Topic: Rewarding Measurable Standards for Better Buildings: Do the Standards Go Far Enough?

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Global Head of Urbanisation
Mott MacDonald
Introduction

- World Green Building Council recently launched “Better Places for People” campaign
- Goal of the campaign is to provide better buildings to support:
  - Healthier lifestyles
  - Happier people
  - Feedback to improve existing and new building stock
- Campaign seeks to explore the “types of tools which can be used to support the development process and improve outcomes through the whole building life cycle”
Introduction

- Daylight & Lighting
- Noise & Acoustics
- Amenities
- Indoor Air Quality
- Thermal Comfort
- Interior Layout & Surroundings
- Biophilia
- Look & Feel
Introduction

To explore:

• The types of tools
• Their application
• Effectiveness
• Contribution to achieving the ultimate goal
Rating Tools

- BREEAM, UK
- LEED, US
- BEAM Plus, Hong Kong
- Green Star, Australia
- Nabers, Australia
- ISCA, Australia
- WELL, US
BREEAM (UK & International)

- Sustainability assessment method for masterplanning projects, infrastructure and buildings
- Assessment process evaluates the procurement, design, construction and operation of a development
- Types of BREEAM Assessment types:
  - Sustainable Homes
  - New Construction Non-Domestic Building
  - New Construction Domestic Building
  - Existing Buildings In-Use
BREEAM (UK & International)

BREEAM covers the following categories for assessment:

- Energy
- Health and Wellbeing
- Innovation
- Land Use
- Materials
- Management
- Pollution
- Transport
- Waste
- Water
• 538,090 BREEAM certified developments to date
• 2,230,382 buildings registered for assessment
• Applied in 72 countries since it was first launched in 1990
• Proportion of BREEAM New Construction non-domestic certificates issued – Design Stage versus As Built Stage (1990-2012) :
Proportion of domestic new construction certificates issued by assessment type by BRE Global Ltd (2000-2012):
- 14,123 buildings certified under the LEED for Building Design and Construction (BD+C) rating system for new buildings
- LEED BD+C includes both design and construction phases in order to attain the certification
- 3,945 buildings certified under the LEED for Buildings Operations and Maintenance (O+M) rating system for existing buildings.
- LEED O+M for existing is awarded based on current building performance data.
LEED covers the following categories for assessment:
• 92.2% of LEED-certified new construction projects are improving energy performance by at least 10.5%, according to an analysis of 7,100 projects.
• From 2015-2018 LEED-certified buildings are estimated to have as much as:
  – US$1.2 billion in energy savings
  – US$149.5 million in water savings
  – US$715.3 million in maintenance savings
  – US$54.2 million in waste savings
Hong Kong BEAM Plus

• A comprehensive environmental assessment scheme for buildings recognised by the HKGBC
• Available for New Buildings (NB) and Existing Buildings (EB)
• The assessment scheme covers six key aspects including Site Aspects, Material Aspects, Energy Use, Water Use, Indoor Environmental Quality, Innovations and Additions.
• Mandatory that all new government buildings should aim to obtain the second highest grade (gold) or above under the BEAM Plus
Number of registered BEAM Plus Projects grouped by project type (as of 1 February 2016):

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>117</td>
</tr>
<tr>
<td>Government, Institutional and Community</td>
<td>122</td>
</tr>
<tr>
<td>Hotel</td>
<td>58</td>
</tr>
<tr>
<td>Industrial</td>
<td>19</td>
</tr>
<tr>
<td>Mixed Use</td>
<td>94</td>
</tr>
<tr>
<td>Others</td>
<td>20</td>
</tr>
<tr>
<td>Residential</td>
<td>319</td>
</tr>
<tr>
<td><strong>Total registered projects</strong></td>
<td><strong>749</strong></td>
</tr>
</tbody>
</table>
Facts about BEAM Plus

Distribution of Assessed BEAM Plus Projects Grouped by rating achieved:

- Final Platinum: 30.9%
- Provisional Platinum: 14%
- Final Gold: 23.9%
- Provisional Gold: 13.4%
- Final Silver: 9.6%
- Provisional Silver: 5%
- Provisional Bronze: 5%
- Final Bronze: 9.6%
- Final Unclassified: 9.6%
- Provisional Unclassified: 9.6%
Types of Green Star rating tools:

