Value of a building: Information and life cycle

« Identification of the Sustainable Building Performance Thresholds generating value »

Frank Hovorka
mrics

UNEP-FI: investment commission co-chair
SBA: chairman
REHVA: vice president
| DIFFERENT VALUES IN REAL ESTATE |

**Market value**
The estimated amount for which an asset should exchange on the date of valuation between a willing buyer and a willing seller in an arm’s length transaction.
(Source: IVS)

**Investment value**
The value of an asset to the owner or a prospective owner for individual investment or operational objectives.
(Source: IVS)

**Insurance value**
The value of real property covered by an insurance policy
(Source: IVS)

**Investment value** is the potential market value of their property, which is in turn influenced by the attractiveness of the property to potential occupants.

source: Valentina Fabi
TERMS OF VALUE EQUATION

\[
\text{MARKET VALUE} = (\text{income} - \text{expenses}) + \text{residual value}
\]

Source Valentina Fabi
Theorizing green value
Applying DCF method

Discounted Cash Flow (DCF)

\[
\text{Market Value} = \sum_{t=1}^{n} \frac{(Gl_e - OETz - ME - OE + OI)_t}{(1 + r_{\text{disc}})^t} x \left( \frac{1}{(1 + r_{\text{disc}})^t} \right) \left( \frac{1}{(1 + r_{\text{discount}})^t} \right) \]

Explanation:
- \( n \): Time frame in years
- \( Gl_e \): Gross rental income
- \( OETz \): Operating expenses non-attributable to tenants
- \( ME \): Marketing expenses
- \( OE \): Other expenses (e.g., modernisation, etc.)
- \( OI \): Other income (e.g., advertising on building facade)
- \( r_{\text{disc}} \): Discount rate
- \( Gl_e_n \): Gross rental income in year \( n \)
- \( OETz_n \): Operating expenses non-attributable to tenants in year \( n \)
- \( r_i \): Risk-free rate
- \( r_p \): Risk premium
- \( g \): Growth rate
- \( d \): Depreciation
- \( T_n \): Terminal value of the building in year \( n \)

Changes in market participants’ preferences
- Lower share of operating costs for tenants
- "Green lease"

Ease of conducting maintenance and servicing activities
- Lower repair costs

Improved marketability
- Shorter vacancy periods

Lower expenses for modernisation / revitalisation

More stable cash flow
- Improved marketability
- Lower sales risk
- Image / Reputation gains
- Potential for increases in rents

Lower property risks (not yet explicitly taken into account in modelling of property cash flow)

Longer useful economic lifespans
- Longer compliance with increasingly stringent environmental legislation

Improved competitiveness
- Risking energy costs
- "Sustainability Hype"

Source: T. LUTZKENDORF
TECHNICAL SYSTEM IMPACT

RISKS

Physical risk
- Occupant satisfaction
- Increasing of noise
- HVAC inability to satisfy IEQ levels

Technology risk
- Indoor flooding
- Fire
- Losses of refrigerant
- Obsolescence of HVAC technology
- Increasing of operating costs

Risk due regulation
- Inability to compete with greener buildings
- Inability to compete with buildings with a better energy label
- Inability to lease due to new regulation

Market risk
- Change in discount rate
- Increased speed of depreciation
- Lower occupancy rates
- Shorter tenancies

source | Valentina Fabi
Environnemental Indicators: Technic Functionnal Social Economic Environmental (EN 15978, …)

TOOLS: STD BIM Certification

DEMOlITION

IN-USE

List of the components

Environnemental Indicators
Technic
Functionnal
Social
Economic
Environmental
(EN 15978, …)

Source: REHVA guidebook 16
Analyse of a building life-cycle and its HVAC system:

Analyse of the life-cycle cost:
- Investment cost of HVAC systems and other systems
- Energy consumption
- Maintenance
- Replacement cycle

Performance indicators:
- Energy consumption
- Water consumption
- Greenhouse gas emissions
- Waste
- Indoor air temperature
- Indoor air quality
- Costs linked to life cycle

Performance analysis:
- Energy simulation
- Simulation of indoor conditions
- Simulation of the lighting
- Building information modelisation (BIM) => quantities
- Life cycle assessment (LCA) => Environmental impacts

Discounted cash flow:

Market Value = Net operating income (rent – operating costs) / Capitalization rate (riskless rate + premium – growth + depreciation)

