Economic indicators:
Proposals and first experiences

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Abstract

In order to deal with a sustainability assessment in the necessary scope within this topic the inclusion of the economic performance is a requirement. For this to be achieved, appropriate indicators and benchmarks need to be developed, tested and recommended for use. This is a sub-task of the EU project SuPerBuildings.

Taking into account the state of the international and European standardization as well as European and national research projects recommendations for indicators were developed. These recommendations have already been incorporated into the preparation and development of national sustainability assessment systems as well as into the European standardization.

The following indicators are proposed: (1) capital costs as well as additional capital costs, (2) costs in the operational phase, (3) life-cycle costs in the narrow sense (LCC), (4) life cycle costs in the broader sense (WLC), (5) short-term value stability, (6) medium to long-term value stability, (7) external costs. These approaches can also be combined, e.g. external costs may be introduced in (1), (2) and (3), as well as (4).

Indicators such as these should be able to show the economic advantages of sustainable buildings. It shall be demonstrated that sustainable buildings (a) can be constructed at reasonable costs, (b) include lower life cycle costs, (c) are easier to rent and more marketable and d) are more stable in terms of value and can contribute to a reduction of financial risks.

SuPerBuildings

ECONOMIC INDICATORS – PROPOSALS AND FIRST EXPERIENCES

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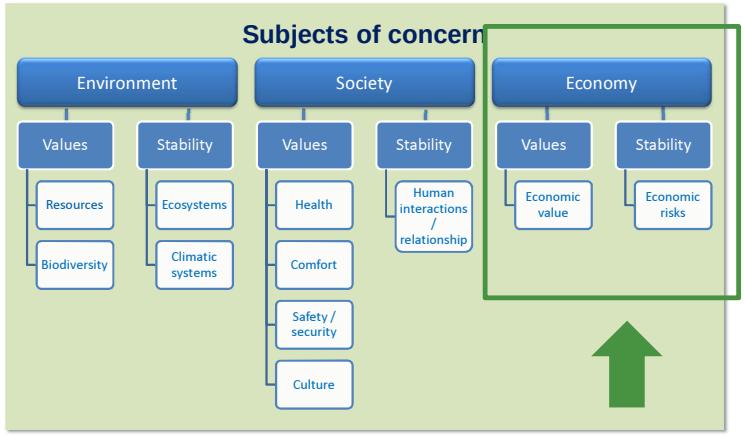
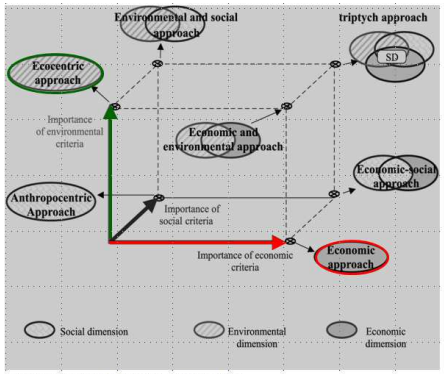
SEVENTH FRAMEWORK PROGRAMME

A Need for Economic Indicators



SuPerBuildings

Sustainability – the Economic Perspective



http://www.emeraldinsight.com/fig/2490060304001.png

SuPerBuildings

Subjects of Concern

Capital

- forms the basis of the economic system.
- It is part of the productive capacity of society, its capacity to act and society's ability to generate and maintain wealth.
- value as such of capital and the long-term-stability of that value are both important.

Economic Prosperity

- 1 of 4 key objectives of EU sustainability strategy (2006)
- Definition: "a stage in an economic cycle in which conditions of relatively low-unemployment and high total income prevail, leading to high purchasing power.
- Wealth: "the state of having strong financial resources".
- Both the level (or absolute value) of prosperity and its long-term-stability are important.

SuPerBuildings

Building Related Subjects of Concern

Property value/ Long-term Property Value

- Buildings are a physical manifestation of the capital invested in them, which can be released at a future point (by selling it). Therefore safeguarding the economic value of the building means safeguarding capital and consequently prosperity. Hence the first building related subject of concern is “the economic value of the property”.

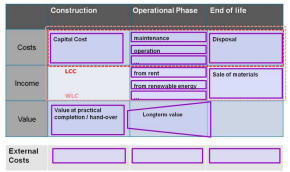
Economic Capacity to Act

- When considering stakeholder perspectives and what their interest in retaining the value of the building is, safeguarding the value of the building means safeguarding the capacity to act of the stakeholders concerned.
- There are further economic aspects that influence the “economic capacity to act”, such as keeping costs low throughout the lifecyle.

