

Integrating Sustainability Issues into Property Risk Assessment – An Approach to Communicate the Benefits of Sustainable Buildings

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Abstract

Although the ‘green’ building community has created a number of processes and tools to assess the design and performance of green buildings, this has had an insignificant impact on the financial appraisal of green buildings and the property markets. However, new property rating systems are emerging as a means of creating risk profiles of property assets. These rating systems are intended for use within both property financing processes as a consequence of new, international banking capital adequacy rules (Basel II) as well as within property investment analyses. The inclusion of sustainability issues into property rating systems allows the advantages of sustainable buildings to be displayed as well as the disadvantages of unsustainability to be treated as additional risk factors. This can help investors to better understand the risk reduction potential of sustainable buildings and can also lead to favourable lending conditions for such buildings in general. This is demonstrated by a recently proposed property rating system by the European Group of Valuers’ Associations (TEGoVA) which is currently undergoing further development and implementation by a number of German banks. The rating system represents a possible platform to combine the interests and instruments of the banking and property investment industries with the concerns and instruments of the sustainable building community. This is because the rating system proposed by TEGoVA contains direct as well as several indirect connecting points for the integration of sustainability issues. The methods and instruments developed by the sustainable building community in order to assess an individual building’s quality and contribution to sustainable development (‘green’ building rating systems, LCA-based assessment tools, post-occupancy evaluations, energy labels, etc.) can now be used to inform the processes of property financing and risk analysis.

1. Introduction and background

Within property markets, several actors such as constructors, designers, engineers, researchers, governmental authorities, or certain occupiers and clients have been long concerned with aspects of sustainable development.¹ Great progress has been made in the further development of design strategies, the technical development of building products, materials and construction techniques as well as of planning and building assessment tools. However, this largely technocratic approach is an important but insufficient driver to successfully implement sustainable buildings and to achieve more sustainable practices within property investment markets.² Actors within global property investment markets such as fund and asset manager, institutional and private investors, estate agents, valuers and analysts have responded relatively late to the challenges imposed by sustainable development. The adoption of sustainable or socially responsible property investment practices is not yet a mainstream activity and the issue is only gradually emerging on property investment agendas (see, for example, Pivo and McNamara, 2005 and UNEP FI, 2006).

One of the main reasons for this lack of uptake of sustainable development principles by the property investment community can be seen in the difficulty of empirically proving the financial advantages of sustainable buildings on a wide basis. The performance of sustainable property assets cannot be evidenced because property transaction databases or indexes that would link financial performance with environmental and social performance of property assets simply are not yet available. But this does not mean that the financial benefits of sustainable buildings and respective investment products do not exist. Sustainable property assets offer a range of features which makes them superior to conventional assets. There are no adverse side effects of applying sustainable development thinking to the investment in, development and management of property assets. Indeed, sustainable development thinking particularly lends itself to cope with the nature of property investments which traditionally require pursuing medium- to long-term investment strategies. Taking sustainability issues into consideration, results in countless win-win situations for the actors of property markets. Sustainable

¹ Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987, p. 54). Thus, the concept of sustainable development can be interpreted as the journey towards one final destination: 'sustainability'. Sustainability is meant to be the desirable overall concept or goal of economies' or societies' development or evolution respectively. The term circumscribes an equilibrium state of an economy or society with regard to environmental, economic and social conditions.

² A *sustainable building* is meant to be a building that contributes – through its characteristics and attributes – to sustainable development. By safeguarding and maximising functionality and serviceability as well as aesthetic quality a sustainable building shall contribute to the minimization of life cycle costs; the protection and/or increase of capital values; the reduction of land use, raw material and resource depletion; the reduction of malicious impacts on the environment; the protection of health, comfort and safety of workers, occupants, users, visitors and neighbours; and (if applicable) to the preservation of cultural values and heritage. In contrast, a *green building* is meant to be a building that does not fulfil all the requirements of a sustainable building but which exhibits positive characteristics and attributes with regard to the following areas: energy efficiency, resource depletion, impacts on the environment as well as protection of occupant health and comfort. It needs to be noted that green building approaches do not necessarily cover all these aspects. Two common green building approaches are usually termed 'building ecology' (with a focus on energy, resources and the environment) and 'building biology' (with a focus and health and comfort).

buildings squeeze the maximum utility for owners, users and the wider public out of the lowest possible use of land and throughput of energy and raw materials. These buildings are not necessarily more expensive to build from the outset than conventional ones³ but their ownership results in various direct and indirect financial benefits for investors and other stakeholders, ranging from drastically lower operating costs to improved marketability, longer useful life-spans, more stable cash flows, reduced exposure to increasingly stringent environmental legislation and significantly increased occupant productivity and well-being. These benefits have been demonstrated through a number of studies and sample projects and they are now well-described in the literature (see for example, Wilson et al., 1998; Heerwagen, 2000; Yates, 2001; Kats et al., 2003 and RICS, 2005). Recently, a report published by the Royal Institution of Chartered Surveyors (RICS) concludes 'that a clear link is beginning to emerge between the market value of a building and its green features and related performance' (RICS, 2005). Based on this evidence as well as the emergence of socially responsible investment (SRI) into mainstream financial markets (see Ambachtsheer, 2005 and US SIF, 2006), it can be argued that the time is right for property professionals to build sustainability considerations into conventional instruments to inform decision making in property investment markets. Amongst others, primarily three instruments can be deployed to express the financial advantages of sustainable buildings and vice versa the disadvantageous or financial risks of conventional ones. These are:

- a) Calculation of property worth;
- b) Property market valuation; and
- c) Property risk assessment / property rating.

