Testing four different certification methods for buildings

- LEED, BREEAM, DGNB and HQE -

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The certification methods tested

Kilde: Natalie Elišig
Brief introduction to the project

• Four different certification methods tested on two recently built office buildings in Denmark

• Requirements for New buildings used

• Five workshops for each buildings held

• Experienced assessors/consultants/auditors for each of the method performed “pre-assessment”, collected documents and evaluated possible classification
Observations and analysis

Workshops observed by a project team from The Benchmark Centre for the Danish Construction Sector and Danish Building Research Institute

Observations and analysis included:

- Classification of the buildings
- Extra time and costs for certification compared to normal practice
- Assessment of the need for adaptation to Danish conditions
- Comparative evaluation of selected subjects
- Life cycle costing
Characterization of the methods

**LEED & BREEAM**
- Well-known
- "International"

**DGNB**
- Life cycle oriented
- Second generation
- European standards

**HQE**
- Process oriented
<table>
<thead>
<tr>
<th>LEED</th>
<th>BREEAM</th>
<th>HQE</th>
<th>DGNB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Certified</strong></td>
<td>Certified</td>
<td><strong>Certified</strong></td>
<td><strong>Bronz</strong></td>
</tr>
<tr>
<td>40-49 points</td>
<td>≥30%</td>
<td>≥30%</td>
<td>≥50%</td>
</tr>
<tr>
<td><strong>Silver</strong></td>
<td>Good</td>
<td>≥45%</td>
<td><strong>Silver</strong></td>
</tr>
<tr>
<td>50-59 points</td>
<td>≥45%</td>
<td>≥45%</td>
<td>≥65%</td>
</tr>
<tr>
<td><strong>Gold</strong></td>
<td>Very good</td>
<td>≥55%</td>
<td><strong>Gold</strong></td>
</tr>
<tr>
<td>60-79 points</td>
<td>≥55%</td>
<td>≥55%</td>
<td>≥80%</td>
</tr>
<tr>
<td><strong>Platinium</strong></td>
<td>Excellent</td>
<td>≥70%</td>
<td></td>
</tr>
<tr>
<td>80 point or more</td>
<td>≥70%</td>
<td>≥70%</td>
<td></td>
</tr>
<tr>
<td>7 categories</td>
<td>Outstanding</td>
<td>≥85%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥85%</td>
<td></td>
<td>5 categories (+1)</td>
</tr>
</tbody>
</table>

**HQE**
- **Certified**
- **Not certified**
- **Krav**
  - Very good – minimum 3 categories
  - Good
  - Basis - max 7 categories
- 14 categories
Outcome of the project
Outcome – classifications of the buildings as built

- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Env. Quality
- Innovation & Design
- Regional Priority

- Not Achieved
- Could be Added
- Likely Achieved

DGNB Result for Company House in Vallensbæk

- Quality of Building
- Quality of Location

- Weighting
  - Ecological Quality
  - Economical Quality
  - Socio-cultural & Functional Quality
  - Technical Quality
  - Quality of the Process

- Management
  - Health & Wellbeing
  - Energy
  - Transport
  - Water
  - Materials
  - Waste
  - Land Use & Ecology
  - Pollution
  - Innovation

- Not Achieved
- Could be Achieved
- Achieved

Klassificering
- Verkning på nærvær
- Materialer og udførede
- Byggeledelse
- Energi
- Vand
- Afstand
- Vælgemiddel
- Termisk komfort
- Audiolisk komfort
- Visuel komfort
- Ophold
- Sundhed
- Værkvalitet

- Megel gød
- God
- Basis
BREEAM - Company House

Certified (potential good)
DGNB - Company House

DGNB Result for Company House in Vallensbæk

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological Quality</td>
<td>~72%</td>
</tr>
<tr>
<td>Economical Quality</td>
<td>~88%</td>
</tr>
<tr>
<td>Socio-cultural &amp; Functional Quality</td>
<td>~54%</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>~68%</td>
</tr>
<tr>
<td>Quality of the Process</td>
<td>~52%</td>
</tr>
<tr>
<td>Quality of Building</td>
<td>~69%</td>
</tr>
<tr>
<td>Quality of Location</td>
<td>~64%</td>
</tr>
</tbody>
</table>

Silver (potential silver)
## Results – as built

<table>
<thead>
<tr>
<th></th>
<th>LEED</th>
<th>BREEAM</th>
<th>DGNB</th>
<th>HQE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company House</td>
<td>Classification</td>
<td>Silver</td>
<td>Certified</td>
<td>Silver (Certified)</td>
</tr>
<tr>
<td>Horten</td>
<td>Classification</td>
<td>Certified</td>
<td>Certified</td>
<td>Bronz</td>
</tr>
</tbody>
</table>

## Potential results – as built

<table>
<thead>
<tr>
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<th>DGNB</th>
<th>HQE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company House</td>
<td>Classification</td>
<td>Gold</td>
<td>Good</td>
<td>Silver (Certified)</td>
</tr>
<tr>
<td>Horten</td>
<td>Classification</td>
<td>Gold</td>
<td>Certified</td>
<td>Bronz</td>
</tr>
</tbody>
</table>
Outcome – indication of economical issues

Important to realize:

- Economic figures are related to this study - recently built buildings and the classification achieved by the four different methods.

- DK-GBC has sought to clarify the cost issues for the certification process as far as it is possible.
Highly relevant issues in Denmark

Issues that have been very important when choosing certification method for adaptation in Denmark

• Sustainability

• Future-proof - forthcoming European standards and regulations, i.e. CEN TC 350
Outcome – comparative evaluation
- need for adaptation

• The certification methods were evaluated related to in what extend they covered the 3 pillars for sustainability (environment, economy, social aspects)

• 9 different subjects were selected for comparative evaluation
  • Energy, water, materials, waste, surroundings, transport, indoor environment, process, economy
Example – materials
- what is included?

<table>
<thead>
<tr>
<th>Materials</th>
<th>LEED</th>
<th>BREEAM</th>
<th>DGNB</th>
<th>HQE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCA (x)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dangerous substances</td>
<td></td>
<td></td>
<td>x</td>
<td>(health)</td>
</tr>
<tr>
<td>Certified wood</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Recycling</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Life time of materials</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

(x) denotes the level of importance or inclusion in each standard.
Example – materials
- how much was achieved within the subject?

Materialer

<table>
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<th>DGNB</th>
<th>HQE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company House</td>
<td>25%</td>
<td></td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Horten</td>
<td>25%</td>
<td></td>
<td>75%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Legend:
- Company House
- Horten
Outcome – comparative evaluation

• The methods do in high degree include the same subjects:
  • the differences is related to details, approach and documentation requirements

• The results of the study depend on:
  • Methods: Level of ambition and references
  • Consultant: Approach

• Buildings performed:
  • Relatively well for criteria on energy, waste, transport and indoor environment
  • Less for water, materials and surroundings

• There is a need for adaptation to Danish conditions:
  • Easier for the subjects where Danish strengths have been identified
  • More difficult where weaknesses were identified and where tools and normal practice is missing
Observations and analysis included:
- Classification of the buildings
- Extra time and costs for certification compared to normal practice
- Comparative evaluation of selected subjects and assessment of the need for adaptation to Danish conditions
- Life cycle costing
Thank you for your attention!

Reports can be downloaded from:
http://www.byggeevaluering.dk/nyheder/analyser.aspx