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# Sustainability Metrics

## TRANSLATION AND IMPACT ON PROPERTY INVESTMENT AND MANAGEMENT

A report by the Property Working Group of the United Nations Environment Programme Finance Initiative

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United Nations Environment Programme

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# ABOUT THE AUTHORS AND THE KARLSRUHE INSTITUTE OF TECHNOLOGY

**This Sustainability Metrics report was prepared on behalf of the UNEP FI Property Working Group by Thomas Lützkendorf and David Lorenz from the Centre for Real Estate at the Karlsruhe Institute of Technology (KIT).**

The Centre for Real Estate at KIT is part of the Department of Economics and Management. It consists of the Institute of Sustainable Management of Housing and Real Estate and the RICS/KIT Shared Professorship on Property Valuation and Sustainability. The main objective of the Centre for Real Estate is to integrate the principles of sustainable development into real estate research, education and professional practices.

KIT is one of the largest research and education institutions in Germany. It was established in 2009 by a merger of Forschungszentrum Karlsruhe and Universität Karlsruhe (founded in 1825). KIT combines the missions of both former institutions: a university of the state of Baden-Württemberg and a large-scale research institution of the Helmholtz Association conducting program-oriented research on behalf of the Federal Republic of Germany.

More detailed information about the Centre for Real Estate at KIT is available at: **www.oew.kit.edu**

# LIST OF ABBREVIATIONS

| | |
|---|---|
| **BIM** | building information modelling / models |
| **CEN** | European Committee for Standardization |
| **CRESM** | corporate real estate sustainability management |
| **EPD** | environmental product declaration |
| **ESG** | environmental, social and corporate governance |
| **GHG** | greenhouse gases |
| **GRI** | Global Reporting Initiative |
| **GW** | global warming potential |
| **HVAC** | heating, ventilation and air-conditioning |
| **ISO** | International Organization for Standardization |
| **IRB** | internal rating based approach |
| **IIGCC** | Institutional Investors Group on Climate Change |
| **IT/ICT** | information technologies / information communication technologies |
| **LGD** | loss given default |
| **ODP** | ozone depletion potential |
| **PD** | probability of default |
| **PRI** | Principles for Responsible Investment |
| **RICS** | Royal Institution of Chartered Surveyors |
| **UNEP FI PWG** | United Nations Environment Programme Finance Initiative Property Working Group |
| **UN GC** | United Nations Global Compact |

# ABOUT THIS REPORT

This report provides a framework for a corporate real estate sustainability management (CRESM) system for property investment and management organisations. The framework can be used as a means (1) to meet their environmental, social and governance responsibilities whilst addressing the financial/risk implications of sustainability and (2) as an overall quality assurance tool and mechanism. Recommendations for best practices are made for different levels: corporate, portfolio and single building. These recommendations are a response to the findings that (1) the property investment community has developed a largely shared understanding of what sustainability means in relation to single buildings and investment vehicles, and that (2) although most of the information and data factors required for sustainability performance assessment and management are already being captured, this is not yet performed in a systematic and well-organised manner.

The various interactions of property market players and interrelated functions at different hierarchical levels within investment and management organisations create a complex web of interconnected information flows and requirements. This complex web needs to be understood and systematically managed. This will enable building-related information and data to be utilized within business routines as a basis for sustainability-informed decision-making. Key challenges are identified for property investment and management firms: to organise information flows more efficiently, to ensure data accessibility and comparability across different corporate departments and between business partners and service providers, and to develop and implement appropriate decision-support instruments.

The purpose of this report is to improve the industry's ability and sophistication in creating the necessary information links and feedback loops within the system (i.e. the property market). This allows the system's actors to possess and see the financial incentive to change their behaviour. A list of applicable sustainability metrics is provided with explanations of (1) how sustainability considerations can actually be embedded within business routines and decision making processes at different corporate levels, (2) how existing tools and methods can be adjusted/fine-tuned accordingly, and (3) how buildings' sustainability performance can impact on asset and portfolio value, corporate reputation and financial success.

The main audience is commercial property investment and management firms, but this report is also useful for other property professionals and decision-makers in related sectors (e.g. banking and insurance). The basic ideas and arguments presented in the report can also be applied to residential buildings and portfolios.

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# FOREWORD FROM THE UNEP FI PROPERTY WORKING GROUP

"As the man said, for every complex problem there's a simple solution, and it's wrong."

**Umberto Eco**

Prior to this report, in February 2014, UNEP FI PWG launched an Investor Briefing entitled *Commercial Real Estate: Unlocking the Energy Efficiency Retrofit Investment Opportunity*. It provides investors with a clear business case for energy efficiency retrofit investments. However the report also shows that the vast majority of profitable retrofit opportunities remain untapped. Investors and executives need to make complex decisions, while dealing with a high level of uncertainty – and hence risk. How to bridge that gap?

The rise of sustainability on the business and investment agenda is accompanied by increased requests for property investors and managers to collect information and data to assess the sustainability credentials and performance of buildings and portfolios. Data is essential in order to make informed decisions. However collecting such information is often perceived as a cost and a burden rather than seeing the value a sophisticated management systems can add through the whole investment decision making process.

Sustainability is complex, and it is time to get away from a call for simple solutions and to integrate the value of complexity. This report proposes an integrated corporate sustainability management framework that enables the real estate finance industry to meet its fiduciary responsibility to integrate ESG issues into their investment and asset management processes. The framework offers a pragmatic three level approach (corporate, portfolio and single building levels) that helps the industry manage the complexity of sustainability metrics and organize information flows more efficiently. It also ensures that sustainability information is translated into a valuable resource for boards and key decision makers.

We believe this work will assist the finance industry to enhance and protect real estate value in ways that contribute to the overall UNEP agenda that is to work toward a more sustainable, energy efficient and low carbon economy.

**Tatiana Bosteels**
Head, Responsible Property Investment
Hermes Real Estate

Co-Chair
UNEP FI
Property Working Group

**Frank Hovorka**
Responsible Property Director
Caisse des Dépôts et Consignations

Co-Chair
UNEP FI
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# FOREWORD FROM THE ROYAL INSTITUTION OF CHARTERED SURVEYORS (RICS)

RICS promotes and enforces the highest professional qualifications and standards in the development and management of land, real estate, construction and infrastructure. We accredit 118,000 professionals whose expertise covers property valuation and management; the costing and leadership of construction projects; the development of infrastructure; and the management of natural resources, such as mining, farms and woodland.

With approximately 70% of the world's wealth bound up in land and real estate, the sector is vital to economic development, helping to underpin stable, sustainable investment and growth around the globe. We believe that standards underpin effective markets.

From RICS' perspective, this UNEP FI investor briefing is very timely. The January 2014 RICS Red Book edition now specifically lists sustainability as a factor that valuers need to take into account when performing valuations and risk assessments for their clients as these sustainability factors can influence investment decision-making. Consequently, valuers are now advised to refer to sustainability metrics where and whenever available, as this will contribute to the level of information and data available.

Data availability and transparent information flows are thus of crucial importance. These can be used not only in making the business case for scaling up investment targeted at increasing the sustainability performance of built assets but also for valuing a building and advising clients accordingly.

To facilitate large-scale market transformation, RICS feels that a two-pronged approach is needed. Guidance to valuers and associated capacity-building programmes on the valuation side need to be accompanied by guidance on the real estate investment and financing side. The latter will raise awareness about the importance of data collection and sustainability metrics not only amongst responsible investors but also amongst the wider investment community.

This report represents two things: the first tangible output of the collaboration between RICS and the UNEP FI Property Working Group and a significant milestone within the industry-academia partnership between RICS and the Karlsruhe Institute of Technology (KIT).

As such, it is an integral part of RICS' extensive global sustainable development research and guidance programme dedicated to creating a common understanding of sustainability within the context of real estate and of RICS' commitment as signatory of the United Nations Global Compact to act as an active proponent of responsible stewardship within the land, real estate and construction sector.

**Ursula Hartenberger**
Global Head of Sustainability
RICS

# FOREWORD FROM THE INSTITUTIONAL INVESTORS GROUP ON CLIMATE CHANGE (IIGCC)

IIGCC is pleased to support this report on sustainability metrics as it provides practical tools that will facilitate the uptake of responsible investment management practices among property investors.

IIGCC provides investors with a platform to encourage public policies, investment practices, and corporate behaviour that address long-term risks and opportunities associated with climate change. IIGCC currently has over 80 members, including some of the largest pension funds and asset managers in Europe, representing around €7.5 trillion in assets.

Our dedicated property programme aims to ensure that considerations of climate change and its implications are integrated into the management and decision-making processes for property investment portfolios.

There is growing momentum in the real estate investment industry towards understanding and acting on the risks and opportunities that arise from climate change and sustainability. This report adds to the body of evidence and tools that will enable the wider uptake of sustainability risk management across the industry. In particular, the proposed corporate sustainability management framework provides a useful tool for managing and mitigating these risks and opportunities across the investment process at company, portfolio and single building levels. By doing so, it helps investors both protect the value of real estate funds and comply with their fiduciary duties.

Finally, the report offers an opportunity for policy makers to better understand the complexity of sustainability management in the real estate sector. This should help them develop sustainability-related policies which maximise environmental and social benefits and provide appropriate incentives and signals to investors.

**Stephanie Pfeifer**
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Head, Responsible Property
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Hermes Real Estate

# FOREWORD FROM THE PRINCIPLES FOR RESPONSIBLE INVESTMENT (PRI)

The PRI is pleased to recommend this resource to the property investment and management community as an important tool to facilitate responsible investment practices. The PRI is proud to collaborate with its partner, the UNEP Finance Initiative, in working toward pragmatic solutions for investors that contribute to the development of a more sustainable global financial system.

The PRI is an international network of investors working to put the six Principles for Responsible Investment into practice. Launched by the United Nations in 2006, the PRI has over 1200 signatories representing more than US$34 trillion in assets. At the heart of the six Principles is the premise that investors have a duty to act in the best long-term interests of their beneficiaries and this means taking into account environmental, social and governance (ESG) factors.

The goal of the PRI is to understand the implications of sustainability for investors and support signatories to incorporate these issues into their investment decision making and ownership practices. The PRI property work stream was formed to understand how the Principles apply to property investment and management practices and support PRI signatories in implementing these practices.

The PRI property work stream has been working with the UNEP FI Property Working Group since 2007 to understand and promote responsible property investment. This relationship embodies Principle 5 (*We will work together to enhance our effectiveness in implementing the Principles*) and we are pleased to promote the great work that the UNEP FI Property Working Group is doing to PRI signatories.

Additionally, this report will support our property investor signatories to implement Principle 1 (*We will incorporate ESG issues into investment analysis and decision-making processes*). Investors are offered a methodology to understand the whole value of a building which will in turn lead to better-informed investment processes.

We believe signatories will appreciate the straightforward process that uses existing systems to get meaningful value out of sustainability data. It is extremely important that the processes around sustainability reporting are made manageable so that more and more investors are incentivised to enjoy the rewards of sustainable practices. The work that is being done to simplify and standardise sustainability reporting is encouraged by the PRI and we congratulate the UNEP FI Property Working Group on their efforts.

**Fiona Reynolds**
Managing Director
Principles for Responsible
Investment (PRI)

# 1. INTRODUCTION

Sustainability has rapidly risen on the business and investment agendas of property (real estate) organisations in recent times. This is due to a number of different but interconnected reasons, such as public and governmental concerns about climate change, the emergence of new risks due to the consequences of extreme weather events and energy price escalation. Initially the most important drivers have obviously been the increasingly stringent environmental and health-related legislative frameworks, along with the associated advent of sustainability as the overarching goal in planning and construction regulations and standards in most parts of the developed world. This has led to gradual shifts in market participants' preferences and value systems.

As a consequence, sustainability is no longer a niche issue. Sustainability goals are no longer pursued by only a small group of "enlightened" property investors and managers but are now a concern in large parts of the property investment community; it is now mainstream. Many organisations have incorporated a dedicated corporate social responsibility (CSR) policy and an (admittedly often vague) appreciation now exists in the property community that there may be a basket of economic advantages in sustainable property investment and management practices. These benefits go beyond mere costs savings or improved compliance with governmental regulations. To a certain extent, sustainability is already embedded in many organisations' mission statement, and is now filtering down to impact daily business routines and decision-making processes. Within some organisations, this development is also supported by a bottom-up process driven by employee initiatives.

This development has been accompanied, influenced, and motivated by the UNEP Finance Initiative Property Working Group (UNEP FI PWG), notably through its series of publications.[1] The reason for the present publication is to address an increased demand, both internally and externally, for information and data to assess the sustainability credentials and performance of individual companies, portfolios and buildings. This demand is driven by a myriad of issues, including: sustainability reporting and accounting obligations, stakeholder and peer-group pressure, the need to comply with sophisticated building codes and standards, the desire to obtain a green/sustainable building label / certificate and to participate in one of the various sustainability indexes and benchmarking initiatives. Additional drivers include the anticipated prospects of "big data" in general but also new sustainability-related property valuation standards and the associated growing information demand by valuation professionals and other analysts.

From a boardroom perspective, it is critical to understand and harness the relationships between sustainability metrics and property investment / asset management operations. Although concern exists about the growing demands for ever increasing data, investors are asking what relevance all these data have for their investment and asset management decisions.

[1] *The UNEP FI PWG publications address a range of relevant issues. These include: the definition, implementation and reporting on responsible property investment strategies, the provision of best practice examples, the discussion of fiduciary implications and duties as well of assessment schemes and metrics, recommendations for owner-tenant engagement and cooperation, and, most recently on public and private financing mechanisms to foster energy efficiency retrofits. See: www.unepfi.org/work_streams/property*

These concerns about the perceived burden of collecting sustainability-related information and data have been expressed in a UNEP FI PWG publication entitled *An Investors' Perspective on Environmental Metrics for Property*. It argued that:

"the property investment community is now being asked to work with a bewildering array of metrics, standards, codes and labels. Asset owners and managers are increasingly confused (and irked) by the ever thickening 'alphabet soup' of acronyms relating to building metrics and the organisations behind them, with which they are expected to co-operate. They are uncertain about which are the best or most enduring measures to adopt and this indecision risks delay and potential inaction from the investment community."

UNEP FI, 2011, p. 4

This confusion can partly be explained by (1) the numerous different objectives – due to the varying needs of different stakeholders – of the various green / sustainability assessment and labelling / certification schemes and (2) the lack of transparency and comparability between them. From an investors' point of view, it appears that an almost infinite combination of different sustainability credentials can result in the same label or certification. This renders comparing like with like a difficult undertaking. The providers of labelling / certification schemes have not sufficiently embraced the fact that investors and asset managers need to know how specific sustainability-related credentials impact on asset values and portfolio performance. An overall (i.e. highly-aggregated) assessment result provided by labels / certificates does not deliver adequate evidence to assess these concerns.

Investors' most serious concern is that in most cases (although some notable exceptions exist) labelling/certification schemes are static (i.e. snapshots in time) and do not provide organisations with performance information on an ongoing basis. Nelson and Frankel (2012, p. 4) aptly express this concern: "too often systems and tools measure (and reward) effort and intermediate outputs rather than performance".

These problems are now recognized by the providers of labelling / certification schemes. Initiatives (e.g. Sustainable Building Alliance or the Green Building Information Gateway) are being undertaken to improve the services offered. However, this will not fully remedy property investors' concerns regarding the collection and utilisation of sustainability-related information and data. A particular concern is that labelling / certification schemes do not cover the entirety of the far more challenging existing building stock.[2]

For their existing portfolios, investors and asset managers may wish to find an *in-house solution*. The basis for such a solution would be the provision of information and data for decision-making over the life cycle of the building. This would enable organisations to better understand and benchmark the sustainability performance of their assets as well as afford them a more systematic process to improve the financial performance of their portfolios.

[2] *Labelling / certification schemes are useful for new buildings in safeguarding quality during planning and construction.*

# Scope and structure

In search of that solution space, the present publication explains how property organisations can move from the currently perceived burden of collecting sustainability-related data to understanding how that data (and other existing data) can best be utilized by them in their regular investment and asset management routines. As such, this report will enhance the linkages between grand mission statements and strategies and the practical aspects of day-to-day business.

This report is based on (1) an understanding of sustainable development applied to the property industry, portfolios and single buildings which is underpinned by the current state of international standardisation in this field (i.e. ISO 15392: 2008 and ISO 21929-1: 2011), (2) desk-based research, (3) theoretical reasoning informed by the authors' experiences and the existing literature, (4) feedback from the UNEP FI Property Working Group, and (5) the results of a survey carried out among international property investment and management organisations.

The structure of this report is in ten chapters (see Figure 1). Building upon the introduction, **Chapter 2** provides the context for the report by taking six questions which have been posed (but left unanswered) by the previous UNEP FI PWG report, *An Investors' Perspective on Environmental Metrics for Property*. Initial answers to these questions emerge as well as ideas and thoughts to move the sustainability metrics debate further. The need for engaging with corporate real estate sustainability management (CRESM) and for setting up corporate-wide information management systems is highlighted.

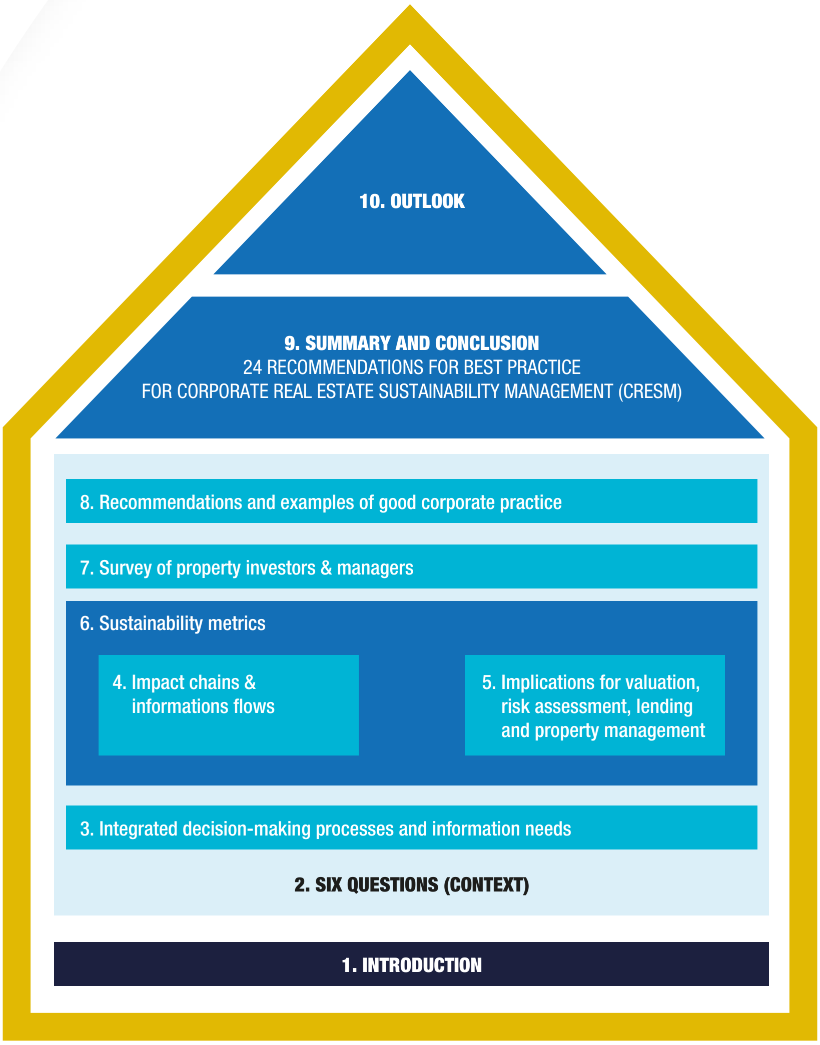


**Figure 1**

Structure of the report

**Chapter 3** develops a common basis and structure for assigning sustainability issues to different corporate levels and areas of responsibility. In addition, relevant sustainability metrics[3] are identified and discussed in relation to corporate decision-making processes. The notion of 'impact chains' is used to demonstrate the mutual interrelationships between various levels of building performance and investment level performance. This is summarized in a Master Diagram (Figure 6) providing the basis and an orientation guide for the analyses and discussion in the subsequent chapters.

**Chapter 4** explains the impact chains in more detail and shows how physical property characteristics can impact on a single building's environmental, social and economic performance characteristics and the related decision-making parameters. Together with Chapter 5, this provides a theoretical foundation for the understanding and successful management of corporate information flows and functions in relation to sustainability metrics and other building-related information and data. **Chapter 5** considers the implications for valuation, risk assessment, lending and property management practices. For example, property valuation standards (notably those put forward by RICS) now explicitly recognize sustainability *as a potential value driver and risk factor* with far-reaching consequences for both valuation practice and the relationships between valuation professionals and their clients.

Against this background, **Chapter 6** deals with sustainability metrics in detail. A comprehensive study is given to the indicators for a sustainability assessment of buildings and the current state of international standardization. The origins of indicators and their relevance / materiality are discussed from the perspectives of sustainable development and finance. In addition, the indicators' applicability for new and existing buildings is debated. Partial and consequential indicators are suggested when the original indicator (e.g. global warming potential) cannot be used.

**Chapter 7** presents the results of a survey carried out among property investors and managers. The findings highlight (1) what types of data property investors and managers typically use to make their decisions and (2) how this relates to their understanding of sustainable buildings and property investment products. Also revealed are what types of sustainability-related data are currently being gathered by property investors and managers and for what purpose. Drawing on the survey results, current gaps and challenges are identified for the management of corporate information flows and the implementation of sustainability issues into corporate functions and business routines.

**Chapter 8** provides practical recommendations for property investors and managers. It suggests how to engage with corporate real estate sustainability management (CRESM) and how to exploit the added-value of a widened, structured and up-to-date information set as a basis for a series of property-related functions, methods and purposes. The recommendations are illustrated by several examples of good corporate practice. These recommendations are then summarized in **Chapter 9** as *24 Recommendations for Best Practice for Corporate Real Estate Sustainability Management*.

While the findings and recommendations contained in the previous chapters first and foremost challenge individual firms, **Chapter 10** considers what actions should be undertaken by industry representatives, initiatives and professional bodies in order to assist the sustainability implementation process within the industry.

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3 *Within this report the following terminology is used:*

*Sustainability Metrics: a standard of measurement, based on assessment criteria and indicators, used for measurement, comparison or to track performance.*

*Assessment criteria: issues of interest; e.g. impacts on the global environment.*

*Indicator: measure for describing and assessing a specified criterion; e.g. Global warming potential is an indicator for assessing the impacts on the global environment; there may be several indicators to assess one single criterion.*

# 2. SIX TRICKY QUESTIONS: INITIAL ANSWERS AND FOOD FOR THOUGHT

In order to begin the discussion on sustainability metrics and to advance a previous debate, six questions – which were posed but left unanswered within the above mentioned PWG report *An Investors' Perspective on Environmental Metrics for Property* – will be taken as a starting point. The questions are as follows.

## 1. What environmental metrics are relevant for today's property owners and managers?

Unfortunately, there appears to be no straightforward or universally applicable answer to this question. In principle, environmental metrics pertaining to the site and location, the building as well as management and operating processes are relevant if they bear the potential to impact (directly or indirectly) on an asset's:

- lettability and marketability (including rental and/or selling price level, time to market, vacancy risk, marketing costs, tenant retention times, tenant fluctuation, etc.)
- level of operating costs non-attributable to tenants
- level of operating costs attributable to tenants
- specific risk profile (e.g. structural risk, obsolescence, liability, vulnerability due to extreme weather events)
- market value and/or investment worth
- sustainability / green assessment, certification and/or labelling result.

In addition, environmental metrics are relevant if they bear the potential to impact (directly or indirectly) on the asset / portfolio owner's:

- reputation
- corporate value and stock market performance (if applicable)
- exposure to risks caused by legislative changes (e.g. "ESG[4] -licence to operate")
- sustainability reporting targets and results
- ability to declare that the portfolio qualifies as being "sustainable"
- access to preferential lending and insurance conditions
- access to governmental grants and subsidies

4 *ESG stands for environmental, social and corporate governance.*

- ease of obtaining planning and construction permissions
- access to sites for development projects
- permission to exceed existing planning restrictions to maximise utilization of a given site (e.g. in Hong Kong and Singapore)
- ability to participate in $CO_2$-trading schemes and to reduce $CO_2$-taxes (if introduced and applicable, e.g. Tokyo has a cap-and-trade emissions system for major buildings).

Any answer to the question regarding the relevance of metrics always has to take into account the surrounding conditions of a specific organisation. The answer will depend on a range of factors such as the type and location of the organisation's assets, the market environment, the legislative framework, preferences of target occupants / buyers, as well as the organisation's strategy, corporate mission and positioning. Nevertheless, it is possible to identify and suggest a list of core environmental and other sustainability metrics (see **Appendix 2**) which are likely (to a lesser or greater extent depending on the surrounding conditions) to drive the aforementioned issues of financial interest.

# 2. What should an environmental performance analysis service provide for property owners and managers?

A useful performance analysis service should allow organisations to utilise the performance analysis results as an information source for a series of corporate functions and purposes. These include but are not limited to:

- sustainability reporting (e.g. according to GRI standards)[5]
- sustainability assessments / certification and labelling of individual assets
- portfolio analysis and portfolio development
- internal and external benchmarking
- early warning and quality assurance mechanisms
- development of asset plans, refurbishment strategies and planning of individual refurbishment measures.

Ideally, a useful performance analysis service enables organisations to analyse performance *internally* and on an ongoing basis by providing, for example, appropriate IT-platforms and IT-solutions, implementation advice and educational services for organisations' staff members.

5 *See: www.globalreporting.org*

# 3. How can financial organisations be engaged with portfolio-level environmental measurement?

Financial organisations can best be engaged on portfolio-level environmental and sustainability measurement by explaining to them (1) the financial implications of various aspects of building performance as well as (2) the risks associated with a lack of respective performance information. This report is an attempt to provide that explanation. It has already been argued elsewhere that an individual asset's sustainability performance can impact on portfolio value, corporate reputation and corporate success in so many ways that portfolio-level sustainability measurement should become a matter of course.

Portfolio-level sustainability measurement is only half the story. In addition to understanding the financial implications of various aspects of building performance, it is important to utilise these insights. This allows active intervention and continuous improvement. In other words, it provides a way to engage in portfolio-level sustainability management and to treat this as an *overall quality assurance tool and mechanism*.

It is necessary to consider whether and to what extent influence can be exercised on:

- the site and surroundings
- the building itself
- facility/property management processes
- occupants'/tenants' processes
- user behaviour(s).

The possibilities to exercise influence will also depend on the financial organisation's willingness and capacity to take action, the administrative/operational level, and the power, duties and level of awareness of the organisation's staff members. It is important to recognize that portfolio-level sustainability performance not only depends on individual assets' characteristics but is also strongly influenced by other factors e.g. facility management processes and user behaviour(s). To a certain extent, these factors can (and should) be managed.

# 4. What variables should data be collected on? What should the frequency of data collection be?

As discussed above, recommended data collection routines depend on the context of a specific organisation. As an initial step, it is advisable to check the availability of information and data on the basic (physical) characteristics of all assets within a given portfolio (**Appendix 1** contains a checklist). If that information set is complete (or as complete as possible), then it is sensible to start with a systematic collection of energy and resource consumption values. It is useful to distinguish between the different operational levels for the frequency of data collection. For portfolio analysis and sustainability reporting functions, data collection and evaluation on an annual basis appears reasonable. This can be coupled with the annual (normalised) utility bills and operating cost account statements.

For facility management functions, a higher frequency of data collection is sensible. Ideally, facility managers have access to monthly, weekly or even daily consumption values. Actual consumption can be compared with pre-specified target values in order to identify deviations and anomalies. As the development towards smart grids, smart buildings and improved building automation and metering proceeds further, an even higher frequency of consumption value monitoring should be possible.

In addition to collecting data on consumption values, post-occupancy evaluations are increasingly important in order to assess occupiers' and tenants' comfort and satisfaction. Occupants' satisfaction will impact on occupancy rates, tenant turnover and retention times, etc. with direct financial implications. It is critical to realise that investing in a super energy- efficient building makes little sense if tenants are dissatisfied with the level of comfort.

Further variables/data fields (see **Appendix 2**) can then be added according to the specific needs, requirements and available resources of individual organisations.

# 5. What reporting services would be desirable or required?

As a general rule, sustainability reporting should provide several functions: (1) it enables and triggers internal processes for improving an organisation's sustainability performance, (2) it provides a basis for internal as well as external benchmarking, and (3) it provides a meaningful evidence base for informed decision-making among investors, stakeholders and the wider public.

In order to achieve this, sustainability reports must fulfil a number of objectives. First, they need to express the commitment of the reporting entity. Second, they must contain performance information that reflects the importance assigned to them by the reporting entity. Of course, a gap may exist between what the reporting entity and others think are important.

Therefore, for reporting services for property organisations, two important requirements can be formulated: First, the Global Reporting Initiative's (GRI) Construction and Real Estate Sector Supplement[6] should be considered as the general framework for sustainability reporting. Second, whenever quantitative performance aspects (such as energy and water usage) are reported, they should be expressed for individual buildings, permanent groups of buildings (where possible) and portfolios (1) in absolute values, (2) as a trend, (3) in comparison to selected benchmarks (whenever possible and applicable), and, most importantly, (4) in a series of different modalities such as per $m^2$, $m^3$, number of occupants / employees, number of workstations in use, number of visitors, etc.

The usage of only one single reference value (which currently is standard practice) makes it difficult to compare performance if organisations are not using exactly the same reference value (which regularly is the case with sustainability reports from property organisations). So whenever possible and meaningful, quantitative performance aspects should be expressed in relation to several reference values. This would significantly improve comparability of sustainability reports from the sector.

# 6. How can the integration of environmental performance indicators with other sustainability / responsible property investment metrics satisfy the investors' requirement for a simple method to assess and compare ESG behaviours in property portfolios, in line with many of their own commitments to the PRI?

This question highlights an arguably widespread perception or practice of treating sustainability as a separate or distinct category that is remote or isolated from core business routines. The need to assess and compare ESG-behaviours in property portfolios is sometimes viewed as just another duty within ESG- or PRI[7]-commitments.

In this context, the use of metrics and indicators is not always fully embraced. The benefits are not sufficiently appreciated. Firstly, the sustainability performance of individual assets and portfolios can drive and influence financial performance and investment risk in many ways. Secondly, sustainability-related information and data can be utilised to monitor a series of corporate functions and purposes (e.g. portfolio analysis, valuation and investment analysis, development of business and management plans for single assets and portfolios, integration of early warning and quality assurance mechanisms, etc).

6 *See: www.globalreporting.org/reporting/sectorguidance/sector-guidance/construction-and-real-estate/Pages/default.aspx*

7 *PRI stands for Principles for Responsible Investment, see: http://www.unpri.org*

An element of irony can be discerned in that question. When seeking a simple method to assess a complex issue (ESG-behaviours in property portfolios), organisations do not always appreciate that many factors are now grouped under the term "sustainability issue". Some of these factors are already collected within business processes and taken into account to support decision-making. Some factors may be named differently, some data collection takes place without proper / systematic coordination and some data is lurking in a range of different corporate departments without the facility to share data (silo effect). But much of the information and data required to assess the sustainability performance of buildings and portfolios already exists "somewhere" within many organisations.

Within this report the proposition is made that the property investment community has developed a largely shared and relatively sound understanding of sustainable building characteristics. This understanding is to a very large extent in line with the core set of indicators required by the International Standardization Organization (ISO) for a sustainability assessment of buildings. A relatively high match exists between this understanding of sustainable buildings on their performance aspects. The information and data on many performance aspects are already being gathered by leading organisations.

As a consequence, it is argued that the leading organisations in the property investment community are not really facing a *metrics problem*. Instead, the challenge lies more in the creation of a systematic approach to collect, manage and utilize the gathered information and data. So the key problems addressed in this report are modifying analytic methods (such as investment and portfolio analyses), re-organising data formats and information flows accordingly, ensuring data accessibility and comparability across different corporate departments, and the implementation of appropriate ICT-based decision support instruments. All these issues are integral parts of corporate sustainability management.

A 2006 UNEP FI report refers to corporate sustainability as: "a business approach that creates long-term shareholder value by embracing opportunities and managing risks derived from economic, environmental and social developments." (UNEP FI, 2006, p.3)

Sustainability management is defined as "a generic term for environmental and social management and corporate governance. It refers to the processes or structures that an organisation uses to meet its sustainability goals and objectives while transforming inputs into a product or service." (UNEP FI, 2006, p.3)

Building on these definitions, Corporate Real Estate Sustainability Management (CRESM) thus refers to the integrated management of all economic, environmental and social aspects of an organisation's property (real estate) activities and associated investment decision-making. It comprises and applies to all relevant strategies, processes and organisational structures that support corporate governance and sustainable business and product development.

Successful CRESM requires a holistic and systematic approach across the whole organisation. This includes an in-depth analysis of different stakeholders' information demands within different decision-making contexts. For example, it must address different hierarchical levels (i.e. corporate level, portfolio level, single building level), different analytical methods and it must provide a profound explanation of impact chains (i.e. interrelationships between physical property characteristics, actual performance and corporate goals and economic success factors). This will be dealt with in the next chapter.

# 3. INTEGRATED DECISION-MAKING PROCESSES AND RESULTING INFORMATION NEEDS

The property industry's engagement with sustainable development has a history and is ongoing. Initially, an intense debate was focused on forming an understanding of what sustainability means and could mean for the industry. Today, a growing portion of the sector accepts there is a need to act. These organisations are currently struggling to actually integrate sustainability considerations into decision-making processes. However, this development is neither homogenous nor steady. Different degrees of implementation (levels of maturity) can be observed (e.g. early adopters, followers, and leaders). A variety of corporations, investment organisations and individual investors have developed an array of responses:

- identified the topic as a source for additional reputational risks
- developed approaches to improve corporate reputation and demonstrate sustainability leadership
- concentrated on single sustainability-related aspects (e.g. the energy performance of their buildings and portfolios) and initially wish to gain experience with new construction techniques and technologies
- developed a broader set of sustainable development principles and implementation strategies
- connected the topic with climate change, resource scarcity, demographic change and increasingly stringent environmental legislation as new challenges to respond to
- made efforts to implement sustainability reporting and data management functions but without linking these functions with their main business processes
- identified sustainability as a key success factor, established direct linkages with income and risk parameters and strived for an integrative approach.