- Green Star - Design & As Built
- Green Star – Performance: (currently 104 certified projects)
- Green Star – Communities
- Green Star - Interiors

Categories and credits:
Green Star Facts

- 1034 certified projects (where 656 certified are office projects)
- 365 registered projects
- 10,500,000+ m² certified

<table>
<thead>
<tr>
<th>Design &amp; As-built Projects</th>
<th>Number of registered and certified projects:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design</td>
</tr>
<tr>
<td>Rating tool</td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td>426</td>
</tr>
<tr>
<td>Public building</td>
<td>9</td>
</tr>
<tr>
<td>Retail centre</td>
<td>28</td>
</tr>
<tr>
<td>Custom</td>
<td>10</td>
</tr>
<tr>
<td>Education</td>
<td>88</td>
</tr>
<tr>
<td>Healthcare</td>
<td>9</td>
</tr>
<tr>
<td>Industrial</td>
<td>17</td>
</tr>
<tr>
<td>Multi-unit residential</td>
<td>59</td>
</tr>
<tr>
<td>Total:</td>
<td>646</td>
</tr>
</tbody>
</table>
NABERS

- “National Australian Built Environment Rating System” that measures the environmental performance of Australian buildings, tenancies and homes
- Carried out by third party ‘Accredited Assessors’, and are based on third party verifiable data (such as utility bills)
- A NABERS rating reflects the environmental performance of a building or tenancy over the past 12 months.
The NABERS rating tools and aspects covered:

- How a NABERS Energy rating for offices is calculated:
The NABERS rating scale for NABERS Energy and Water tools for offices, shopping centres and hotels:

- 6 stars........ Market leading performance
- 5 stars........ Excellent performance
- 4 stars........ Good performance
- 3 stars........ Average performance
- 2 stars........ Below average performance
- 1 star......... Poor performance
- 0 stars........ Very poor performance
ISCA specialise in the facilitation and development of industry led performance based integrated triple-bottom-line governance and reporting frameworks, decision tools and rating tools.

Industry-compiled voluntary sustainability performance rating scheme

Evaluate planning, design, construction and operation of all infrastructure asset classes in all sectors linking industry, communities and commerce beyond regulatory standards.

Since launching in 2012, over $50 billion in infrastructure and civil works projects or assets across Australia and New Zealand have either been certified or registered for an IS rating.
Infrastructure Sustainability (IS), ISCA

Categories and credits of the IS rating scheme:

<table>
<thead>
<tr>
<th>Themes</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management and Governance</td>
<td>Management Systems</td>
</tr>
<tr>
<td></td>
<td>Procurement and Purchasing</td>
</tr>
<tr>
<td></td>
<td>Climate Change Adaptation</td>
</tr>
<tr>
<td>Using Resources</td>
<td>Energy &amp; Carbon</td>
</tr>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td>Materials</td>
</tr>
<tr>
<td>Emissions, Pollution and Waste</td>
<td>Discharges to Air, Land &amp; Water</td>
</tr>
<tr>
<td></td>
<td>Land</td>
</tr>
<tr>
<td></td>
<td>Waste</td>
</tr>
<tr>
<td>Ecology</td>
<td>Ecology</td>
</tr>
<tr>
<td>People and Place</td>
<td>Community Health, Well-being and Safety</td>
</tr>
<tr>
<td></td>
<td>Heritage</td>
</tr>
<tr>
<td></td>
<td>Stakeholder Participation</td>
</tr>
<tr>
<td></td>
<td>Urban &amp; Landscape Design</td>
</tr>
<tr>
<td>Innovation</td>
<td>Innovation</td>
</tr>
</tbody>
</table>
IS Rating Facts

- 37 projects under the design rating; 8 projects under the as-built rating
- 20,510 tonnes of carbon saved
- 2,966 ML of water saved
- 983,148 tonnes of carbon saved through materials reduction
- The tool covers the methodology required to secure a rating for a range of infrastructure types:

<table>
<thead>
<tr>
<th>Transport</th>
<th>Water</th>
<th>Energy</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airports, Ports and Harbours</td>
<td>Sewerage and Drainage</td>
<td>Electricity Transmission and Distribution</td>
<td>Communication Networks</td>
</tr>
<tr>
<td>Cycleways and Footpaths</td>
<td>Storage and Supply</td>
<td>Gas Pipelines</td>
<td></td>
</tr>
<tr>
<td>Railways, Roads and Bridges</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Launched in 2013 by Delos and administered by the International WELL Building Institute (IWBI)
• **Performance-based system** for measuring, certifying, and monitoring features of the built environment that impact human health and well-being, through air, water, nourishment, light, fitness, comfort and mind.
• WELL Certified™ spaces and WELL Core and Shell Compliant™ developments can help create a built environment that **improves the nutrition, fitness, mood, sleep patterns and performance of its occupants.**
• WELL is further organised into Project Typologies of:
  – New and Existing Buildings
  – New and Existing Interiors
  – Core and Shell
WELL Rating System

- WELL Certification is achieved when projects demonstrate all Preconditions (baseline for compliance)
- Higher certification levels above Silver can be achieved by pursuing Optimization Features – optional enhancements
- More than 100 projects encompassing nearly 22 million square feet have already registered or certified through WELL
- New and Existing Buildings projects: WELL Certification is valid for three years

THE SEVEN CONCEPTS OF THE WELL BUILDING STANDARD

- Air
- Water
- Nourishment
- Light
- Fitness
- Comfort
- Mind

Better Places for People
Manchester Civil Justice Centre, UK
Key Features

- Natural ventilation system designed to maximise free cooling potential
- An ‘environmental veil’ on the east façade to control solar gain and maximise natural daylight
- Groundwater cooling alone reduces cooling load energy consumption by 15-20%
- The elongated form of the building allows for natural cross-flow ventilation
- The slender plan allows natural light to permeate most areas of the building
Why has the building’s energy performance not been as good as predicted at design stage?

- The missing link in environmental performance appears to be the under use of the natural ventilation system and over use of the mechanical system
- Significant turnover for building management services staff
Review

The use of the BREEAM system of rating buildings at design stage has become commonplace within this market.

However...
The incentive to follow up this new approach once an occupier is in place is less apparent to date.
Things to consider after completion...

- Who knows how to use it
- Seasonal Tuning
- User training and guides by qualified and experienced personnel
- Post Occupancy Evaluation
  - find out what has worked and what hasn’t
Vulcan House, UK
Vulcan House - Awards
1st BREEAM Excellent rated building in Sheffield, UK
2nd highest BREEAM scoring building in the UK when completed
Biggest threat to Vulcan House’s in-use environmental performance comes from the behaviour of its occupants.

- All staff were initially given user manuals and guided tours
- if staff understood the design principles it would help them to conserve energy.
- Staff were informed that the building’s fresh air comes from intakes on each floor, not a centralised unit.
- It travels short distances rather than down long, dusty ducts and it is therefore more hygienic.
The Star, Singapore
Features

Some of the unique sustainable design features incorporated
- strict acoustic requirements, evacuation provisions and operational flexibility.
- High efficiency chiller plant, under floor displacement air-conditioning beneath auditorium seating
- evaporative cooling for the outdoor civic plaza

For its environmentally friendly design, The Star was awarded the Green Mark Non-Residential Gold Award by Singapore’s Building and Construction Authority’s (BCA).
CBRE Head Office, USA
The introduction of these evidence-based wellness technologies sets a new standard for the healthy office space – serving as an example for organizations interested in making their spaces WELL Certified.

This pilot project included a targeted focus on indoor air quality, lighting, water quality, visual acuity, physical comfort, acoustics and psychological impacts within the work environment.

Some of the features in the office include:

- Air filtration systems
- Sound damping walls
- VOC-free paints
- Water purification
- Ergonomic desks and chairs
- Biophilic plantings
- Energy absorbing flooring and
- Smart lighting systems
CBRE recently published the results of an employee survey given after one year in their LEED Gold, WELL-certified office space in Los Angeles.

**FINDINGS**

- 83% of employees say they feel more productive in the new building;
- 90% would recommend the new space to colleagues;
- 92% feel the new space has a positive effect on their health and wellbeing.
Summary and Conclusions

Thank you