While the work of the Sustainable Property Appraisal Project in the UK (see Sayce et al., 2004 and Kingston University, 2005) has developed a methodology for integrating sustainability issues into calculations of property worth and while an explanation of the rationale and initial suggestions for reflecting sustainability considerations in property market valuations have been addressed, for example, in Lützkendorf and Bachofner (2002), Guidry (2004), Lützkendorf and Lorenz (2005), and McNamara (2005), the issue of integrating sustainability issues into property risk assessment / property rating has not yet received much attention in the literature. This is because the application of credit rating techniques to individual property assets is a relatively new instrument. It has emerged as a means of creating risk profiles of property assets to be used in property financing processes as well as within property investment analyses (see TEGoVA, 2003 and Adair and Hutchison, 2005). As such, property ratings (sometimes referred to as risk scoring systems) can and should be used to assess and communicate 'unsustainability' as additional property risk factors.

³ See for example, Matthiessen and Morris (2003) who found that many building projects can achieve sustainable design within (!) their initial budget, or with very small supplemental funding (< 3% of initial budget).

The necessity of pursuing such an approach can be supported by making reference to the Principles of Responsible Investment endorsed by a group of the world's largest institutional investors and recently published by UNEP's Finance Initiative and the UN Global Compact (PRI, 2006). The investors committed themselves to incorporate environmental, social and corporate governance (ESG) issues in investment analysis and decision-making processes; for example, through supporting the development of appropriate tools, metrics and analyses or by asking investment services providers such as consultants and rating companies to integrate ESG factors into evolving research and analysis (PRI, 2006). In addition, the world's leading banks have already issued a self-imposed commitment in 1997 which emphasises that identifying and quantifying environmental risks shall form part of the conventional risk assessment and risk management procedures within the financial services industry. In addition, they have committed themselves to developing products and services which promote environmental protection (UNEP FI, 1997). But little has been done during the last years within the banking industry to develop products and services for financing of property to promote environmental protection (e.g. only a very small number of banks worldwide are currently offering lower interest rates for sustainable buildings, see Table 5). However, the methodologies and processes by which banks assess and monitor the risks associated with property lending are currently undergoing major changes. The application of new, international banking capital adequacy rules called Basel II requires banks to take a much more sophisticated approach with regard to the risks they take in lending (BCBS, 2004). As a consequence, property ratings will increasingly be conducted for lending purposes. Fortunately, the property rating methodology, which has been proposed by the European Group of Valuers Associations (TEGoVA, 2003) and which is currently being adopted and developed further by a number of German banks does contain rating criteria that allow treating unsustainability as property risk factors. This may finally lead to preferential lending conditions for sustainable buildings. Furthermore, property professionals can adopt these property rating systems in order to communicate property risks (and opportunities) to clients.

This will be discussed within the present paper which reports on selected findings of a current research project undertaken by the authors and financially supported by the German Federal Office for Building and Regional Planning. The two basic goals of the research project were (1) to identify and explain the functioning of newly developed credit rating systems for property assets and property clients, and (2) to investigate why and how to integrate sustainability issues into these rating systems.

2. Rating systems for property assets and property borrowers

In a very general sense, a rating is a procedure which illustrates the assessment of a thing, a person or situation, etc. on a (given) scale in order to improve the informational basis for decision-making. Rating is not a new concept; it has been used since the beginning of the 20th century by companies like Moody's and Standard & Poors in order to provide information on the financial strengths and willingness of companies to comply with liabilities completely and in time (TEGoVA, 2003). In today's banking practice, ratings are used, amongst other issues, to predict the probability of default (PD) of granted loans based on historical credit data. Banks have developed sophisticated rating instruments which enable them to predict the probability of default of individual or corporate borrowers subject to a wide range of rating criteria and/or performance information. However, similar and equally sophisticated instruments that can predict the probability of default as well as the bank's loss in the event of the default of loans secured by property assets do not (yet) exist; this is mainly due to a lack of information on property characteristics and attributes associated with historical credit data. Nonetheless, Basel II requires banks to develop such property rating systems⁴ as a precondition for the application of the so-called 'advanced internal rating based approach'. This approach for determining the bank's equity capital is perceived to be beneficial since it allows banks to calculate the required amount of equity capital by themselves (BCBS, 2004). As a consequence, banks and banking associations are keen on developing appropriate property rating systems. A wide range of different rating systems are currently being tested, under further development or are already applied in practice. This was done initially to enhance the bank valuers' estimates of mortgage lending or market value by visualising the risks associated with granting a property loan in more detail. In addition, consulting agencies are offering property rating services to the public. Basically, it is possible to differentiate between three different types of rating systems for property assets and property clients. These are:

Type 1: Combined rating systems that consist of a borrower rating component tailored to the particularities of property clients and of a property rating component that is focused on the property to be financed.

Type 2: Property rating systems that focus on the property to be financed without aiming to assess the credit standing of the borrower (since these rating systems also assess the relevant property market they are also called property and market ratings).

Type 3: Rating systems that solely focus on determining the banks' loss in the event of a property loan default (Loss Given Default, LGD).

⁴ However, the required property rating systems will need to be tested and approved by the national banking supervisory authorities.

The following Table 1 gives an overview on different rating systems that are currently being tested, under further development or are already applied in practice. Besides TEGoVA's property and market rating the table contains rating systems from Germany, Austria and Switzerland only⁵.

