the landlord.

Second, a higher demand for buildings of a good energy efficiency level might lead to a **higher tenants' willingness to pay just because these buildings are more "prestigious/desirable"**, while rents for buildings of a poor thermal quality tend to decrease. Again this aspect could also be criticized since first the question needs to be answered for how long the tenant might want to pay this premium, since every new product or idea will **lose its "bonus" over time**.

Very important is the fact that all this **mainly refers to new lettings / new tenants**. During the term of a rental contract there will probably only be in very few cases the chance to uplift the rent just because the thermal quality has been improved. In a lot of countries more obstacles of this sort might arise. There could for instance be laws in place which prevent the owner from raising the rent for new leases if the house has a certain age.

To what extend the net rental income will rise compared to non-green comps is not predictable on a general level. The market will set "new" prices for energy efficient buildings or inefficient buildings, respectively. Furthermore, a number of different factors must be considered, e.g. the location of the building: Retail units in top-locations tend to be leased at a higher price and show lower vacancy rates,

no matter they offer is a good or poor thermal quality. On the other hand in times of oversupply, for “standard” buildings energy efficiency will play a crucial role for their marketability. Both arguments reflect the fact that the **relevance of energy efficiency must be dependant on different factors**, like market state, vacancies, location, use etc.

However, since most markets until today do not reflect good results concerning energy savings in the sense of higher revenues, **valuers should not estimate this fact pro-actively by pricing in assumed reactions of the market**. A fundamental principle behind this is that an appraiser must reflect the market reaction and current state but may not influence it. A pro active estimation of the effects might influence the market in an endogenous way. As long as nobody knows how the new transparency achieved by energy certificates will affect the market, valuers must observe and analyse market behaviour and derive persistently attainable rents for each property individually. To a certain extent „tricky“ is the fact that the rental income reflected in the valuation process today must also account for future rental growth which might be linked to energy efficiency. This leads us to the next possible adjustment, the yield, since rental growth within the income approach (except DCF-Models) is incorporated in the yield applied.

8.2.2 Adjustment of lease terms

In general the lease agreement should be discussed in connection with the rental income that results based on these agreements. However the simple direct capitalization approach fails to reflect certain lease terms in the valuation process. Since these might be positively influenced by green building features this is indeed a strong argument for the application of more advanced techniques like DCF when it comes to:

- ⇒ Shorter lease up periods
- ⇒ Tenant retention
- ⇒ Longer leases

Long rentals are in some cases – for the government or big corporates – a substitute for higher rents they can avoid when leasing energy efficient buildings.

8.2.3 Adjustment of the non-recoverable operating expenses and vacancies

The potentially lower vacancy rate will of course lead to higher overall revenues and could therefore be discussed in connection with the rental income. Moreover it will lead to a **lower vacancy and collection loss** which ranges e.g. in German speaking countries between 3 % and 4 % of the potential gross income. Since these expenses reflect the fluctuation and overall quality of tenants these aspects must be influenced. Indeed the possibility to attract class-A-tenants with a good economic background and the possibility to increase the probability of renewal of lease agreements are often stated arguments for green building.

This hypothesis bases on the assumption that the marketability of buildings of a high thermal quality (probably) will increase in the future (while that of buildings of a poor will decrease) - this leads to lower (higher) vacancy rates.

Again the amount of reduction will be market driven and can not be a general result.

Since other operating expenses which might be discussed in this section only refer to the non-recoverables there is little left where a positive impact on value could possibly be identified. Of course the costs for vacant units (which are likely to decrease anyway) should be lower but administration costs will probably remain unchanged.

The effects we analysed above mainly refer to changes on the demand side of the market. The introduced approaches are based on the assumption that the availability of the energy certification will raise consumers’ awareness regarding energy efficiency of buildings and consequently shift consumers’ demands. On the other hand there are **effects in context of energy certification which do not result from the market-side but from technical qualities of properties**. Maintenance costs are

an example for a technical influence and refer to the expenses of keeping a property in a good state of repair. The idea of the adjustment of the maintenance costs in context of energy certification is that e.g. buildings in a good efficiency level are in top-condition and therefore cause lower maintenance costs. Or, as the other side of the coin, cause **higher costs because of sophisticated technical equipment** like heat pumps or solar heating systems.

Maintenance costs have to be derived from the qualities and the condition of the technical equipment, independently from the energy certificate or energy efficiency itself. Therefore the introduction of the energy certificates will not change anything. On the other hand it should be mentioned that an energy certificate provides much data which is useful for the derivation of the maintenance costs. Therefore, a more detailed calculation of the maintenance costs might be possible in the future.