A more consistent involvement with the topic is needed. This will require an integrative approach. Several actions are needed to support and sustain this:

- an analysis of impact chains (i.e. impact of sustainability issues on corporate goals and economic success factors)
- an operationalisation of the description and assessment that different levels of granularity (a single building's, portfolios' and investment products') contribute to sustainable development
- the oversight and control of extended information flows within a given organisation.

These actions show that the implementation of sustainable development principles within the property industry is an executive, management, and controlling task.

In order to appropriately structure this task, the following "elements" need to be described and a series of questions need to be answered respectively:

- What is the organisation's or individual investor's underlying understanding of sustainable development? Does a dedicated sustainability strategy exist? To what extent are sustainability considerations already embedded within an overall strategic mission / vision?
- What object of assessment (i.e. building, portfolio, investment product, etc.) is this understanding of sustainable development applied to?
- What is the predominant decision-making context (i.e. investment, change to existing portfolio, refurbishment, lending, etc.)?
- Who are the key stakeholders involved, what are their motives, goals, duties, cognizances and competences?
- What are the administrative/operational level and the perspective of action?
- Which success factors, methods, criteria and decision-making instruments are currently applied?
- What information/data demand results from the applied methods, criteria and decision-making instruments?
- What are the resources needed (time, staff, expenses) in order to serve this information/data demand in terms of quality and quantity?
- How are internal information flows organised?
- Given the availability of appropriate information, what (direct and indirect) options exist for reacting / responding?
- What mechanisms are in place to review / monitor the impacts of sustainability-related activities on strategic success factors?

Any operationalisation of the overall concept of sustainable development will require an adjustment to a given situation / environment. The application of the overarching concept of sustainable development will need to be adjusted to the respective assessment object. It must also reflect the given decision-making context, the perspective of action as well as the key stakeholders' motives, goals, duties, cognizances and competences. This requires distinguishing between different administrative levels and corporate functions (see **Figure 2**).

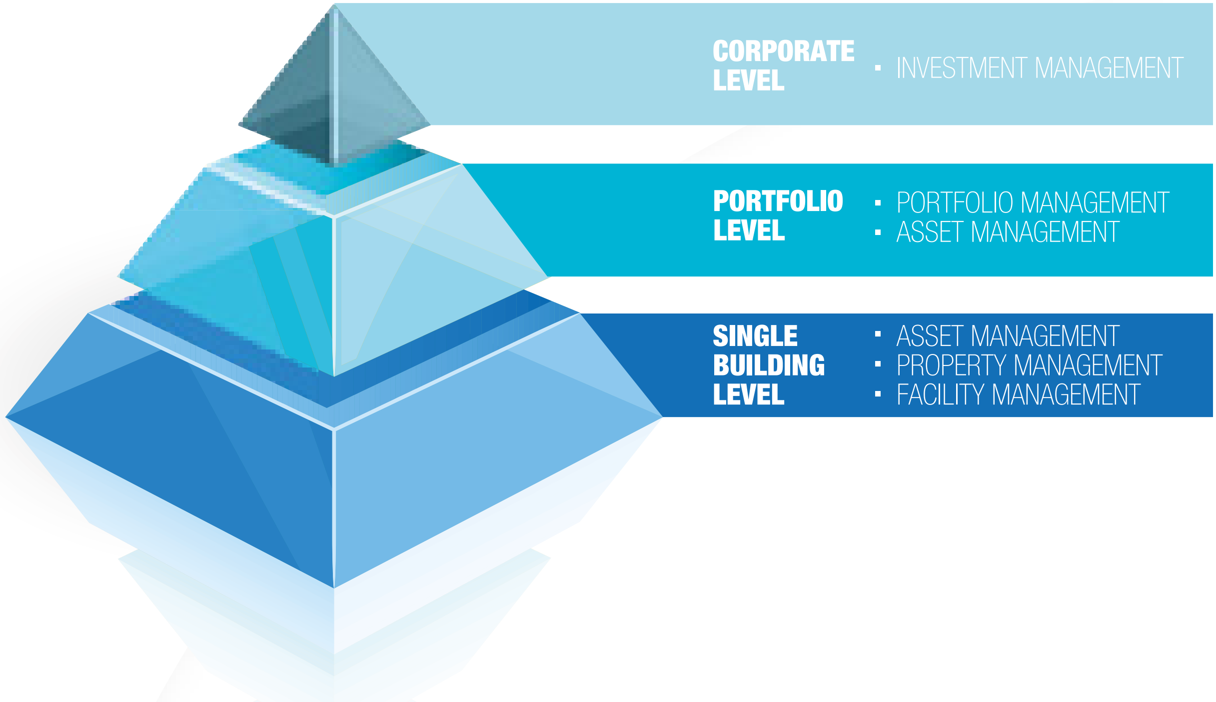



**Figure 2**

Administrative levels and corporate functions

To address the question whether and to what extent sustainability issues are to be integrated into information flows and decision making processes, the key starting point is the manner and extent to which sustainability is embedded within a given organisation's corporate vision and mission. (The vision and mission are usually based on an underlying corporate value system and philosophy or the business model respectively.) At the corporate level, the degree of implementation decides whether sustainability is treated pro-actively as an additional success factor, if it is an integral part of corporate responsibility, or if is just perceived as (another) external risk that needs to be dealt with.

Depending on the corporate vision and business model, organisations usually determine corporate goals, investment and implementation strategies, as well as appropriate success factors. At this formative stage, it needs to be determined whether and to what extent hard and soft corporate success factors can be affected by sustainability issues. Several linkages require consideration: sustainability-related information demand within a given organisation and sustainability-related performance requirements of a given portfolio, building or project.

As a result, the degree and recommended actions for an integration of sustainability aspects into decision-making processes and information flows depend on whether or not a given corporation already has:

- a clearly defined understanding of sustainable development adapted to the property industry
- embedded sustainability into its vision and mission
- extended the classical triangle of investment targets (i.e. security, liquidity, and return) by adding an ESG-dimension (see **Figure 3**)
- assigned and regulated managerial responsibility to this issue
- installed controlling systems / mechanisms which already do (or could) cover sustainability aspects
- implemented sustainability reporting functions.

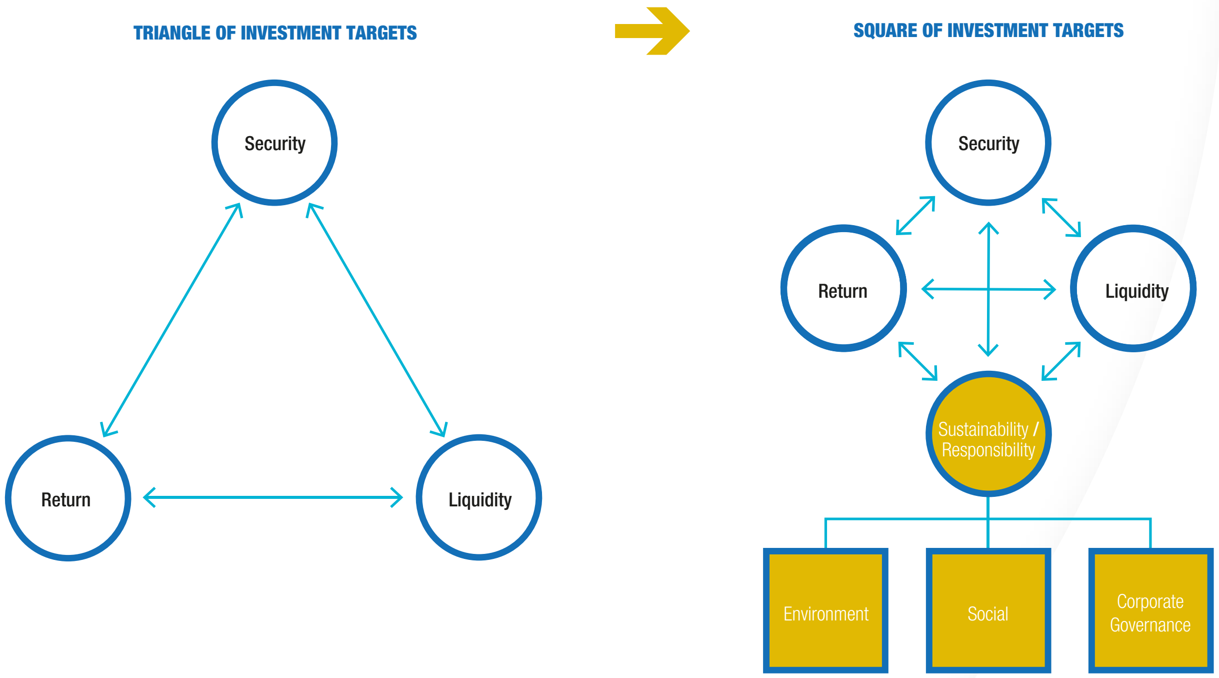



**Figure 3**

Triangle vs. square of investment targets

In this context, the question arises whether an organisation's degree of sustainability should become a corporate success factor on its own. This may be true for a few organisations with a dedicated sustainability strategy and profile. For the majority of organisations, it is more likely that the success factors at the corporate level will remain unchanged. However, the fulfilment of corporate success factors (e.g. corporate reputation) will depend on how new, additional sustainability related aspects have been realized and/or acknowledged. As such, the degree of sustainability of an organisation is likely to become an early-warning financial indicator.

Further courses of action for the integration of sustainability issues into *specific* information flows and decision-making processes are dependent on the stakeholder type (e.g. investor, bank, funds manager, etc.), their role, the wider decision-making context and the main object of interest (building, portfolio or asset investment). In the remaining parts of the present report, the discussion now turns to the organisations holding property portfolios and/or organisations which are either directly or indirectly involved in the investment, sale, letting, management, operation, refurbishment, and the planning and construction of buildings. Obviously, the main object of interest for such organisations is their property portfolio. Strategies and success factors for the further development of the property portfolio need to be defined, implemented and reviewed.

At the *portfolio level*, an integration of sustainability aspects into decision-making processes and information flows will entail organisations defining and considering:

- typical time horizons and strategies for portfolio development
- appropriate success factors and decision-making parameters (the extent to which existing decision making parameters already embrace sustainability / ESG issues)
- the relevance of implementation strategies such as:
    - *Positive Screening* (purchase and/or disposal of property assets (including indirect investment products) that meet/don't meet predefined environmental and social performance requirements)
    - *Build and operate / Build and sell* (investments into new building projects that are designed, constructed and subsequently managed according to the requirements for sustainable buildings)
    - *Optimisation* (investments into the existing building stock in order to systematically improve sustainability performance)
    - *Cause-based investments* (affordable housing and urban revitalisation, etc.)
- whether existing ICT-systems and applied methods for portfolio analysis are appropriate and flexible
- the gap or degree of match between sustainability-related aspects and current / existing lists of criteria used to characterise the location, site and building
- the opportunities and efforts required to close the identified gaps by extending the existing lists of criteria and by gathering / assessing additional sustainability related data

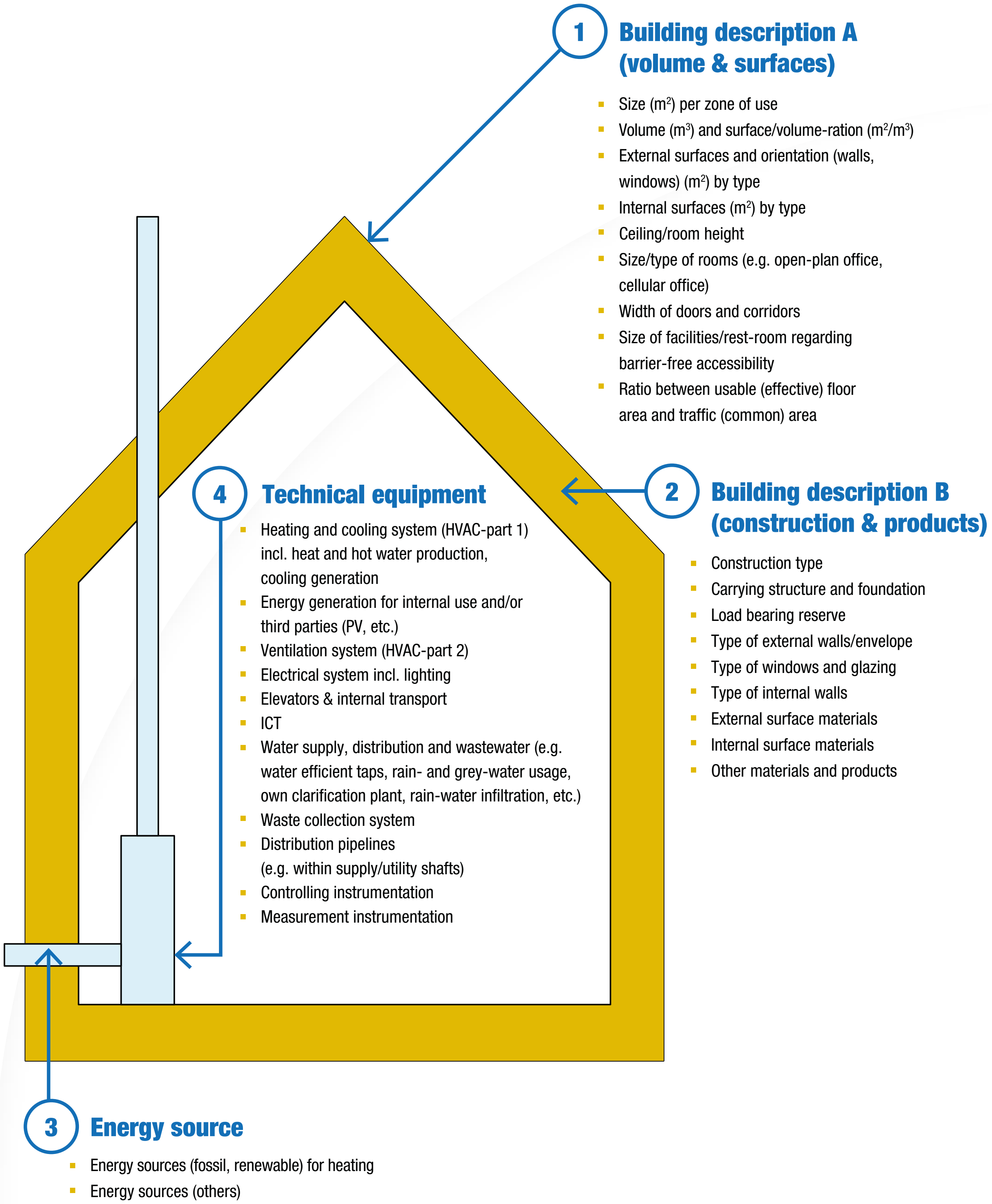
Strategies for portfolio management and development are typically realized on the *single building level*. Therefore, the success factors defined at the corporate and portfolio level need to be adjusted to single buildings. In connection with the sustainable development discourse, traditional economic factors such as cash flow, value and economic risk can be complemented by factors like cultural value, image and environmental value. If possible, these factors can either be monetized or be treated and assessed separately. Whether and to what extent such factors can play and need to play a role at the single building level depends on a range of issues:

- corporate mission and portfolio strategy
- other market players within a given market or sub-market (i.e. the extent to which sustainability aspects already impact on prices, rent levels, marketing times, vacancy rates, tenant retention times, etc.)
- awareness, sophistication and competences of property professionals to appropriately consider sustainability aspects within the services delivered (e.g. valuation)
- general availability of data and information on sustainability-related characteristics of site, location and building. In turn, this depends on:
  - systematic information/data generation and management from planning and refurbishment phases
  - systematic information/data generation, management and analyses during the operation phase
  - rigorous information/data requests and reviews within the asset acquisition process (i.e. unavailability of reliable information/data as a potential "deal-breaker")
  - the extent to which service providers (e.g. facility management) are encouraged and/or contractually obliged to deliver information/data
  - the extent to which tenants and users are encouraged and/or contractually obliged to share consumption information/data.

Required information/data at the building level to support corporate decision-making can be subdivided into:

- *physical property characteristics* (e.g. size and volume, type of building envelope, etc.) which are usually (or should be) known from the planning phase (see **Figure 4** and **Appendix 1**), and
- *performance / quality characteristics* (e.g. energy consumption, occupant comfort, etc.) which can (in principle) be measured during the operating phase (see **Figure 5** and **Appendix 2**).

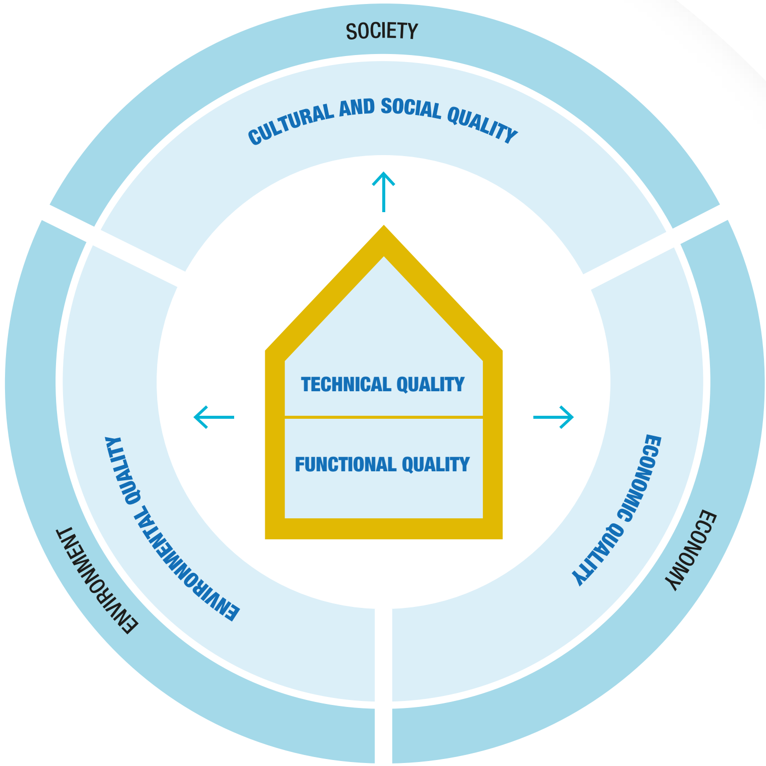
Occupancy characteristics will influence performance data as well. For example, the levels of density, kinds of equipment, time periods of use and quality of facility management will impact on resource consumption. Two identical facilities may have very different outcomes due to these "soft" factors. Therefore, some information on these characteristics is needed.




*Notes:* *HVAC = heating, ventilation and air conditioning*
*PV = photovoltaics*
*ICT = information communication technologies*

**Figure 4**

Physical property characteristics




**Technical quality**

Structural safety

Fire protection

Noise protection

Moisture protection

Maintainability

Flexibility and adaptability

Ease of cleaning

Durability

Resilience against natural and man-made hazards

Design for deconstruction and recyclability

**Functional quality**

Serviceability (fitness for purpose, usability)

Space efficiency

**Cultural and social quality**

Aesthetic quality

Urban design quality

Cultural value

Health & well-being

Indoor air quality

Comfort (thermal, visual, acoustic, olfactory)

User safety

User participation and control

Accessibility (to and inside the building)

**Environmental quality**

Energy performance

Resource depletion

GHG-emissions & GWP

Other impacts on the global & local environment incl. risks to the local environment

Land use change & sealing

Water consumption

Wastewater

Waste (construction & user related)

**Economic quality**

Life cycle costs

**Figure 5**

Performance / quality characteristics

_Notes:_ *GHG = greenhouse gases*
*GWP = global warming potential*

A variety of information sources can be used to gather this data/information. These include planning documents, building files and passports (logbooks), BIM (building information models), environmental / sustainability assessment results, facility management data, etc. Different possibilities for gathering / assessing a property's performance characteristics will be discussed in the context of a more detailed exploration of sustainability metrics in Chapter 6.

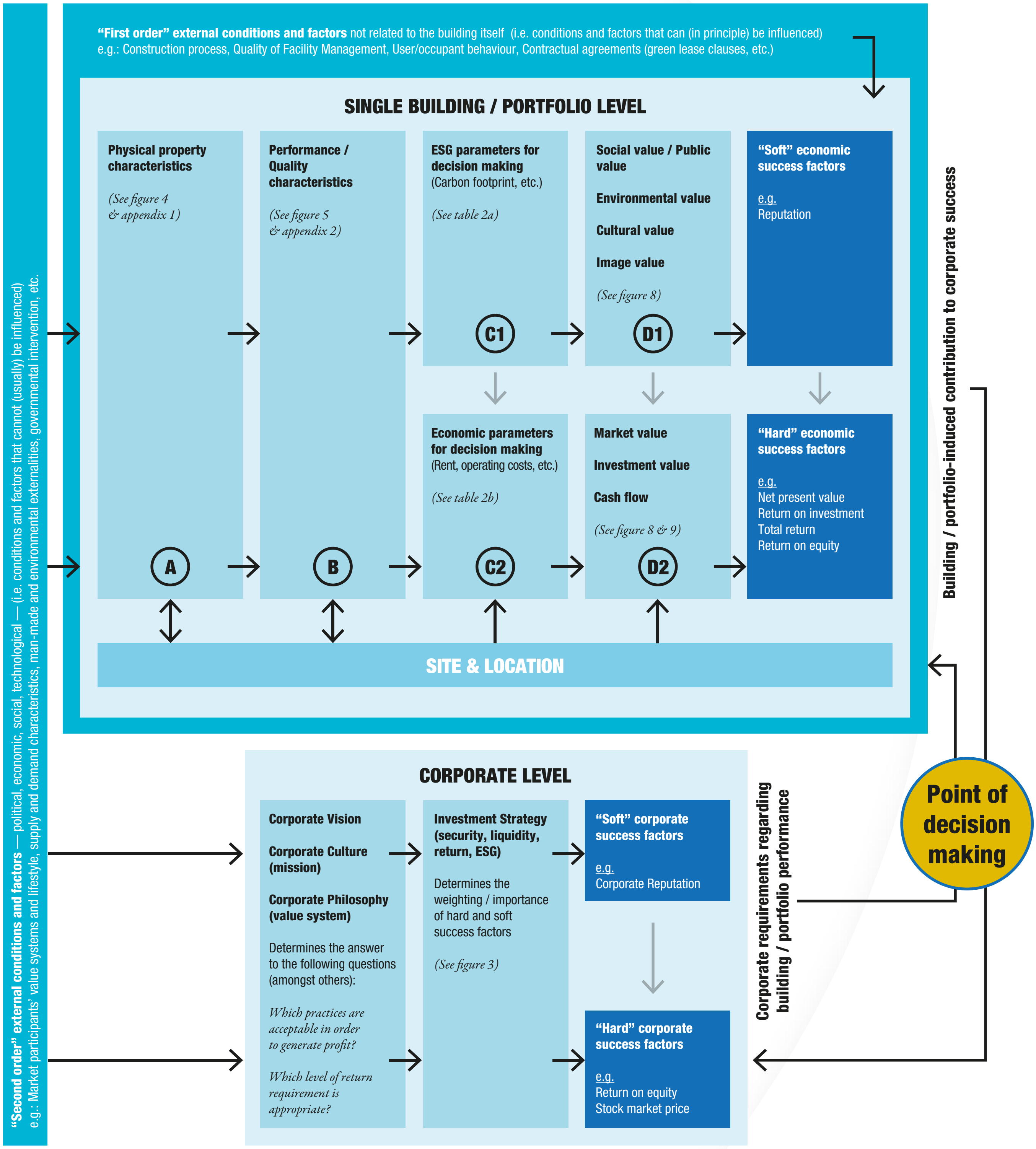
To address the integration of sustainability issues into decision-making processes, the discussion has considered information/data demand and requirements. These requirements emerge at the corporate level and then proceed through the portfolio level to the single building. The concern now shifts to the respective impact chain.

The starting point for the impact chain is the physical property characteristics. These physical aspects influence the property's performance characteristics. Furthermore, property performance (in addition to the influences from the market environment, location and site) impact on a property's cash flow, risk profile and market value as well as investment value. Above all, single buildings contribute to realising goals at the portfolio level. For organisations that hold property portfolios, the portfolio's performance significantly links through to corporate success and corporate value.

This impact chain needs to be mapped by corporate information flows. These flows can be aggregated from bottom to top and interpreted at different levels (building, portfolio, and corporation).

**Figure 6** (which acts as a Master Diagram) summarizes the content of this paragraph and depicts impact chains as well as the mutual interrelationships between information/data demand and information/data gathering and processing. Figure 6 can be read by either starting at the bottom or top of the diagram. Reading it from the bottom, it shows that depending on the corporate vision and investment strategy and the resulting economic success factors, several requirements regarding the performance and characteristics of buildings / portfolios emerge. Or expressed another way: in order to comply with a defined corporate vision and investment strategy, the organisation's investment properties (and owner-occupied properties) need to meet (amongst other criteria) environmental and social performance requirements. In order to determine the degree of compliance as well as resulting corrective actions, property performance needs to be measured, monitored and reported.

Reading Figure 6 from the top, it shows that physical property characteristics influence the performance / quality characteristics of single buildings (and portfolios). These impact on economic parameters (e.g. rent and operating cost) and link through to market value and other economic success factors. Certain physical and performance characteristics directly link through to economic factors while other physical and performance characteristics indirectly impact economic factors through image / reputational gains.




*Source:* *Lützkendorf, T. and Lorenz, D., Karlsruhe Institute of Technology (KIT)*

**Figure 6**

Information demand and impact chains

Master Diagram

# 4. TRANSLATING IMPACT CHAINS TO INFORMATION FLOWS

A critical factor for the successful identification, analysis, management, and controlling of relationships between decisions at the corporate level ("boardroom") and the physical and performance-related characteristics of single buildings ("boiler-room") is the profound understanding of impact chains. Impact chains can reveal how "technical data" on physical and performance information can be aggregated or used to generate valuable (i.e. decision-relevant) information. A problem is that the decision-makers often sometimes do not know (or care) about "technical data" and often do not realize how this information can be harnessed.

**Table 1** describes how physical property characteristics impact on a single building's performance / quality characteristics. It is clear that various physical characteristics of a building (which result from decisions at the planning/design stage) impact on a variety of performance-related characteristics. Such basics are of interest whenever organisations are involved in planning and project development or whenever strategies and requirements need to be defined for new construction or refurbishment projects. In this context, a typical risk is the abrupt loss of information about the physical characteristics after handover or after a change in ownership. It is therefore advisable to take measures (such as dedicated contractual arrangements with planners, designers and other service providers) so that information on physical characteristics can efficiently be transferred from planning documents and technical due diligences into corporate databases and IT-based decision-support instruments respectively. The usage of BIM (building information models) particularly lends itself to support this process.

**Figure 7** portrays an example of energy performance. To begin with, the figure shows which physical property characteristics determine a building's potential energy performance. During the operation phase, a building's energy performance is determined by other factors as well, particularly by the quality of facility management, user behaviour and weather conditions. During operation, energy performance can usually be deduced by analysing measured (and corrected) energy consumption values. Energy performance can be evaluated through a comparison with appropriate benchmarks. In the planning/design phase, however, energy demand can only be simulated if the building's physical characteristics (among other issues) are known. The same applies to several other performance aspects as well:

- physical characteristics determine potential performance
- during operation, performance is affected by other factors
- performance can be measured during operation but only be estimated during planning / refurbishment if detailed information on physical characteristics is available.

This implies, for example, that gaining the most from energy efficiency retrofits will require accurate information on the building to be refurbished. Otherwise, the principle of retrofitting *at the right time and at the right place* as formulated in the UNEP FI PWG retrofit report cannot be realised (UNEP FI, 2014).

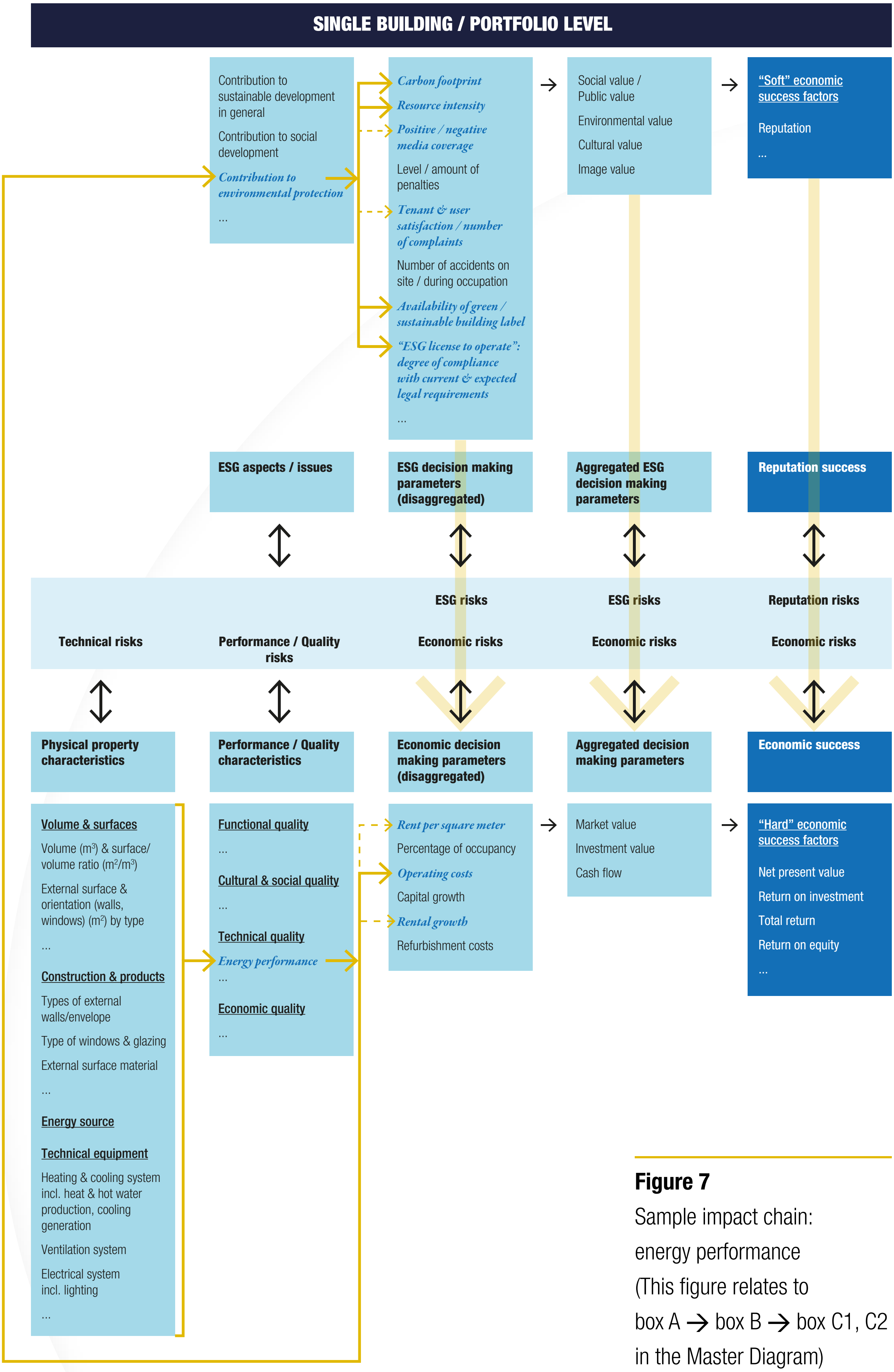
## IMPACT ON PERFORMANCE / QUALITY CHARACTERISTICS

■ High / direct impact
□ Low / indirect impact

| | PHYSICAL PROPERTY CHARACTERISTICS | 1.1 Serviceability | 1.2 Space efficiency | 2.1 Aesthetic quality | 2.2 Urban design quality | 2.3 Cultural value | 3.1 Health & well-being | 3.2 Indoor air quality | 3.3 Comfort | 3.4 User safety | 3.5 User participation and control | 3.6 Accessibility / barrier-free | 4.1 Structural safety | 4.2 Fire protection | 4.3 Noise protection | 4.4 Moisture protection | 4.5 Maintainability | 4.6 Flexibility and adaptability | 4.7 Ease of cleaning | 4.8 Durability | 4.9 Resilience | 4.10 Design for deconstruction | 5.1 Energy performance | 5.2 Resource depletion | 5.3 GHG-emissions and GWP | 5.4 Other impacts on nvironment | 5.5 Land use change and sealing | 5.6 Water consumption | 5.7 Wastewater | 5.8 Construction waste | 6.1 Life cycle cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 | Size per zone of use | ■ | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | |
| 1.2 | Volume & surface/volume ratio | | | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | ■ | | | | □ |
| 1.3 | External surfaces & orientation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.4 | Internal surfaces | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | □ |
| 1.5 | Ceiling/room height | ■ | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | □ |
| 1.6 | Size/type of rooms / floor plan | ■ | | | | | | | | | | | | | | | | ■ | | | | | | | | | □ | | | | |
| 1.7 | Width of doors and corridors | ■ | ■ | | | | | | | ■ | | ■ | | | | | | ■ | | | | | | | | | | | | | |
| 1.8 | Size of facilities/rest-rooms | | ■ | | | | | | | | | ■ | | | | | | ■ | | | | | | | | | | | | | |
| 1.9 | Ratio usable area / traffic area | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.1 | Construction type | | | □ | □ | | | | | | | | ■ | | | | ■ | □ | | ■ | ■ | ■ | | | □ | □ | ■ | | | ■ | ■ |
| 2.2 | Carrying structure & foundation | | | | | | | | | ■ | | | ■ | | | | | □ | | ■ | ■ | ■ | | | □ | □ | | | | | ■ |
| 2.3 | Load bearing reserve | | | | | | | | | | | | ■ | | | | | | | | ■ | | | | | | | | | | |
| 2.4 | Type of external walls/ envelope | | ■ | ■ | ■ | | | | ■ | | | | ■ | ■ | ■ | ■ | ■ | □ | □ | ■ | ■ | ■ | ■ | ■ | □ | □ | | | | ■ | ■ |
| 2.5 | Type of windows & glazing | | | ■ | ■ | | □ | | ■ | ■ | | | | ■ | ■ | | ■ | □ | ■ | ■ | ■ | ■ | ■ | ■ | □ | □ | | | | | ■ |
| 2.6 | Type of internal walls | | ■ | | | | | | ■ | | | | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | | ■ | □ | ■ | □ | □ | | | | ■ | ■ |
| 2.7 | External surface materials | | | ■ | ■ | | | | | | | | | ■ | | | ■ | | □ | ■ | ■ | ■ | | ■ | □ | ■ | | | | ■ | ■ |
| 2.8 | Internal surface materials | | | | | | □ | ■ | ■ | ■ | | | | ■ | □ | | ■ | | ■ | ■ | | ■ | | ■ | □ | □ | | | | ■ | ■ |
| 2.9 | Other materials & products | | | | | | □ | | | ■ | | | | ■ | | | ■ | | □ | ■ | ■ | ■ | | ■ | □ | ■ | | | | | ■ |
| 3.1 | Energy sources for heating | | | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | ■ |
| 3.2 | Energy sources - other | | | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | ■ |
| 4.1 | HVAC part 1 - heating/cooling | □ | | | | | | | ■ | | | | | | | ■ | | □ | | ■ | | ■ | ■ | ■ | ■ | ■ | | | | | ■ |
| 4.2 | Energy generation (PV, etc.) | | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | | | | | ■ |
| 4.3 | HVAC part 2 - ventilation | □ | | | | | □ | ■ | ■ | | | | | | | ■ | | □ | | ■ | | ■ | ■ | ■ | ■ | ■ | | | | | ■ |
| 4.4 | Electrical system incl. lighting | □ | | | | | | | ■ | ■ | | | | | | | | □ | □ | ■ | | ■ | ■ | ■ | ■ | ■ | | | | | ■ |
| 4.5 | Elevators & internal transport | ■ | | | | | | | | ■ | | ■ | | | | | | □ | □ | ■ | | ■ | ■ | ■ | ■ | ■ | | | | | ■ |
| 4.6 | ICT | □ | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | | | | | ■ |
| 4.7 | Water supply, wastewater | | | | | | ■ | | | | | | | | | | | □ | | ■ | | ■ | | ■ | | | | ■ | ■ | | ■ |
| 4.8 | Waste collection system | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ■ |
| 4.9 | Distribution pipelines (shafts) | | | | | | | | | | | | | | | | ■ | ■ | | ■ | | ■ | □ | | | | | | | | □ |
| 4.10 | Controlling instrumentation | □ | | | | | | | □ | | ■ | | | | | | | | | | | | □ | | | | | | | | □ |
| 4.11 | Measurement instrumentation | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | □ |

**Table 1**

Impact of physical property characteristics on a single building's performance/quality characteristics (This table relates to box A → box B in the Master Diagram)




Source: Lützkendorf, T. and Lorenz, D., Karlsruhe Institute of Technology (KIT)

**Figure 7**

Sample impact chain: energy performance (This figure relates to box A → box B → box C1, C2 in the Master Diagram)

**Figure 7** also depicts how energy performance impacts on economic as well as ESG-related decision-making parameters. These parameters include operating costs, achievable rents or the degree of compliance with current legal requirements ("ESG-license to operate"). The positive impact of energy performance on various decision-making parameters has also been empirically evidenced in recent years through a large body of research. (For an overview of latest empirical evidence see: European Commission, 2013, DECC, 2013 and WGBC, 2013). The same applies to other performance aspects as well. For example, the positive interrelationship between indoor air quality and occupant/tenant satisfaction as well as productivity is also well documented. **Tables 2a and 2b** represent an overview on interlinkages between performance / quality characteristics and economic as well as ESG-related decision making parameters.

