# Tool scope, structure and content

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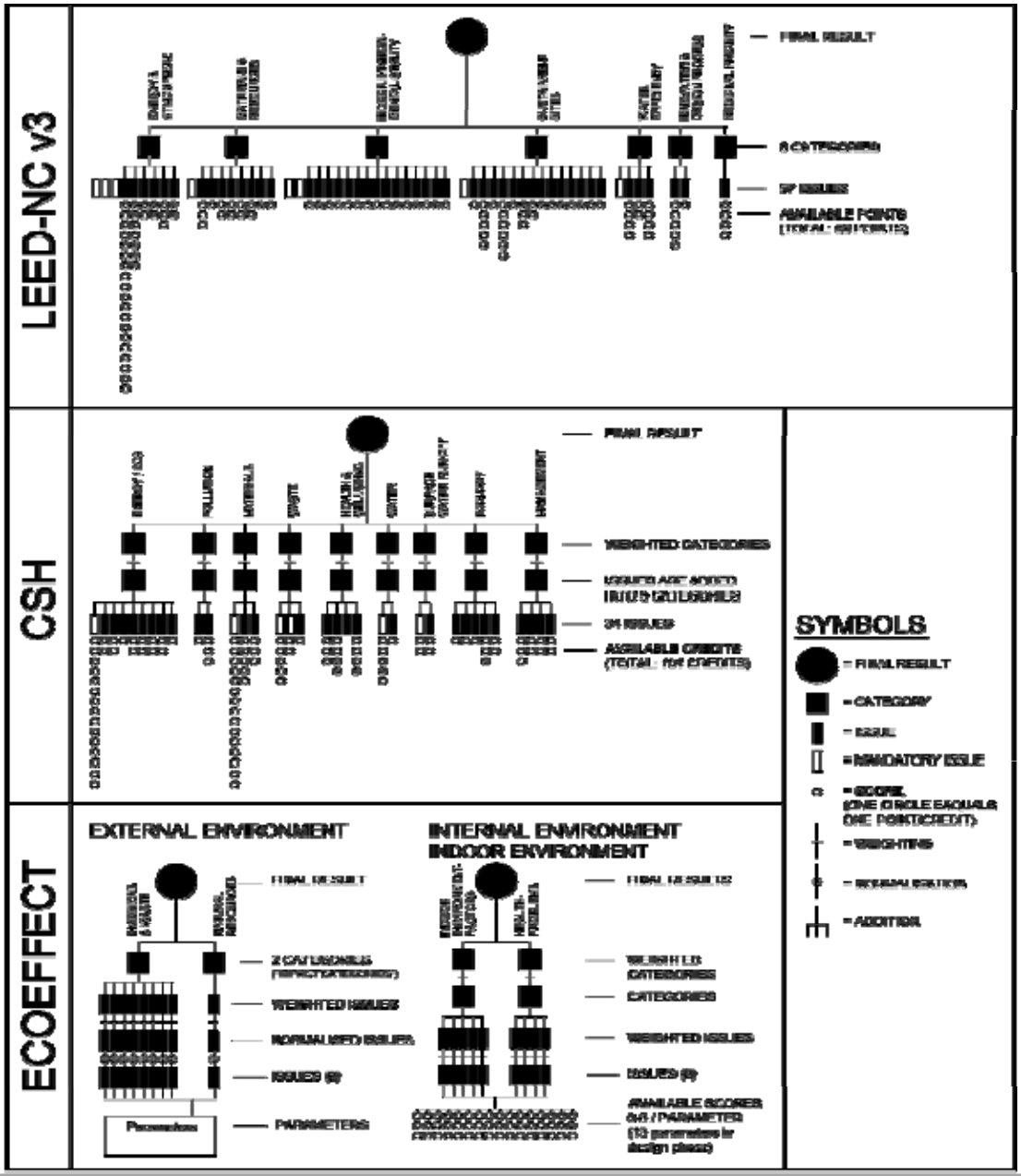
# Use of building tools

- Marketing
- Internal learning
- Evaluation of environmental/sustainability targets
- Formulation of targets
- Design tool
- ....