8.2.4 Adjustment of the yield

The derivation of the yield is one of the most important parts when applying the standardized direct capitalisation method as well as for other, non standardized approaches like e.g. the discounted cash flow method. The idea of integrating the energy certification at this point of the appraisal process is as follows: the new transparency concerning energy efficiency will change the demand side of the market to some extent. Buildings of a good thermal quality will have a lower risk concerning marketability while buildings of a poor thermal quality will probably suffer from lower rents and higher vacancy rates resulting from lower demand and therefore a higher yield. **The attribute “Future proofed” against rising energy costs results in a lower risk profile and therefore lower yields.** This argument is not redundant to higher income, since the likelihood of a better growth prospective needs to be reflected in the yield even so if at present income must not have changed to a great extent. On the other hand the appraiser has of course to avoid redundancies in his valuation.

Finding the “right” yield is the crucial point for every valuation and at least in a lot of European countries the applied all risk, terminal, equated, equivalent and so on yields are potentially also the most vulnerable part for the valuer – on the other hand it’s “his professional judgement” and therefore the explanation is just his “market feeling”. We have analysed valuations for assets worth more than 6 Billion Euro of various valuation companies and not matter how profound market research was for other parts, the best explanation for the yield is in most cases just the net initial yield for three comparables (without a proper definition for the NIY in most cases). The point is that there is already still a huge gap between theoretically profound calculations of yields and practical application as well as available market data. This leads to the fact that even if green-features should be priced in by adjusting the yield, we must be realistic enough that for appraisers this will be a very hard task.

8.2.5 Adjustment of the remaining economic life

The remaining economic life of a building is the period of time for which income can be expected in the future. Basically it can be extended by carrying out several refurbishments or reduced due to insufficient maintenance etc. The potential change will almost be impossible to measure at this stage which is probably also a reason for the experts view.

But it is also necessary to mention that - assuming that a comprehensive market change will take place in the upcoming years - there will be a potential influence from the market side but relating to non-green properties. To give an example: **Assuming that buildings of a certain poor thermal quality are not marketable in the future this would result in a reduction of the remaining economic life** caused by the demand-side of the market.

8.2.6 Implication for comparables

One fundamental basic of property valuation is finding comparable data – not just when applying the comparison approach – and analyse this data to derive input figures which could be used within the valuation process. The essential rule to ensure that the outcome is correct is therefore: do compare apples with apples! **Comps must have the same building characteristics** in terms of location, technical equipment, condition etc. and also **with respect to the green-features** for example the

energy efficiency level. With the introduction of yet another aspect which needs to be comparable things will become far more complex. The solution could of course be using Hedonic Pricing Models to a certain extend.

9 Overview of green value drivers

Green feature	Green impact	Theoretical linkage: added value to owner?	Evidence of market impact	Recommendation for adjustment
Energy efficiency				
Energy efficiency	Public benefits	<ul style="list-style-type: none"> •Only if tax savings / subventions etc. directly connected to the property 	If applicable easy to assess.	Adjustment of income (if clear regulation shows positive effect compared to Peers. BUT penalties for non-green might be more relevant in the future).
	Intangible benefits for tenants (Improved occupant productivity, lower churn, Increased turnover etc)	<ul style="list-style-type: none"> •Higher turnover rent if applicable. •Generally increased willingness to pay higher rent must be tested. •General lease agreements could be more favourable for owner. •Potentially lower vacancy and collection loss. •Potentially decreasing risk of economic obsolescence and therefore lower yield. •Longer economic life. •Higher marketability leads to faster lease up, lower vacancies and lower fluctuation. 	Rare market evidence and difficult to isolate.	Adjustment of income (only if market impact compared to Peers can be revealed). Reduce vacancy and collection loss slightly Reflect effect of potentially more favourable lease agreements accurate.
	Lower energy costs (for the tenant)	<ul style="list-style-type: none"> •Higher rent for new leases (but: bargaining and ending top-slice?) •Higher rent for "prestige"? •Lower yield for future proved property. 	Pure cost cutting effect will have an impact but regression etc. must be carried out. „Prestige“ probably just a first mover bonus that will disappear soon Yield impact crucial but hard to isolate. 10 to 20 BP were benchmarks in other markets.	Adjustment of income (not permanently and not the whole delta and only if leases are actually negotiable) (Adjustment in case of gross leases of course bigger!) Yield only if at least countrywide evidence can be stated.
	Maintenance costs	<ul style="list-style-type: none"> •Both way (higher and lower) might be the case depending on the technical level of the building 		Adjustment of maintenance costs in both ways is possible
Other green features				
Sustainable site development
Water efficiency				
...				

Figure 8: Green value drivers (e.g. energy efficiency)

10 Results from expert surveys

In line with other surveys carried out in Australia, New Zealand, the US and England¹² our expert interviews indicate identical results. The results can be summarised:

- ⇒ Many investors in not so mature markets also tend to look at sustainability as an emerging market with high growth rates where profit can be generated.¹³
- ⇒ Sustainable buildings have a higher marketability (Sale and lease-up).
- ⇒ A clear link between lower operating costs for the tenant and a potentially higher gross rent passing for the owner is broadly accepted. Basically the interviewed experts agree that the adjustment of forecasted rents in an appropriate way to consider energy efficiency in the valuation process.