As a result, market participants involved with property pricing increasingly distinguish between buildings that exhibit different sustainability-related features and associated physical or operational performance. This is also represented in **Figure 7** as it shows that economic and ESG-related decision-making parameters naturally influence, for example, valuation and risk assessment results. This links through to aggregated decision-making parameters at the portfolio and corporate level.

■ High / direct impact
□ Low / indirect impact

| PERFORMANCE / QUALITY CHARACTERISTICS | IMPACT ON … Carbon footprint | Resource intensity | Positive / negative media coverage | Level / amount of penalties | Tenant satisfaction | Occupier satisfaction | Number of accidents (in use) | Compliance with current and expected legal requirements | Sustainability assessment / labelling | "Eco"-Image |
|---|---|---|---|---|---|---|---|---|---|---|
| **1.1** Serviceability | | | | | ■ | □ | | | ■ | |
| **1.2** Space efficiency | | | | | ■ | | | | ■ | |
| **2.1** Aesthetic quality | | | ■ | | □ | □ | | | ■ | |
| **2.2** Urban design quality | | | ■ | | □ | □ | | | ■ | |
| **2.3** Cultural value | | | ■ | | □ | □ | | | ■ | |
| **3.1** Health & well-being | | | | □ | □ | ■ | | ■ | ■ | |
| **3.2** Indoor air quality | | | | | □ | ■ | | ■ | ■ | |
| **3.3** Comfort (thermal, acoustic, visual) | | | | | □ | ■ | | ■ | ■ | |
| **3.4** User safety | | | ■ | ■ | ■ | ■ | ■ | ■ | □ | |
| **3.5** User participation and control | | | | | ■ | ■ | | | □ | |
| **3.6** Accessibility | | | ■ | | ■ | ■ | | | ■ | |
| **4.1** Structural safety | | | | | ■ | ■ | | ■ | □ | |
| **4.2** Fire protection | | | | ■ | ■ | ■ | ■ | ■ | □ | |
| **4.3** Noise protection | | | | | □ | ■ | | | ■ | |
| **4.4** Moisture protection | | | | | | | | | □ | |
| **4.5** Maintainability | | | | | | | | | □ | |
| **4.6** Flexibility and adaptability | | | | | ■ | ■ | | | ■ | |
| **4.7** Ease of cleaning | | | | | ■ | □ | | | □ | |
| **4.8** Durability | | | | | | | | | ■ | □ |
| **4.9** Design for deconstruction and recyclability | | | | | | | | | ■ | ■ |
| **5.1** Energy performance | ■ | ■ | ■ | ■ | □ | | | ■ | ■ | ■ |
| **5.2** Resource depletion | | ■ | | | | | | | ■ | □ |
| **5.3** GHG-emissions and GWP | ■ | | ■ | | □ | | | ■ | ■ | ■ |
| **5.4** Other impacts on environment & risks | | | ■ | ■ | □ | | | | ■ | ■ |
| **5.5** Land use change and sealing | | | | | | | | | ■ | □ |
| **5.6** Water consumption | | ■ | | | □ | | | | ■ | ■ |
| **5.7** Wastewater | | | | | □ | | | | ■ | ■ |
| **5.8** Waste (construction waste) | | | | | | | | | ■ | □ |
| **6.1** Life cycle cost | | | | | □ | | | | □ | |

## Table 2a

Impact of performance / quality characteristics on ESG-decision making parameters
(This table relates to box B → box C1 in the Master Diagram)

■ High / direct impact
□ Low / indirect impact

| PERFORMANCE / QUALITY CHARACTERISTICS | IMPACT ON … Rent | Rental growth | Percentage of occupancy | Capital growth | Operating costs | Refurbishment cost |
|---|---|---|---|---|---|---|
| **1.1** Serviceability | ■ | ■ | ■ | ■ | | |
| **1.2** Space efficiency | ■ | ■ | ■ | ■ | | |
| **2.1** Aesthetic quality | □ | □ | □ | □ | | |
| **2.2** Urban design quality | | | | | | |
| **2.3** Cultural value | | | | | | |
| **3.1** Health & well-being | | □ | □ | □ | | |
| **3.2** Indoor air quality | | □ | □ | □ | | |
| **3.3** Comfort (thermal, acoustic, visual) | □ | □ | □ | □ | | |
| **3.4** User safety | □ | | □ | | | |
| **3.5** User participation and control | | | | | | |
| **3.6** Accessibility | □ | □ | □ | □ | | |
| **4.1** Structural safety | | | | | | |
| **4.2** Fire protection | | | | | | |
| **4.3** Noise protection | □ | □ | | □ | | |
| **4.4** Moisture protection | | | | | | |
| **4.5** Maintainability | | | | | ■ | ■ |
| **4.6** Flexibility and adaptability | □ | ■ | ■ | ■ | □ | ■ |
| **4.7** Ease of cleaning | | | | | ■ | |
| **4.8** Durability | | □ | | □ | | ■ |
| **4.9** Design for deconstruction and recyclability | | | | | | ■ |
| **5.1** Energy performance | □ | ■ | ■ | ■ | ■ | |
| **5.2** Resource depletion | □ | □ | | □ | | |
| **5.3** GHG-emissions and GWP | | □ | ■ | □ | | |
| **5.4** Other impacts on environment & risks | | □ | ■ | □ | | |
| **5.5** Land use change and sealing | | | | | | |
| **5.6** Water consumption | | | □ | | ■ | |
| **5.7** Wastewater | | | | | ■ | |
| **5.8** Waste (construction waste) | | | | | | |
| **6.1** Life cycle cost | □ | □ | | □ | ■ | |

## Table 2b

Impact of performance / quality characteristics on economic decision making parameters (This table relates to box B → box C2 in the Master Diagram)

# 5. IMPLICATIONS FOR VALUATION, RISK ASSESSMENT, LENDING AND PROPERTY MANAGEMENT

Impact chains can be further understood in terms of their relation to valuation (see **Figure 8**) and risk assessment (see **Figure 9**). Figure 9 depicts the implications associated with financial risk. On a more aggregated level, Figure 8 shows the various impacts of performance aspects on different categories of value, particularly on economic value. These impacts are increasingly being recognized, acknowledged and built into value estimates by property valuation professionals (a large body of research exists on this topic; for a more detailed explanation and a literature overview see: Lorenz and Lützkendorf, 2011 and Sayce et al., 2010).

These practices have now been made explicit obligations by those responsible for setting valuation standards (notably RICS). The result is that valuation practitioners now must (1) explicitly recognize the importance of sustainability considerations within valuation assignments and (2) extend their data collection and inspection routines accordingly.

Regarding the former requirement – explicit recognition of sustainability as a potential value driver and risk factor – the 2014 edition of the RICS Valuation Standards (commonly referred to as the Red Book) states that:

"as commercial markets become more sensitised to sustainability matters, so they may begin to complement traditional value drivers, both in terms of occupier preferences and in terms of purchaser behaviour."

RICS, 2014, p. 59

Therefore, valuers are advised to:

"[…] assess the extent to which the subject property currently meets sustainability criteria and arrive at an informed view on the likelihood of these impacting on value, i.e. how a well-informed purchaser would take account of them in making a decision as to offer price, […]."

RICS, 2014, p. 59-60

Interestingly, the Red Book refers to the issue of *sustainability as a potential value driver and risk factor* in the form of a Valuation Practice Statement (VPS) under the heading "assumptions". A valuation practice statement is described as containing "specific, *mandatory requirements* [authors' emphasis] and related implementation guidance, in relation to the process of providing a valuation that complies with the International Valuation Standards (IVS)." (RICS, 2014, p. 10). An assumption according to RICS terminology is defined as:

"a supposition taken to be true. It involves facts, conditions or situations affecting the subject of, or approach to, a valuation that, by agreement, do not need to be verified by the valuer as part of the valuation process. Typically, an assumption is made where specific investigation by the valuer is not required in order to prove that something is true."

RICS, 2014, p. 6

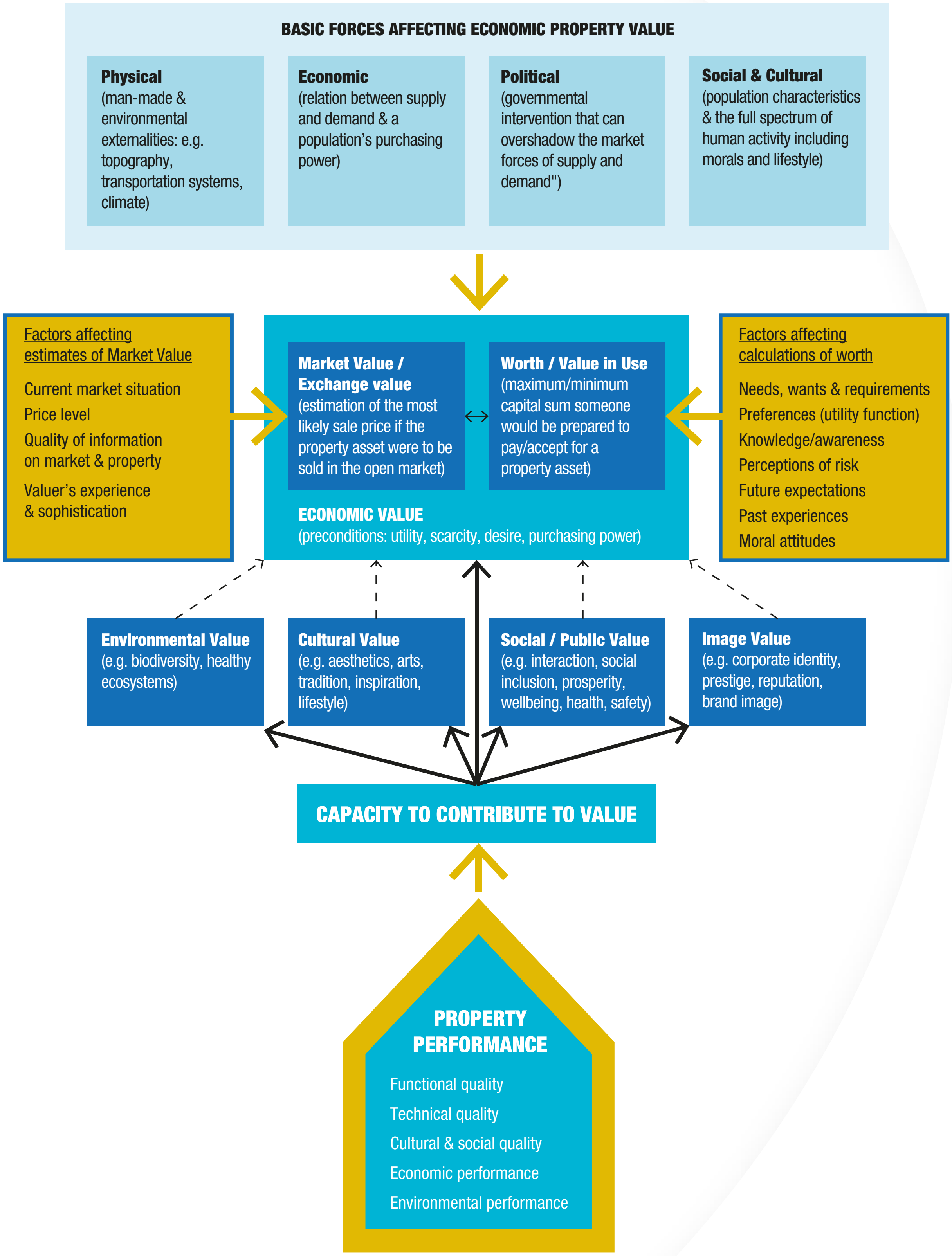



**Figure 8**

Value map[8]: relationships between performance / quality characteristics and monetary/non-monetary categories of value (This figure relates to box B → box D1, D2 in the Master Diagram)

[8] *Based on: Lorenz and Lützkendorf (2011); Additional sources for this figure are: RICS (1997); Pearce and Barbier (2000); McParland et al. (2000); Appraisal Institute (2001); Kohler and Lützkendorf (2002); Gaddy and Hart (2003); Morris Hargreaves McIntyre (2006); CABE (2006); Macmillan (2006).*

Regarding the latter requirement – extended data collection routines – RICS has published a Guidance Note on sustainability and commercial property valuation, which accompanies the more generic requirements contained within the Red Book. The Guidance Note contains a checklist of data and other information factors "that valuers should consider collecting where feasible, whether or not there is direct evidence that these currently impact on value." It argues that:

"by so doing valuers will be contributing to the systematic improvement in data that will help ensure that, as markets become sensitised to sustainability issues, appropriate analysis can be undertaken to support future estimates of value."

RICS, 2013a, Appendix A

The checklist of data and other information factors suggested by RICS is compatible to the listing contained in Appendix 2 of the present report as both listings are based on respective ISO standards.

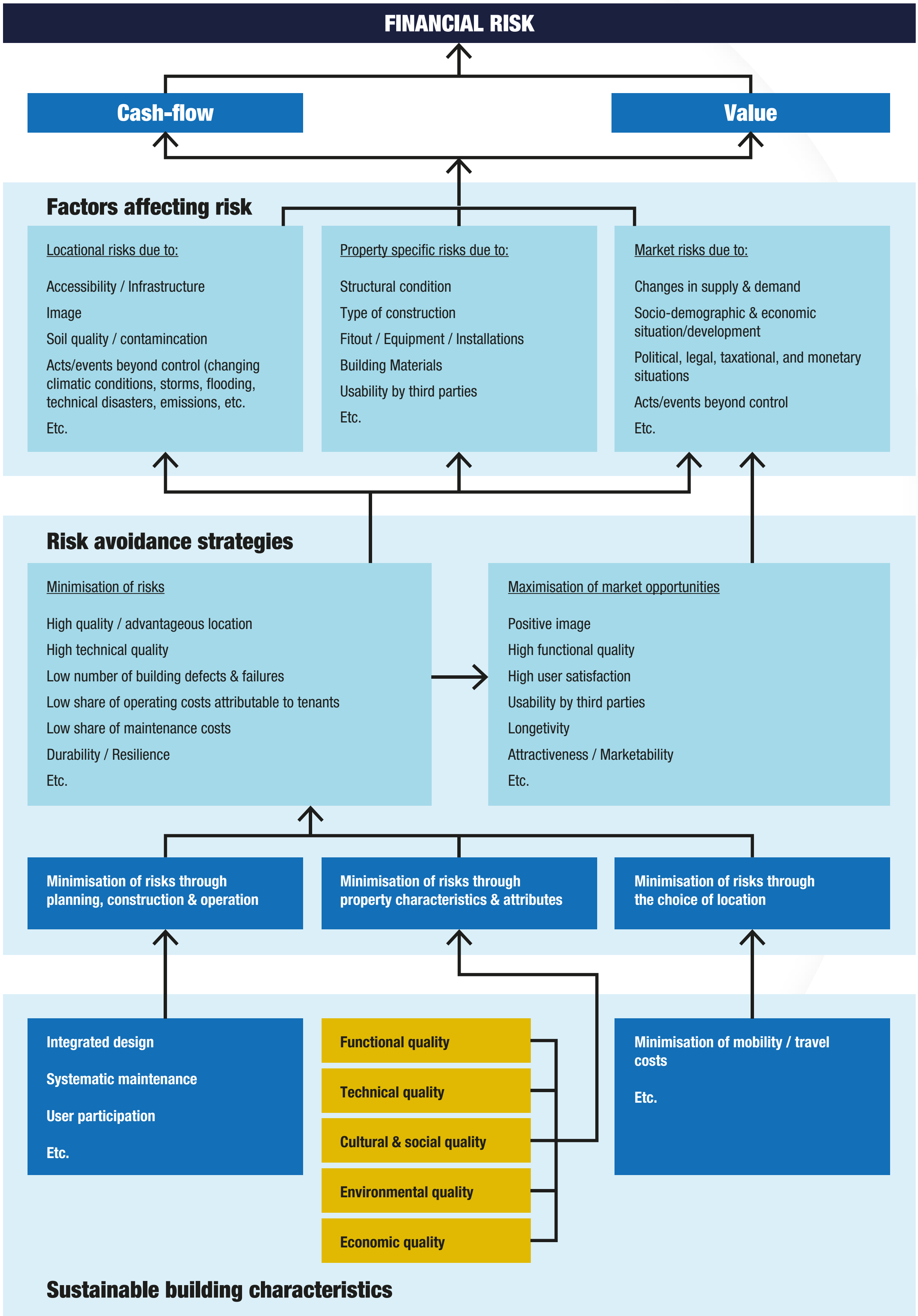
Valuation guidance also places pressure and new demands on clients (i.e. property owners). The RICS Guidance Note encourages valuers to request property performance information from their clients:

"In undertaking their investigations, the valuer should also ask their clients to provide data (e.g. on energy performance). If clients are unable (or unwilling) to provide data, then this should be treated as a potential additional risk factor."

RICS, 2013a, para 3.2.1

These recent alterations to the RICS' Red Book and the accompanying Guidance Note are by far the strongest endorsement of sustainability as a potential value driver and risk factor contained in any professional valuation standard, nationally or globally. As this alteration is recent, it is too early to tell how valuation professionals will cope with these new standards and their far-reaching consequences for valuation practice.

An important implication arises for clients. Whenever a client / owner organisation needs a property valuation performed to RICS standards (e.g. for their accounts), there will be a demand for extended information. This entails the establishment of a properly managed internal information flow and an organised information system.




Source: Lützkendorf, T. and Lorenz, D., Karlsruhe Institute of Technology (KIT)

**Figure 9**

Understanding financial risk through property performance & characteristics

Physical property characteristics and associated sustainability-related building performance not only impact on property pricing, risk assessment and valuation. Additional close linkages exist with property lending practices, credit risk assessments and the determination of financing/loan conditions. This is not a newly discovered or recently strengthened relationship (as in the case with valuation). These lending-related aspects emerged as a direct consequence of the further development and adoption of international banking capital adequacy rules put forward by the Basel Committee on Banking Supervision (BCBS). The so-called Basel II Accord (published in 2004 and subsequently adopted into national law in most developed countries except in the US) required banks to take a much more sophisticated approach with regard to their risks associated with lending. Basel II also required banks to develop property rating systems as a precondition for the application of the 'advanced internal rating-based approach'. This approach for determining the bank's equity capital was perceived to be beneficial. It allows banks to deviate from pre-defined capital requirements and to calculate (within certain boundaries) the required amount of equity capital for property financing by themselves (BCBS, 2004). The recently introduced Basel III Accord has not changed the basic mechanisms and rules for property financing but it has increased measures to protect against future economic downturns. This potentially further increases the need for portfolio managers to integrate sustainability management practices which help to contain risk.

In a very general sense, a rating is a procedure that illustrates the assessment of an object, a person or situation, etc. on a (given) scale. Its purpose is to improve the informational basis for decision-making. Within the banking industry ratings are used, amongst other issues, to predict the probability of default (PD) of granted loans as well as the amount of loss in the event of default (loss given default, LGD) based on historical credit data. The property rating systems developed in the last decade (and which are applied by many banks today) contain sustainability-related rating criteria. For example, the property rating system developed by the Association of German Public Banks (Bundesverband öffentlicher Banken Deutschlands, VÖB) contains the rating criteria "ecological sustainability", "environmentally-friendly building concept", "energy consumption" as well as further socio-cultural and functional aspects.

It is very difficult (from a researcher's perspective) to precisely quantify the actual impact of such factors on loan conditions – as banks do not publish historical credit data and the algorithms by which they transform borrower and property rating results into interest rates offered to their customers. However, at a more practical level, it is possible to explain the basic mechanism or impact chain (Lützkendorf and Lorenz, 2007).

**Figure 10** shows a simplified 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 the Basel II/III Accords. It explains how loan conditions (loan amount and interest rate) depend on a combination of property rating and valuation results, along with other factors.

The loan amount mainly depends on the market or mortgage lending value of the property. The interest rate depends on several factors, which are also portrayed in Figure 10. Two of these factors, the standard risk costs and the cost premium for equity capital, normally depend on the risks associated with the property and with the borrower. These risks are assessed through ratings that result in an estimation of the possible loss in the event of loan default (LGD) and of the probability of loan default (PD). In order to conduct the ratings, banks evaluate different kinds of information on the property and the client by making use of rating criteria, weightings, and measurement standards in order to derive rating results or risk scores. However, in property project financing or in cases where the major security for the loan consists of the property asset to be financed, the bank's rating is mainly focused on the property asset. The qualities of the property asset then determine both the possible loss in the event of loan default and the probability of loan default, i.e. the rating of the borrower becomes almost unimportant and the rating of the property becomes decisive for determination of the interest rate.

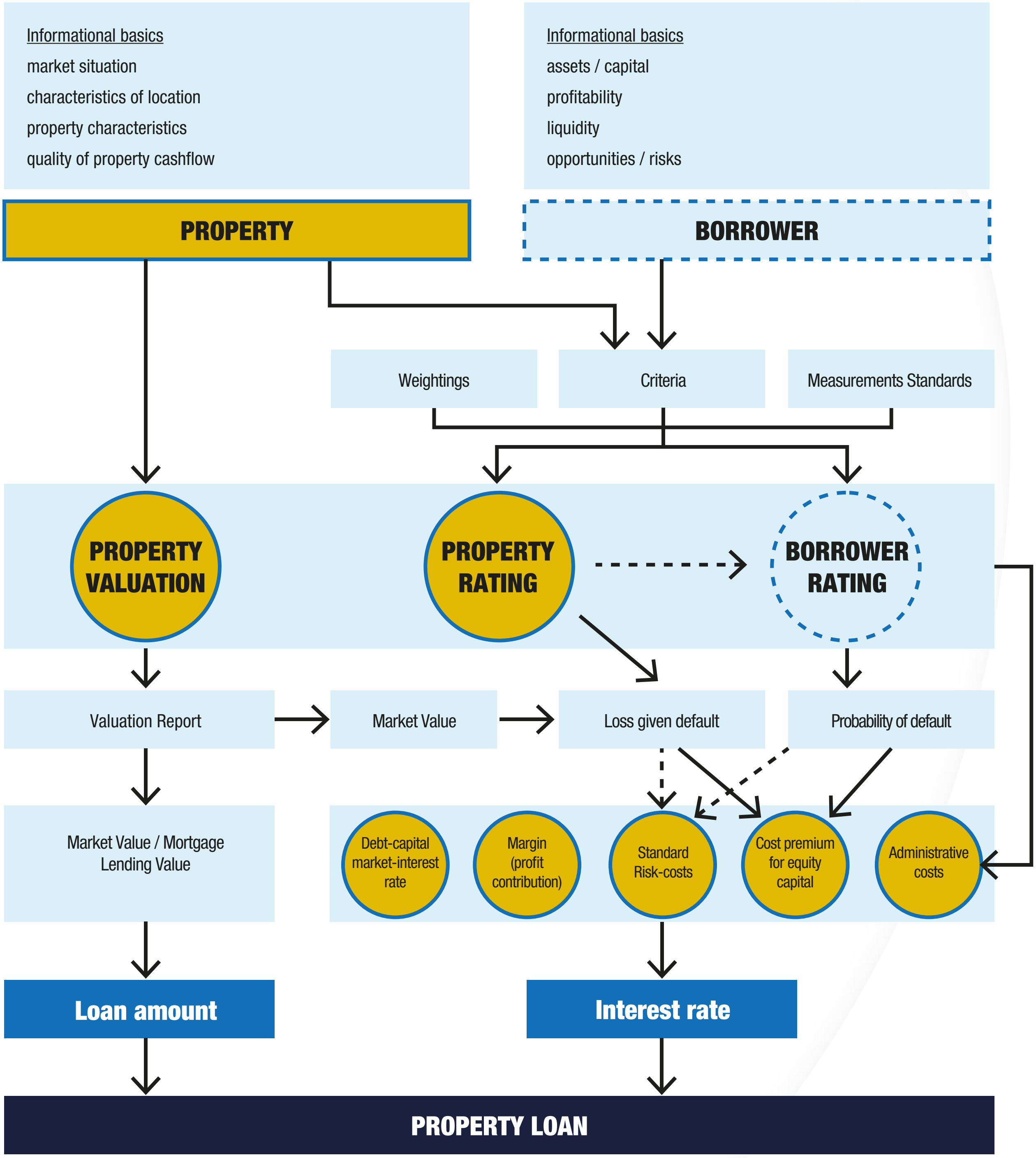



**Figure 10**

Determination of financing conditions under the advanced IRB-approach of the Basel Accord (based on: Lützkendorf and Lorenz, 2007, p. 651)

A strong (theoretical) case exists for the assumption of a twofold impact. First, the increased consideration of sustainability issues within valuation practices can lead to higher/lower loan amounts granted for sustainable/unsustainable assets. Second, the inclusion of sustainability-related rating criteria within property rating systems can result in favourable/unfavourable interest rates for the financing of sustainable/unsustainable assets. Consequently, it is advantageous for those organisations seeking a property loan to provide this information to the bank for determining loan conditions. (The benefit is a better interest rate or loan amount.) This entails the organisation(s) seeking a loan having internal information systems in place to meet the bank's information demand.

An explanation is needed why the aforementioned impact chain (or mechanism) has not yet fully developed its potential and led to much more tangible consequences in lending practices. The reason is that many banks arguably do not treat a lack or absence of information as a potential risk factor. When banks apply property rating systems they typically judge the rating criteria on a scale (usually ranging from 1 = very good to 10 = disastrous). If no information is available on a particular rating criterion (e.g. energy consumption), then an average rating (rating grade 5) is usually applied by a bank for judging this criterion. From a methodological and risk-sensitive perspective, this can be characterised as a flawed lending practice. It is beyond the scope of this report to investigate the extent to which banks actually adopt such a *risk-indifferent approach to property lending* (some sustainability-conscious banks may well adopt a different approach). However, evidence based on the authors' personal communication with several banking representatives (also with the Association of German Public Banks) have confirmed that this is prevailing practice. Given the arguments provided in this report (and elsewhere) for treating sustainability as potential value driver and risk factor, any risk-sensitive bank might not wish to continue using a flawed lending practice.

Up to this point, the discussion has focused on only those impact chains, information flows and opportunities to exercise influence directly related to the building itself. There are additional perspectives which influence building performance and value, such as property management. **Table 3** describes the non-physical factors which impact on property performance.

These factors include site and location, climate and weather conditions, surroundings, the construction process, the suitability of the design to facility management capacity, the quality of facility management services, the ease of use (by occupants), the affordances provided to inhabitants and, above all, occupant, tenant and corporate behaviours. These factors can be influenced. It is important to bear in mind that, for example, occupant behaviour heavily impacts on energy performance. As a result, not only do external conditions need to be accepted (e.g. local climate can be seen as a systematic risk) but there are low-cost possibilities to exercise influence. (An often under-estimated low-cost option to improve energy performance is to influence occupants' behaviour.)[9]

Against this background, new duties and responsibilities emerge between building owners (landlords), facility managers and corporate tenants (see Axon et al, 2012). For example, corporate tenants need to be actively informed about consumption values. Depending on the split of liabilities, corporate tenants themselves and their employees (occupants) influence consumption. The provision of feedback enables corporate tenants to sensitise their employees in regard to their own impact on these performance variables. In certain cases, however, facility managers or owners/landlords depend on corporate tenants to provide information on consumption values (e.g. on water and energy consumption) whenever these utilities are settled directly between the tenant and the utility service provider. These mutual duties and responsibilities can be (and should be) negotiated and settled within green lease clauses. However, the potential of green leases goes well beyond that. For example, they can also be used to agree on consumption reduction strategies as well as to share the costs and benefits of energy efficiency retrofits, etc. Several green lease guides are available (e.g. from the Better Buildings Partnership[10]) which also help to settle individual contracts based on template clauses and contract modules.

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9 *In this context it is also important to briefly mention a typical misunderstanding concerning waste: waste is often listed as sustainable building indicator. However, waste needs to be clearly distinguished into waste from the construction process and waste generation during operation. The last-mentioned category is neither caused nor influenced by the building but by its occupants.*

10 *See: http://www.betterbuildingspartnership.co.uk/working-groups/green-leases/green-lease-toolkit*

■ High / direct impact
□ Low / indirect impact

| PERFORMANCE / QUALITY CHARACTERISTICS | INFLUENCED BY … Site and location | Climate | Surroundings | Construction processes | Building | Building equipment | Energy source | Facility management | Interior fitting | Occupant behaviour | Corporate tenant behaviour |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.1** Serviceability | | | | | ■ | | | | | | |
| **1.2** Space efficiency | | | | | ■ | | | | | | |
| **2.1** Aesthetic quality | | | | | ■ | | | | | | |
| **2.2** Urban design quality | | | □ | | ■ | | | | | | |
| **2.3** Cultural value | | | | | ■ | | | | | | |
| **3.1** Health & well-being | | | | | ■ | | | ■ | | | |
| **3.2** Indoor air quality | | | □ | | ■ | ■ | | ■ | ■ | ■ | |
| **3.3** Comfort (thermal, acoustic, visual) | | | | | ■ | | | ■ | | | |
| **3.4** User safety | | | | | ■ | | | ■ | ■ | ■ | □ |
| **3.5** User participation and control | | | | | | ■ | | ■ | | ■ | ■ |
| **3.6** Accessibility | | | | | ■ | | | □ | □ | | |
| **4.1** Structural safety | | | | | ■ | | | | | | |
| **4.2** Fire protection | | | | | ■ | | | | ■ | □ | □ |
| **4.3** Noise protection | | | □ | | ■ | | | | □ | □ | |
| **4.4** Moisture protection | | | | | ■ | | | | | | |
| **4.5** Maintainability | | | | | ■ | | | | | | |
| **4.6** Flexibility and adaptability | | | | | ■ | ■ | | | □ | | |
| **4.7** Ease of cleaning | | | | | ■ | ■ | | ■ | | | |
| **4.8** Durability | | | | | ■ | | | | | | |
| **4.9** Design for deconstruction and recyclability | | | | | ■ | | | | | | |
| **5.1** Energy performance | ■ | ■ | □ | □ | ■ | ■ | ■ | □ | | ■ | □ |
| **5.2** Resource depletion | □ | □ | □ | | ■ | □ | ■ | □ | | □ | □ |
| **5.3** GHG-emissions and GWP | □ | □ | □ | | □ | □ | ■ | □ | | □ | □ |
| **5.4** Other impacts on environment & risks | □ | □ | □ | □ | □ | □ | □ | □ | | □ | □ |
| **5.5** Land use change and sealing | | | | | ■ | | | | | | |
| **5.6** Water consumption | | | | | | ■ | | □ | | ■ | □ |
| **5.7** Wastewater | | | | | | ■ | | □ | ■ | ■ | □ |
| **5.8** Waste (construction waste) | | | | ■ | | | | | | | |
| **6.1** Life cycle cost | □ | □ | | □ | ■ | ■ | ■ | □ | | ■ | □ |

## Table 3

Areas of influence on performance / quality characteristics

# 6. SUSTAINABILITY METRICS: CRITERIA AND INDICATORS

In the property sector, it has long been accepted that a need exists to gather and analyse a variety of data. This is particularly true for data and information to estimate economic values and to judge financial risks. To a large extent, there is consensus that structuring relevant information and data into the following assessment levels is sensible:

- location and market environment (macro- and micro-location)
- plot of land
- building
- quality of the cash flow

Consensus also exists for how sustainability issues should be treated. Whenever sustainability issues are considered within the scope of property-related decision-making and risk assessment processes, these issues should not be treated in isolation (e.g. as an "add-on") or as a separate category or criteria class. Instead, sustainability issues should be integrated and embedded into existing methods and instruments. A good and almost "historical" example for this is TEGoVA's property and market rating (see: TEGoVA, 2003) which lists "ecological sustainability" as a sub-indicator of the criteria class "quality of the building". This consensus view is also shared by Muldavin (2010) and can be supported by referring to a recent RICS publication which states:

"while basic valuation methods remain unchanged, sustainability issues are increasingly embedded into the traditional canon of value-relevant factors."