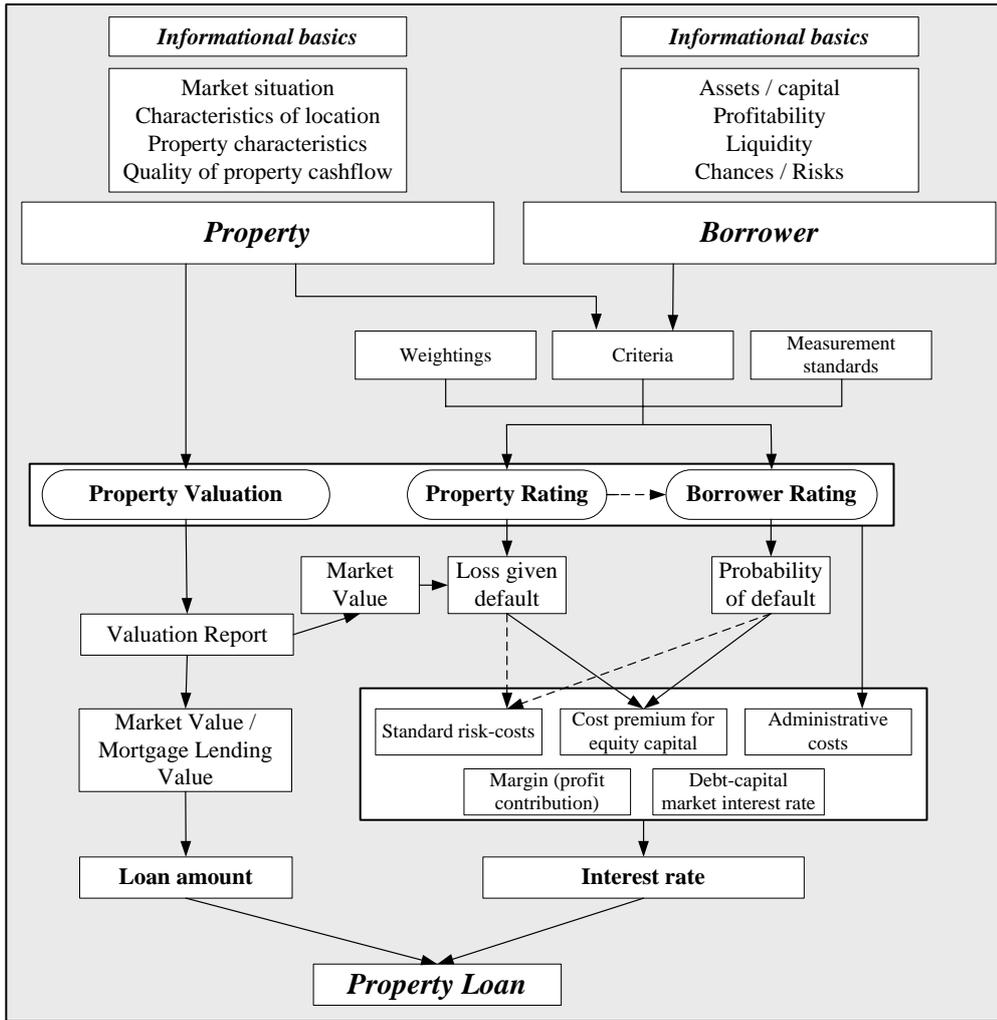
Table 1: Rating systems for property assets and property clients

Type	Name / Developer
1	<ul style="list-style-type: none"> - Sparkassen-Immobilien-Geschäfts-Rating (DSGV-Rating), http://www.s-rating-risikosysteme.de - Scoringmodell der Volksbanken (Bundesverband der Volks- und Raiffeisenbanken), http://www.bvr.de - Portfolio gewerbliche Immobilienfinanzierungen (Bankverlag Köln), http://www.bank-verlag.de - DIRA Immobilien Rating (DIRA - Immobilien Rating Agentur AG), http://www.dira-rating.de - TRX-ImmoRating (Bank Austria Creditanstalt AG), http://www.ba-ca.com - Indikatives Rating der ave Consulting AG, http://www.ave-ag.de
2	<ul style="list-style-type: none"> - European Property and Market Rating (TEGoVA, The European Group of Valuers' Associations), http://www.tegova.org - MoriX Immobilien – Markt- und Objektrating (HVB Expertise GmbH), http://www.hvbexpertise.de - VDP Objekt- und Marktrating (VDP, Verband deutscher Pfandbriefbanken), http://www.hypverband.de - VÖB Immobilienmarkt- und Objektanalyse (VÖB, Bundesverband Öffentlicher Banken Deutschlands), http://www.voeb-service.de - Feri Immobilien Rating (Feri Research GmbH), http://www.feri-research.de - ImmoCheck (Fraunhofer-Institut für Arbeitswirtschaft und Organisation, DIFA Deutsche Immobilien Fonds AG), http://www.office21.de/englisch/ergebnisse/forschung/immocheck.htm - ABS-Immobilien-Rating (Alternative Bank ABS), http://www.abs.ch
3	<ul style="list-style-type: none"> - LGD Grading (Verband deutscher Pfandbriefbanken, Hyp Real Estate Rating Services GmbH), http://www.hyprating.de

As indicated before, property ratings are designed to fulfil two basic roles within banks' property financing processes. These are (1) property risk analyses in the forefront of granting property loans, and (2) determination of capital adequacy requirements and further aspects of banks' internal calculations of interest rates. The following Figure 1 shows a stylized representation of the role of property and borrower rating systems within the process of granting a property loan under the advanced internal rating based (IRB) approach of Basel II. It also shows the interrelation between property valuation and rating.

⁵ Apparently the development of property rating systems for bank financing purposes is not so much an issue within countries like the US and UK since bank financing does not play such an important role. For example, in Germany the share of bank financing among corporations is 71 % while in contrast this share is only 10 % in the UK and 18 % in the United States (Holter, 2005, p. 12). Nonetheless, the need to develop methods for property professionals to report property risks to clients is also evident in these countries; for example, due to the lack of appropriate methodologies, Adair and Hutchison (2005) have recently proposed a property risk scoring system based on a standard credit rating model.