¹² Myers/Reed, 2008, pp.305ff // RICS, 2005, p.5ff // Bowmann/Wills, 2008, pp. 5ff
¹³ Myers/Reed, 2008, p.302

- ⇒ The adjustment of yields between Green Buildings and their non-Green Peers will not be a total shift but rather 10 – 40 BP according to most respondents and case studies. Although generally it seems a possible way, most experts point out that the adjustment of the yield is a very momentous lever: A marginal adjustment can have huge consequences for the result of the appraisal. Moreover, experts assume that the introduction of the energy certification will not lead to a fundamental change of market condition or become as important for appraisal as e.g. location or flexibility. However, this adjustment is theoretically possible and can be justified by facing a changing market situation - although probably some 10 to 20 BP are sufficient for the adjustment concerning this specific green feature.
- ⇒ Adjustments of the economic life of the building and the expected maintenance costs are recommended only by a few of experts.
- ⇒ Concerning comparables experts expressed their worries that comps that are similar in LEED certification or similar in their results of the energy certified will be extremely limited in the same market area. Other – more general adjustments – might in these cases be more appropriate. The interviewed experts point out that this is theoretically sound and would also be the best solution for an accurate valuation, but in practice the availability of such highly comparable objects is rather rare.
- ⇒ Attraction of Class-A-tenants is easier for Green buildings – with accordingly reduction of vacancy and collection loss.
- ⇒ Green buildings tend to enable owners to negotiate also other more favourable lease terms (not only higher rents or instead of higher rents).

11 Recommendations

Taking our findings and observations into account the following recommendations can be summarised.¹⁴

- ⇒ Appraisers should share their experiences regarding sustainability in a transparent way. Especially comparable data should be collected and shared.
- ⇒ Appraisers need more impartial evidence of how green features contribute to the overall value.
- ⇒ Green labels and sustainability rating systems must more clearly address the language of the appraisal community to be understood and transferred into monetary measures.
- ⇒ Valuations standards need to address the new topic of sustainable issues directly and help appraisers to process the information gathered correctly.
- ⇒ The financial benefits for all stakeholders must be transparent and allocated accordingly.
- ⇒ Professional education is needed to assist appraisers to fully understand the potential impact.
- ⇒ In each (full) valuation report the green value contribution of the property should be discussed in a specific section of the report.
- ⇒ Regulators and policy makers must improve the awareness of a market in transition further and support internalisation of external effects further to reach a “fair” market value from a social perspective.
- ⇒ Support more research work to isolate the value drivers of green features further.
- ⇒ In general we all must work as real estate professionals hard to tear down the barriers “green” sometime still faces in our industry.

¹⁴ RICS, 2005, p. 5

12 Conclusions

Premiums for green-buildings are likely and can already be revealed in a number of markets and by specific case studies. Therefore the Null-Hypothesis that "There is no (positive) relationship between the market value of a real estate asset and its green features and related performance" was already proven wrong.¹⁵

The accuracy of the valuation will depend upon the skills and market knowledge of the appraiser and his understanding of the fundamental context of green features and how they contribute to the overall market value. Therefore this paper can only support the understanding of basic fundamentals referring to green values – the answer for a specific property in a specific market will differ a lot and it is the appraisers' task to transparently reveal the market behaviour in "his" submarket concerning certain features.

We are sure that time will heal most of the open issues since market evidence will become eventually better and valuers will automatically be in a more favourable situation once market data can be stated. Still finding comparables with yet another attribute which makes the property market even more heterogeneous underlines, that skills and education must be further supported.

Concluding there are several issues which should be kept in mind when integrating the energy efficiency into property valuation:

- ⇒ The effects due to the energy efficiency can be categorized into technical aspects which are directly related to the buildings' components and more relevant market aspects which come up due to a shift of customers' expectation.
- ⇒ Due to the recent introduction of the energy certification, currently there is a lack of empirical data. Therefore the market effects are unclear and can not be priced in on the basis of empirical data yet. Furthermore the effects of energy efficiency must be separated from the effect of the existence of energy certificates.
- ⇒ Pricing-in these effects on the basis of individual assumptions would impact the market in an endogenous way. As long as nobody knows how the market will react, valuers should not act proactively by pricing in assumed and therefore rather speculative developments. They are obligated to analyse market change accurate and try to follow it continuously until empirical data is available.
- ⇒ When considering energy efficiency, there is the threat to mix up causes and effects. Appraisers must be aware of the fact that one cause can imply a number of effects which should be priced in once - but never twice.
- ⇒ We will never be able to derive global benchmarks to price in energy efficiency classes. Different utilizations, locations, market situations require different types of calculations. This aspect stresses the need to follow the reaction of the local market.

¹⁵ See also RICS, 2005

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