RICS, 2013b, p. 23-24

What exactly is meant by "sustainability issues" and where do they come from? The contribution of products and services to sustainable development is usually described and evaluated by an assessment. The assessment embraces (1) their ability to meet current and future requirements as well as (2) their capability to keep current and future impacts, expenses and risks within certain limits or boundaries. If the assessment results are positive, such products and services are commonly called 'sustainable'. This also applies for buildings and constructed works. Buildings and the investments in buildings have the potential to contribute to sustainable development.

In order to define relevant issues for buildings, it is possible to start with general protection targets which can be deduced from the overall concept of sustainable development as defined in the Brundtland Report (WCED, 1987). These protection targets are as follows:

- Protection and restoration of the natural environment / ecosystem (T1)
- Protection of natural resources (T2)
- Protection of human health and, wherever possible, improvement of well-being (T3)
- Protection and promotion of social values and of public goods (T4)
- Protection of capital and material goods (T5).

Transferred to buildings and their associated plots of land, several requirements can be formulated that help to classify sustainable buildings. These can be grouped under environmental, social and economic assessment criteria as well as under criteria related to the fulfilment of users' and occupants' needs. The latter include the maximization of the building's serviceability and functionality. The former encompass the following: minimisation of life cycle costs / cost effectiveness from a full financial cost-return perspective; reduction of land use and use of hard surfaces; reduction of raw material / resource depletion; closing of material flows; avoidance / reduction of hazardous substances; reduction of $CO_2$ emissions and other pollutants; reduction of impacts on the environment; protection of health and comfort of building occupants / users as well as of neighbours; and preservation of buildings' cultural value.

How this translates into manageable indicators has been the subject of intense international debate over the course of more than a decade. In the past, stakeholder groups (construction product manufacturers, designers, etc.) as well as scientists and specialists for life cycle assessment (LCA) dominated this debate.

An international consensus developed and crystallized in the work of the International Organization for Standardization (ISO), notably in the work of the Technical Committee on Sustainability in buildings and civil engineering works (ISO/TC 59/SC 17). The international standard ISO 21921-1 (2011) – entitled *Sustainability in building construction: Sustainability indicators, Part 1: Framework for the development of indicators and a core set of indicators for buildings* – provides applicable recommendations on a minimum set of indicators.[11]

The indicators suggested by ISO can be assigned to the criteria classes mentioned above: location, plot of land, building. As such, the traditional criteria classes for structuring the relevant information and data applied to property remain intact, but can be extended by additional sustainability related indicators within each criteria class.

The core set of indicators suggested by ISO is as follows:

For *location*:

- access to modes of transportation, green and open areas, and user-relevant basic services

For the *plot of land*:

- change of land use
- accessibility of the site

[11] *For a European application specific standards have been developed within the scope of CEN TC 350; notably EN 15643 Parts 1 to 4: Sustainability of construction works - Sustainability assessment of buildings (see the References section for more details on these European standards).*

For the *building*:

- global warming potential (GWP)
- ozone depletion potential (ODP)
- non-renewable resource consumption (materials)
- non-renewable resource consumption (energy)
- freshwater consumption
- waste generation
- accessibility of the building
- indoor conditions (thermal, visual and acoustic comfort)
- indoor air quality
- adaptability (change of use or user needs)
- adaptability (climate change)
- lifecycle cost
- maintainability
- safety (structural safety, fire safety, safety in use)
- serviceability (fit for purpose)
- aesthetic quality

The above-mentioned indicators have been used (in similar/comparable format) to design the survey question on property investors' understanding of sustainable buildings (see Chapter 7). The indicators have also been used to create a "long-list" of decision-relevant information and data which combines/merges information and data traditionally being used in property with information and data relating to sustainability. This long-list as well as property investors' judgment on the relevance of each item in their data collection routines are shown in **Appendix 3**.

The core set of indicators suggested by ISO reveals that an assessment of a single building's contribution to sustainable development ("degree of sustainability") goes significantly beyond environmental issues. It covers a variety of aspects that have traditionally played a role in property valuation and property risk assessment (e.g. serviceability and adaptability / third-party usability). The information demand of two formerly distinct disciplines – valuation / risk assessment and sustainability assessment – is now converging and increasingly overlaps. These two disciplines also increasingly draw upon each other for two reasons. Valuation and risk assessment increasingly require and integrate sustainability-related information. Sustainability assessments of buildings increasingly consider economic factors (in addition to life cycle costs) as well.

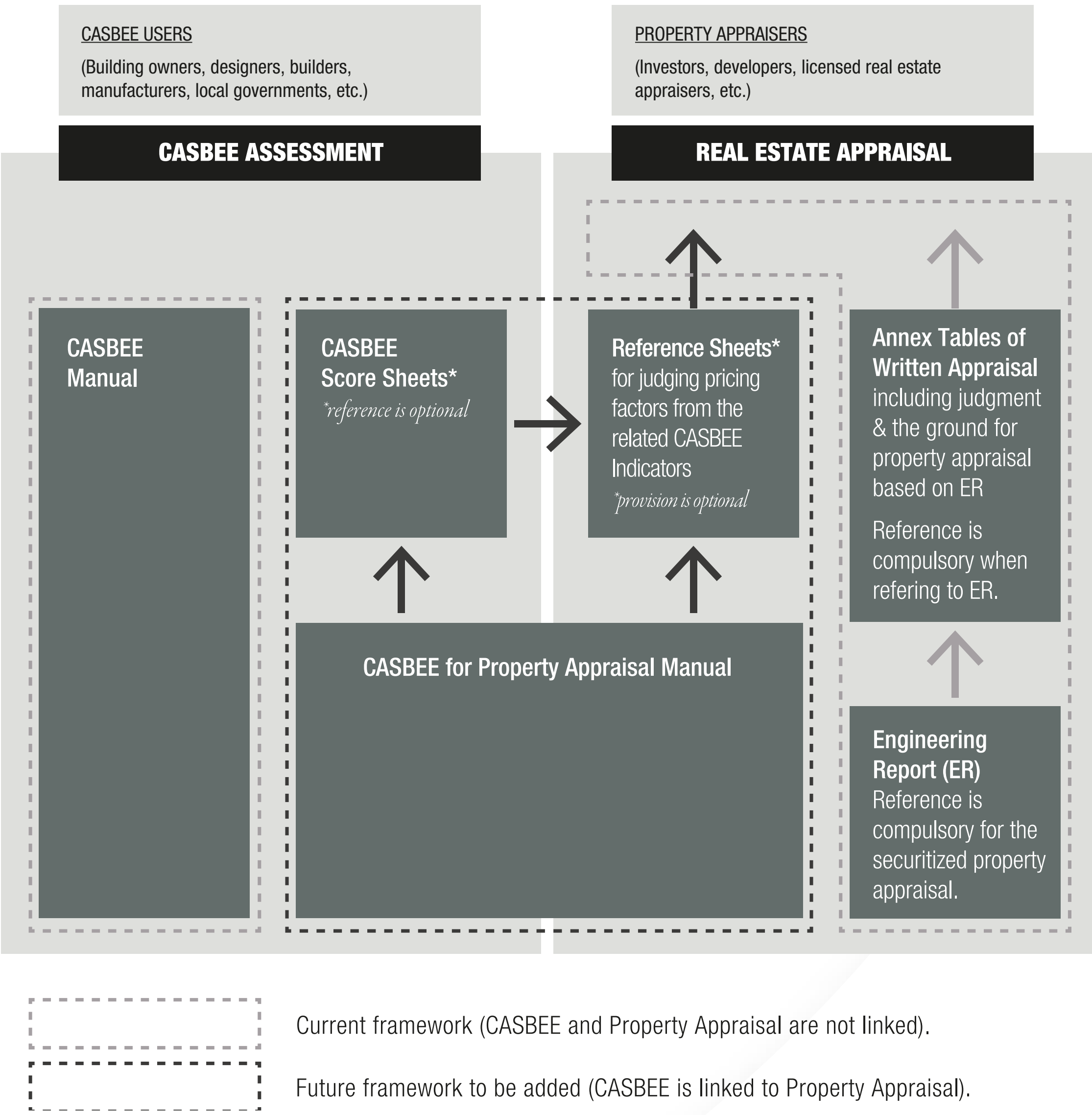
## Box 1

Examples on the linkages between sustainability assessment systems and property valuation

### CASBEE, Japan

When creating CASBEE (Comprehensive Assessment System for Built Environment Efficiency) in Japan, its developers realised that the results of sustainability assessment systems can – if provided in a disaggregated format – generate added-value to several different forms of stakeholders, particularly for valuation and valuation professionals. The developers of CASBEE have therefore investigated the information links and the possible sharing of functions between sustainability assessment systems and valuation:

*Linkage between CASBEE and property valuation/appraisal*




Source: *www.ibec.or.jp/CASBEE/english/document/CASBEE_property_brochure.pdf*

**Box 1**, continued

Examples on the linkages between sustainability assessment systems and property valuation

Dedicated guidelines and tools for using CASBEE for valuation purposes have been developed and are freely available: www.ibec.or.jp/CASBEE/english/download.htm

A recent initiative by the developers of CASBEE is to create a special (simplified) version of their assessment system tailored to the needs of UNEP FI and UNEP SBCI member organisations. This will provide an easy to understand and highly compatible assessment system. The draft version of "CASBEE for Market Promotion" is also available through the website mentioned above.

**NaWoh, Germany**

This system is focused on the assessment of new multi-family apartment buildings. The sustainability assessment system NaWoh ("NachhaltigerWohnungsbau", sustainable housing) provides more than life cycle costs as an indicator for assessing the economic dimension: It includes two additional valuation-related indicators. Besides minimising life cycle costs, the preservation of capital values constitutes an important aspect of the economic dimension of sustainable development.

*"Short-term cost-value ratio"*
In order to assess this indicator, the investment costs are compared with the property's market value at the date of completion/handover/commissioning of the building. This determines whether and to what extent the created value of the project is proportional to the financial expenses required. In order to estimate the property's market value the standard investment method is applied.

*"Building-induced contribution to long-term value stability and value development"*
In order to describe and ascertain this metric, consequential indicators need to be applied. In this case, the future viability of the building's construction is taken as a consequential indicator. This can be assessed by considering the durability of the construction, the quality and the potential for retrofitting the insulation and technical equipment, as well as the utilisation neutrality of the housing layouts.

The system is available free of charge: www.nawoh.de. Compliance checks and the issuing of corresponding quality marks are carried out by the not-for-profit association on the advancement of sustainability in the housing industry ("Verein zur Förderung der Nachhaltigkeit im Wohnungsbau e.V.").

The set of ISO indicators listed above also reveals that the ISO standard emanates from / assumes an assessment of new buildings. To a certain extent, this implies the availability of results of a full life cycle analysis (life cycle assessment and life cycle cost assessment). Currently, these are only occasionally carried out within the (full) sustainability assessment and certification of new or existing buildings, or larger refurbishment projects. In the case of existing buildings and refurbishment projects, this causes problems since the necessary information and data (e.g. environmental product declarations (EPDs) for all building materials and components) are usually unavailable.

To address this problem (i.e. unavailability of a full life cycle analysis for existing buildings), the providers of sustainability assessment systems and certification schemes develop and offer "in use" approaches. These typically focus on measuring and assessing energy consumption, emissions (usually $CO_2$), water consumption, as well as waste generation during occupation.

A closer look at the issue of sustainability metrics reveals that the problem is not solved by merely listing a core set of indicators. Instead, several further questions arise. These relate to the availability of data, appropriate measurement rules, reference units and benchmarks. Depending on the phase of the building's life cycle, data availability, and further external conditions, one or more suitable indicators can be identified in order to describe and assess one single assessment criteria. For example, energy performance can be described and assessed by referring to (1) calculated energy demand, (2) measured energy consumption, and (3) the characteristics of the building envelope and the building equipment (heating, ventilation, lighting, and cooling system). In addition, the choice and applicability of benchmarks and reference units will depend on the local climate, local traditions and conventions, as well as on local resource availability, etc. It should also be noted: the magnitude of the impact of sustainability indicators on financial factors will not only depend on a range of surrounding factors (such as market conditions and context) but is also likely to change over time (e.g. due to changes in lifestyle, consumer preferences, etc.).

**Table 4** contains a commentary on ISO's core set of indicators. It highlights (1) the individual indicator's materiality (i.e. its relevance from a sustainable development perspective as well as from a financial perspective), (2) the indicators' applicability for new and existing buildings, and (3) partial and consequential indicators which can be used whenever the full and direct application of the original indicator is not possible due to data limitations.

| Indicator | Relevance for targets of protection (SD-perspective) | | | | | Financial relevance / perspective | Comments on applicability for new and existing buildings | Partial-/Sub-Indicators & Consequential Indicators |
|---|---|---|---|---|---|---|---|---|
| | T1 Ecosystem | T2 Resources | T3 Health & Well-being | T4 Social | T5 Capital | | | |
| Global warming potential (GWP) – life cycle approach | ■ | | ■ | | ■ | · Emission trading<br>· Reputation<br>· ESG requirement | Result of a full life cycle assessment (LCA) which is usually only available in connection with a sustainability assessment; equals the carbon footprint. Alternatively, assessment through replacement-indicators is possible. In most cases applicable during the planning stage only.<br>For existing buildings (during the use phase), GWP can be assessed on the basis of actual energy consumption (part of carbon footprint), various measurement rules exist. | · Emissions during usage (e.g. $CO_2$)<br>· Selection of environmentally friendly materials and products<br>· Durability<br>· Maintainability<br>· Design for deconstruction and recyclability<br>· Energy demand / Energy consumption<br>· Energy sources |
| Ozone depletion potential (ODP) – life cycle approach | ■ | | ■ | | ■ | · Reputation<br>· ESG requirement | Result of a full life cycle assessment which is usually only available in connection with a sustainability assessment. Alternatively, assessment through replacement-indicators is possible. In most cases applicable during the planning stage only.<br>For existing buildings (during the use phase), ODP can be assessed on the basis of actual energy consumption (part of carbon footprint), | · Emissions during usage<br>· Selection of environmentally friendly materials and products<br>· Durability<br>· Maintainability<br>· Design for deconstruction and recyclability<br>· Energy demand / Energy consumption<br>· Energy sources |
| Non-renewable resource consumption (materials) – life cycle approach | ■ | ■ | | | ■ | · Construction costs<br>· Refurbishment costs<br>· Disposal costs<br>· Reputation<br>· ESG requirement | Result of a full life cycle assessment which is usually only available in connection with a sustainability assessment. Alternatively, assessment through replacement-indicators is possible. Applicable during the planning stage only.<br>Meaningful application to existing buildings is not possible. | · Selection of environmentally friendly materials and products<br>· Durability<br>· Maintainability<br>· Design for deconstruction and recyclability |
| Non-renewable resource consumption (energy) – life cycle approach | ■ | ■ | | | ■ | · Operating costs<br>· Reputation<br>· ESG requirement<br>· Compliance with legislation/ building codes, etc.<br>· Value retention / growth | Result of a full life cycle assessment which is usually only available in connection with a sustainability assessment. Alternatively, assessment through replacement-indicators is possible. In most cases applicable during the planning stage only.<br>For existing buildings (during the use phase), the demand/consumption of non-renewable primary energy can be assessed (partial indicator). Requires energy consumption monitoring. Various measurement rules and benchmarks exist. | · Selection of environmentally friendly materials and products<br>· Durability<br>· Maintainability<br>· Design for deconstruction and recyclability<br>· Energy demand / Energy consumption<br>· Energy sources |

**Table 4**

A commentary on ISO's core set of indicators for buildings

| Indicator | Relevance for targets of protection (SD-perspective) | | | | | Financial relevance / perspective | Comments on applicability for new and existing buildings | Partial-/Sub-Indicators & Consequential Indicators |
|---|---|---|---|---|---|---|---|---|
| | T1 Ecosystem | T2 Resources | T3 Health & Well-being | T4 Social | T5 Capital | | | |
| Fresh water consumption (usually during the use phase) | ■ | ■ | (■) | | ■ | · Operating costs<br>· Reputation<br>· ESG requirement | During the planning stage, fresh water demand during usage can be estimated. Alternatively, description of type and extent of water saving measures and initiatives can be used. There is a trend towards assessing life cycle related water consumption (water footprint)<br>For existing buildings (during the use phase), the fresh water consumption can be measured. Requires water consumption monitoring. Various measurement rules and benchmarks exist. | · Water saving measures (e.g. efficient taps)<br>· Rain- and grey-water usage (on-site water harvesting)<br>· Availability of own clarification plant<br>· Water consumption |
| Construction Waste generation – life cycle approach (usually during construction, maintenance and deconstruction) | ■ | ■ | | | ■ | · Construction costs<br>· Refurbishment costs<br>· Costs for deconstruction<br>· Reputation<br>· ESG requirement | During the planning stage, construction waste amount during the building's life cycle can be estimated.<br>Meaningful application to existing buildings is not possible. However, it can be applied to refurbishment and modernisation projects.<br>CAUTION: this indicator is often confused with waste generation caused by occupants / building users. | · Design for waste minimisation<br>· Waste segregation on site<br>· Waste avoidance on site<br>· Maintainability<br>· Design for deconstruction and recyclability |
| Accessibility of the building | | | ■ | ■ | ■ | · Lettability<br>· Marketability<br>· Compliance with legislation/ building codes, etc | Accessibility can be proven during the planning stage.<br>For existing buildings (during use phase), accessibility can be evaluated through building inspection, due diligence. | · Degree of barrier-free accessibility<br>· Width of doors and corridor<br>· Availability of ramps<br>· Size of facilities/rest-rooms regarding barrier-free accessibility |
| Indoor conditions (thermal, visual and acoustic comfort) | | | ■ | ■ | ■ | · Tenant / occupant satisfaction<br>· Employee satisfaction<br>· Employee productivity<br>· Compliance with legislation/ building codes, etc | Can be calculated during planning stage. Degree of compliance with pre-defined requirements can be proven.<br>At handover, sound insulation / noise protection can be checked.<br>For existing buildings (during the use phase), parameters can be measured. Various measurement rules exist. In addition, degree of user satisfaction can be evaluated through surveys / occupancy evaluations. Both should be done in parallel. | · Post-occupancy evaluations (user/tenant surveys)<br>· Analysis of user/tenant complaints<br>· Noise protection test<br>· Measurement of daylight availability<br>· Measurement of illumination levels<br>· Measurement of indoor air temperatures |

**Table 4**, continued

A commentary on ISO's core set of indicators for buildings

| Indicator | Relevance for targets of protection (SD-perspective) | | | | | Financial relevance / perspective | Comments on applicability for new and existing buildings | Partial-/Sub-Indicators & Consequential Indicators |
|---|---|---|---|---|---|---|---|---|
| | T1 Ecosystem | T2 Resources | T3 Health & Well-being | T4 Social | T5 Capital | | | |
| Indoor air quality | | | ■ | ■ | ■ | · Employee satisfaction<br>· Employee productivity<br>· Tenant / occupant satisfaction<br>· Absenteeism<br>· Tenant satisfaction<br>· Compliance with legislation/ building codes, etc. | During the planning stage, a pre-determination of future indoor air quality is not yet possible. Requires selection and proof of appropriate construction products and internal surface materials.<br>At handover, a check of indoor air quality is through measurement is possible and sensible.<br>For existing buildings (during the use phase), user/tenant surveys regarding olfactory freshness possible. In addition, analysis of specific user/tenant complaints and/ or illnesses (building related illness / sick building syndrome) is possible and sensible. Also measurements of indoor air quality are possible; however, at this stage an identification of specific causes for problems with indoor air quality is almost impossible. | · Selection of health-friendly materials<br>· Ventilations system / concept<br>· Air exchange rates<br>· Indoor air measurements<br>· Post-occupancy evaluations (user/tenant surveys)<br>· Analysis of user/tenant complaints<br>· Analysis of building related illnesses |
| Adaptability (change of use or user needs) | ■ | ■ | ■ | ■ | ■ | · Third party usability<br>· Refurbishment costs<br>· Modernisation costs<br>· Value retention / growth<br>· Risk | Degree of required adaptability and flexibility needs to be specified by the client / awarding authority. This can then be incorporated into the design. Compliance with predefined requirements can be documented in the planning stage.<br>For existing buildings (during usage), the degree of adaptability and flexibility can be evaluated through building inspections, technical due diligence. | · Modernisation / re-modelling concept during planning stage<br>· Type of internal walls<br>· Ceiling / room height<br>· BUS-Systems for electrical installations<br>· Availability supply slots<br>· Location of vertical elements (stairs, lifts, risers) |
| Adaptability (climate change) | ■ | ■ | ■ | ■ | ■ | · Insurance costs<br>· Asset vulnerability | During the planning stage, the ability to resist exposure due to natural hazards and extreme weather events can be estimated and documented.<br>For existing buildings (during usage), usually a dedicated expert's report is necessary. | <u>Depending on region and exposure level:</u><br>· Resilience against flood, snow, storm, extreme heat and cold, etc.<br>· Land subsidence, changes in groundwater<br>· Ability to adapt insulation level to changing temperatures |
| Life cycle cost | | | | | ■ | · Cash Flow | During the planning stage, life cycle costing (LCC) / whole life costing (WLC) can be carried out. CAUTION: Rules for carrying out LCC or WLC within sustainability assessment do not always comply with the conventions applied within economic efficiency calculations / profitability accounting.<br>For existing buildings (during usage), operating costs can be measured (operating cost controlling required). Various measurement rules and benchmarks exist. | · Construction costs<br>· Operating costs<br>· End of life (decommissioning and disposal) costs |

**Table 4**, continued

A commentary on ISO's core set of indicators for buildings

| Indicator | Relevance for targets of protection (SD-perspective) | | | | | Financial relevance / perspective | Comments on applicability for new and existing buildings | Partial-/Sub-Indicators & Consequential Indicators |
|---|---|---|---|---|---|---|---|---|
| | T1 Ecosystem | T2 Resources | T3 Health & Well-being | T4 Social | T5 Capital | | | |
| Maintainability | ■ | ■ | ■ | ■ | ■ | · Operating costs | Needs to taken into account during the planning stage in the sense of safeguarding ease of carrying out maintenance, servicing and cleaning works. Maintainability is usually assessed through consequential indicators.<br>For existing buildings (during usage), maintainability can be evaluated through a building inspection, due diligence. | · Ease of carrying out maintenance works<br>· Ease of carrying out servicing works<br>· Ease of carrying out cleaning works<br>· Accessibility and exchangeability of critical building components<br>· Availability of inspection chambers<br>· Suitability for maintenance and modernisation while the building is occupied / in use |
| Safety (structural safety, fire safety, safety in use) | | | ■ | ■ | ■ | · Insurance costs<br>· Asset vulnerability<br>· Compliance with legislation/ building codes, etc.<br>· Building related accidents<br>· ESG requirement | Requirements concerning safety need to formulated and realized during the planning stage. Compliance can be proofed and documented during the planning stage. Important is a prognosis of expected future loads caused by usage, snow, etc.<br>For existing buildings (during usage), particularly the compliance with the legal duty to maintain safety in use is / can be checked. In addition, dedicated experts can check compliance with fire safety requirements.<br>Problems concerning structural safety (e.g. cracks in walls) can usually be evaluated through a building inspection, due diligence. If necessary or required, load bearing reserves can be evaluated through dedicated measuring tests. | · Structural safety test / proof<br>· Fire protection test / proof<br>· Compliance with the legal duty to maintain safety in use |
| Serviceability (fit for purpose) | | | ■ | ■ | ■ | · Lettability<br>· Marketability<br>· Tenant retention<br>· Tenant fluctuation<br>· Rent level<br>· Value retention / growth | Serviceability of new buildings is determined through user requirements and needs to be realized in the planning stage. Compliance can be checked through post-occupancy evaluations (user surveys).<br>Also for existing buildings (during the use phase), serviceability can be evaluated through a survey among occupiers / tenants. | · Space efficiency<br>· Size and type of rooms<br>· Post-occupancy evaluations (user/tenant surveys) |
| Aesthetic quality | | | ■ | ■ | ■ | · Lettability<br>· Marketability<br>· Reputation<br>· Value retention / growth | Can only be assessed through consequential indicators. | · Architectural competition<br>· Design award<br>· Design quality indicator (DQI) |

**Table 4**, continued
A commentary on ISO's core set of indicators for buildings

# 7. SURVEY OF PROPERTY INVESTORS AND MANAGERS

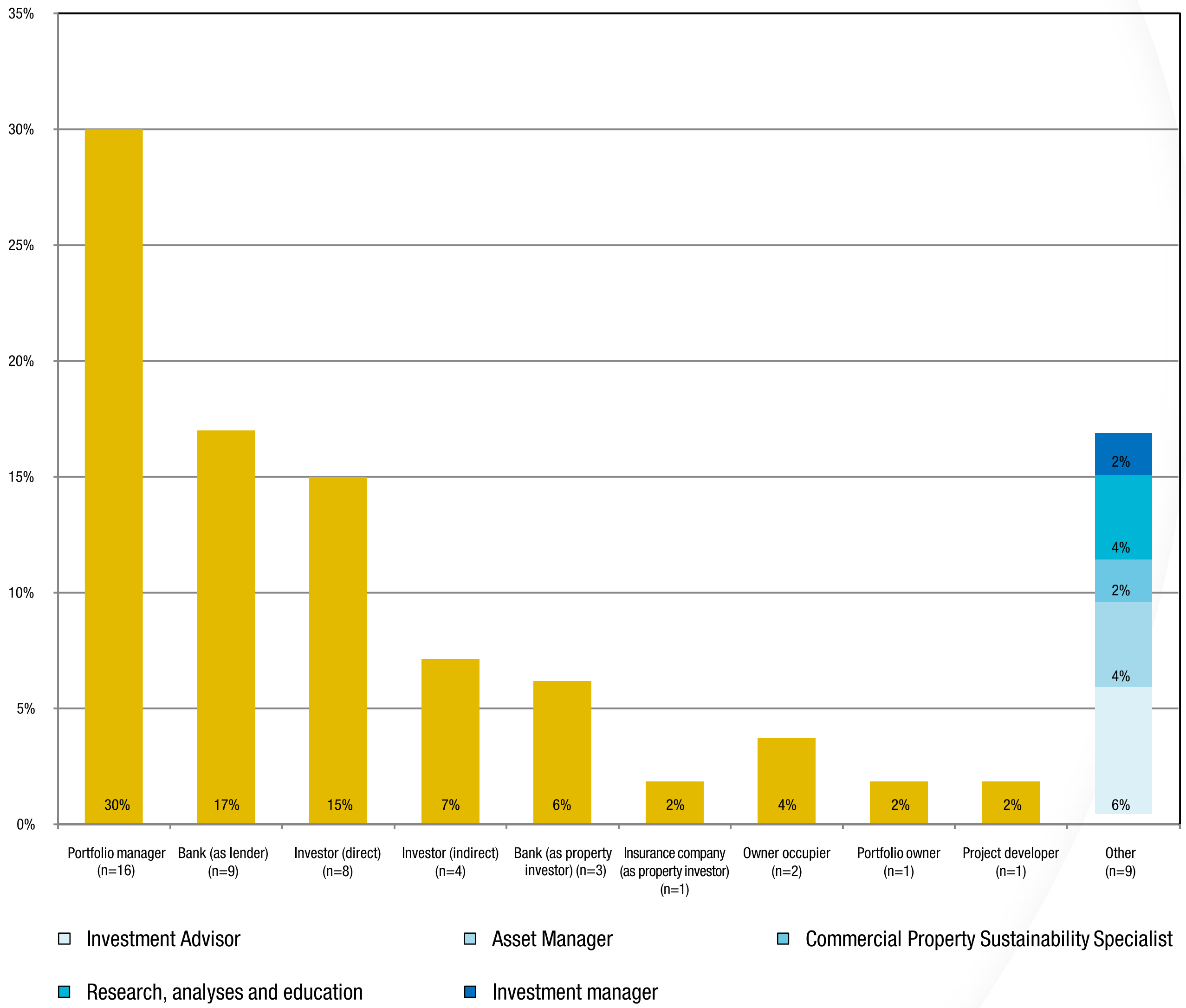
The survey was undertaken between August and September 2013 with an online-questionnaire. The goal of the survey was to improve the understanding of the following concerns:

- What parameters guide property investment and management decisions generally?
- What types of data do property investors and managers typically use to make their decisions?
- What do property investors and managers understand by the terms 'sustainable' real estate and 'sustainable buildings'?
- What types of sustainability related data are currently being gathered by property investors and managers and for what purpose?

The survey was distributed by e-mail (and newsletter) via the channels of UNEP FI, PRI, UN Global Compact, the Urban Land Institute's Greenprint Centre for Building Performance, RICS, the Better Buildings Partnership and the Institutional Investors Group on Climate Change (IIGCC).

The survey was answered by a total of 54 organisations. However, not all of them answered all questions. The majority of survey participants primarily deal with commercial assets (84%) while only 16% are mainly focused on residential assets. The survey revealed that more than two-thirds of the responding organisations (81%) currently have some form of a "sustainability / green / environmental / ethical / social check or due diligence system" in place in order to assess new and/or existing buildings. Further selected results of the survey are as follows:

Exhibit 1 provides an overview on the type of responding organisations. The majority of organisations that participated in the survey are portfolio managers, banks (as lenders), or investors. Surprisingly, owner-occupiers and portfolio owners are somewhat under-represented.

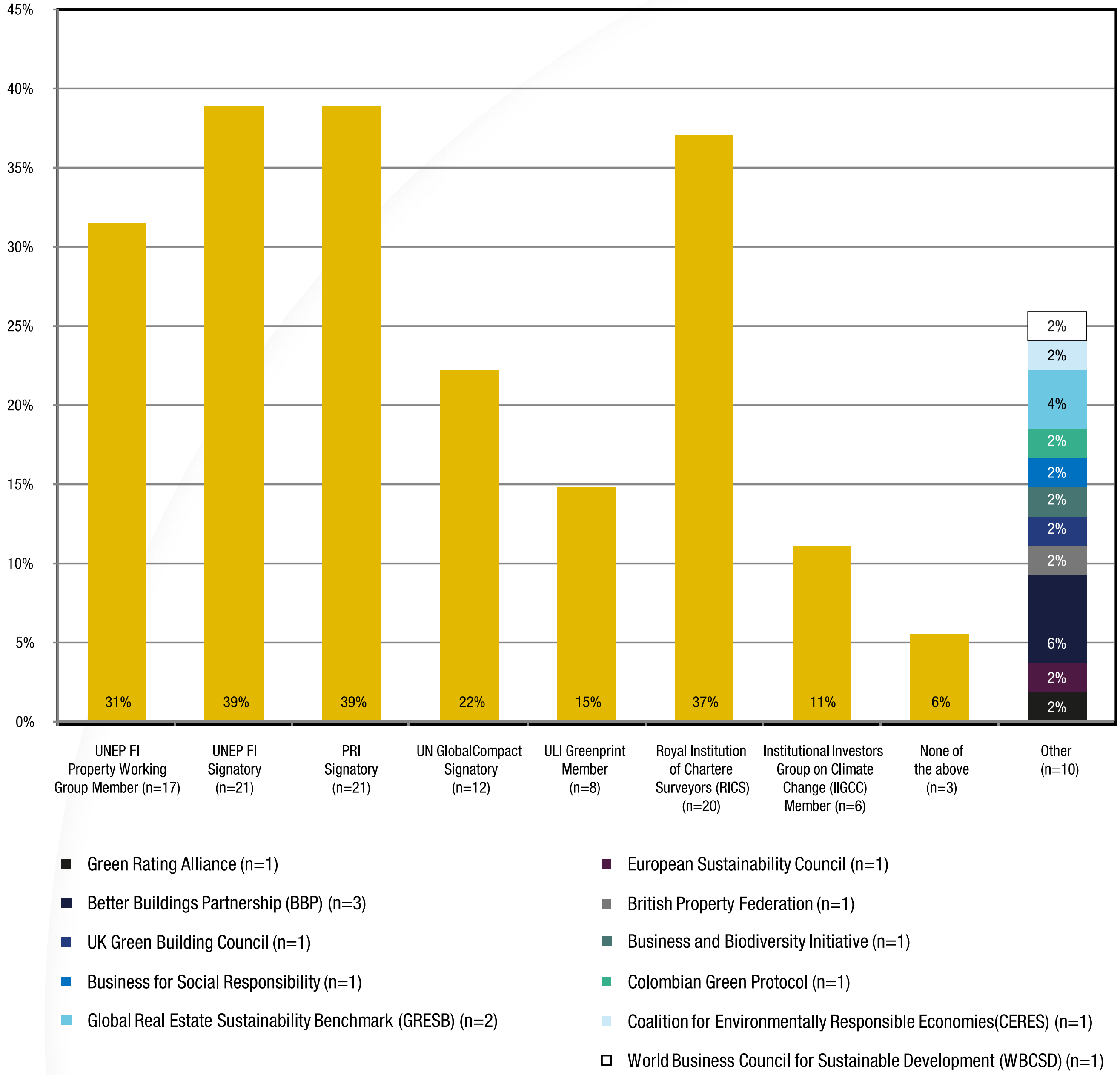



<u>Note:</u> *based on 54 valid responses*

**Exhibit 1**

Type of organisation (in %)

Exhibit 2 reveals the responding institutions' supported initiatives and/or organisations (multiple answers were allowed in this question). Most of the respondents are either UNEP FI Property Working Group members, and/or UNEP FI, UN Global Compact or PRI signatories. Many of them are also RICS member firms.