Figure 1: Determination of financing conditions for property under the advanced IRB-approach of Basel II



According to TEGoVA (2003) property ratings can be used for several other purposes as well. These are:

- Risk analysis of portfolios in connection with securitisation,
- Portfolio analysis and controlling; and
- Property risk analysis in connection with investment and disinvestment decisions.

The issue of identifying and expressing risk (and uncertainty) within the scope of property valuations is also one of the key concerns in contemporary UK valuation literature. It is argued that risk and uncertainty are inherent parts of the valuation process because the valuer is 'unable to specify and price accurately all current and future influences on the value of the asset' (Adair and Hutchison,

2005, p. 254). The UK Investment Property Forum (IPF, 2000 and 2002) stressed the need for more advanced and rigorous risk assessment measures within the property investment industry and argued that 'we need a much tighter measurement framework that is designed to operate initially at least at the level of the individual asset rather than one drawn from conventional theory which operates primarily at the portfolio level' (IPF, 2000, p. 15). Property ratings or risk scores can fulfil this role since they can be easily understood and communicated to third parties, are applicable to all property types, and the results enhance the decision-making process and do not confuse end users (Adair and Hutchison, 2005).

3. Basic functions of property ratings

The basic functioning of property ratings can be explained by referring to a combination of two property rating approaches: (1) the rating proposed by TEGoVA (2003), and (2) its further development through the German Association of Public Banks (VÖB, 2005). For the purpose of this paper these two have been selected mainly for three reasons: (1) As opposed to the majority of rating systems mentioned in Table 1, information on the functioning of these two rating approaches is publicly available to a very large extent and thus, property professionals can re-build the systems by making use of Excel-spreadsheets.⁶ (2) Both rating approaches already contain the rating criteria ecological sustainability. (3) The selection of criteria classes and rating indicators as well as the calibration of both rating systems was based on in-depth expert surveys and tests with concrete samples. As a consequence, property professionals can cite reliable sources when using and referencing the rating system within their analysis and/or valuation reports.

The rating system originally proposed by TEGoVA and further developed by VÖB contains four main criteria classes and up to 4 levels of sub-criteria classes that are weighted according to their influence on the medium-term sales prospects of the individual property in its relevant market. The rating system employs a scale that ranges from 1 (excellent) to 10 (disastrous). The average rating is set at 5 because the 'disastrous' rating is designated for specific circumstances only. Table 2 provides an overview on the rating for office buildings.

⁶ Since summer 2006 VÖB's rating is also accessible and usable through an internet platform which is, however, only available in German. See: <http://www.v-ia.de>

Table 2: Main criteria classes, rating scale, weightings and sample result (based on TEGoVA, 2003)

Rating Scale	Excellent	Very good	Good	Slightly above Ø	Ø	Slightly below Ø	Mediocre	Poor	Very poor	Disastrous	
Criteria Classes	1	2	3	4	5	6	7	8	9	10	Weighting
Market					5						20%
Location						6					30%
Property						6					20%
Quality of the property cash flow				4							30%
Overall Rating Result					5						100%

The following Table 3 shows the full list of criteria classes, indicators and weightings for the rating of office buildings. It needs to be mentioned that a detailed specification of rating criteria for the sub-category *national market* can only be found within TEGoVA's country ratings⁷; in contrast the VÖB approach does contain more detailed rating criteria for the rating classes *regional market*, *location*, *property* and *quality of the property cash flow* than TEGoVA's publications. In addition, the authors have introduced weighting factors for the indicators that specify the rating of the regional market at the fourth level because these weighting factors have not been published by VÖB. As an initial solution equal weighting factors have been assigned to these indicators. In order to state explicitly which parts of the rating system represent a modification of TEGoVA's original approach, the indicators introduced by VÖB are marked with *; furthermore, the weighting factors introduced by the authors are marked with **.

For a further explanation of these two property rating approaches, examples for the graphical display of rating results and examples for measurement standards, see TEGoVA, 2003 and VÖB, 2005.

⁷ See: www.tegova.org/en/4291ed80f067d

Table 3: Full rating criteria list and weightings (adopted from TEGoVA, 2003 and VÖB, 2005)