Building Related Costs and Indicators

	Construction	Operational Phase	End of life
Costs	Capital Cost	maintenance operation ...	Disposal
Income	LCC WLC	from rent from renewable energy ...	Sale of materials
Value	Value at practical completion / hand-over	Longterm value	
External Costs			

Building related Costs and Indicators



Building related indicators:

I. **Capital costs**
II. **Costs in the operational stage**
III. **Life cycle costs**
IV. **Whole life costs**
V. **Cost/value ratio at point of handover**
VI. **Long-term stability of value or financial risk**
VII. **External costs**

Grouping of Indicators

Finally, three main indicator groups can be derived:

A **Investment/capital cost**
(external costs are included, if needed and agreed)

B **Life cycle cost – extended**
(construction costs, operational costs, external costs (if needed and agreed) and negative/avoided costs (if needed and agreed) are included)

C **Value stability / financial risk**
(Cost/value ratio at point of handover / financial risk or long-term value stability)

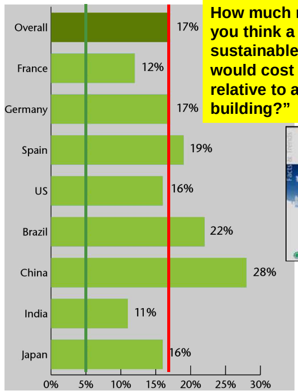
http://showme.co.za/paarl/lifestyle/green-living/green-buildings/

Economic Indicators

A) Investment / capital cost

http://staeblerappraisal.com/wp-content/uploads/2011/08/10441446-construction-cost-estimation-services.jpg

A) Investment / capital cost



How much more do you think a certified sustainable building would cost to build relative to a normal building?"

Table E10: Cost ratios and financial impact per functional unit of GPP for new offices and buildings. A cost ratio smaller than one implies cost reductions and a cost ratio larger than one implies cost increases. For the weighted average impact, negative numbers imply costs reductions and positive numbers imply costs increases.

Construction - *New buildings and offices*		
LCC relevant costs	cost ratios	
	core / no GPP	compr / no GPP
Investment cost	1,02	1,02
Costs for heating	0,38	0,38
Costs for electricity use	0,25	0,23
Costs for water use	0,70	0,70
Maintenance costs	1,00	1,00
Disposal costs	1,00	1,00
Financial impact per building	*-10%*	*-10%*

A1 Investment / capital costs

Investment / capital cost - Short description

- **Capital cost** is the actual initial outlay required to pay for the construction project. It includes **construction and non-construction costs**.
  Capital costs are costs incurred on the purchase of land, buildings, construction and equipment to be used in the production of goods or the rendering of services, in other words, the total cost needed of bringing a project to a commercially operable status.
- It aims to identify the **additional capital costs for energy efficiency and sustainability** in comparison to average buildings of same type and use. These are usually overestimated.
  Lower interest rates can be allocated to sustainable buildings, as they have higher economic value or lower financial risk.
- *Capital costs can be assessed in their own right or be considered as part indicator of LCC, WLC or "cost/ value ratio at point of hand-over".*

A2 Investment / capital costs

Validity

- **For whom?**
  Owners, owner-occupiers, investors
- **Why?**
  Fear of increased capital costs is one of the main reasons for not building sustainably

Assessment method

- Comparison with average capital/construction costs for buildings of the same type and use. Usually values from literature are being used, i.e. values compiled by professional bodies for architects, surveyors etc.

A3 Investment /capital costs

Applicability

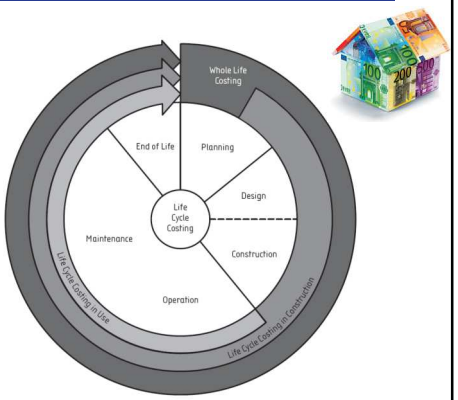
- In principle it is estimated as part of general capital budgeting
- ISO 15686-5:2008 Fig.3 can be used for guidance on cost items

Comparability

- It is important that **the year of data capture**, **treatment of VAT**, **system boundaries** of costs captured etc. are comparable. It needs to be made clear, **which cost items are included** and which are not.

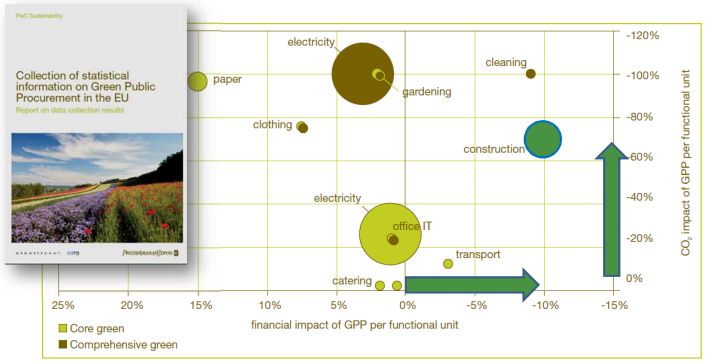
Economic indicators

B) Life cycle cost



ISO 15686-5

B) Life cycle cost



B1 Life Cycle Costs

LCC - short description

- Only costs/expenses, not incomes, that occur in the course of the life cycle are being captured. These have to be defined in accordance with ISO15686-5.
- When income streams, as well as other costs not so close related with building are included the life cycle costs indicator is extended to whole life costs. However, as a special case the **income from electricity generated with PV** or similar could be **included as negative costs** in LCC. This approach can also be applied to incomes from recycling.