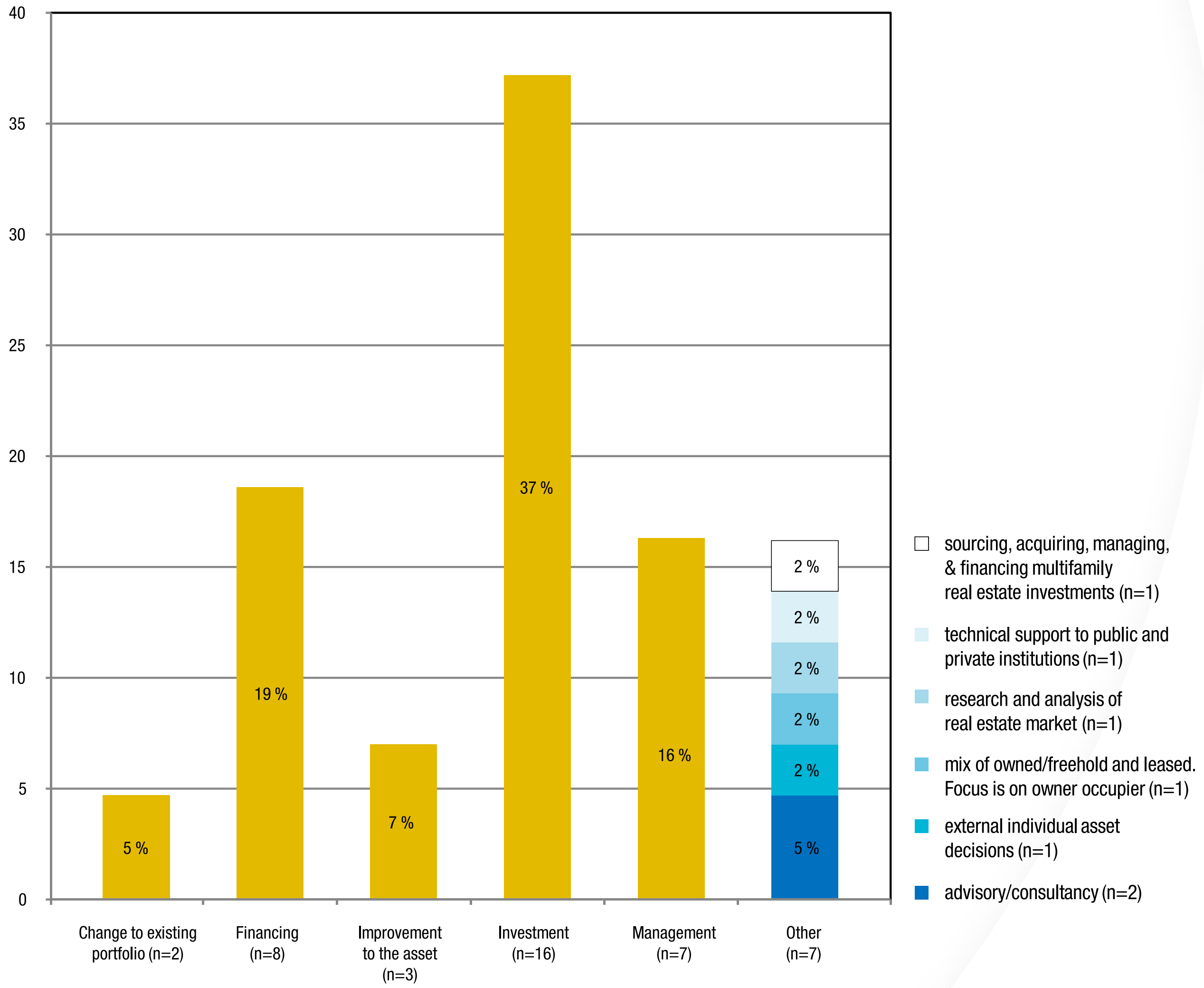



*Note:* *based on 54 valid responses*

**Exhibit 2**

Supported initiatives / organisations (in %)

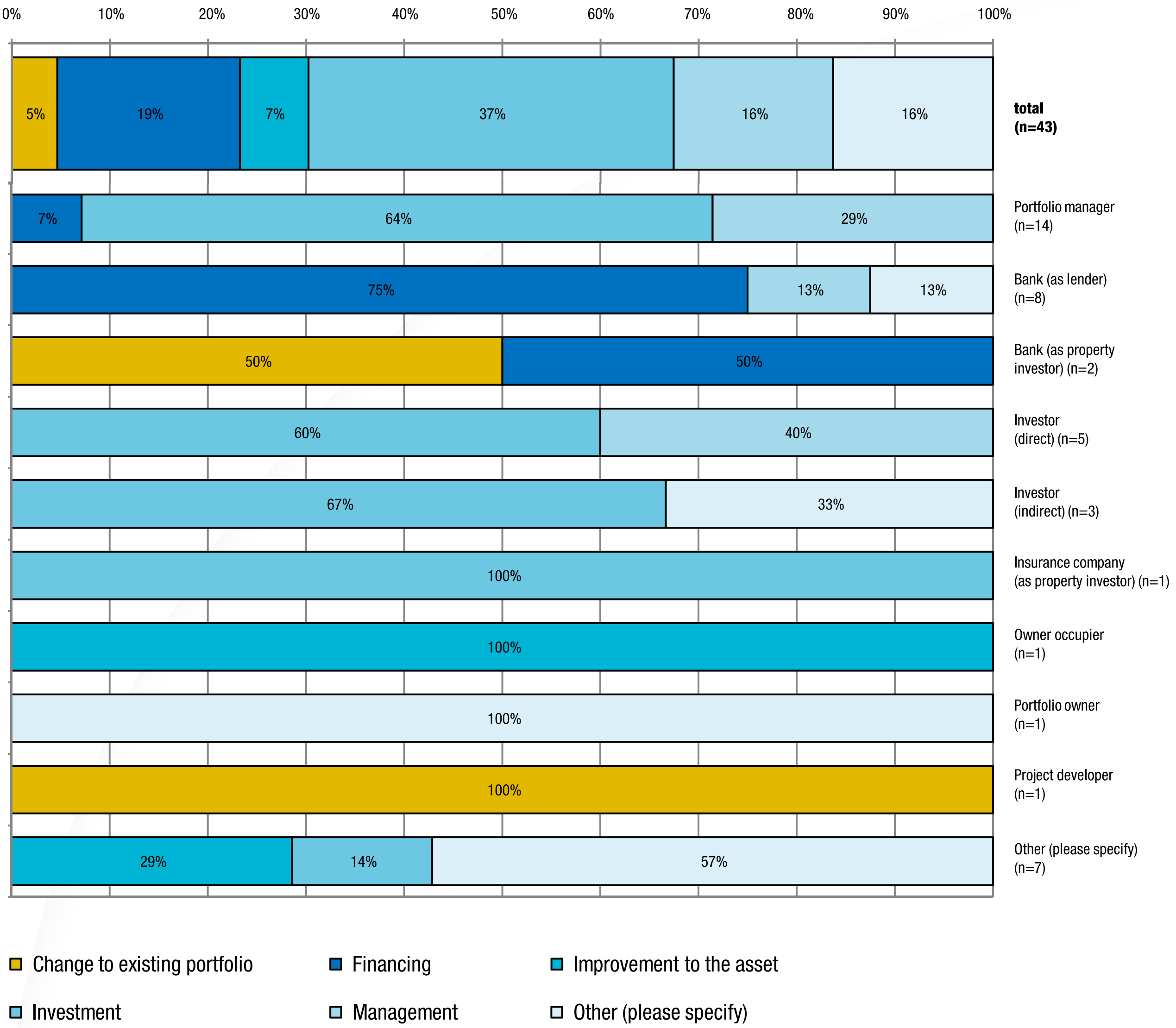
Exhibits 3 and 4 reveal the responding institutions' predominant decision-making context. While Exhibit 3 provides an overall picture indicating that the majority of respondents are predominantly concerned with property investment (37%), Exhibit 4 breaks down the answers by type of responding institution. Surprisingly, within this survey portfolio managers are more concerned with investment decision-making rather than with management related decisions. Another interesting result is that only a minority of respondents answered that asset improvement related decisions represent their primary concern.




*Note: based on 43 valid responses*

**Exhibit 3**

Predominant decision making context (in %)

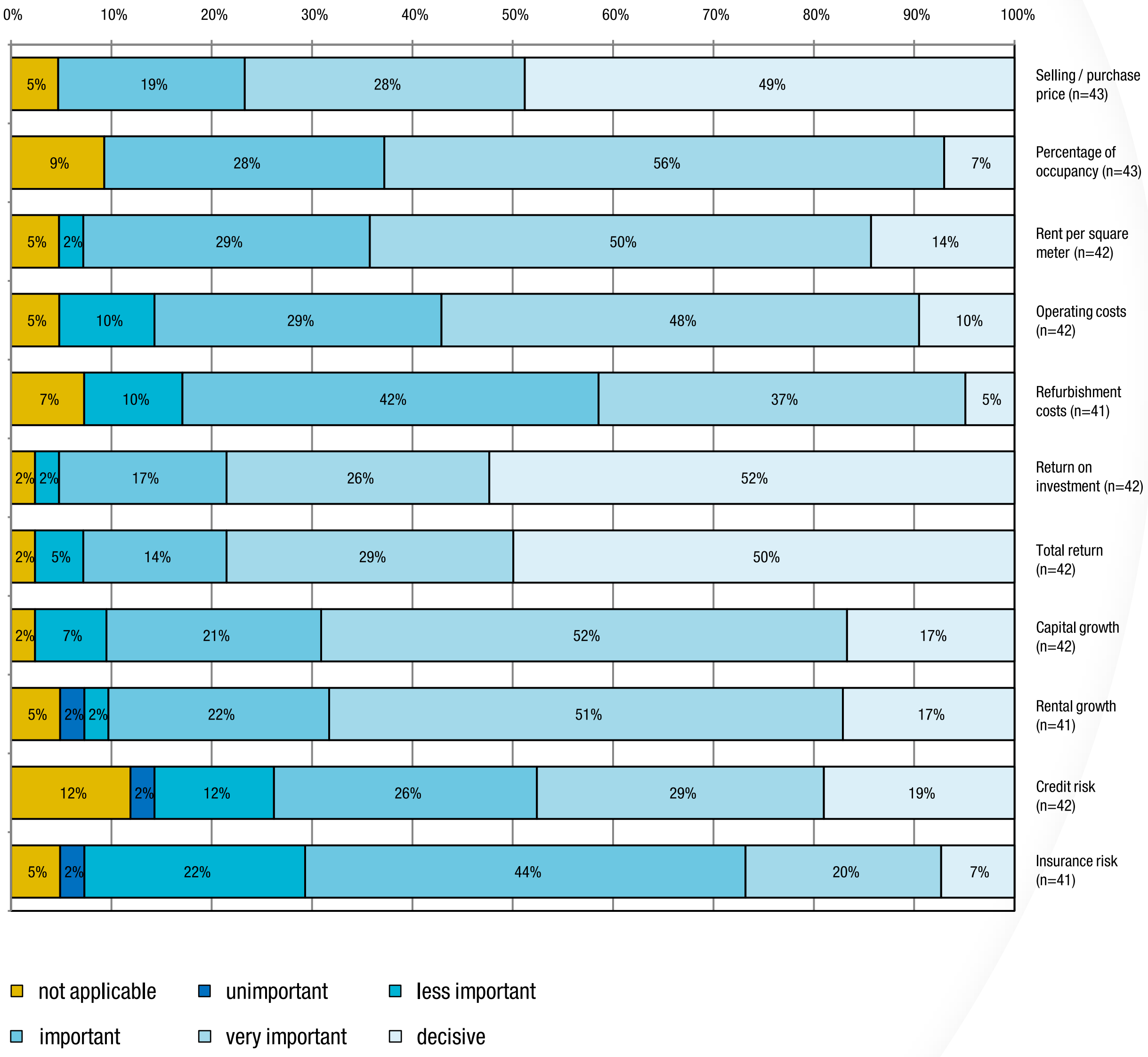



*Note:* *based on 43 valid responses*

**Exhibit 4**

Decision-making context by type of organisation (in %)

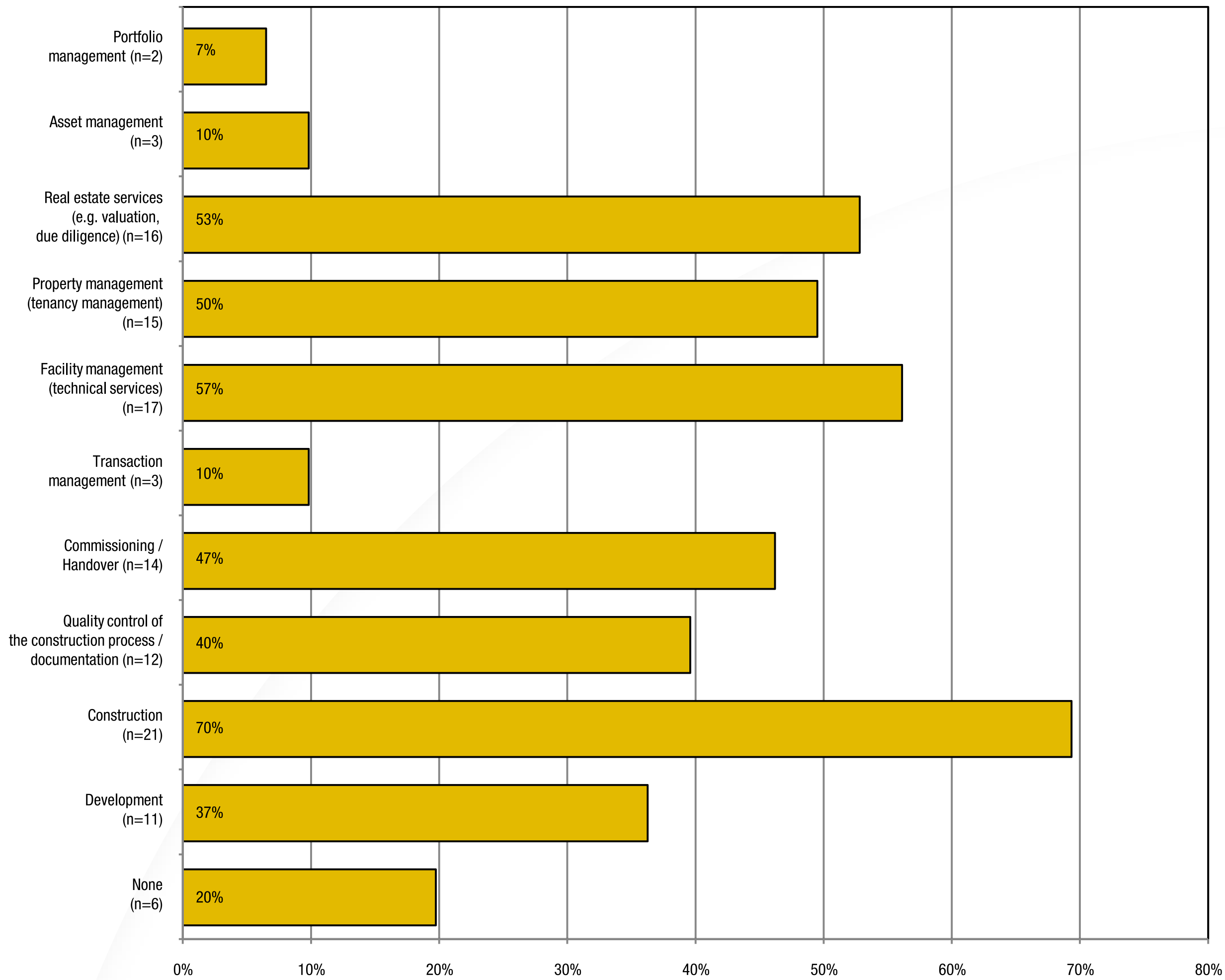
Exhibit 5 gives an overview of predominant economic decision-making parameters applied by the responding organisations as a basis for decision-making. Not surprisingly, "return on investment", and "total return" followed by "selling / purchase price" are the most decisive parameters across all types of respondents.




*Note: based on 43 valid responses*

**Exhibit 5**

Predominant decision-making parameters (in %)




*Note: based on 30 valid responses*

**Exhibit 6**

Externalised services / Degree of direct control over the assets under management (in %)

Exhibit 6 shows the extent to which responding organisations externalise certain functions such as project development or facility management to third-party service providers. 20% of all respondents undertake all property-related activities exclusively in-house. Also, strategic managerial activities such as portfolio, asset and transaction management are mainly carried out in-house. A maximum of only 10% of respondents externalize these kinds of functions. The relatively high share of externalized services in the areas of construction, development, quality control, commissioning and handover does not come as a surprise since organisations usually want to benefit from the knowledge and expertise of highly-specialized contractors and service providers.

The relatively high share of externalized services in the areas of facility and tenancy management as well as other real estate (property) services indicates that third parties are responsible for providing information and data. This information is highly relevant for strategic and managerial functions. This effectively means that many responding organisations have given away direct control over the processes of gathering, processing and managing of such information and data (e.g. consumption values). In such cases, it is very important that organisations take appropriate measures to ensure:

- a high quality of information sharing occurs with their external service providers. This includes prompt and well-structured reporting mechanisms
- the specification of early warning indicators and resulting actions if an individual asset's / portfolio's performance leaves pre-defined boundaries of acceptable performance levels.

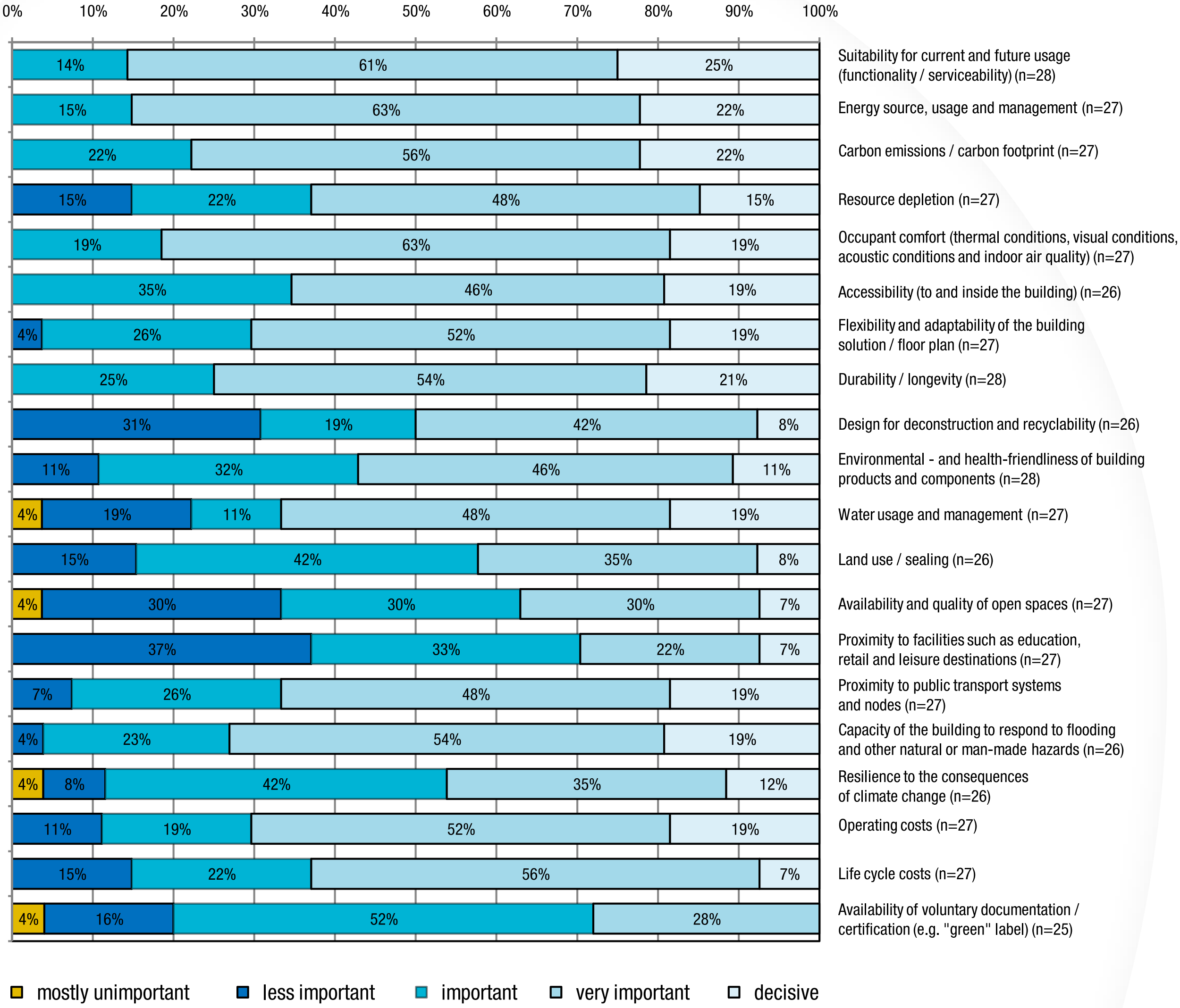



**Exhibit 7**

Organisations' understanding of the main characteristics and attributes of a sustainable building

Despite the efforts in international standardisation to create a consistent understanding of the sustainable development concept in its application to single buildings, the survey reveals some variation in the understanding of sustainable building features and their assumed importance. This is shown in Exhibit 7. As expected, issues relating to energy and $CO_2$ are considered most important, closely followed by issues impacting on user satisfaction and health. Apparently, responding organisations consider the fulfilment of current and future user requirements as an important sustainable building issue. This is in line with international standardisation in this area (also see Exhibit 10). However, several issues are not yet acknowledged for their importance: recyclability, design for deconstruction, various locational issues (e.g. the proximity to educational and leisure facilities). The relatively low importance of operating and life cycle costs as well of the availability of green / sustainable building labels in particular comes as a surprise.

Overall, it can be observed that a shift in perceptions has arguably occurred within the property industry. While the focus of attention has often been on mere energy-related issues in the past, the importance and relevance of almost the full breadth of sustainable building issues is now recognized and acknowledged; as indicated by the participants of this survey. This is a promising and very positive result.

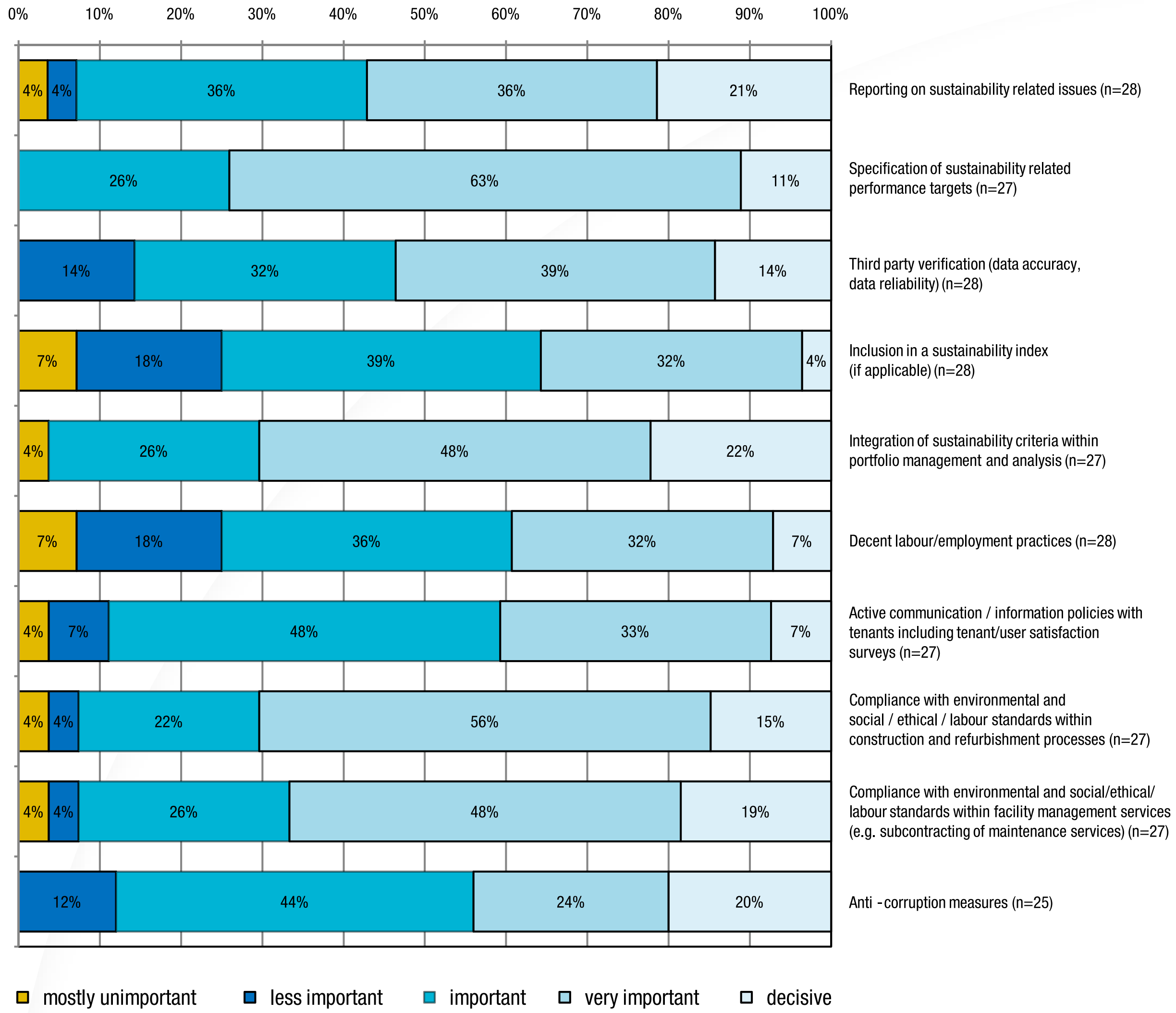
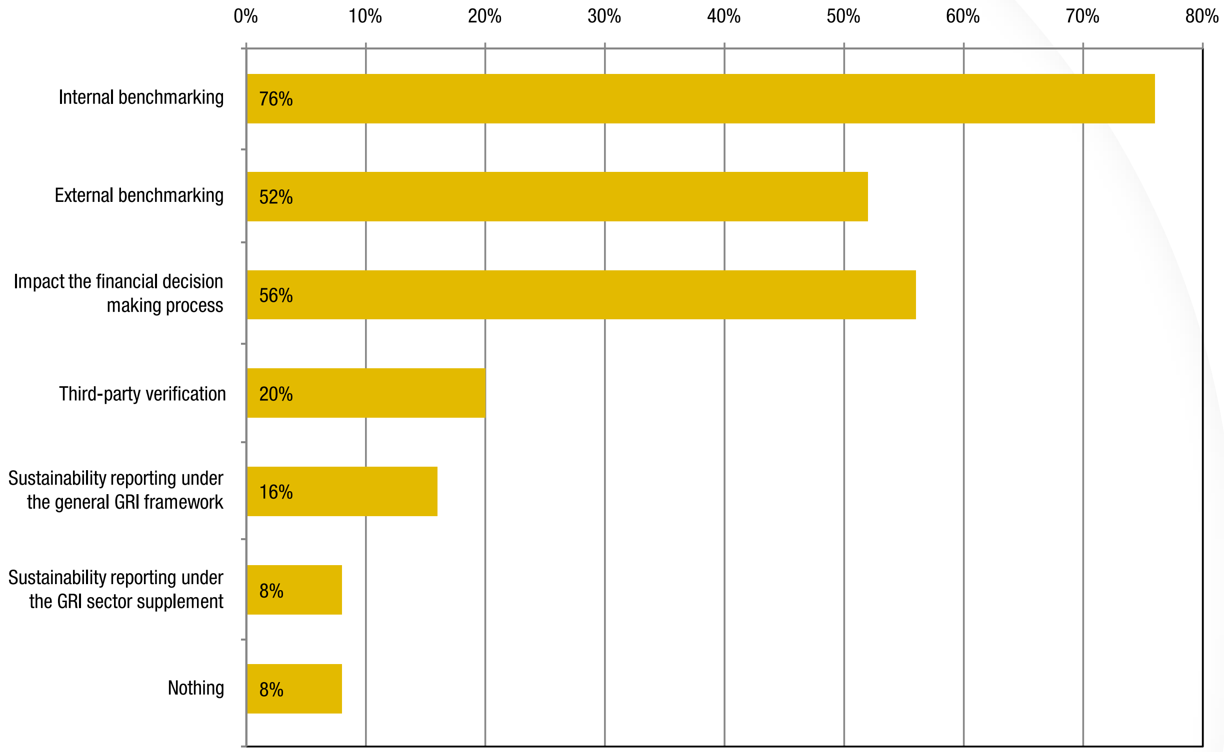



**Exhibit 8**

Organisations' understanding of the main characteristics and attributes of a sustainable property investment vehicle

Exhibit 8 analyzes the responding organisations' perception of the main characteristics and attributes of sustainable property investment vehicles. In contrast to the question regarding relevant sustainable building features (asset view) this question is focused on actual (investment) products. As such, the answers provided to this question go beyond the characteristics and attributes of single buildings to include aspects of process quality and product management as well. Most responding organisations (more than 70%) consider the following characteristics very important / decisive for the qualification of a property investment product as being a sustainable investment vehicle: specification of sustainability related performance targets, integration of sustainability criteria within portfolio management and analysis, as well as compliance with environmental and social / ethical / labour standards. The least important aspects appear to be the inclusion in a sustainability index and the adoption of decent employment practices; whereas more than 50% consider regular reporting on sustainability related issues as well as third-party verification of the data used as very important or even decisive.




*Note:* *based on 25 valid responses*

**Exhibit 9**

Purpose / context for the organisational use of a "sustainability / green / environmental / ethical / social check or due diligence system"

Exhibit 9 is concerned with the 81% of the responding organisations which currently have any form of a "sustainability / green / environmental / ethical / social check or due diligence system" in place. This highlights how the results of such systems are actually being used: most organisations use the results for benchmarking purposes and in order to support the financial decision making process. Few organisations (8%) have no further usage for such results at all and their level of utilisation for sustainability reporting functions is low. However, more than 50% of the responding organisations' consider sustainability reporting very important / decisive. It is fair to say that there is much room for improvement when it comes down to the development and dissemination of such investment vehicles.

Given this high level of support for sustainability reporting, there seems to be a gap with actual practice. Why aren't more organisations actually feeding the results of their sustainability checks or due diligence systems for individual assets into their corporate reporting functions? This can be explained by a combination of two mutually reinforcing obstacles:

- an isolated application of sustainability checks with little or no connectivity to wider corporate frameworks and the absence of centralized information pools
- reliance on analytical tools from third-party service providers (see explanations for Exhibit 6) as well as on assessment results that are already processed (i.e. often highly aggregated).

The first assertion can be supported by the answers to another question contained in the survey. Here survey participants have been asked if they have an internal information management system in place. 58% of the survey participants responded that they do not. Although this cannot be directly concluded from this survey, there is another key obstacle: inertia; (i.e. a change in practices is difficult to undertake, unless it is forced).

One of the key findings is a relatively high degree of overlap between the responding organisations' understanding of sustainable buildings and the choice of performance aspects to support decision-making. Another key finding is the close match between the responding organisations' understanding of sustainable building characteristics and the core set of indicators required by ISO for a sustainability assessment of buildings.

Both findings are displayed in Exhibit 10. The figure is based on a combination of selected answers from two different sets of survey questions. Survey participants were asked what data they currently collect to assist property-related decision-making and risk assessment for several aspects: location and market environment, the plot of land, the building and quality of the cash flow. The answers to this question are represented in **Appendix 4**. In addition, the survey participants' understanding of sustainable buildings was addressed in a separate question (see Exhibit 7).

The findings reveal that most of the information and data factors required for a sustainability assessment of buildings are already being captured, although possibly under another name and not yet in a systematic manner. At present, the information is scattered in disconnected systems. The implication is that the organisational effort and expense should not be too high to engage in sustainability management and reporting.

It is clear that traditional data collection routines to support decision-making in the property industry and the information requirements for sustainability assessments are not too distinct from each other. They can be merged into an integrated approach.