Property and Market Rating for office buildings			Weightings		
			2. Level	3. Level	4. Level
Criteria Class 1 'Market'			20,0%		
1.1	National Market		30,0%		
	1.1.1	Acts of God		5,0%	
		1.1.1.1 Natural disasters			70,0%
		1.1.1.2 Emissions			20,0%
		1.1.1.3 Man-made disasters			10,0%
	1.1.2	Socio-demographic development		10,0%	
		1.1.2.1 Population Growth			33,3%
		1.1.2.2 Gross Domestic Product (GDP) per capita			33,3%
		1.1.2.3 Unemployment rate			33,3%
	1.1.3	Overall economic development		30,0%	
		1.1.3.1 GDP growth			20,0%
		1.1.3.2 Inflation			20,0%
		1.1.3.3 Exchange rate volatility			10,0%
		1.1.3.4 Economic structure			10,0%
		1.1.3.5 Infrastructure			20,0%
		1.1.3.6 International competitiveness			20,0%
	1.1.4	Political, legal, taxation and monetary conditions		15,0%	
	1.1.5	Property market: office		40,0%	
1.2	Regional Market		70,0%		
	1.2.1	Socio-demographic development		30,0%	
		1.2.1.1 Number of children per woman *			16,7% **
		1.2.1.2 Population movements over district boundaries (per 1.000 inhabitants) *			16,7% **
		1.2.1.3 Ratio of employable people (over 20 - below 65 in % of inhabitants) *			16,7% **
		1.2.1.4 Population density (inhabitants / km ²) *			16,7% **
		1.2.1.5 Highly qualified employable people (in % of inhabitants) *			16,7% **
		1.2.1.6 Unemployed people and those that receive social welfare (per 1.000 inhabitants) *			16,7% **
	1.2.2	Economic situation and attractiveness		30,0%	
		1.2.2.1 Economic concentration (GDP per capita) *			20% **
		1.2.2.2 Earnings from business taxes (in € per branch) *			20% **
		1.2.2.3 Public investments (investments per household) *			20% **
		1.2.2.4 Debt service (debt service / administration expenses) *			20% **
		1.2.2.5 Economic success (regional GDP growth, insolvency ratio, new businesses) *			20% **
	1.2.3	Property Market: Office		40,0%	
		1.2.3.1 Rent level (in € per m ²) *			50% **
		1.2.3.2 Market fluctuation / volatility *			30% **
Criteria Class 2 'Location'			30,0%		
2.1	Image of the quarter (office district) and of the location		15%		
	2.1.1	Centrality *			20,0%
	2.1.2	Quarter quality / Centrality and settlement of particular branches *			40,0%
	2.1.3	Address quality / Image *			40,0%
2.2	Suitability of the micro location for the property type and for target occupiers		25%		
2.3	Quality of transportation infrastructure of the plot and quarter		25%		
	2.3.1	Airport *			10,0%
	2.3.2	Train *			25,0%
	2.3.3	Public transport services *			25,0%
	2.3.4	Road access *			25,0%
	2.3.5	Parking space situation *			15,0%
2.4	Quality of local supply facilities of the plot and quarter for target occupiers		15%		
	2.4.1	Shopping facilities, services offered, social and medical facilities, public authorities *			70,0%
	2.4.2	Restaurants and catering facilities *			30,0%
2.5	Acts of God		20%		
	2.5.1	Natural disasters *			10,0%
	2.5.2	Environmental burdens / brownfields (micro location – regional assessment) *			10,0%
	2.5.3	Technical / man-made disasters *			25,0%
	2.5.4	Safety of location *			30,0%
	2.5.5	Immissions (pollution, noise, etc.) *			25,0%

Table 3 (cont.): Full rating criteria list and weightings (adopted from TEGoVA, 2003 and VÖB, 2005)

Property and Market Rating for office buildings		Weightings		
		2. Level	3. Level	4. Level
Criteria Class 3 'Property'		20,0%		
3.1	Architecture / Type of construction	20,0%		
	3.1.1 <i>Design Quality *</i>		25,0%	
	3.1.2 <i>Illumination / Shading *</i>		15,0%	
	3.1.3 <i>Quality of the layout / Functionality *</i>		60,0%	
3.2	Fitout	10,0%		
	3.2.1 <i>Quality of the building's technical and security equipment *</i>		25,0%	
	3.2.2 <i>Quality of information and communication technology *</i>		25,0%	
	3.2.3 <i>Internal fixtures and fittings *</i>		35,0%	
	3.2.4 <i>Social facilities *</i>		15,0%	
3.3	Structural condition	15,0%		
	3.3.1 <i>Age / year of construction / construction era *</i>		20,0%	
	3.3.2 <i>Degree of modernisation / Revitalisation *</i>		40,0%	
	3.3.3 <i>Maintenance situation / Maintenance backlog *</i>		40,0%	
3.4	Plot situation	25,0%		
	3.4.1 <i>Plot layout / Topography *</i>		25,0%	
	3.4.2 <i>Geological condition and archaeological aspects *</i>		20,0%	
	3.4.3 <i>Contaminations *</i>		20,0%	
	3.4.4 <i>Internal and external accessibility / infrastructure *</i>		20,0%	
	3.4.5 <i>Appurtenant structures / External facilities *</i>		15,0%	
3.5	Ecological sustainability	10,0%		
	3.5.1 <i>Building materials *</i>		40,0%	
	3.5.2 <i>Energetic performance / energy demand / energy consumption *</i>		35,0%	
	3.5.3 <i>Emissions *</i>		25,0%	
3.6	Profitability of the building concept	20,0%		
	3.6.1 <i>Space efficiency (rentable floor area / gross floor space) *</i>		30,0%	
	3.6.2 <i>Operating costs (in € per m² of gross floor space) *</i>		50,0%	
	3.6.3 <i>Public burdens (planning regulations, fire safety requirements, historical interest, etc.) *</i>		20,0%	
Criteria Class 4 'Quality of the property cash flow'		30,0%		
4.1	Tenant and occupier situation	20,0%		
	4.1.1 <i>Number of tenants, tenants' solvency and image, appropriate mix of tenants *</i>		60,0%	
	4.1.2 <i>Duration and structure of rental contracts *</i>		40,0%	
4.2	Rental growth potential / Value growth potential	30,0%		
	4.2.1 <i>Rental growth potential *</i>		50,0%	
	4.2.2 <i>Value growth potential (estimated change of re-selling price) *</i>		50,0%	
4.3	Letting prospects	20,0%		
4.4	Vacancy / Letting situation	10,0%		
4.5	Recoverable and non-recoverable operating expenses	10,0%		
	4.5.1 <i>Level of operating costs *</i>		65,0%	
	4.5.2 <i>Possibility of attributing management and operating costs to the tenants *</i>		35,0%	
4.6	Usability by third parties and/or alternative use	10,0%		

4. Integrating sustainability issues into property rating

The list of rating criteria and indicators shown above makes clear that property rating represents a possible platform to combine the interests and instruments of the banking and property investment industry with the concerns and instruments of the sustainable building community. This is because the rating system proposed by TEGoVA and further developed by VÖB contains direct as well as several indirect connecting points for the integration of sustainability issues into the processes of property

financing and property risk analysis. TEGoVA's rating system already contains the rating criterion ecological sustainability which predominantly focuses on the assessment of 'green' building issues. Unfortunately, what is meant by ecological sustainability and the issue of how to assess it is neither defined nor explained within TEGoVA's publications. However, VÖB's further development defines three sub-criteria of ecological sustainability which will have to be assessed: building materials, energy performance and emissions. Again, detailed guidelines on how to assess these three sub-criteria could not be accessed by the authors. For this reason, the authors' own interpretation is contained within the following Table 4.1.