# Scope or assessment boundaries

- Building stage
- Building type
- Scale (object of study)
- Coverage regarding issues/impacts that are assessed
- Coverage regarding for instance flows contributing to external impacts
- Assessment methodologies (e.g LCA or not)
- …

# Illustration of tool structure




Source: Wallhagen, M. Licentiate thesis

Note: after this article was published LEED has included weighting of categories.

# Tool structure and category focus

| | LEED NC | BREEAM | CSH | Green star | Miljöbygg | EcoEffect |
|---|---|---|---|---|---|---|
| **Energy** | 31% | 23% | 29% | 20% | 24% | |
| **Material/Waste** | 12% | 14% | 30% | 17% | 12% | 38% |
| **Emissions/pollution** | | 13% | 4% | 13% | | |
| **Indoor env./Helth** | 13% | 14% | 11% | 19% | 53% | 42% |
| **Site/Ecology** | 26% | 11% | 8% | 6% | | 21% |
| **Water** | 10% | 6% | 9% | 8% | 12% | |
| **Management** | 8% | 11% | 8% | 8% | | |
| **Transports** | | 9% | | 8% | | |
| | | | | | | |
| **Max points** | 110 | 105 | 107 | 148 | - | - |
| **Assessed issues (mandatory)** | 37 (8) | 105(4) | 34 (7) | 62 (2) | 17 (17) | 24 |

% of possible credits in a category

LEED 2009 New Construction
BREEAM New Construction 2011 – non domestic
Code for Sustainable Homes 2009 (”version” of BREEAM)
Green Star Office ver. 3
Miljöbygg is the Swedish tool Miljöbyggnad
EcoEffect, swedish life-cycle based tool

# Selection of aspects for inclusion in a tool

## ex. indoor environmental aspects

| **Most severe problems/aspects** | **Most extensive problems/aspects** | **Aspects in Swedish official objectives** | **Aspects in Swedish mandatory rules** | **Most common aspects in current practice** |
|---|---|---|---|---|
| Indoor air quality – *radon* | Indoor air quality – *SBS related* | Indoor air quality – *ventilation* | Indoor air quality - *ventilation* | Indoor air quality |
| Indoor air quality – *legionella* | Noise & acoustics | Indoor air quality - *radon* | Indoor air quality - *formaldehyde in plywood, chipboard, etc.* | Noise & acoustics |
| Indoor air quality – *allergy related* | Thermal climate – *cold* | Noise & acoustics - *traffic noise* | | Thermal climate |
| Noise & acoustics – *traffic noise* | Electromagnetic fields (EMF) – *EMF sensitivity* | Tap water quality | | Daylight conditions |
| Magnetic fields – *childhood leukaemia* | | | | Illumination |
| Tap water quality | | | | |

We ended in prioritising most severe aspects and aspects dealt with in official objectives

Source: Malmqvist PhD thesis

# Differences in content focus

| | LEED | BREEAM (CSH) | MILJÖBYGGNAD |
|---|---|---|---|
| **ENERGY** | Energy efficiency<br>Renewable energy | Energy efficiency<br>Reduced CO2 emissions | Low energy use<br>Renewable energy |
| **MATERIAL** | Recycling of waste<br>Reused material | Reduced CO2 emissions<br>Recycling of waste | Embedded hazardous substances |
| **INDOOR ENV.** | Indoor air quality<br>Thermal climate | Indoor air quality, thermal climate, lighting, (Daylight<br>Noise), legionella | Noise, indoor air quality, thermal climate, daylight, legionella |
| **SITE** | Choice of site<br>User transports | Ecology, biodiversity<br>User transports | |
| **WATER** | Reduced water use | Reduced water use<br>Flooding | Tap water quality<br>Low emissions from individual sewage systems |