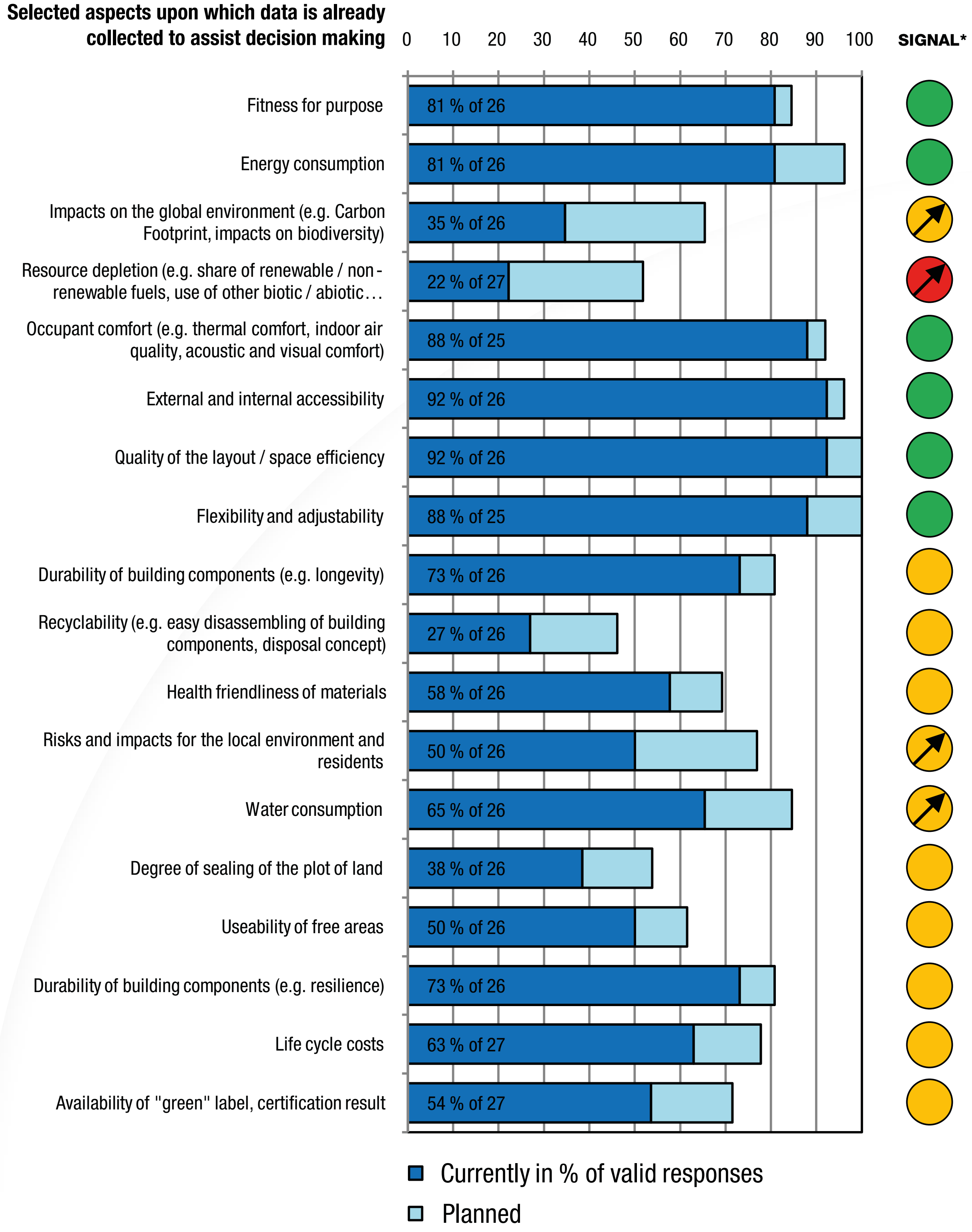
"We are encouraged by the finding that organisations like ours are collecting most of the right information. The challenge that our industry faces is developing consistent and robust, yet efficient, frameworks that combine information from various sources and processes in order to inform investment decisions. We are working with groups like UNEP-FI PWG, [Urban Land Institute's] Greenprint, the UK Better Buildings Partnership and others to drive industry consensus that benefits both the assets we manage on behalf our clients, and the planet."

**Ari Frankel**
Head of ESG Strategy, Real Estate
Deutsche Asset & Wealth Management

A few factors are still under-represented. For example, some aspects – which are traditionally difficult to measure (e.g. the carbon footprint, resource depletion and recyclability) – are not yet a full part of organisations' data collection routines. Nor do these currently play an important role within decision-making processes.

One particular aspect is not yet fully recognized for its significance: recyclability and design for deconstruction. These are important because (1) during the life cycle of buildings some building components need to be replaced several times, and (2) several positive impacts arise for a building's adaptability and third-party usability. An improved approach to deconstruction is also an important precondition for undertaking refurbishment measures within a building that is still occupied or not completely vacant.

Survey participants were also asked about planned data collection routines. Their response shows the importance assigned to this and that data collection is planned in the future.

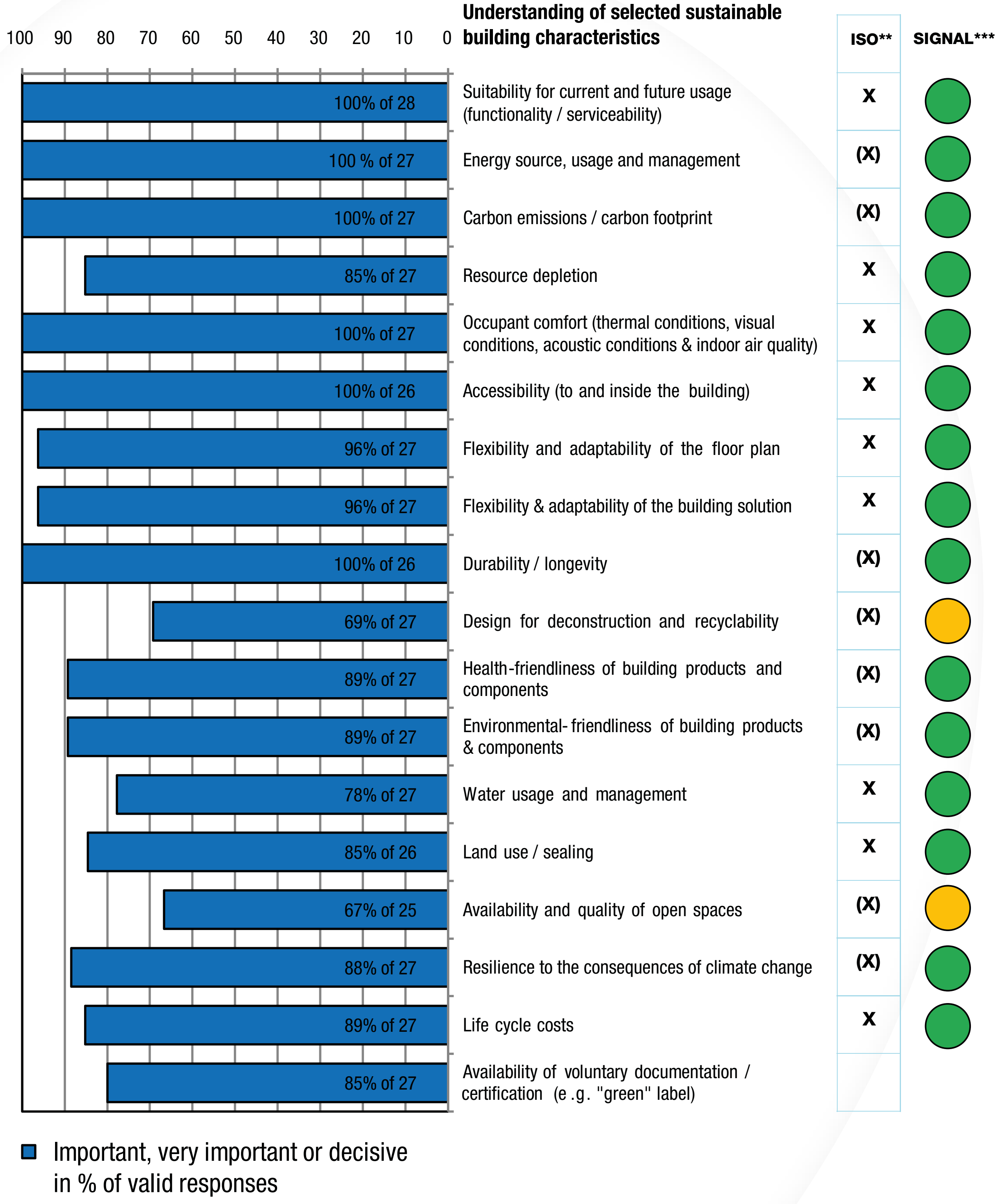



Signal*: Degree of compliance (and trend) between already gathered/collected data and survey respondents' perception/understanding of relevant sustainable building features.

*Source:* *Lützkendorf, T., Lorenz, D. and Michl, P., Karlsruhe Institute of Technology (KIT)*

**Exhibit 10**

Mapping data collection practices vs. understanding of sustainable buildings vs. ISO requirements



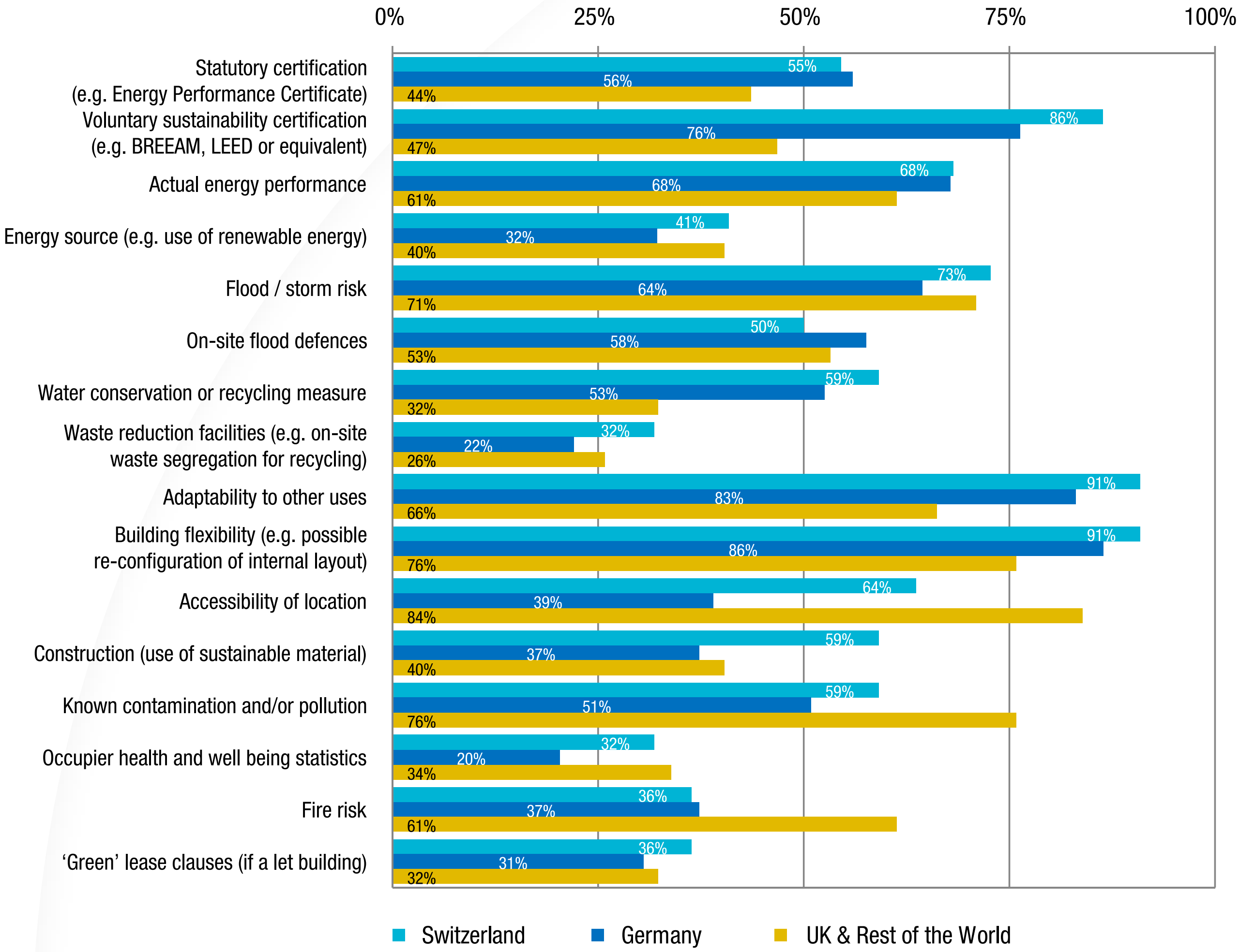

ISO**: Degree of compliance between listed criteria and minimum requirements according to ISO 21929-1 (2011);

**x** = full compliance; **(x)** = analogous compliance

Signal***: Degree of survey respondents' recognition of the importance of minimum requirements according to ISO.

*Note:* *Note: the green dots indicate a high match (more than 75%) between data collection practices and understanding of sustainable buildings, and ISO requirements respectively. Yellow dots indicate an average match (between 75 and 25%); and the red dots indicate a low match (below 25%). Arrows in the dots indicate if there is a tendency towards the next higher category due to planned data collection routines. Light blue areas represent the extent to which data collection is planned in the future.*

A further observation can be made between the results from this survey (on property investment and management organisations) and from a recent survey of property valuation professionals. Together with Sarah Sayce and Fiona Quinn of Kingston University (UK), the authors of this report undertook a survey to evaluate, amongst other issues, valuation professionals' perception of relevant sustainability aspects. Valuation professionals were asked which sustainability aspects are actually taken into account within valuation assignments due to their perceived impact on market value. Their answers are displayed in **Figure 11**.




<u>*Note:*</u> *Based on 143 valid responses from practicing valuers (22 from Switzerland, 59 from Germany, and 62 from the UK and other RICS world regions). The percentage figures show the response frequency and do not represent strength or magnitude of impact*

<u>*Source:*</u> *Sayce, S., Lorenz, D., Michl, P., Quinn, F., and Lützkendorf, T., 2013, RICS members survey on the uptake of VIP 13, work in progress*

**Figure 11**

Sustainability aspects and valuers' perception regarding an impact on market value

Strong agreement exists between the two surveys. Several aspects from Exhibit 10 are also perceived by valuation professionals to have an impact on market value. This strengthens the relevance of this list of aspects. It also gives credence to the assertion that sustainability issues are being increasingly embedded into the canon of value-influencing factors and are used in valuation assignments.

Overall, the results of this survey are positive and promising. They show that the property investment community is no longer "confused (and irked) by the ever thickening 'alphabet soup' of acronyms relating to building metrics" (UNEP FI, 2011, p. 4) as it was stated in a previous UNEP FI PWG report on metrics. In the space of a few years, a straightforward understanding has developed (at least, amongst the survey participants) on what constitutes a sustainable building and what factors are relevant for measuring its sustainability performance for individual buildings and corresponding investment vehicles.

The survey results confirm the existence of an information management problem. This hinders the systematic utilization and analysis of building-related data and performance information. The complex interactions of property market players and interconnected functions at different hierarchical levels of property organisations as well as the different analytical methods applied create a complex web of interconnected information flows and requirements. Some confusion resides within the investment community on how to approach and manage this complexity.

To address this problem, information flows can be structured and managed in relation to three different domains (see also **Figure 12**):

- **Organisational**: the sharing and aggregation of information and data occurs across different hierarchical functions and levels within the organisation (corporate, portfolio and single building)
- **External**: relevant data/information need to flow efficiently between an organisation and its contractors, third-party service providers, stakeholders; as well as between the parties involved in property transactions
- **Cross-over**: a property organisation takes the role of an information-sharing platform between its business partners and service providers. It can be a valuable information source, for example for valuation professionals.

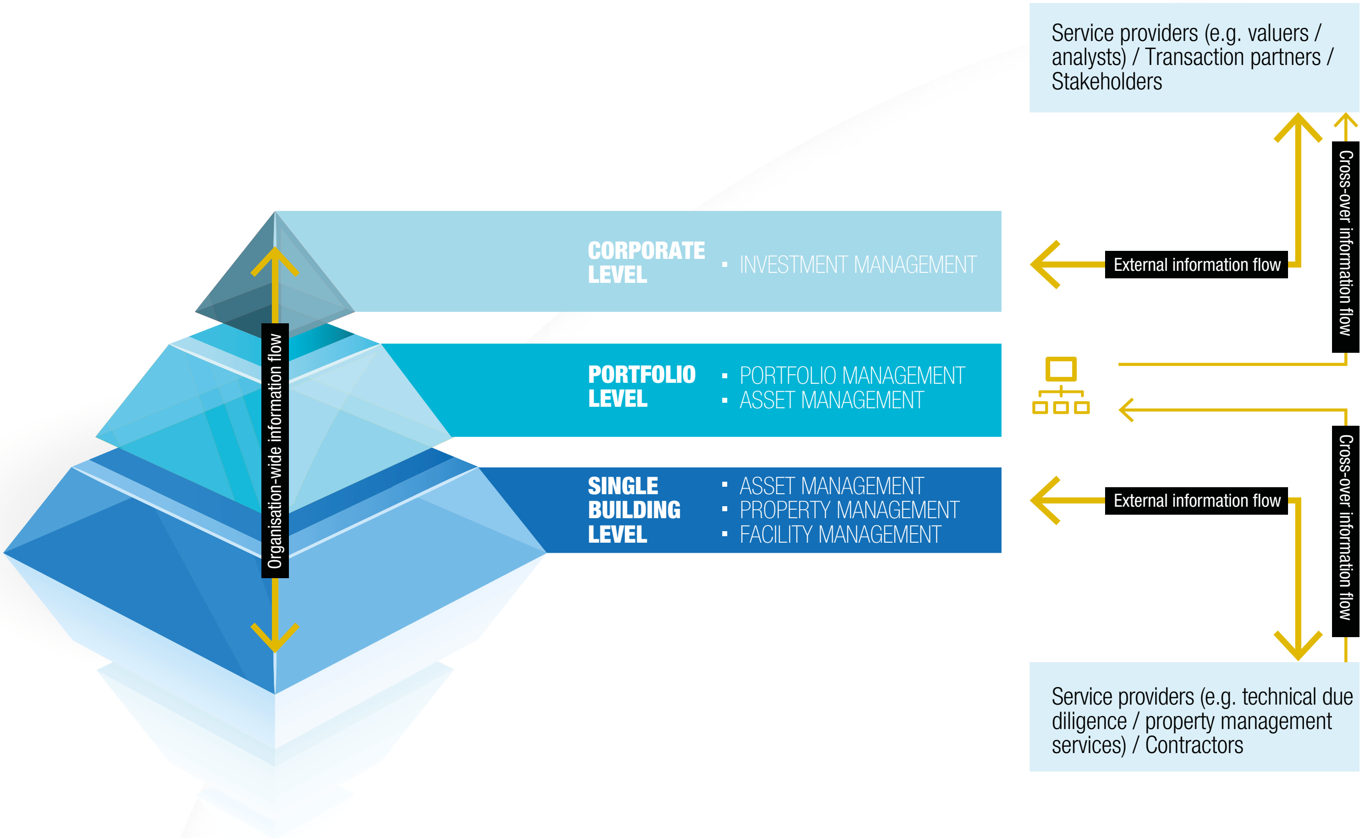



**Figure 12**

Simplified representation of information management domains

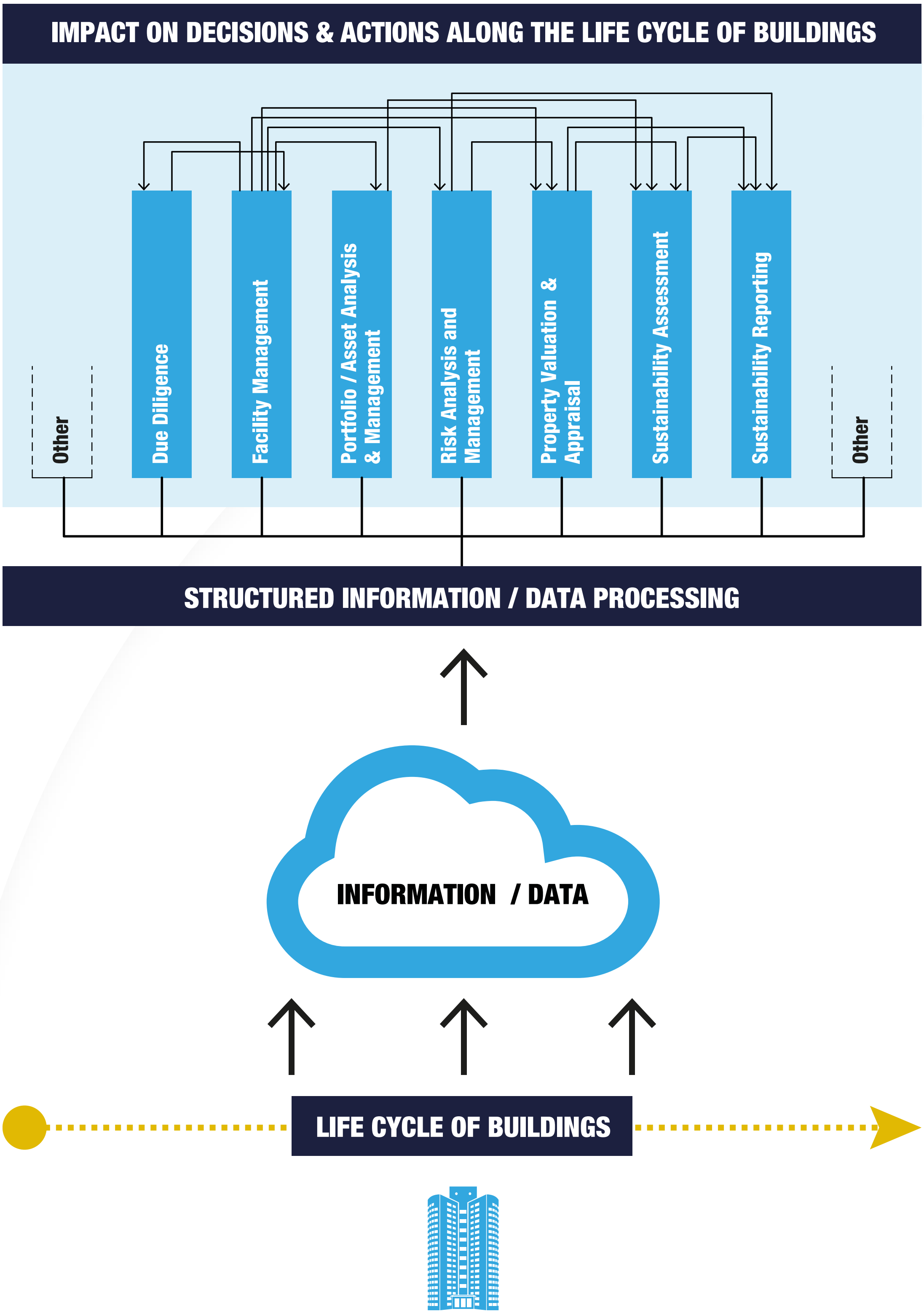
The key challenges that arise for property investment and management firms are in modifying analytical methods (such as investment and portfolio analyses), re-organising data formats and information flows accordingly, ensuring data accessibility and comparability not only across different corporate departments but also in relation to external partners and service providers, and in developing and implementing appropriate ICT-based decision support instruments.

# 8. RECOMMENDATIONS AND EXAMPLES OF GOOD CORPORATE PRACTICE

This section provides several recommendations for the design and implementation of a Corporate Real Estate Sustainability Management system within property investment and management organisations. It is based on the preceding critical review and discussion of the survey results. This has identified the current problems and obstacles, as well as potential strengths in the commercial property sector. Based on these findings and further consultation with the UNEP FI Property Working Group, this section offers a number of management strategies, tactics and ideas. It provides brief examples of good practices from property organisations.

## a) Exploit synergies when collecting and processing data

Several corporate functions and methods of property investment and management organisations rely on similar information and data. This is true for an investigation of the information and data demand associated with, for example, valuation and risk analysis, portfolio analysis or sustainability reporting. In each case, the "smallest element" upon which information is required is the single building. For the portfolio and corporate level, available information on single buildings is usually aggregated. One result of analysing data demand for different functions and methods is the identification of a high degree of overlap, i.e. additional data demand caused by the need to integrate sustainability issues into different functions and methods is very homogenous. Consequently, there are multiple usages for additionally gathered sustainability related information and data (shown in **Figure 13** and further explained in a table in **Appendix 5**).




Source: *Lützkendorf, T. and Lorenz, D., Karlsruhe Institute of Technology (KIT)*

**Figure 13**

The added value of (structured and up-to-date) information as a basis for a series of property-related functions, methods and purposes

This creates an added value which justifies the efforts for extended data collection routines. Moreover, functions like sustainability reporting and sustainability assessment serve the traditional ones as an additional information source (e.g. sustainability assessments feed into / serve valuations, and sustainability reports feed into / serve annual reports).

For these reasons it also appears advisable to screen processes like facility management or due diligence services (which are often sub-contracted to third parties) in order to ascertain whether or not the additionally required data already exists. If not, then existing contracts with service providers could be modified and extended accordingly.

### Box 2

An example of establishing an internal sustainability information- and management-system

**Generali Deutschland Group, Germany**

Generali Deutschland Group recently established a sustainability reporting system to measure the sustainability performance of its whole real estate portfolio in collaboration with AAAcon. Notable is its integration into the existing portfolio management system (which already provides extensive information) and that it is linked into Generali's existing ICT-database. Another important aspect identified is the measurement of all key performance indicators (KPI) both by the company's own staff and by responsible external service providers. The local management works in daily close contact with tenants and users of the properties and thus is familiar with all problems in detail. In addition to a continuous and successful idea management, this ensures an optimal improvement of the property performance in terms of competitiveness and users benefit.

The system enables Generali Deutschland to integrate its sustainability strategy as a considerable element of a comprehensive Total Quality Management approach. The advantage is not only that performance data is available cheaper, faster and in better quality but also that property development and operating processes can be improved continuously.

The implemented system has a user-friendly data input interface. Thus it allows its operation without the need of extensive training. The asset management acts as a quality auditor, is responsible for the reporting based on property and portfolio level and takes all decisions related to particular assets.

Due to the comprehensive and carefully selected catalogue of KPIs, the system is suitable to check whether a single asset would qualify for a certification according to well-known sustainability schemes such as BREEAM and LEED. In addition it serves as data source whenever single assets are to be certified or information needs to be provided in order to prepare sustainability reports and to participate in initiatives like IPDs EcoPAS.

The example in **Box 2** is further evidenced by the following statement:

"This real estate sustainability management system represents a major step towards the process of integrating sustainability in our core business. Within a five-level maturity model it enables us to determine the sustainability performance of our property portfolio. While it is still difficult to exactly quantify the cost-benefit ratio of the sustainability management system, we observe several added values:

The system is future-proof as all data required are collected and stored in-house. It is also more cost-effective and faster than any external certification since we are able to build upon existing data management and reporting systems. As a result, the expenses per building amount up to approximately 2,000 Euros within the first two years only; this is less than our typical marketing expenses per building within a single year. In addition, the system generates positive marketing effects and allows us to better serve our existing tenant base which shows an increased interest in sustainability issues. Finally, the system enables strategic optimisation at the building level through more sophisticated ancillary cost analyses. Above all, at Generali Deutschland Group (the second-largest primary insurance group in Germany) we are convinced that sustainability management ensures our future long-term corporate success and competitiveness."

**Michael Hermanns**
Head of Sustainability
Generali Deutschland Group

## b) Actively request building-related information and treat its absence as a potential deal-breaker

In most cases, all information and data on physical property characteristics (see **Appendix 1**) accrue during the design and construction process. However, all too often this information gets lost when the building is handed over or between transactions. It is costly and time-consuming to recover this information. Due to the lack of original construction records, it may be almost impossible to re-assess (through a building inspection) certain characteristics like the type of construction materials or their environmental- and health-friendliness.

Therefore, it is recommended to have specific contract clauses (with developers, designers, construction firms, etc.) for both new build and refurbishment projects. This can ensure that an appropriate documentation of completed buildings' physical characteristics (or of single construction measures) is provided after project completion.

Within acquisition processes, the prospective buyer usually is in a good position (before a contract is signed) to request a proper building documentation (including information on past performance) from the seller. In cases where the seller is unable to provide this documentation, this circumstance can potentially be used to re-negotiate the selling price.

Professional advisors and analysts should be instructed to comment on how they have reflected sustainability considerations within property valuation and appraisal reports and to place such commentary within the appropriate market context.

Pressure could also be placed on providers of green / sustainable building labelling and certification services to provide information and data in a disaggregated format (in addition to an overall and highly aggregated assessment result).

## c) What gets measured gets managed: integrate consumption management into facility management routines

Much information that is now grouped under the heading "sustainability issue" already accrues during the standard facility/property management processes (e.g. energy bills or annual operating costs accounts for tenants). However, controlling functions within many organisations are mainly concerned with economic parameters. The controlling and internal reporting functions should be extended by including actual consumption values, notably on energy and water.[12] Ideally, this would provide facility managers with an in-house ICT-solution ("decision cockpit") with an up-to-date overview on economic parameters (e.g. operating cost development) as well as on the physical performance of the buildings under management.

[12] *Readers may wish to view the International Sustainability Alliance project: www.internationalsustainabilityalliance.org*

## Box 3

Examples on extended reporting and consumption management functions

### IL&FS Investment Managers Limited (IIML), India

IIML is a fund management firm mandated to raise, advise and/or manage private equity funds that invest in property, infrastructure and growth capital projects. The firm has adopted an Environmental and Social Policy Framework (ESPF) in 2011 which states: "IIML recognizes Environmental, Health, Safety and Social (E&S) considerations in its business operations to add value and minimize adverse impacts and risks, in order to enhance value of its Fund's investments. To achieve this, IIML will establish and implement mechanisms to encourage, influence or mandate its stakeholders and business partners to conserve natural resources, protect the environment, provide safe and healthy workplace for their employees and contractual staff and restore standards of living for those affected by its project operations, wherever relevant and necessary."

As a consequence of adopting this ESPF, the firm performs an Environmental and Social Risk Assessment prior to engaging in new investments and strives to ensure that all new project developments in which the firm invests meet environmental and social criteria. These include (but are not limited to) site aspects (e.g. accessibility and connectivity), locally-sourced construction materials, water and energy efficiency, indoor air quality, and waste management (during construction and operation).

However, these "pre-engagement checks" are not the end of the story. The firm's internal reporting functions were extended in order to ensure that environmental and social performance aspects can be evaluated and monitored during the usage / asset management phase. The firm's facility managers have to provide quarterly progress reports which cover financial aspects, environmental impact assessment results and information on the implementation status of environmental and social management plans.

### AXA Real Estate Investment Managers Limited, UK

AXA Real Estate considers sustainability and responsible investment as the core of their business philosophy and corporate culture. A dedicated responsible investment strategy is provided in their annual sustainable development report over the past 3 years. One of the targets of this strategy is to expand energy monitoring capabilities so that they become routine across AXA's business. Energy monitoring is considered a cornerstone of the firm's responsible investment strategy.

For example, in 2010 the UK asset management team decided to focus on energy management of a representative sample of the larger multi-tenanted assets selected from the funds managed for their largest client. The selected assets are in the retail shopping centre/park and office sectors as they are the highest energy consumers, and therefore have the biggest material impact in terms of $CO_2$ emissions. The 2012 measurement results are tabulated in the following diagram. The positive numbers represent savings or reductions in consumption/emissions, the negative numbers represent increases:

**Box 3**, continued

Examples on extended reporting and consumption management functions

*Energy consumption and CO2 emissions of selected assets in the UK market*

| Sector | Number of assets | Net floor area sq ft | Net floor area sqm | 2011-2012 consumption movement Electricity | Gas | 2012 allowances £ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Offices | 10 | 495,104 | 45,996 | -2.42% | 7.05% | 51,830 | 0.20% |
| Retail shopping centres | 5 | 562,000 | 52,211 | 0.17% | -55.60% | 8,682 | -0.03% |
| Retail warehouse park | 1 | 217,390 | 20,196 | -1.30% | 100.00% | 485 | -1.07% |
| Global | 16 | 1,274,494 | 118,403 | -1.90% | 6.92% | 60,998 | -0.16% |

In addition, AXA's sustainable property management criteria delegated to their property managers cover the following broad requirements: access to premises and safety, social and community activities, utility procurement, energy and water management, provision of recycling facilities, monitoring of environmental conditions, and refrigerant management. AXA expects their property managers to report annually on the progress achieved in these areas.

A word of warning is needed: the usage of and reference to inappropriate benchmarks (which do not fit to the specific context) may lead to unfavourable outcomes and may send misleading signals. When it comes to the development and usage of consumption benchmarks, more transparency and attention to detail than hitherto applied is necessary. It is particularly important to highlight which parameters are influenced by the building itself, its occupants and type of usage as well as by the local climatic conditions. If these factors are ignored or not made explicit, then meaningful benchmarking is impeded.

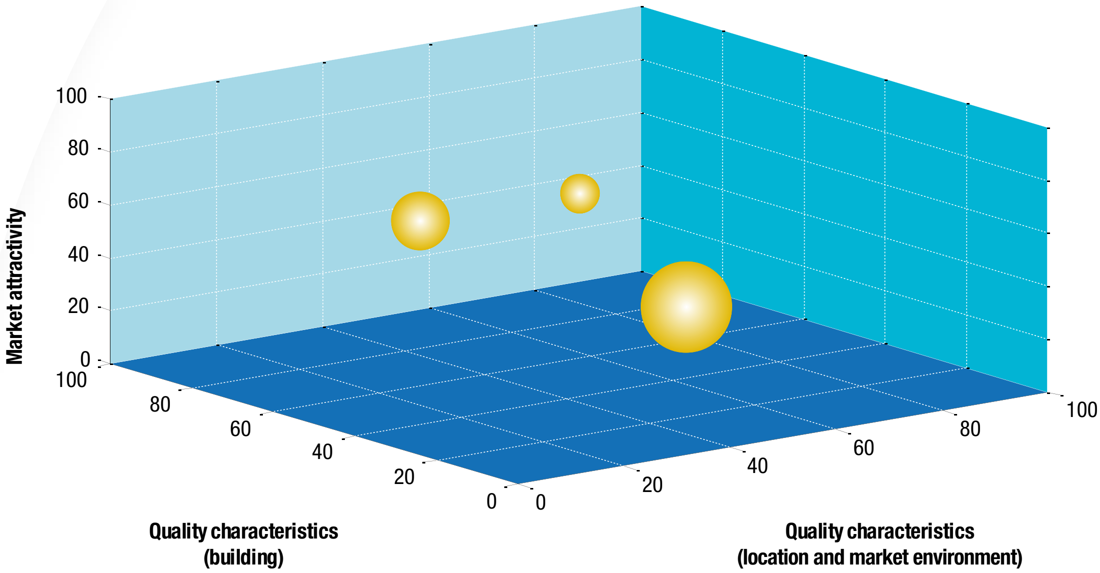
A counter-intuitive idea[13] in this context is the fallacy of the assertion that "you cannot manage what you cannot measure". In fact, corporations have to manage a cohort of issues that are not measured well. For example, corporations' average spending on promotion and marketing is about 10% of revenues. However, two-thirds of Chief Marketing Officers have no way to measure the effectiveness of their marketing investment (Bendewald et al., 2014). People and corporations invest in lobbies, landscaping and many other things where the measurement of performance is not possible – or at least not done. Therefore, "caution should be taken not to set up a *manage what you measure* based decision-framework that actually artificially limits sustainability investment" (Scott Muldavin, 2014, personal communication). Instead, "the emphasis should be to seek to *measure what needs to be managed*" (Sarah Sayce, 2014, personal communication).