Critics may argue that a weighting of 10 % out of 20 % for the criteria ecological sustainability is a very modest start. However, both rating approaches contain (slightly different) so-called 'dynamic risk weight functions'; i.e. the basic weighting assigned to each indicator or sub-criteria class is flexible; the more the rating score deviates from the average, the more significantly it impacts on the overall rating results. This is done to reflect the circumstance that high level of exposure to one particular hazard is usually perceived to have a greater impact on the outcome of a property investment or on the property's selling or letting prospects respectively (e.g. a property with very good overall structural condition and fitout, etc. would achieve a good rating for the criteria class 'property'; however, if the property's location is 'disastrous' then this circumstance deserves more attention). As a result of applying dynamic risk weightings, a particular indicator that is originally assigned secondary importance can have a great impact on the overall rating result. For example, a 'disastrous' or 'excellent' rating of the criterion ecological sustainability can change the overall rating result by several points. In addition, a closer look at the rating criteria classes 'property' and 'quality of the property cash flow' reveals that there are further indirect connecting points that allow addressing aspects of the economic and social dimension of sustainable development as well (e.g. in connection with the assessment of 'operating costs' and 'functionality'). Examples are explained within Table 4.2. In addition to the examples mentioned in Table 4.2 the following rating criteria allow for an integration of further sustainability aspects: architecture/type of construction, fitout, and profitability of the building concept.

It is becoming clear that the methods, instruments and tools that have been developed by the sustainable building community in order to assess individual buildings' quality and contribution to sustainable development such as 'green' building rating systems, LCA-based assessment tools, post-occupancy evaluations, energy labels, etc. can now be used to inform the processes of property financing and risk analysis.⁸ This is indicated within the following Tables 4.1 and 4.2 (the text parts written in italics are additional suggestions for sustainability issues that are not yet discussed within the scope of property ratings of banks and credit rating agencies).

⁸ It needs to be noted that some of these methods, instruments and tools relate to partial aspects or single dimensions of sustainable development only. For example, 'green' building rating systems usually focus on environmental issues only or on a combination of environmental issues and aspects of occupant health and comfort.

Table 4.1: *Connecting points to sustainability issues (criteria class ,property') – selected examples*

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Nr. from Table 3	rating category (sub-criteria)	comments and proposals	source of information - during design stage - during operation stage
3.5.1	Building materials	<p>In general this rating indicator requires the assessment of environmental- and health-related compatibility of the building materials used within the building. However, detailed guidelines concerning manner, appropriate indicators and scope of such an assessment are not yet specified for property ratings. Normally, the environmental- and health-related compatibility of building materials is interpreted in terms of concrete hazards for the environment and occupant health.</p> <p><i>Approaches that are based on life cycle assessments and that focus on an assessment of resource use and the resulting impacts on the environment are not yet pursued within the property rating systems of banks and rating agencies.</i></p>	<ul style="list-style-type: none"> - Building description - environmental product declaration (EPD) - positive-lists - environmental assessment (LCA) - Green Building Rating System⁹ - environmental label(s)
3.5.2	Energy performance / energy consumption	<p>Energy demand and energy consumption are appropriate indicators for an assessment of both resource use (use of primary energy transfer mediums) and impacts on the environment (e.g. CO₂-emissions). Within several countries rules for the calculation of energy demand and for an assessment of buildings' energy performance (e.g. energy efficiency class A, B, C, ...) exist.</p>	<ul style="list-style-type: none"> - energy demand calculation - energy certificate¹⁰ - energy efficiency label¹¹ - energy consumption (measurement)
3.5.3	Emissions	<p>The indicator emissions is not appropriately specified within property rating systems. Therefore, further specification is necessary. This indicator could, for example, cover emissions into the local environment such as:</p> <ul style="list-style-type: none"> - CO₂-emissions and air pollutants through combustion processes within the building - pollutants through washout from building products - pollutants through fumigation from building products - pollutants through abrasion/deterioration of building products - odours, acoustic noise and waste heat (depending on the use of building). <p>An assessment of these emissions forms the basis for an assessment of the risks for the local environment (air, water, soil) and for the health of occupants, users, visitors and neighbours.</p> <p><i>Approaches for an assessment of emissions into the global environment (expressed as global warming potential (GWP), ozone depletion potential (ODP), acidification potential (AP), etc.) cannot yet be observed within the scope of property rating systems of banks and rating agencies.</i></p>	<ul style="list-style-type: none"> - environmental product declaration (EPD) - environmental assessment (LCA) - Green Building Rating System - Sound insulation assessment - Emission measurement <p style="margin-top: 20px;">- environmental assessment (LCA)</p>

⁹ e.g. LEED, BREEAM, etc.