Source: REHVA guidebook 16
<table>
<thead>
<tr>
<th></th>
<th>Traditional Building</th>
<th>Low energy building (-25%)</th>
<th>Sustainable Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>€/m²,a</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Maintenance</td>
<td>€/m²,a</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Energy</td>
<td>€/m²,a</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Net rent income</td>
<td>€/m²,a</td>
<td>270</td>
<td>275</td>
</tr>
<tr>
<td>Renting process</td>
<td>rental months</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Free rent period</td>
<td>rental months</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Churn</td>
<td>rental months</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total months</td>
<td>rental months</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Rental period</td>
<td>years</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Net operating income</td>
<td>€/m²,a</td>
<td>220</td>
<td>225</td>
</tr>
<tr>
<td>Capitalization rate</td>
<td>%</td>
<td>6.25</td>
<td>6.25</td>
</tr>
<tr>
<td>Value</td>
<td>€/m²</td>
<td>3520</td>
<td>3600</td>
</tr>
<tr>
<td>Change</td>
<td>%</td>
<td>+2.3%</td>
<td>+11.8%</td>
</tr>
</tbody>
</table>

Source: REHVA guidebook 16
How to build confidence?

Real performance

Uncertainty management

Life cycle assessment
<table>
<thead>
<tr>
<th>Summary of EEFIG Recommendations (Buildings Sector)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To Policy Makers</strong></td>
</tr>
<tr>
<td>Existing Buildings Regulations should be fully implemented, harmonised and consistently enforced across EU Member States</td>
</tr>
<tr>
<td>Future Regulatory Pathways for EU Buildings should provide concerted and consistent regulatory pressure to improve the energy efficiency of buildings</td>
</tr>
<tr>
<td>High quality decisions and low transaction costs can only be delivered by easily accessible data and standard procedures</td>
</tr>
<tr>
<td>Reporting, accounting and procurement procedures must facilitate, and not hinder, appropriate energy efficiency investments in public buildings</td>
</tr>
<tr>
<td>The “at-scale” energy efficiency upgrade of residential buildings can only happen with a concerted address of the specific investment demand and supply drivers of this segment and the engagement and alignment of retail distribution channels</td>
</tr>
<tr>
<td>The targeted address of energy efficiency investment supply and technical assistance through the smart deployment of European Structural and Investment Funds 2014-2020 and Horizon 2020 into risk sharing mechanisms and project development assistance, working with partners with an successful track-record</td>
</tr>
<tr>
<td><strong>To Markets Participants</strong></td>
</tr>
<tr>
<td>Engage key decision makers (owners and managers) with a clear business case that raises their awareness of the multiple benefits of buildings’ energy efficiency renovations with evidence</td>
</tr>
<tr>
<td>Make it easy to get the right data to the right decision makers</td>
</tr>
<tr>
<td>Improve the Processes and Standards for Buildings Labels, Energy Performance Certificates and Energy Codes</td>
</tr>
<tr>
<td>Standards should be developed for each element in the energy efficiency investment process</td>
</tr>
<tr>
<td>Leverage of private sector finance through optimal use of European Structural and Investment Funds and Member States funds</td>
</tr>
</tbody>
</table>
Changing the game: the new RICS Red Book 2014
*Sustainability as a potential value driver and risk factor*

- **RICS Valuation Practice Statement 4:**
  “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, Valuation –Professional Standards, 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, Valuation –Professional Standards, 2014, p. 59*
Sustainability is no longer a niche issue

The financial business case is clear: energy efficient and sustainable buildings provide an overall better market value for investors.

There is an increasing demand for data to assess the sustainability credentials and performance of companies, portfolios and buildings.

Asset owners and managers are increasingly confused by the ever thickening ‘alphabet soup’ of acronyms relating to building metrics and the organisations behind them.

Link to download the publications
www.unepfi.org/publications/property
Translating information for decision-making

"From the boiler room to the board room."
What about data collection and information?
From data transparency to valuable information

It is all about:

- data collection
- uncertainty management
- translation mechanisms through the market filters!
Sustainability related information

Recommendations for sustainability assessment bodies on the type of information needed by investors and valuers
Sustainability-related data collected by owners and property managers

- A large number of sustainability information is already collected by leading companies... But respective data are not yet systematically captured and processed through decision making process.
  - **81%** have some form of “sustainability check” in place. 56% of them use these checks during their financial decision making process.
  - **16%** are able to use the information for sustainability reporting functions.
  - **58%** do not have any form of internal management system in place.
    (Source: UNEP FI, 2014, *Sustainability Metrics*)

- The translation into financial ratios would ensure a better integration of sustainability information into investment decision process.
Existing initiatives on sustainability integration into valuation and decision making process

Examples of initiatives aiming to better integrate sustainability issues into valuation and decision making process.