Miljöbyggnad (Environmental rating of buildings), is a swedish tool

# Indicator types

- **Performance** - measureable properties kWh/m2 etc,
- **Features** – used technology, properties, etc. for example solar panels, cycle storage…
- **Process** – organisation and routines, ex. environmental management routines, follow-up routines, competence

*Some comments on indicator types*

- Performance –*coverage of contributing flows can be more or less complete*
- Features, process – *can be more or less of potentials, ex. cycle storage and adjustable inner walls are more of potentials than solar panels*
- Innovations – *feature (or process) indicators measuring innovative creativity rather than environmental performance*

# Indicator types

## ex. assessment of health problems due to inferior indoor air quality

**DIRECT PERFORMANCE**

**INDIRECT PREVENTIVE MEASURES/ PROCEDURES**

Occupant survey on health symptoms

Measurement of indoor contaminants

Measurement of ventilation qualities (air flow rates, etc.)

Position of air intakes

Individual controllability of ventilation

Routines for ventilation filter exchange

# Selection of indicators

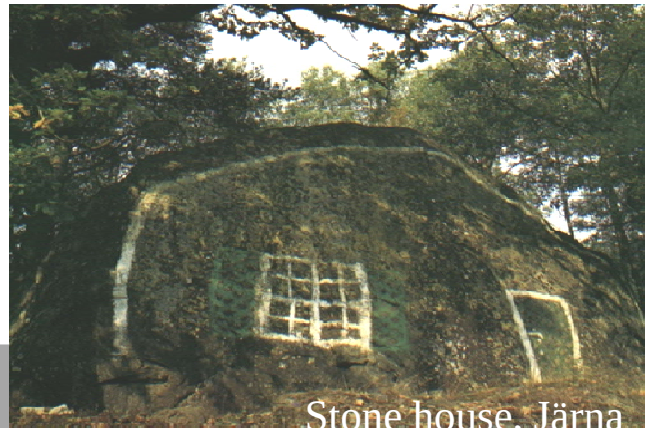
Possible indicators can be more or less appropriate for characterising an environmental problem with regard to:

**Theoretical criteria**

- Validity (to what extent is the addressed problem measured?)
- Accuracy (how accurately is the addressed problem measured?)
- Repeatability (do repeated measurements produce the same result?)

**Practical criteria**

- Influence (to what extent can the building owner influence the result?)
- Intelligibility (how easy is it to communicate the indicator?)
- Cost (how costly is it to collect data needed for calculations?)



Stone house, Järna

# Analysis of indicator types

- Wallhagen, M, Glaumann, M, Westerberg, U. Understanding differences between the environmental assessment tools – LEED, Code for Sustainable Homes and EcoEffect. *Analysis of indicator types with regard to performance, process and features.*
- Malmqvist, T. (2008). Environmental rating methods: Selecting indoor environmental quality (IEQ) aspects and indicators. Building Research & Information 36 (5): 466-485. *Analysis of indoor environmental quality indicators in 16 tools with regard to theoretical and practical criteria*
- Malmqvist, T, Glaumann, M. (2006). Selecting problem-related environmental indicators for housing management. Building Research & Information 34 (4), 321-333. *Analysis of indicators with regard to theoretical and practical criteria.*

# To discuss

1. Is it important that clients/users understand the differences in tool content?
2. On what basis should one decide on inclusion of an issue (aspect) in a tool? Rank the following… (Severity for people of a problem, extent of a problem, issues prioritised in agreed-on societal objectives, issues dealt with in current legislation, issues dealt with in other tools, issues prioritised by industry, other?)
3. Is it a problem that different tools put so different emphasis on different issues?
4. Is it a problem that tools claim to assess sustainability while covering very different issues?
5. Is it OK that highly rated buildings may have poor performance in some issues?
6. Is it important for the tool user that a tool has a simple structure?
7. On what basis should one select indicators? Rank the following….(validity, repeatability, accuracy, influence, intelligibility, cost, other?)