¹⁰ e.g. according to the European directive on the energy performance of buildings

¹¹ e.g. Energy Star for homes and offices

Table 4.2: Connecting points to sustainability issues (criteria class ,quality of the property cash flow') – selected examples

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Nr. from Table 3	rating category (sub-criteria)	comments and proposals	source of information - during design stage - during operation stage
4.2 / 4.3	letting prospects / vacancy / letting situation	Vacancy rate, letting situation and future letting prospects are, amongst other issues, directly or indirectly influenced by the building's capability to meet functional and comfort-related user requirements. Furthermore, they are influenced through possible risks for occupant health and safety. The issues of occupant health and comfort can be assigned to the social dimension of sustainable development.	- post occupancy evaluation (POE) - predicted mean vote (PMV) ¹² - analysis of occupant satisfaction
4.5.1	level of operating costs	The level of operating costs feeds into the assessment of a building's life cycle costs. The assessment of a building's life cycle costs is a part of the economic dimension of sustainable development. In addition, the level of (building specific) operating costs is a (raw-) indicator for the use of energy and water and for the amounts of waste and waste water. This is therefore also relevant for an environmental assessment. The share of operating costs that are attributable to the tenant also has an indirect impact on letting situation and future letting prospects.	- Calculation / prognosis of operating costs - Life cycle costs / Whole life costs
4.6	usability by third parties / alternative use	The building's adaptability and usability by third parties does not only have an impact on economic aspects. Due to a longer useful life span of the building it can also be assumed that the resource use per time unit is also lower. Aspects like the building's adaptability to changing occupier demands are sometimes assessed within green building rating systems.	- description of the building's functional performance - Green Building Rating Systems

The property rating systems (which are currently being developed and implemented within the banking industry as a consequence of Basel II) contain several connecting points that allow the advantages of sustainable buildings to be displayed as well as the disadvantages of unsustainability to be treated as additional risk factors. This trend could be further strengthened through a modification of respective measurement standards and/or by including additional rating criteria and indicators (e.g. 'technical and functional building performance' in order to cover, amongst other issues, aspects related to sound and heat insulation that link through to occupant comfort and satisfaction; or 'occupant health compatibility' in order to cover aspects relating to risks from black mould, radon, electromagnetic fields, legionnaires' diseases, or pollutants within the building).

¹² indicator for thermal comfort during winter / summer

5. Benefits of integrating sustainability issues into property rating

The use of property ratings in their current form already allows distinguishing more clearly between conventional buildings and sustainable ones within property financing and risk analysis processes. On the one hand, if property professionals would use these rating systems they could help investors to better understand the risk reduction potential of sustainable buildings; on the other hand this could finally lead to the offering of more favourable credit and mortgage conditions for such buildings in general. This would contribute to the realisation of the recommendations contained within the European thematic strategy on the urban environment (European Commission, 2004). The European Commission has encouraged member states to influence the wider business environment (in particularly banks and insurance companies) in order to develop and offer favourable banking and insurance products and advantageous interest and insurance rates for sustainable buildings. However, at the moment, most banks in Europe and worldwide do not distinguish between sustainable buildings and conventional ones when it comes down to the calculation of credit and mortgage conditions; nonetheless, there are some banks that already do, particularly in Switzerland. Here most of the smaller county banks offer 'green' or 'energy-efficient' mortgages (see: Energia, 2005, p. 5). Table 5 provides some examples of banks that offer preferential credit conditions for 'green' buildings or for financing measures to improve building performance. It needs, however, to be noted that some of these examples consist in the transfer of governmental subsidy programmes and do not originate from the bank's view that loans on sustainable buildings are less risky.

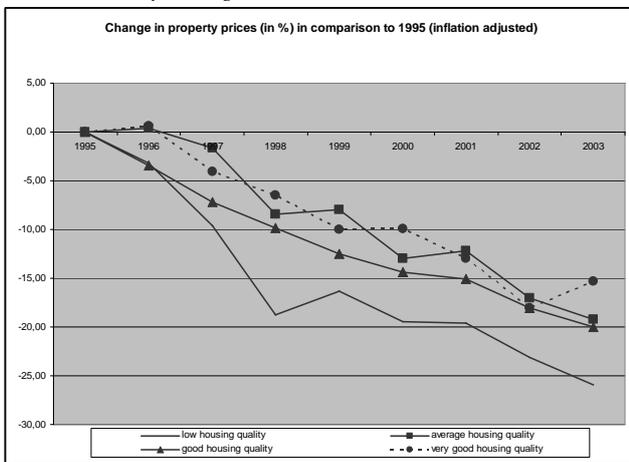
Table 5: *Preferential credit conditions for 'green' buildings*

Country	Bank	Explanation
Germany	Kreditanstalt für Wiederaufbau (KfW)	Lower interests rates for measures to reduce energy consumption in buildings; covers new and existing buildings. http://www.kfw-foerderbank.de
Germany	SEB-Bank Hannover	Higher loan amount for energy efficient houses made of wood. http://www.seb-bank.de
Switzerland	Various Banks	Almost all smaller county banks offer green or energy-efficient mortgages; including reduced interest rates and higher loan amounts (see: Energia, 2005, p. 5).
US	Fannie Mae and Department of Housing and Urban Development	Energy efficient mortgage: Lower downpayment requirement; closing costs can be financed; higher loan amount http://www.hud.gov/offices/hsg/sfh/eem/energy-r.cfm
US	Indigo Financial Group	Higher Loan Amount; the costs for the energy efficiency improvements are added onto the appraised value of the home. http://www.energyefficientmortgages.com/
UK	Norwich and Peterborough Building Society	Green Mortgage: offered is a discount of 0.25% off the interest rates of the bank's standard products for the first two years of the mortgage term. http://www.npbs-commercial-mortgages.co.uk/products.html
UK	Co-operative Bank	Green Mortgage: lower interest rates; in addition the bank uses a share of the mortgage payments to financially support the organisation Climate Care, an organisation dedicated to helping solve global warming problems. http://www.co-operativebank.co.uk/