<table>
<thead>
<tr>
<th>Project name</th>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Property Appraisal project (UK)</td>
<td>Proposition of methodology. A questionnaire on property future-proofness is used for investors to assess the risks associated to poor sustainability performance. The results are used as inputs to adjust discount factor in a DCF calculation.</td>
</tr>
<tr>
<td>Environmental value added (Japan)</td>
<td>Recommendations for the analysis of the added value from sustainability, investigating both the net income and the risk assessment.</td>
</tr>
<tr>
<td>Value Beyond Cost Saving (USA)</td>
<td>Suggestions to adapt existing appraisal tools such as DCF to integrate sustainability issues transparently. It advocates valuers to get a deeper understanding of sustainability issues and market uptakes of the</td>
</tr>
<tr>
<td>ESI Property Valuation (SWTZ)</td>
<td>Proposition of methodology. A global factor (ESI) is used to adjust the final result of a traditional DCF valuation. The indicator is calculated using a property rating against against five key sustainability criteria. Weight for each criteria are provided thanks to experts' diagnosis on their relative potential impacts on value for different scenarios of future changes in the context.</td>
</tr>
<tr>
<td>ImmoValue Project (EU)</td>
<td>Suggestions on how new developments such as EPC and LCC can be used to integrate sustainability issues into property valuation.</td>
</tr>
<tr>
<td>Integrating Sustainability and Green Building into the Appraisal Process (USA)</td>
<td>Proposition of a three-step valuation process for real estate valuers. First step consists in assessing the market uptake of sustainability (importance of sustainability topics for the different stakeholders in the market). Second step consists in analyzing the subject property sustainability performance within its market using a sustainability risk matrix. Last step consists in monitoring the evolution of demand and supply of sustainable properties over time.</td>
</tr>
</tbody>
</table>
Existing initiatives on sustainability integration into valuation and decision making process

<table>
<thead>
<tr>
<th>Project name</th>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPD Eco Pas</td>
<td>Benchmarking service aiming to identify environmental risks for a given property. Data are collected according to a Valuer Sustainability Checklist developed in partnership with the RICS. This checklist is used to complete the risk analysis and compare it with peer thanks to a database with environmental data and capital values for different properties type.</td>
</tr>
<tr>
<td>Sustainability and Income-Producing Property Valuation (USA)</td>
<td>Systematic practical procedure for evaluating sustainable property. The underlying principles is that appraisers should systematically collect building information on sustainability as well as market context information on sustainability so as to adjust traditional input parameters. The uncertainty associated with the procedure is thus assessed through a sensitivity analysis using Monte Carlo simulations.</td>
</tr>
<tr>
<td>How to calculate and present deep retrofit value (USA)</td>
<td>Guide providing practical guidance for owner-occupiers as to how value deep retrofits beyond the mere costs savings. They define &quot;Deep retrofit value is the net present value of all of the benefits of a deep energy or sustainability investment.&quot; Methodologies incorporate risks analysis and considerations to properly avoid double counting.</td>
</tr>
<tr>
<td>Renovalue (EU)</td>
<td>Training material for valuation professionals on sustainability features and their impacts on value drivers. (rent, discount rate, capital expenditures, maintenance costs...)</td>
</tr>
</tbody>
</table>
Accounting for uncertainty

“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.” (UNEP FI, 2014, *Sustainability Metrics Report p85*)

Sustainability–related information represents a new source of uncertainty:

<table>
<thead>
<tr>
<th>Market uncertainties</th>
</tr>
</thead>
<tbody>
<tr>
<td>- market sentiment on sustainable properties (Evolution in the rental gap and reletting period between sustainable and non sustainable properties)</td>
</tr>
<tr>
<td>- Energy price volatility</td>
</tr>
<tr>
<td>- evolution of users’ expectations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical uncertainties</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Installations remaining lifespan</td>
</tr>
<tr>
<td>- Evolution in the replacement costs of component</td>
</tr>
<tr>
<td>- Uncertainties on sustainability metrics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Legal uncertainties</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Evolution in the regulatory context</td>
</tr>
</tbody>
</table>
The main benefit from green refurbishment lies in its impact on long term value. Whether on a pessimistic (depreciation of poor performing building) or on an optimistic scenario (premiums for the environmental-friendly building), green retrofit should not be only analysed through conventional paybacks period but considerations on their impact on the possible evolutions of assets value.
Translation to achieve
The challenge

A combination of **QUALITATIVE AND QUANTITATIVE** methods

Quantitative & Qualitative Inputs → Qualitative Filters → Quantitative Inputs for DCF Model

Simulation Modeling Tools Such as Energy Plus, eQuest, CFD, Radiance, etc

Valuers (Underwriters, Appraisers, Due Diligence Persons)

Final Report to Decision Makers

Green Building Systems and Strategies

Performance Indicators

Building Performance

Financial Model Inputs

Financial Performance

1 → 2 → 3 → 4

Uncertainty

Probability Distribution → PERT/Monte Carlo Simulation

A FRAMEWORK FOR INTEGRATING VALUE AND UNCERTAINTY IN THE SUSTAINABLE OPTIONS ANALYSIS IN REAL ESTATE INVESTMENT

Risk management & insurances