13 *The authors are grateful to Scott Muldavin for this remark.*

# d) Integrate sustainability considerations into portfolio management and analysis

Along with extended facility management routines, portfolio analyses should be adjusted as well. It is advisable to apply a three-dimensional approach to portfolio analysis and develop / use respective analytical tools. These can be used to depict financial success factors in relation to the quality characteristics of the building as well as of its location and market environment (see **Figure 14**). The factors used to describe such characteristics should embrace traditional as well as sustainability-related variables (see **Appendix 4** for an integrated list of factors). This requires drawing upon information and data from extended location analyses (e.g. environmental risk, potential for solar energy use, demographic changes, etc.) as well as from extended building documentations/descriptions.

Over time, such an approach will allow for more sophisticated analytics enabling a better understanding of the relationship between the sustainability performance of property assets and their overall financial performance, including a deeper understanding of what will make property 'future-proofed' in environmental, social and economic terms.




<u>*Notes:*</u> *Circles represent single buildings within a given portfolio; size of the circle indicates the building's market value*

**Figure 14**

Example for a three-dimensional approach to portfolio analysis

# e) Develop, prescribe targets and monitor compliance

In order to meet corporate level sustainability goals, it is necessary to develop and prescribe/set sustainability-related targets and monitor compliance within the scope of project developments and refurbishments projects. Client organisations are advised to ensure that building documentations (building files / passports) are issued within project development and refurbishment projects and that these are continuously updated during the management phase. In addition, performance targets must be set and monitored for the facility/property management phase. This will ensure a process of continuous improvement. Instruments and tools that can be used to support this process are, amongst others, energy consumption monitoring, operating cost controlling, post-occupancy evaluations in combination with complaint management, and tenant satisfaction surveys. The information and data obtained through such activities form an important evidence base for decision-making processes at the higher corporate levels.

**Box 4**

Example on target setting, monitoring and reporting

**Hermes Real Estate, UK**

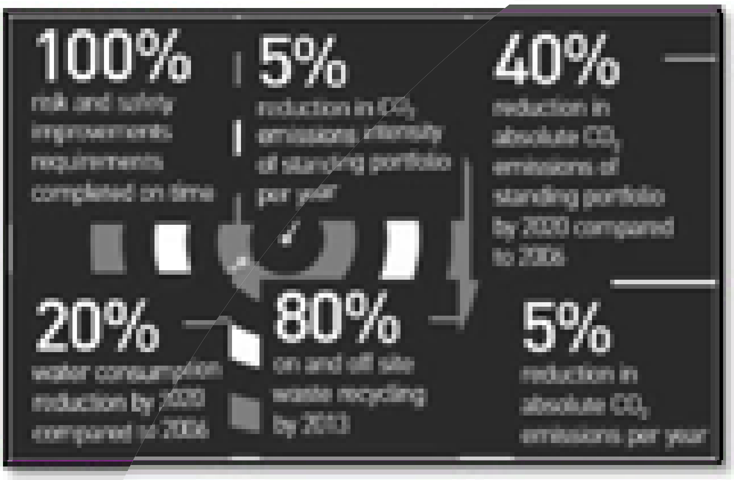
"At Hermes Real Estate we believe environmental, social and governance risks are integral to both functional and physical depreciation of buildings. Therefore we assess and manage these risks by embedding responsible property investment principles in our real estate investment and asset management practices. These include sustainability indicators, data monitoring and management, and sustainability targets."

*Complexity to effectively assess and manage performance:*
"In regard to data collection, we have learned along the way that well managed complexity is crucial to capture all of the complexities of the sector and enable both effective reporting to our clients and active asset management to deliver sustainability performance. In 2006 we committed ourselves to long term targets to improve our actual sustainability performance and reduce our environmental footprint."

**Box 4**, continued

Example on target setting, monitoring and reporting

*Targets against which performance is reported in Hermes' responsible property investment report (which is published in its seventh year now):*




"While we are proud to have been able to report continuous improvement year on year, we have learned that to be effective, the analysis of our performance must go beyond our original targets and required incorporating key characteristics of the real estate sector. Crucial questions that need answering include: How does one account for changes in the portfolio year-on-year through sales, acquisitions or refurbishments? In how much detail should one normalise for changes in weather, density of occupation or special uses? How should we account for the areas where one has no management control and how should areas controlled by occupiers be dealt with?

"Based on our findings we have implemented a dual system. From a management perspective, we have set year-on-year targets for managed properties as the most effective tools to focus effort and measure the efficiency of the sustainability programme. These are measured on a like-for-like building basis and through intensity targets for areas over which we have management control. We have found it useful to normalise for weather conditions and for density of occupation in the spirit of capturing the actual effectiveness of a given measure. While it is difficult to set targets for areas over which we have no control, it is important to report occupiers data where available, clearly stating where this is the case.

"From an overall fund management programme, we have set governance led long-term absolute targets that incorporate the effect of acquisition, sales and refurbishments and allow us to capture actual sustainability footprint of our investments. Moreover, they are useful to assess our efforts against government objectives and help better understand the real estate sector's potential to support these."

— Tatiana Bosteels, Head Responsible Property Investment, Hermes Real Estate

## f) Set new and endorse existing standards

The property investment and management organisations under the umbrellas of the UNEP Finance Initiative, PRI and IIGCC represent a strong market power. Arguably, they possess influence on the development of industry conventions and new standards as well as on the further development of respective legislation. This collaborative approach and influence can (and should) be used to strengthen, for example, building documentation requirements (e.g. a legal requirement to pass performance information to the new owner) and subsequent incorporation of such data within building information modelling systems (BIM) and/or building logbooks. This also involves the support of governmental attempts towards the introduction of more (legally) mandatory and detailed building documentation requirements for designers, construction companies, and construction product manufacturers, etc.

In addition, this influence could also be used to strengthen the propagation and adoption of already existing standards within the property industry. By endorsing and trying to adhere to them, their popularity would significantly increase. Collaborate with the Global Reporting Initiative (GRI), International Organization for Standardization (ISO) and other stakeholders, including accounting bodies, to further develop sustainability performance measurement and reporting activities aligned to wider corporate accounting standards and processes.

## g) Take a stepwise approach

When first engaging with sustainability measurement and management, it must be ensured that the basic information and data on physical property characteristics are available (as this is not self-evident). A strategy of gradual steps will make the process easier. Then start with the "low hanging fruit"; i.e. consumption values and $CO_2$-emissions (the latter can be calculated as a function of energy source and actual consumption).[14] Next, add information on comfort levels and user satisfaction. Subsequently, add further data fields according to your needs, available resources and surroundings conditions. Ideally, encourage the collection, storage and sharing of information and data whenever there is a theoretical case that they may impact in the future (even where such impacts and risks cannot yet be quantified).

If your organisation relies on property valuations carried out under RICS standards (for example due to IFRS-accounting requirements), then consider taking into account further data fields contained in the Sustainability Checklist of the RICS Guidance Note on Sustainability and Commercial Property Valuation (RICS, 2013a). The Checklist is reproduced in **Appendix 6**.

[14] *A recent UNEP FI report contains recommendations on measuring, disclosing and managing the carbon emissions of investments and investment portfolios. See: UNEP FI, 2013*

# h) Actively communicate with third parties

The issue of sustainability is not only increasingly important within the property industry but also receives increased attention within the closely connected banking and insurance industries. As discussed above, banks have also started to factor sustainability issues into risk analysis and pricing mechanisms for loan conditions. To a certain extent, the same applies for insurance companies. For this reason it seems advisable to actively communicate sustainability credentials of corporate assets and projects. It is likely that this will be rewarded through preferential loan and insurance conditions. For those banks / insurers that have not yet adjusted their pricing mechanisms, an active communication strategy might improve their level of awareness.

**Box 5**

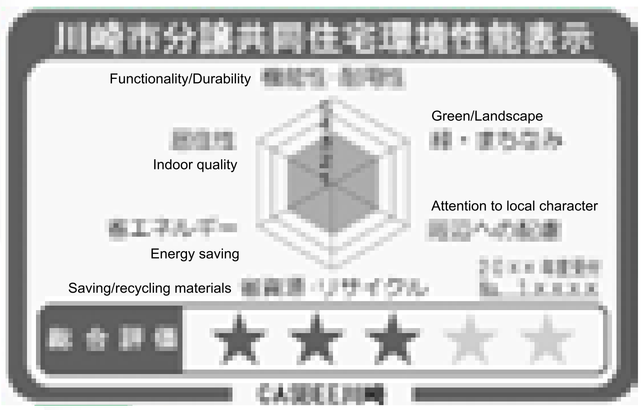
Examples on preferential loans for sustainable buildings

**Sumitomo Mitsui Trust Bank Limited, Japan**

This bank has recognised and acknowledged the risk reduction potential of more sustainable assets. Therefore preferential loans are offered for sustainable construction activities. The loan rate depends on the property project's sustainability assessment indicated through an application of the "CASBEE Kawasaki" model or the Condominium Environmental Performance Indication of the Tokyo Metropolitan Government.

CASBEE Kawasaki is a local version of CASBEE (Comprehensive Assessment System for Build Environmental Efficiency). Its assessment items are divided into 6 categories: functionality/durability, green/landscape, attention to local character, saving/recycling materials, energy saving, and indoor quality. The assessment results by category are summarized in the form of a radar chart and the comprehensive assessment result is shown by the number of stars (5 stars in maximum). Sumitomo Mitsui Trust Bank offers preferential loan rates according to the number of stars achieved.

*Sample assessment result of CASBEE Kawasaki*



**Box 5**, continued

Examples on preferential loans for sustainable buildings

Similarly, the Condominium Environmental Performance Indication of the Tokyo Metropolitan Government shows the assessment results of condominiums in 5 categories: insulation, energy efficiency, solar power systems, durability and vegetation. The assessment results of each category are shown by the number of stars (3 stars in maximum for each category, 15 stars in maximum in total). Again, Sumitomo Mitsui Trust Bank offers preferential loan rates according to the number of stars achieved.

**Banco Pichincha, Ecuador**

According to the bank's sustainable management model and its strategy to build a culture of corporate social responsibility and commitment, several ecological loans schemes with preferential conditions for activities committed to protecting the environment are being offered.

These schemes include, amongst others, consumer loans and home loans. The consumer loan scheme also includes the financing of the installation of domestic wastewater systems. The home loans scheme focuses on the construction and refurbishment of individual houses and housing complexes. In order to qualify for the preferential loan rates, the projects need to meet several pre-specified minimum requirements. These include, but are not limited to the following:

- Walls and roofs with thermo-acoustic materials
- Usage of natural lighting possibilities
- Low maintenance façade materials
- Low-flow showers and low-flush toilets
- Lifts with energy-saving certification
- Separate storage facilities for recyclable waste and for hazardous waste
- Communal lighting areas equipped with LEDs and controlled by motion sensors
- Grey water treatment system
- Rainwater catchment system
- Green areas with native plant species
- Living walls as neighbourhood fences
- Actions to protect native fauna of the area

In addition to these loan schemes, the bank has an environmental awareness raising program for its customers in order to sensitise them for the various benefits of sustainable construction and refurbishment activities.

# i) Tweak existing DCF-models and link them with Monte Carlo Simulation techniques

Although property and facility managers will need up-to-date information on a range of performance characteristics, asset and portfolio managers will need a tool to translate sustainability-related performance information into financial language. At investment board level, the universally understood language is that of risk premiums and the results of discounted cash flow (DCF) calculations.

DCF calculations particularly can explicitly account for the full spectrum of sustainability-related revenues, opportunities and risks within an investment analysis. In this context, the recommendation is to fine-tune DCF models so that a relationship is established (according to pre-defined risk-and-return profiles as well as the specific surrounding conditions) between an asset's sustainability performance and applied risk premiums, as well as other DCF input variables such as depreciation rates, rental growth estimates, exit yields, etc. For example, an investment analysis for an energy efficient building located in a market environment where tenants tend to appreciate energy efficient premises could involve the determination of a higher rental growth potential for the time period under investigation as well as a lower exit yield (as compared to an average building).

"We believe that sustainability risks are integral to both functional and physical depreciation of buildings. Indeed, over the years evidence has been growing which suggests that sustainable building characteristics will be associated with reduced risks of obsolescence and depreciation, enhanced tenant retention, reduced void periods, and reduced operating costs.

Therefore assessing the associated risks has to be part of our standard investment process. We see this as a key risk factor that should be incorporated in the real estate industry's existing dividend discount models in assessing value. Only in this manner will we be able to manage our portfolio as a responsible investor on behalf of our clients."

**Chris Taylor**
Chief Executive Officer
Hermes Real Estate

When incorporating sustainability-related risks and opportunities into a DCF model, it is very important to use a set of ranges for potential adjustments to DCF input variables. This will help to avoid the impression of unrealistic levels of precision. This particularly applies whenever there is a lack of comparable evidence to quantify more specific adjustments. Over time, as more data and knowledge accumulate (i.e. when the level of uncertainty involved decreases), DCF models can then be re-calibrated by adjusting the applied ranges in order to reflect the actual investment situation and context.

One method for depicting and expressing the degree of uncertainty involved within an investment analysis is Monte Carlo Simulation. This method allows for the use of different ranges (or more precise, different distribution functions) in order to highlight the differences between competing investment alternatives, or, for example, between the alternative of taking a retrofitting measures or doing nothing. A word of caution is necessary. The use of Monte Carlo Simulation can entail the risk of a *blind reliance on the numbers*. Therefore, it must always be considered as an *aid* to decision-making, and not as the decision-maker.

The underlying premise of Monte Carlo simulation is to undertake a calculation process (in this case investment analysis) a large number of times. Instead of using a single point estimate for each input variable Monte Carlo simulation allows ascribing a probability distribution to each input. The Monte Carlo technique then selects random figures for each variable and produces an answer (e.g. Investment Value) before selecting another random input (from within the set range) and repeating the exercise (e.g. 50,000 times). In doing so a multiple of possible outcomes is produced that can be statistically analysed to provide an average outcome, a range, a standard deviation, etc. A detailed discussion of DCF models coupled with Monte Carlo Simulation techniques is beyond the scope of the present report.

A simplified example is provided to show the underlying logic. Assume that an asset manager or analyst is aware of the need to undertake a deep retrofitting measure aimed at improving the sustainability performance of one of the buildings in a given portfolio but the investment board is sceptical. To highlight the differences between the building with and without a retrofitting measure, the following could be done. In the first case (retrofit), the analyst is likely to use ranges (e.g. for achievable rents) that tend more towards the positive end (e.g. triangular distribution for rent per square meter: minimum €8, most likely: €9, maximum: €11). In the second case (no retrofit), the analyst is likely to use ranges tending more towards the negative end (e.g. triangular distribution for rent per square meter: minimum €7, most likely: €8.5, maximum: €10). Similar adjustments are applied to several other DCF input variables. The results of the simulation process are different probability distributions for the output variable (e.g. Investment Value). These probability distributions can then be overlaid to show the difference between the two alternatives (see **Figure 15**).

As the results of the simulation process are determined by the underlying assumptions, it is of critical importance to make these assumptions explicit. This ensures that the stakeholders are not misled by unrealistic and/or hidden assumptions.

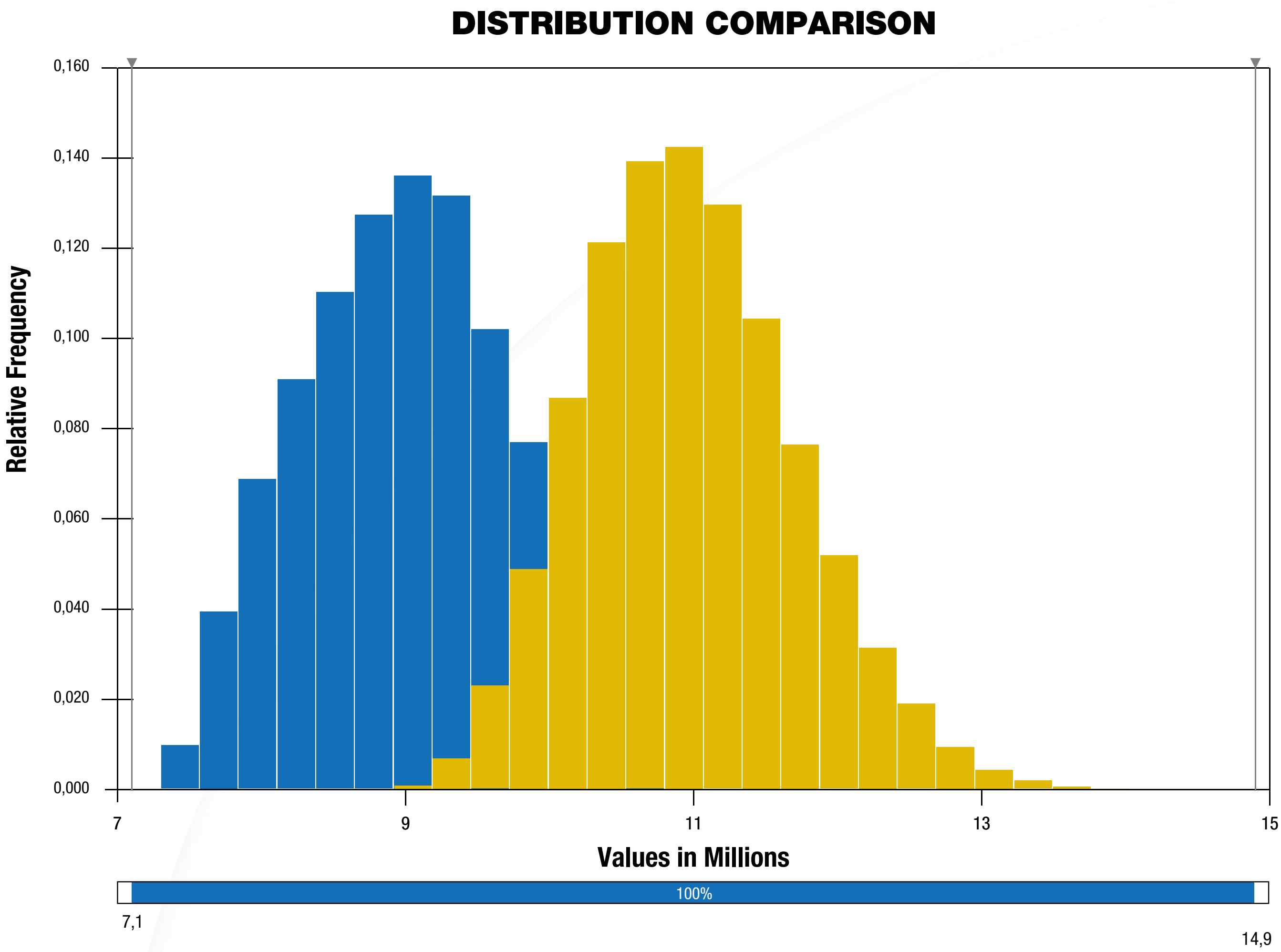



**Figure 15**

Monte Carlo Simulation sample output frequency chart:
non-retrofitted (blue) vs. retrofitted building (yellow)

## j) Capture the value of property level sustainability investment at the corporate level

Owner-occupied properties require the adoption of approaches and analytic methods for capturing the value created at the corporate level due to property level sustainability investment. In this regard, the adoption of the Deep Retrofit Value Model for owner-occupants developed by the Rocky Mountain Institute[15] is recommended as it:

> "details how to calculate and present property-specific deep retrofit value, focusing on the value beyond energy cost savings delivered to building owner-occupants and tenants. The model provides the terminology and accounting to make sure values are not missed or double counted, and the flexibility to enable calculation of value elements most relevant to a particular retrofit decision. Perhaps most importantly, the model comprehensively integrates risk analysis and mitigation into the retrofit decision-making process."
>
> Bendewald et al., 2014, p. 3

## k) Achieve comprehensive, informed decision-making

If an investment organisation aspires to go beyond the recommendations listed above in order to achieve the possibility of full sustainability informed decision-making, the following three measures should be taken (UNEP FI PWG / RICS, 2011):

(1) Instigate a changed set of expectations whereby investors / clients should expect / be willing to challenge their advisors to provide holistic advice. This advice must truly fulfil their needs and requirements as responsible investors committed to supporting long-term sustainability goals which transcend private financial gains.

(2) Support the development of skills and standards which enable property professionals to challenge their clients on the balance between private interests and the protection of the public interest objectives, as required by their professional institution's charter and/or professional code of conduct.

(3) Work with other professionals, including environmental economists to develop methodologies and techniques that support full sustainability evaluations. (One needs to bear in mind that some sustainability aspects can be integrated into current, traditional methods of valuation, risk and investment analysis, whereas other notions of value are not yet explicitly recognised within professional codes).

15 *See: www.rmi.org/retrofit_depot_deepretrofitvalue*

# 9. SUMMARY AND CONCLUSION: 24 RECOMMENDATIONS FOR BEST PRACTICE

Sustainability is an implementation issue. If done systematically and consistently, implementation can lead to a mutually beneficial set of outcomes for the environment, society and business (i.e. a 'win-win-win' situation). The mutual benefits of more sustainable property investment, development and management practices have been demonstrated by leading firms and through various project case studies. Good sources for examples of best practices are two previous UNEP FI PWG publications entitled "Responsible Property Investing – What the leaders are doing" (UNEP FI, 2008 and 2012) as well as the research library of the Green Building Finance Consortium.[16] However, while such examples naturally shine, many organisations are not yet at the practical implementation level.

There is a distinct gap between commitment and engagement. Expressed another way, a gap exists between the knowledge about best practices ("what should be done") and actual actions undertaken. This not only applies to the property (real estate) industry but also holds for other sectors as well. Two examples are:

- The UN Global Compact (GC) Annual Implementation Survey (UN GC, 2013) has shown that many UN GC signatories are very active in communicating their commitment to corporate sustainability, in adjusting policies and mission statements and also even in monitoring sustainability-related performance. Fewer signatories, however, are actually active in integrating corporate sustainability considerations into business unit operations and corporate functions. Regarding the sustainability implementation status across all industries, the 2013 report argues "while 65% of signatories are committing to sustainability at the CEO level, only 35% are training managers to integrate sustainability into strategy and operations." (UN GC, 2013, p. 7)
- Similarly, the survey among UNEP FI PWG member organisations and other property investors and mangers presented in this report revealed that the majority considers sustainability reporting an important element of a sustainable property investment vehicle but only a minority is actually engaged in sustainability reporting.

Bearing in mind that UN Global Compact and UNEP FI signatories may represent the more "enlightened" and active organisations, it appears reasonable to suggest that the *gap between knowledge / commitment and engagement / action* is much wider within the remaining part of the industry. The existence of this gap is understandable since sustainability is a complex concept and implementation takes time, commitment and funding. There are no quick fixes. However, if the industry wants to truly strengthen its contribution to sustainable development, then the remaining barriers hindering a change in behaviour and adoption of new practices need to be addressed.

16 *See: www.greenbuildingfc.com/Home/ResearchLibrary.aspx*

Action is required in four linked domains to overcome the remaining barriers to a change in individual and corporate behaviour within the property industry. These domains are:

- **Institutional**: the laws, regulations, standards, codes of best practice and industry conventions that motivate and enforce "good" practice and a change in behaviour taking place
- **Technical / Practical**: the technical ability and sophistication to create and strengthen the necessary information links and feedback loops within a given system (i.e. the property market) so that the system's actors have and see the (financial) incentive to change behaviour.
- **Educational**: the current education and training of built environment professionals to facilitate the development of a firm commitment to creating, operating, and preserving a sustainable built environment (see: Hartenberger et al., 2013).
- **Personal**: the necessary sustainability literacy, motivation and incentives for individuals to take *personal responsibility for ethical behaviour* (see: Hill et al., 2013).

Addressing the conditions for a change in behaviour with regard to the aforementioned domains is essential. It does not require systemic change, but a change in perspective by key actors (policy and standards makers, corporate investors, property managers, property professionals):

"the same combination of people, organisations, and physical structures can behave completely differently, if the system's actors can see a good reason for doing so, and if they have the freedom, perhaps even the incentive, to change."

Meadows et al., 2004, p. 237

The present report was primarily concerned with the technical / practical domain as it provided an implementation framework by explaining:

- how sustainability considerations can actually be embedded within business routines and decision making processes at different corporate levels
- how existing tools and methods can be adjusted/fine-tuned accordingly
- how buildings' sustainability performance can impact on asset and portfolio value, corporate reputation and financial success.

By suggesting a list of applicable metrics for a building's performance and quality characteristics and by providing recommendations for best practices and desirable industry conventions, this report has implications for the institutional domain (see **Figure 16**). An investigation of the educational and personal domains was beyond the scope of this report.

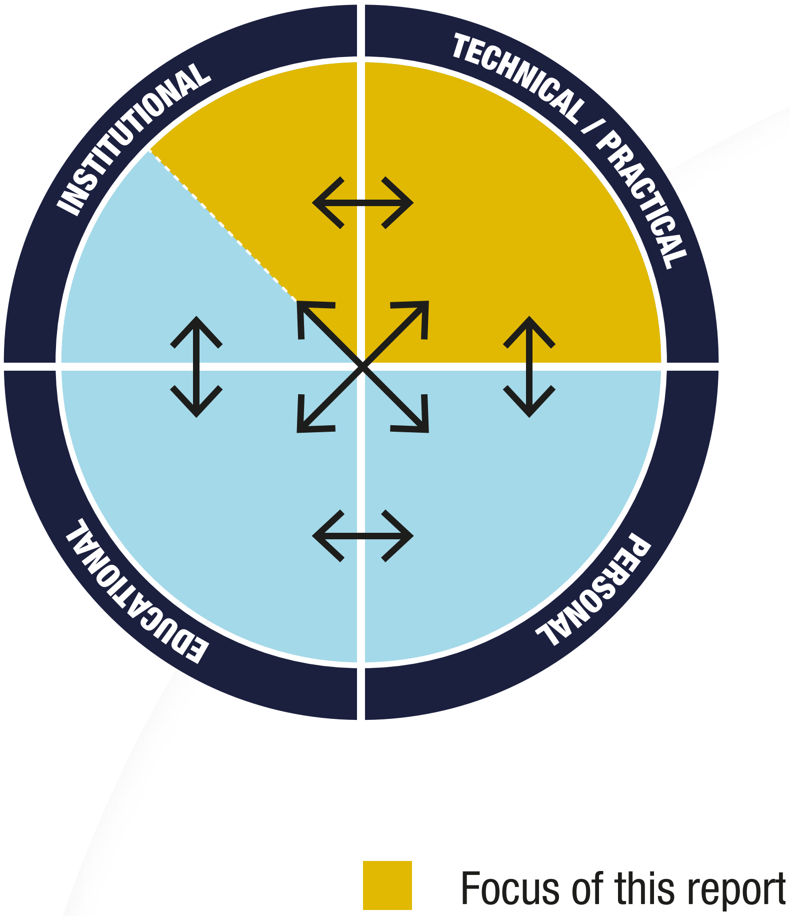



**Figure 16**

Interrelated domains with remaining barriers to a change in behaviour

The present report identified the need to engage in Corporate Real Estate Sustainability Management (CRESM) by linking aspirations / values with the delivery and measurement of actual performance at different levels / scales. This can be achieved by organising information flows more efficiently, by ensuring data accessibility and comparability, and by implementing interconnected ICT-based decision support instruments as one of the industry's key challenges in order to cope with the financial / risk implications of sustainability and to manage property portfolios more responsibly. CRESM requires dealing with an extended information and data basis at all corporate levels. This is highlighted in **Figure 17** and the corresponding recommended actions are summarised in the form of 24 Best Practices for Corporate Real Estate Sustainability Management below.

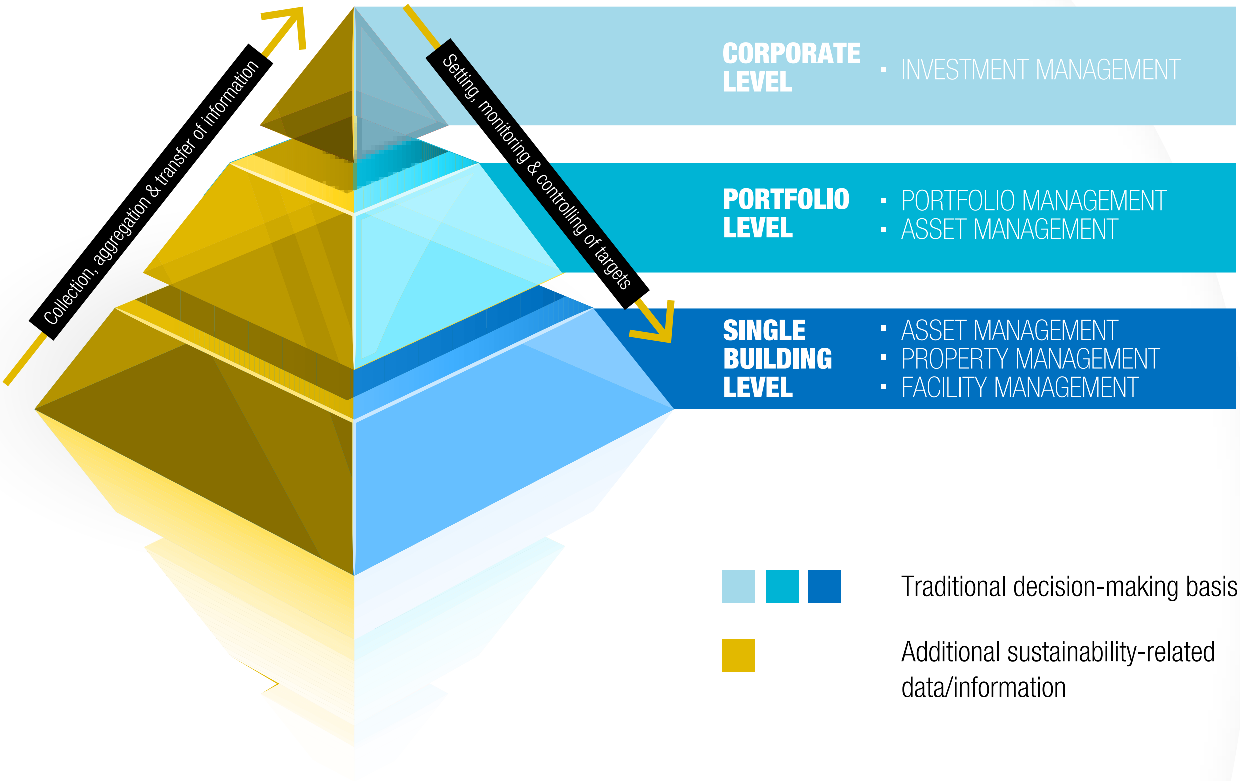



**Figure 17**

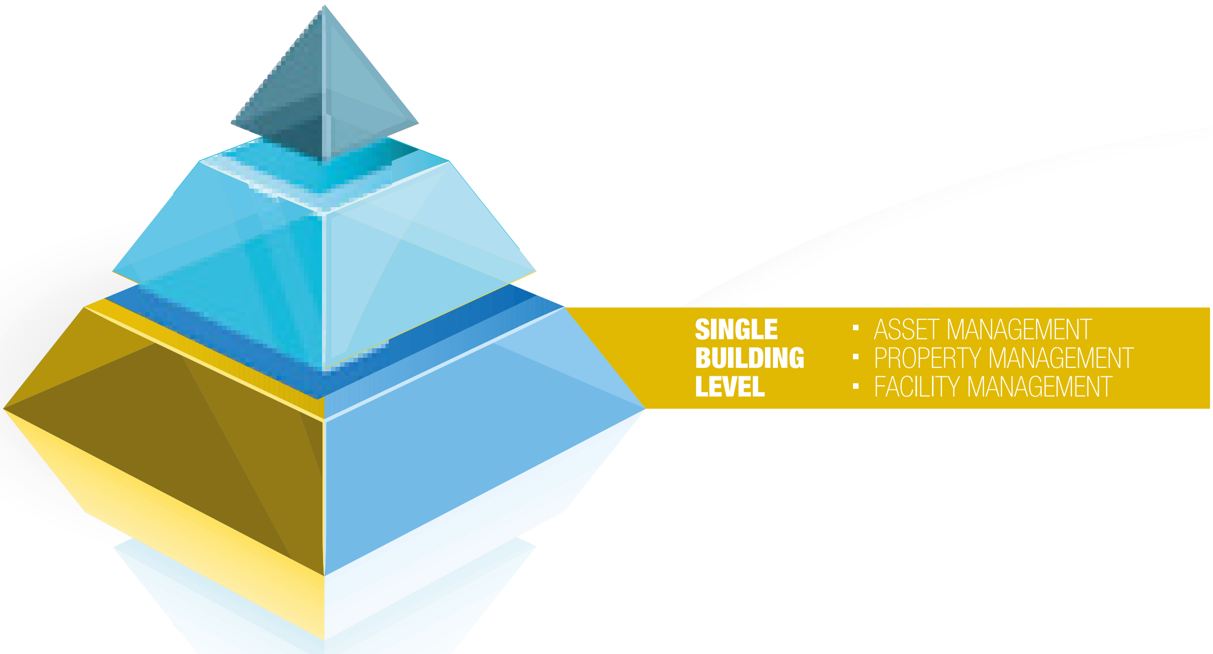
Extended decision-making basis at all corporate levels

# Best Practice recommendations at the corporate level

- Integrate sustainability into the corporate mission and value system. At the minimum, consider the avoidance of negative consequences for society and the environment resulting from corporate activities as a business constraint.
- Adjust the investment strategy by adding an environmental, social and corporate governance (ESG) dimension to the classical triangle of investment targets (security, liquidity, return).
- Treat sustainability as an integral part of business processes along with the traditional decision-making factors and parameters, rather than as an add-on or separate category.
- Build structures for corporate sustainability management. Treat this as an *overall quality assurance tool and mechanism*.
- Whenever property services are outsourced, create a framework of requirements (that have to be applied at all corporate levels) for type, extent, format and frequency of data/information exchange with third-party service providers. Amend the contractual arrangements with these counterparts accordingly.
- Challenge your advisors to provide holistic advice.
- Set targets for portfolio level performance and monitor their compliance.
- Produce meaningful sustainability reports.
- Consider that performance at the building and portfolio level might impact not only on corporate reputation and leadership profile but also on employee costs, productivity, promotional and marketing costs, etc. Therefore, undertake efforts to capture the value of property level sustainability investment at the company level.
- Support the adoption of building documentations (building files, building passports) within the industry.
- As a large organisation use your influence to set and enforce industry conventions, cooperate with initiatives like UNEP FI, UN Global Compact (GC), the Principles for Responsible Investment (PRI), and endorse existing standards such as those of the Global Reporting Initiative.