In this context, the Alternative Bank in Switzerland (ABS-Bank, <http://www.abs.ch>) needs to be mentioned. It has developed a specific rating system tailored to assess ‘green’ buildings within their financing process. However, this approach is an exception from the norm because it is applied outside standard credit rating approaches. But as said before, the banks’ credit rating approaches are currently undergoing major changes as a consequence of new capital adequacy rules (Basel II) which will have to be applied from 2007 onwards. This particularly counts for the application of credit rating techniques to property assets. In general, it can be stated that the better the property rating is, the better the credit conditions will be. However, it is not yet ultimately clear how property rating results and the conditions offered for granting a property loan or for financing a particular project are interrelated because there is a lack of information on property characteristics and attributes associated with historical credit data. Banks in Germany are currently creating databases that enable them to quantify the relationship between property rating results and the probability of property loan default. As a consequence of this lack of data, it is not yet possible to state that sustainable buildings (which are likely to receive better property rating results) will automatically receive preferential credit conditions in general. However, the authors assume that this will be the case.

In order to support this assumption, it may be useful to report on the property price development within ‘shrinking’ regions of eastern and middle Germany. Figure 2 shows the average price development for single-family houses within 17 towns in eastern and middle Germany during the time period 1995 and 2003¹³. The property price data has been provided by the German Association of Estate Agents. Within these regions, average property prices for housing have fallen quite dramatically as a consequence of economic and demographic reasons as well as population migration to other parts of the country.

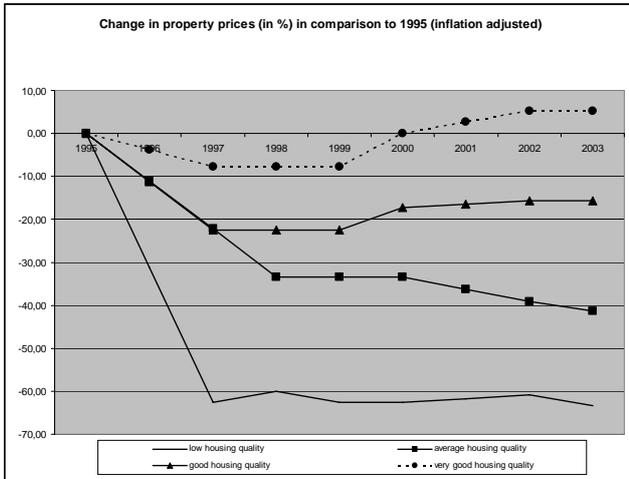
Figure 2: Property price development of single family homes within shrinking regions of eastern and middle Germany during 1995 and 2003



¹³ These 17 towns include: Chemnitz, Dessau, Dresden, Erfurt, Gotha, Halle, Ilmenau, Jena, Leipzig, Magdeburg, Meiningen, Merseburg, Rostock, Schwerin, Stralsund, Weimar and Zerbst.

Figure 3 shows the property price development for the town Chemnitz. Here the prices for high quality houses have even increased while the prices for low quality houses have decreased dramatically.

Figure 3: Property price development of single family homes in Chemnitz during 1995 and 2003



The analysis of the development of property prices within these regions shows that there is a connection between housing quality (including a locational and a building quality component) and losses in property prices; i.e. the prices for high quality houses have remained more stable than the prices for average or low quality houses within an overall market downturn. This indicates that there is an inverse connection between building quality and the risk of property price losses (at least within phases of stagnation and market downturn), which in return can impact on the probability of property loan default and on the loss amount in the event of default.

6. Conclusions

Property rating systems are increasingly being developed and applied in Germany, Austria and Switzerland (but also in the UK, see Adair and Hutchison, 2005) in order to create (opportunities and) risk profiles of property assets. An area of further research consists in the development, agreement and standardisation of measurement standards. However, already within their current form or stage of development, these property rating systems are capable of expressing and communicating the advantages of sustainable buildings for banks and investors through the treatment of 'unsustainability' as additional risk factors. In time, with these mechanisms, it is expected that 'green' or sustainable building will illustrate the financial incentives for investing in green or sustainable property. Communicating the advantages of sustainable buildings in this form, will lead to an increased demand for sustainable buildings. Another contributing factor will be the inclusion of certain sustainability

issues for the calculation of credit and mortgage conditions. These will impact positively on the developers and providers of products and services in the area of sustainable construction.

The use of information from existing methods, instruments and tools developed by the sustainable building community can be harnessed to inform the processes of property financing and risk analysis. This will increase the demand for such methods and instruments (e.g. 'green' building rating and labelling systems, LCA-based assessment tools, etc.). As a consequence, their future role within property markets (which has been recently discussed within a special issue of *Building Research & Information*, see Lorch and Cole, 2006) can be extended and more precisely described within an overall system of measures and instruments that contribute to the market transformation of the construction and property sectors.

The interest in these issues at events such as RSC06, the series of conferences within the scope of SB07 as well as the next world conference SB08 is expected to grow steadily. The opportunity exists for the built environment research community to work together with the financial community to discuss, develop, monitor and refine these mechanisms and to use these to accelerate the market transformation for greener buildings. How responsible property development adds value for the developer, lender, owner and occupant needs to be clearly demonstrated and understood.

Acknowledgements

The paper reports on selected findings of a current research project undertaken by the authors and financially supported by the German Federal Office for Building and Regional Planning (Bundesamt für Bauwesen und Raumordnung, BBR).

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