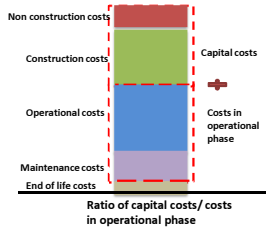
Sub-indicators

- In accordance with ISO 15686-5:2008: **a) Construction costs, b) Operational costs, c) Maintenance costs, c) End of life costs**

B2 Life Cycle Costs

Validity

- **For whom?**
  seen from the perspective of owner occupier and architects or engineers
- **Why?**
  - Traditionally buildings are being built with an aim to minimize up-front capital cost – **follow-on costs are often ignored or neglected**
  - Core notion of sustainability to consider **long-term effects of buildings**
  - Can help **optimization of design**
  - Particularly important for showing the **advantageousness of investment in EE &RE**



B3 Life Cycle Costs

Assessment method

- **Net present value calculation** is the most common methodology, though costs calculated year by year (as annuity) are acceptable, too
- **Benchmarks** have to be defined for different types of buildings and their uses.
- "**typical scope of costs**" given in ISO 15686-5:2008 Fig. 3
- Income could be included only as **negative (avoided) cost**.
- **Discount rate**
- Length of **reference study period** (50 years is proposed)

Applicability

- Calculation is straight forward in principle, but maintenance costs and end-of-life costs can be difficult to obtain.

Comparability

- Discount rate, system boundaries, and costs included have to be the same.

Economic indicators

C) Economic value / financial risk

http://stuartgoldman.wordpress.com/g

C) Economic value / financial risk

"Green is good for asset value."

Source: RICS, 2005, *Green Value – Green buildings, growing assets*, Published by: The Royal Institution of Chartered Surveyors

C1a Value stability (financial risk)

Investment cost/ economic value ratio - short description

- **Short term value stability** can be expressed by the indicator "**investment cost/economic value ratio at point of handover**" (or "worthwhileness" of investment).
- Both investors and owner occupiers have an interest in ensuring that the market value of the building at point of completion is not less than the capital cost of it.

Investment cost/ economic value ratio - validity

- **For whom?**
  Seen from the perspective of owner-occupier, investor, banks/ mortgage providers.
- **Why?**
  A fear that investing in sustainable buildings is not financially "worthwhile" still prevails.

C2a Value stability (financial risk)

Investment cost/ economic value ratio - assessment method

- The market value has to be at least as high as the capital costs.

Investment cost/ economic value ratio - applicability

- A method for defining the market value needs to be defined and may or may not rely on formal valuation.

Investment cost/ economic value ratio - comparability

- System boundaries for capital costs have to be defined, that are comparable to those considered for valuation - e.g. including land costs

C1 b Value stability (financial risk)

Long-term stability of value - short description

- **Long-term stability of value/ positive development of value** or conversely, **long-term financial risk**
- This indicator assesses **certain building characteristics** that can be expected to help safeguard the value of a building in the long term and that mean the building is less affected by market related fluctuation in value.

Long-term stability of value - validity

- **For whom?**
  owner occupiers, investors, owners.
- **Why?**
  If the building is built to anticipate future developments or risks (regulatory, environmental...) it is more likely to retain its value in the long term.

C2 b Value stability (financial risk)

Long-term stability of value - assessment method

- Through **consequential sub- indicators** such as:
  - options for easy adaptation to change of use
  - ability to meet future legislative requirements (e.g. Energy legislation)
  - ability to adapt to climate change (e.g. to greater over-heating risks)
  - certain physical characteristics that have been proven to remain in demand over decades (e.g."neutrality" of spaces)
- Through **financial risk indicators**: e.g. according to TEGOVA- PaM

Long-term stability of value - comparability

- If qualitative assessment methods are being used, these allow for a certain amount of personal judgement by the assessor, therefore total comparability may not be possible.

Discussion / conclusions

- Whole life costing is very close to the profitability calculations employed by real estate investors – it was felt that it was not a main concern of sustainability assessment to cover the particular concerns of profitability. However, is felt that it is in the interest of sustainability to show economic advantages from renewable energy installations. Therefore, the **definition of LCC should be extended** to include such income streams as negative costs.
- The disadvantages of using net present value (NPV) calculation as LCC methodology are that they essentially represent the point of view of the current owner or investor, discounting future costs to their present day value. **Possible solutions**:

  a) reduce discount rate, or set discount rate to 0 (UBA),

  b) costs to be shown on a 'per year' basis over the course of the life cycle (as annuities).