# Best Practice recommendations at the portfolio level

- Integrate sustainability considerations into portfolio management and adopt a three-dimensional approach to portfolio analysis whereby financial success factors are depicted in relation to the quality characteristics of the individual building as well as its location and market environment.
- Integrate sustainability considerations into existing decision-making instruments; notably within DCF (discounted cash flow) methodologies.
- Set sustainability performance targets for property and facility management and monitor compliance.
- Ensure that your external service-providers report continuously, consistently and in a pre-defined format.
- Ensure that the basic information and data on physical property characteristics are available for all buildings within the portfolio. Then add consumption values and $CO_2$-emissions. Information on comfort levels and user satisfaction is vital.
- Exploit synergies when collecting and processing building-related information.

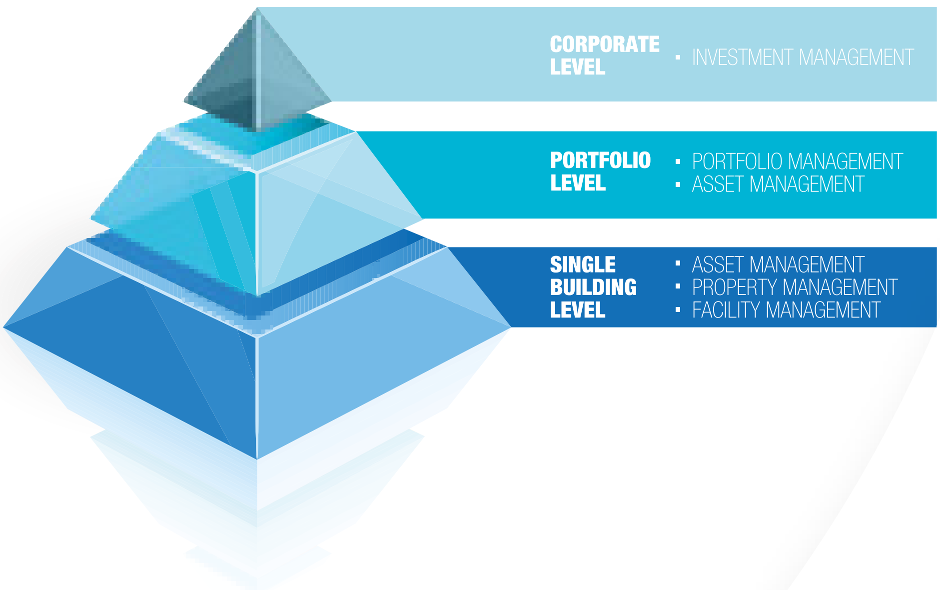



# Best Practice recommendations at the single building level

- Set sustainability performance targets and measure progress within individual assets business plans.
- Extend facility management processes by adopting energy consumption monitoring, operating cost controlling, post-occupancy evaluations in combination with complaint management, and tenant satisfaction surveys.
- Make sustainability a requirement for new and refurbishment projects.
- Actively request building-related information and documentation. Treat its absence as a potential deal-breaker.
- Ensure that building documentations (building files / passports) are issued within project development and refurbishment projects and that these are continuously updated during the management phase.
- Exploit the full potential of green leases.
- Actively communicate the sustainability credentials of individual buildings/projects towards third parties such as banks and insurance companies.

This report has provided evidence to suggest that the benefits of adopting these best practices far outweigh the required implementation efforts. There are multiple usages for the additionally gathered (or now accessible) building-related data/information: they can support most business processes and corporate functions.

In addition, property investors' and managers' concerns and efforts to engage in sustainability management do not happen in isolation. They are supported by governmental moves and other stakeholders' initiatives and collaboration. Notably the efforts in sustainability management work in parallel with the efforts undertaken by the valuation profession in order to make sustainability an integral part of valuation theory and practice. This helps to create a mutually reinforcing process between property investors and the property valuers, eventually leading to *virtuous loops of feedback and adaptation* (see: RICS, 2008). As more sustainability-related information becomes available in the market place, then more sophisticated analyses can be undertaken. This will result in (1) better-informed investment decision-making and management actions and (2) support future estimates of value. Both aspects are in the sustainability-conscious investor's and manager's own best interest.



# 10. OUTLOOK

While the findings and recommendations contained in this report first and foremost challenge individual firms, there are also several steps / actions that can be undertaken by industry representatives and initiatives and professional bodies in order to assist the sustainability implementation process. Five of them are:

*A renewed attempt to create building files*: storage, updating and exchange of building-related data and performance information require an appropriate format or "data container". Ideally, a standardized format would exist which would ensure that all parties involved are communicating in the same format or language. In the construction but also in the property (real estate) sector, the concept of building files has been discussed for decades. However, there has been little tangible progress to date. The recommendation is to make a new attempt to establish building files, test the current prospects in relation to BIMs, and to discuss possibilities of standardisation or an industry convention for an appropriate data exchange format.

*Guidelines and reference books*: when existing methods and instruments are to be adjusted and fine-tuned to incorporate sustainability considerations, it appears advisable to develop guidelines and reference books. This is needed for both property professionals and their clients in order to ensure consistency, comparability and transparency. The most obvious recommendation (or "the lowest hanging fruit") in this regard would be the development of a guideline / reference book on the integration of sustainability considerations into discounted cash flow (DCF) methodology.

*Changes in sustainability assessment certificates and labels*: in the past, the developers and providers of sustainability assessment / certification systems have been focused on the provisioning of overall (i.e. highly aggregated) assessment / certification results. From an investor's or manager's perspective, this means that much of the data and information within the assessment is either lost or not accessible. In order to create an added-value here, the recommendation is to engage with the developers and providers of such systems. The property finance and development communities need to stipulate changes in the way sustainability assessment results are presented in order to meet their needs. In particular, raw and disaggregated data and information must be included in the results.

*Sustainability metrics measurement handbook*: most property (real estate) analysts but also valuation and other property professionals with an economic background are not fully trained to assess building fabrics in detail and to interpret technical and physical construction values and performance information.[17] The development of a handbook on how to actually measure and interpret certain sustainability metrics would be extremely useful. This could also include explanations on how to best exploit available information sources and to perform plausibility checks. Such a volume, targeted at property professionals, could serve practitioners and could also be used in education and training.

*Foster holistic higher-education programs*: Similar to investment and management organisations, there is a tendency in higher-education institutions to treat sustainability in isolation. This not only creates "add-on" subjects but also impedes students from understanding their role in relation to others. This can lead to ineffective communication between stakeholders because students / professionals fail to comprehend the information needs of others. It is recommended that professional bodies (and other initiatives) engage with higher-education institutions to develop holistic educational schemes for property professionals.

[17] *The actual sustainability metrics measurement rules and guidelines have not been discussed within this report as this is beyond the scope of the project. It would have resulted in a more technical report.*

Finally, this report has shown the viability of aligning corporate goals with sustainable development objectives. There are clear economic advantages to be gained from this exercise. This *Sustainability Metrics* report might also have been titled *Quality Metrics* report. It contributes to changing the perspective on the management of sustainability-related data/information. It shifts the viewpoint from another duty within ESG- and PRI- commitments towards what it actually is: an *overall quality assurance tool and mechanism* that supports all corporate processes. The resulting financial advantages need to be understood as an opportunity for the property (real estate) industry which requires taking action – the sooner the better.

Tis written: '**In the Beginning was the Word**.'
Here am I balked: who, now can help afford?
The Word?—impossible so high to rate it;
And otherwise must I translate it.
If by the Spirit I am truly taught.
Then thus: 'In the Beginning was the Thought'
This first line let me weigh completely,
Lest my impatient pen proceed too fleetly.
Is it the Thought which works, creates, indeed?
'In the Beginning was the Power' I read.
Yet, as I write, a warning is suggested,
That I the sense may not have fairly tested.
The Spirit aids me: now I see the light!
'**In the Beginning was the Act**' I write.

**Johann Wolfgang von Goethe**
**(1749-1832)**
Faust
The First Part of the Tragedy
1808

# 11. APPENDICES

## Appendix 1: List of physical property characteristics

**1. Building description A (Volume and surfaces)**

1.1 Size ($m^2$) per zone of use
1.2 Volume ($m^3$) and surface/volume-ratio ($m^2/m^3$)
1.3 External surfaces and orientation (walls, windows) ($m^2$) by type
1.4 Internal surfaces ($m^2$) by type
1.5 Ceiling/room height
1.6 Size/type of rooms (e.g. open-plan office, cellular office)
1.7 Width of doors and corridors
1.8 Size of facilities/rest-rooms regarding barrier-free accessibility
1.9 Ratio between useable (effective) floor area and traffic (common) area

**2. Building description B (construction and products)**

2.1 Construction type
2.2 Carrying structure and foundation
2.3 Load bearing reserve
2.4 Type of external walls/envelope
2.5 Type of windows and glazing
2.6 Type of internal walls
2.7 External surface materials
2.8 Internal surface materials
2.9 Other materials and products

**3. Energy source**

3.1 Energy sources (fossil, renewable) for heating
3.2 Energy sources (others)

**4. Technical equipment (type, size, flexibility)**

4.1 Heating and cooling system (HVAC-part 1) incl. heat and hot water production, cooling generation
4.2 Energy generation for internal use and/or third parties (PV, etc.)
4.3 Ventilation system (HVAC-part 2)
4.4 Electrical system incl. lighting
4.5 Elevators & internal transport
4.6 ICT
4.7 Water supply, distribution and wastewater (e.g. water efficient taps, rain- and grey-water usage, own clarification plant, rain-water infiltration, etc.)
4.8 Waste collection system
4.9 Distribution pipelines (e.g. within supply/utility shafts)
4.10 Controlling instrumentation
4.11 Measurement instrumentation

# **Appendix 2:** List of performance / quality characteristics

**1. Functional quality**

1.1 Serviceability (fitness for purpose, usability)
1.2 Space efficiency

**2. Cultural and social quality – part I**

2.1 Aesthetic quality
2.2 Urban design quality
2.3 Cultural value

**3. Cultural and social quality – part II**

3.1 Health & well-being
3.2 Indoor air quality
3.3 Comfort (thermal, visual, acoustic, olfactory (part of indoor air quality))
3.4 User safety
3.5 User participation and control
3.6 Accessibility (to and inside the building)

**4. Technical quality**

4.1 Structural safety
4.2 Fire protection
4.3 Noise protection
4.4 Moisture protection
4.5 Maintainability
4.6 Flexibility and adaptability (also in the sense of suitability for re-use and third-party usability)
4.7 Ease of cleaning
4.8 Durability
4.9 Resilience against natural and man-made hazards
4.10 Design for deconstruction and recyclability

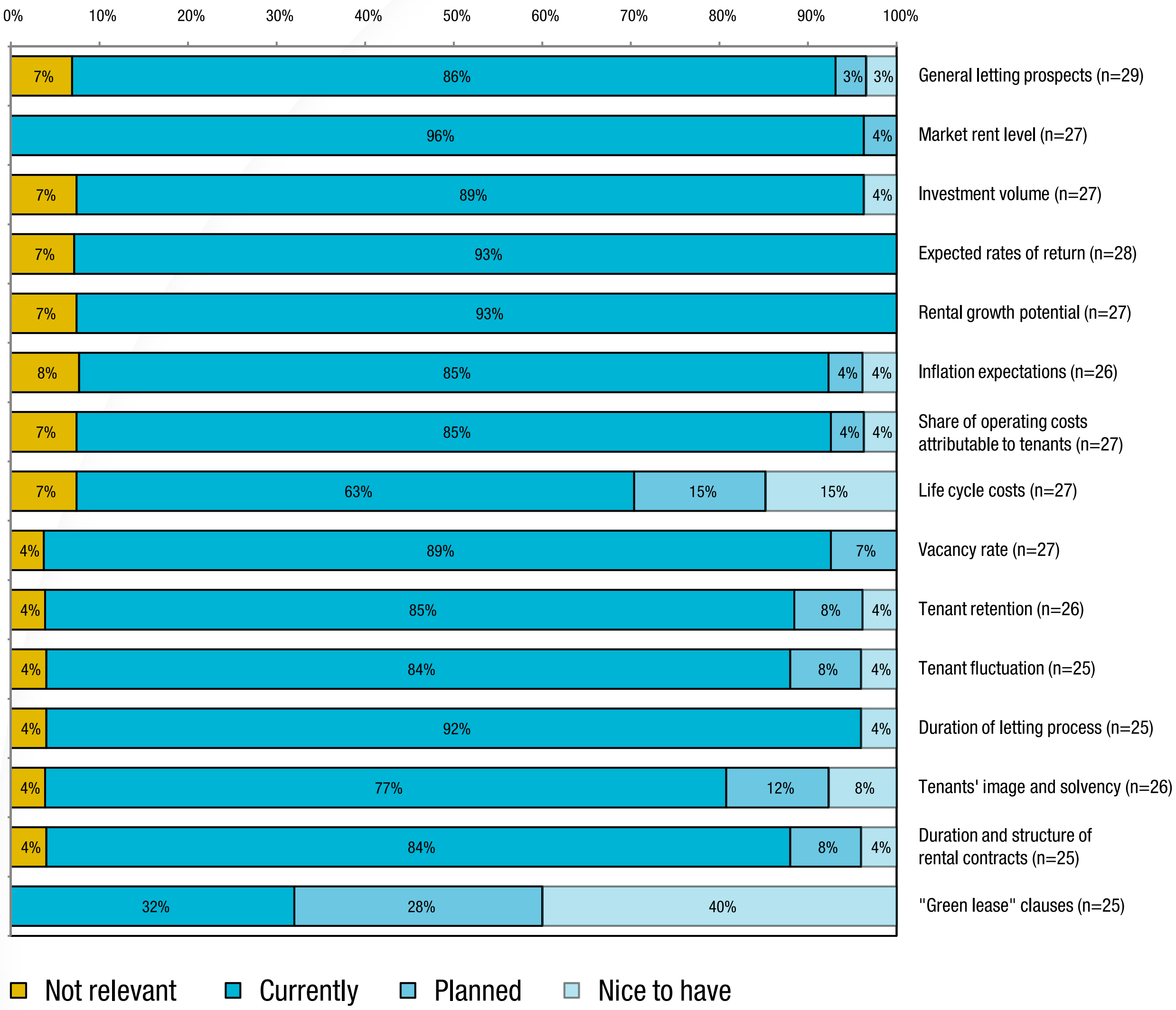
**5. Environmental quality**

5.1 Energy performance
5.2 Resource depletion
5.3 GHG-emissions and GWP
5.4 Other impacts on the global and local environment including risks to the local environment
5.5 Land use change and sealing
5.6 Water consumption
5.7 Wastewater
5.8 Waste (from construction activities)
5.9 [Waste (user related)]

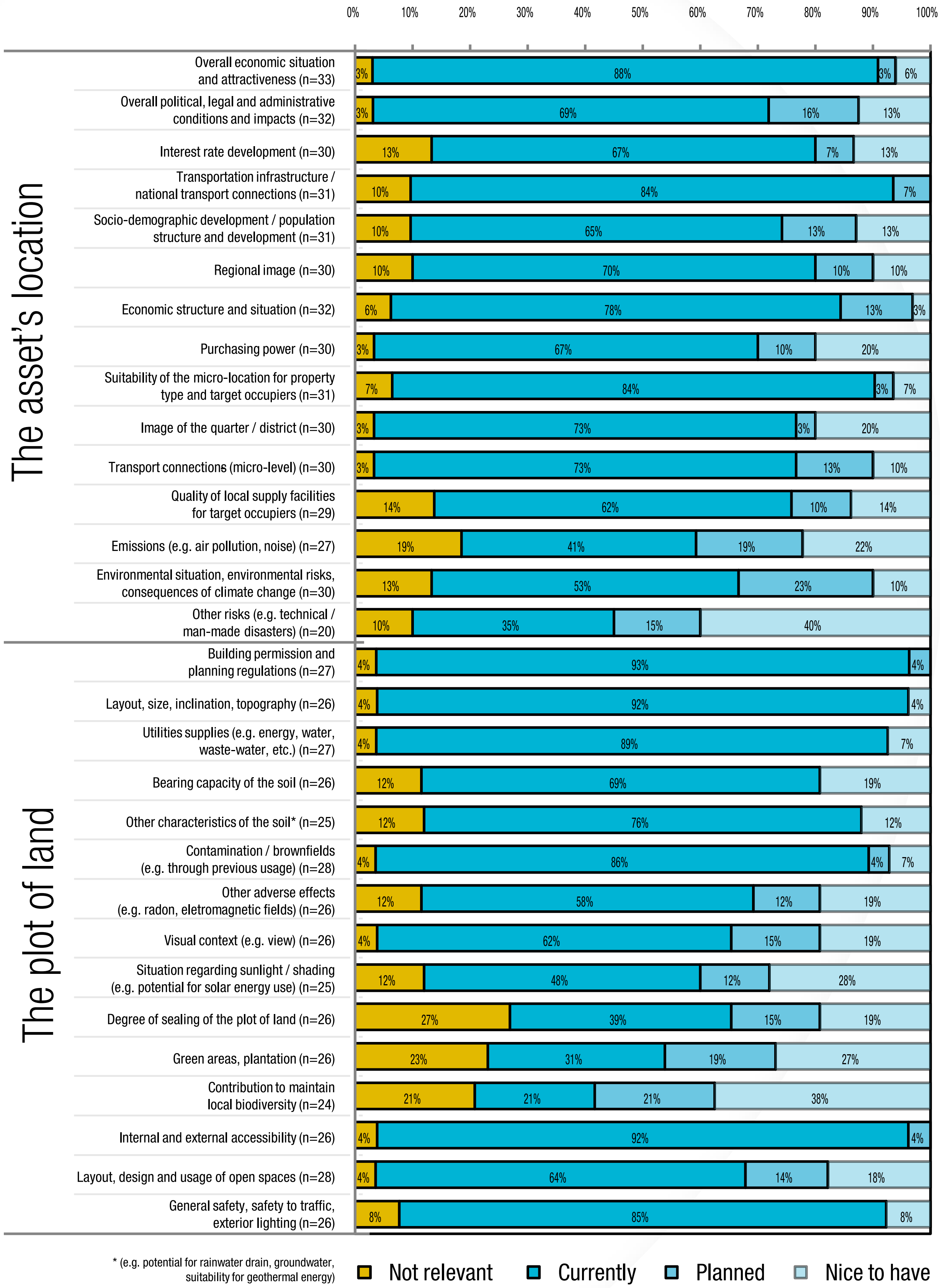
**6. Economic quality**

6.1 Life cycle costs

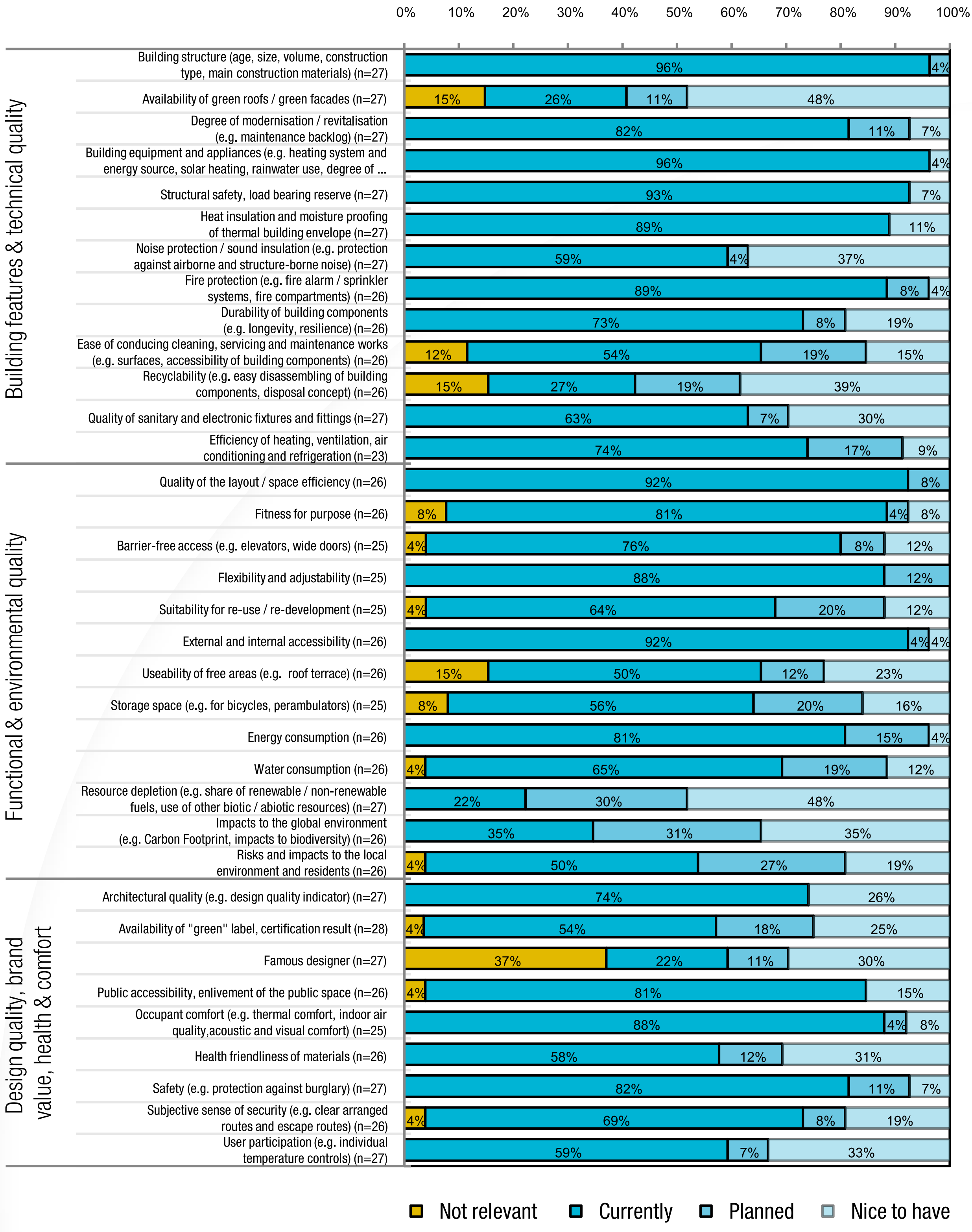
# **Appendix 3:** Long-list of decision-based information and data collection routines as well as property investors' judgments on their relevance




Quality of the Cash Flow




Location and plot of land



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Building features & technical quality
Building structure (age, size, volume, construction type, main construction materials) (n=27) 96% 4%
Availability of green roofs / green facades (n=27) 15% 26% 11% 48%
Degree of modernisation / revitalisation (e.g. maintenance backlog) (n=27) 82% 11% 7%
Building equipment and appliances (e.g. heating system and energy source, solar heating, rainwater use, degree of ... 96% 4%
Structural safety, load bearing reserve (n=27) 93% 7%
Heat insulation and moisture proofing of thermal building envelope (n=27) 89% 11%
Noise protection / sound insulation (e.g. protection against airborne and structure-borne noise) (n=27) 59% 4% 37%
Fire protection (e.g. fire alarm / sprinkler systems, fire compartments) (n=26) 89% 8% 4%
Durability of building components (e.g. longevity, resilience) (n=26) 73% 8% 19%
Ease of conducing cleaning, servicing and maintenance works (e.g. surfaces, accessibility of building components) (n=26) 12% 54% 19% 15%
Recyclability (e.g. easy disassembling of building components, disposal concept) (n=26) 15% 27% 19% 39%
Quality of sanitary and electronic fixtures and fittings (n=27) 63% 7% 30%
Efficiency of heating, ventilation, air conditioning and refrigeration (n=23) 74% 17% 9%
Functional & environmental quality
Quality of the layout / space efficiency (n=26) 92% 8%
Fitness for purpose (n=26) 8% 81% 4% 8%
Barrier-free access (e.g. elevators, wide doors) (n=25) 4% 76% 8% 12%
Flexibility and adjustability (n=25) 88% 12%
Suitability for re-use / re-development (n=25) 4% 64% 20% 12%
External and internal accessibility (n=26) 92% 4% 4%
Useability of free areas (e.g. roof terrace) (n=26) 15% 50% 12% 23%
Storage space (e.g. for bicycles, perambulators) (n=25) 8% 56% 20% 16%
Energy consumption (n=26) 81% 15% 4%
Water consumption (n=26) 4% 65% 19% 12%
Resource depletion (e.g. share of renewable / non-renewable fuels, use of other biotic / abiotic resources) (n=27) 22% 30% 48%
Impacts to the global environment (e.g. Carbon Footprint, impacts to biodiversity) (n=26) 35% 31% 35%
Risks and impacts to the local environment and residents (n=26) 4% 50% 27% 19%
Design quality, brand value, health & comfort
Architectural quality (e.g. design quality indicator) (n=27) 74% 26%
Availability of "green" label, certification result (n=28) 4% 54% 18% 25%
Famous designer (n=27) 37% 22% 11% 30%
Public accessibility, enlivement of the public space (n=26) 4% 81% 15%
Occupant comfort (e.g. thermal comfort, indoor air quality,acoustic and visual comfort) (n=25) 88% 4% 8%
Health friendliness of materials (n=26) 58% 12% 31%
Safety (e.g. protection against burglary) (n=27) 82% 11% 7%
Subjective sense of security (e.g. clear arranged routes and escape routes) (n=26) 4% 69% 8% 19%
User participation (e.g. individual temperature controls) (n=27) 59% 7% 33%
Not relevant
Currently
Planned
Nice to have


Building

# **Appendix 5:** Selected characteristics of property-related functions, methods and purposes

■■■ strong
■■ moderate
■ little
□ indirect

| | Due Diligence | Facility Management | Portfolio-/ Asset-Analysis and Management | Risk Analysis and -Management | Property Valuation & Appraisal | Sustainability Assessment | Sustainability Reporting |
|---|---|---|---|---|---|---|---|
| **A. Handling of information** | | | | | | | |
| Gathering of information | ■■■ | ■■■ | ■■ | ■■ | ■■ | ■■■ | ■■ |
| Processing / reformatting of information | ■■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ |
| Interpretation | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■ |
| Decision-making based on information | | ■ | ■■■ | ■ | | | |
| Transfer of information to third parties | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ |
| **B. Manner of exercising influence** | | | | | | | |
| Active | | √ | √ | √ | | □ | |
| Passive | √ | | | | √ | √ | √ |
| **C. Subject matter** | | | | | | | |
| Single building | ■■■ | ■■■ | □ | □ | ■■■ | ■■■ | |
| Portfolio | ■ | □ | ■■■ | ■■ | □ | | ■ |
| Corporation | □ | | | ■■■ | □ | | ■■■ |
| **D. Perspective** | | | | | | | |
| Technical | ■■■ | ■■■ | □ | □ | □ | □ | |
| Functional | ■■■ | ■■■ | □ | □ | □ | □ | |
| Economic | ■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■■ |
| Environmental | ■ | ■■■ | □ | □ | □ | ■■■ | ■■■ |
| Social | ■ | ■■ | □ | □ | □ | ■■■ | ■■■ |
| **E. Areas of interest** | | | | | | | |
| Physical property characteristics | ■■■ | ■■■ | ■ | ■ | ■ | ■ | |
| Performance / quality characteristics | ■■ | ■■■ | ■■ | ■■ | ■■ | ■■ | |
| Economic decision making parameters | ■ | ■■■ | ■■■ | ■■■ | ■■■ | ■■ | |
| Economic success | | | ■■■ | ■■■ | | ■ | ■ |
| Economic risks | ■ | ■ | ■■■ | ■■■ | ■■■ | | ■ |
| ESG parameters and issues | ■ | ■ | ■ | ■ | ■■ | ■■■ | ■■■ |

# **Appendix 6:** Checklist of data and other information factors that valuers should consider collecting where feasible within the scope of valuation assignments (RICS, 2013a, Appendix A: Sustainability Checklist)

## LOCATION

**How accessible is the property to:**

- public modes of transportation?
- users with special needs (e.g. physical disability)?
- private modes of transportation?
- green and open areas?
- user-relevant basic services?

**Is the property subject to:**

- known environmental risks such as flood, storm, etc. and is this risk increasing?
- exposure to potential man-made hazards?
- noxious emissions (e.g. exposure to noise, dust, etc.)?

## SITE CONSIDERATIONS

**What is/are the:**

- land use and likelihood of achieving a change of type and quality of land use?
- current and planned on-site defences against environmental risks?
- likely or known on-site contamination?
- building's exposure to sunlight/shading?
- conditions of the soil (e.g. bearing capability, potential for geothermal energy usage)?

## BUILDING

**In relation to the building's specification, condition and configuration, what is/are the building's:**

- energy asset rating (if one exists)?
- energy performance (consumption of non-renewable resources during use)?
- carbon emissions?
- source of energy sources available and/or used?
- services in relation to age and efficiency and future life expectancy?
- potential for energy renewal usage?
- likely risks to the local environment through emissions, etc.?
- water consumption during operation?

## BUILDING

**In relation to the building's specification, condition and configuration, what is/are the building's:**

- water conservation or installation of measures to promote water use efficiency?
- waste reduction facilities (e.g. on-site waste segregation for recycling)?
- capacity to be adaptable/flexible to enable it to be used differently in the event of changing demand patterns?
- likely resilience to the consequences of climate change (e.g. storm damage, maintaining usability if temperature change ensues)?
- barrier-free accessibility to and inside the building (e.g. for disabled users)?
- safety under extreme conditions (such as fire and tempest)?
- design and construction in relation to its ability to facilitate future re-use and recycling of materials in the event of refurbishment and/or demolition?
- health impacts in relation to building materials and building specification (daylight/natural ventilation, etc.)?
- ability to support user comfort (thermal conditions, visual conditions,
- acoustic conditions and indoor air quality)?
- overall likelihood to maintain a long future life based on the developing sustainability agenda including the periods between refurbishments?
- availability of solutions to resist environmental risks (e.g. flood prevention schemes for buildings at risk)?

## DOCUMENTATION

**What documentation is available in relation to:**

- statutorily required certifications or ratings (e.g. as required in the EU under the Energy Performance in Buildings Directive)?
- voluntary certifications, including the date granted and grade achieved (e.g. LEED, BREEAM, etc.)?
- any other externally verifiable evidence of sustainability (e.g. winner of any sustainability-orientated design awards)?
- building passports/building files (in the sense of object/building documentations along the building life cycle)?
- ground expert testimonies, building diagnostics, blower-door-tests, etc.?
- planning documentation which supports claims of sustainability?
- life-cycle assessments, ecological footprint analysis, etc.?
- lease terms that encourage or mandate behaviours and standards in relation to environmental and social factors?
- management of the building in line with ethical/social responsibility goals (e.g. Environmental Management Systems, etc.)?

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# ABOUT THE UNEP FI PROPERTY WORKING GROUP

Property investing is a multitrillion-dollar worldwide industry that can have profound positive or negative effects on environmental, social and cultural goals. Issues as diverse as urban poverty, global warming and indigenous people's rights are affected by decisions about the development, refurbishment and management of properties. Investors can have a positive influence on these decisions.

The UNEP FI Property Working Group (PWG) was created in 2006 with the aim to encourage property investment and management practices worldwide that achieve the best possible environmental, social and financial results.

## The members of the PWG are:

**Actis**, UK
**Allianz Real Estate** (**Allianz SE**), Germany
**Aviva Investors** (**Aviva plc**), UK
**Axa Real Estate Managers** (**Axa – Group Management Services**), France
**Bentall Kennedy**, USA and Canada
**BNP Paribas Investment Partners**, France
**British Columbia Investment Management Corporation** (**bcIMC**), Canada
**Caisse des Dépôts et Consignations**, France
**CalPERS**, USA
**Colonial First State Global Asset Management** (**Commonwealth Bank of Australia**), Australia
**Deutsche Bank**, Germany and USA
**F&C REIT Asset Management**, UK
**Hermes Real Estate**, UK
**Hesse Newman Capital AG**, Germany
**Infrastructure Leasing & Financial Services**, India
**Investa Property Group**, Australia
**Lend Lease**, Australia
**The Link REIT**, Hong Kong
**M&G Real Estate**, UK
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## United Nations Environment Programme Finance Initiative (UNEP FI)

The United Nations Environment Programme Finance Initiative (UNEP FI) was established in 1992 as a partnership between policymakers and financial intermediaries. With over 200 members representing banks, insurers and investors from around the world, UNEP FI contributes the perspectives of financial institutions to the United Nations and global activities on sustainable finance. UNEP FI's mission is to bring about systemic change in finance to support a sustainable world by "changing finance, financing change".

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