

Guest Lecture to HKU Department of Architecture
[ARCH 5310 - Design, Assessment and Certification of Sustainable Buildings]

www.mech.hku.hk/bse/sbs/



Building Environmental Assessment



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Contents



- Basic Principles
- Assessment Criteria
- Assessment Methods
- Current Tools



Basic Principles



- **Building environmental assessment***
 - Identify & evaluate the environmental effects of building development or operation
 - Inform decision making and promote sustainable design & management
- An objective assessment is a useful starting point from which to make design and building improvements

For supporting decision making

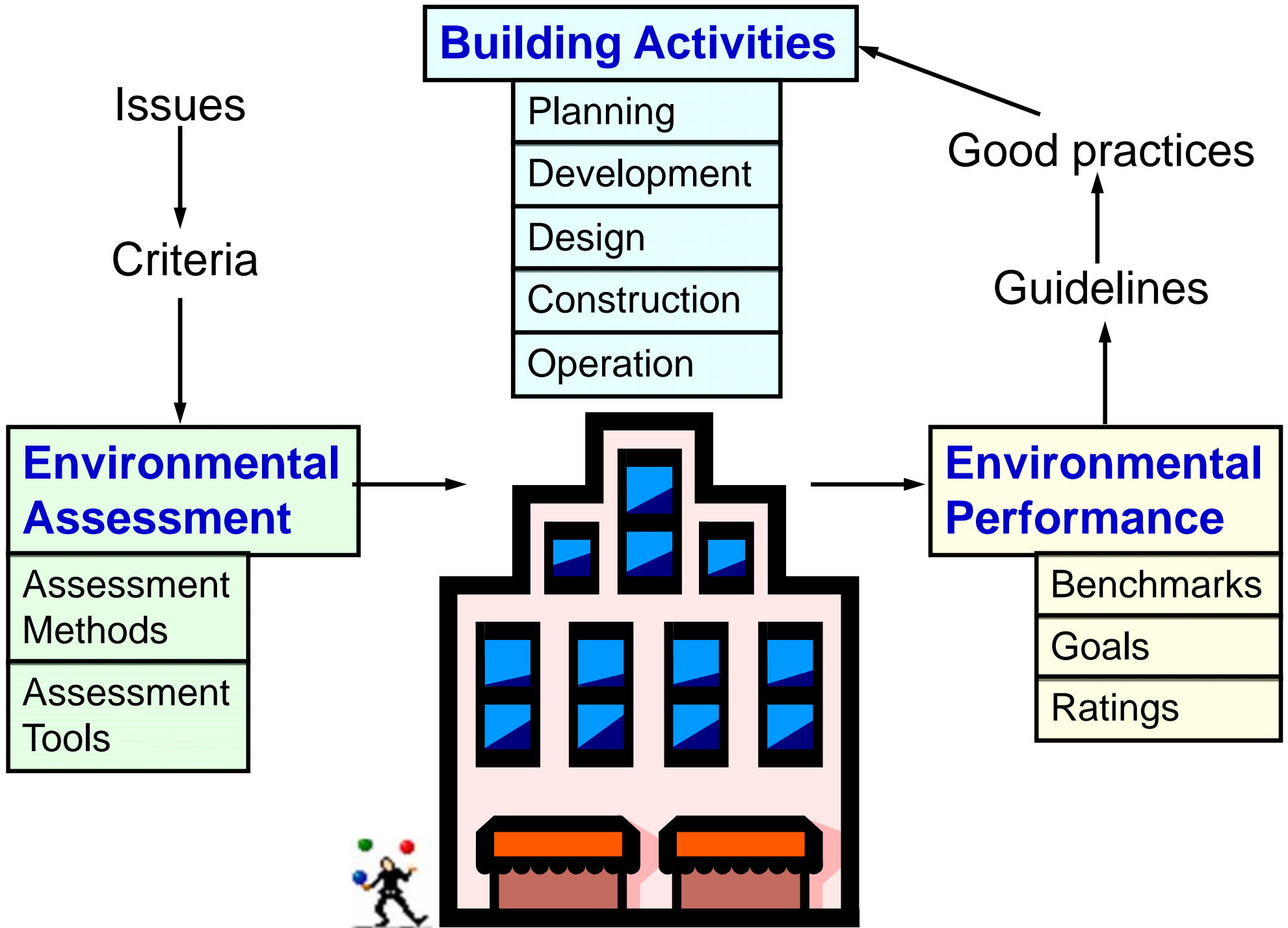
(* Also known as **green building assessment**.)

Basic Principles



- Why environmental assessment?
 - Provide a common set of criteria & targets
 - Guide design decisions & choices
 - Raise awareness of environmental issues/standards
 - Recognise & encourage good practices
 - Stimulate the market for sustainable construction
 - Allow a verifiable method & framework
 - Enable policies & regulation (e.g. certificate/label)
 - Improve management & prioritization (incentives)

Basic principles of building environmental assessment



Basic Principles

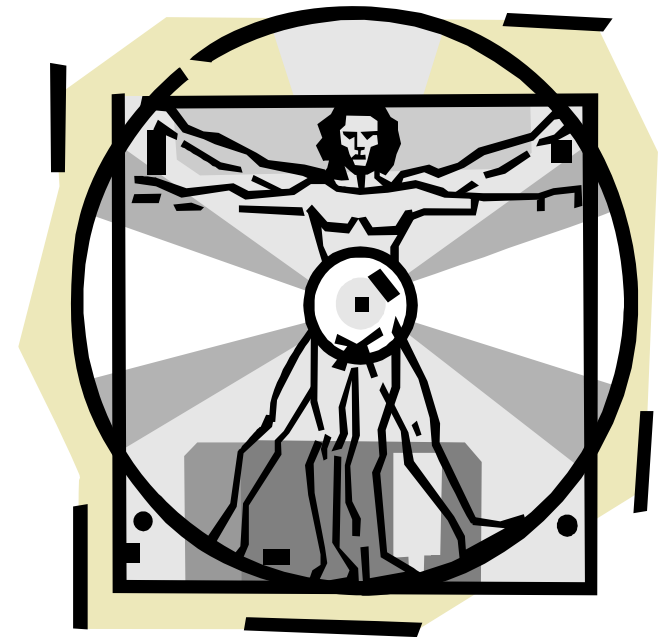


- Design guidelines provide a broader range of issues; Assessment methods give structure and priority, and provide strategic advice
 - Enhance environmental knowledge
- Enable *building performance* to be described
 - Performance-based indicators
 - Declared benchmarks
 - Prescriptive requirements (proxies for actual performance)

Basic Principles



- Scope/Scale of the evaluation
 - Building products
 - Building processes
 - Structural members/elements
 - Building systems
 - Single buildings
 - Groups of buildings
 - District, urban, regional & city
- Building types: new, existing & refurbished



Assessment Criteria



- A broad range of criteria
 - Qualitative issues
 - Quantitative issues
- Types of criteria
 - Ecological *vs* health-related
 - Direct impacts *vs* indirect impacts
 - Immediate *vs* long-term implications
 - Global *vs* local



- site selection
- urban design
- landscape planning

- CO₂ emissions
- acid rain
- ozone depletion
- rainforest depletion

- energy performance
- renewable energy
- water conservation

**Environmental
Criteria &
Factors**

- environmental policy
- transport strategy
- building maintenance

- material selection
- recycling of materials
- waste management
- disposal & reuse

- air quality
- thermal comfort
- lighting & noise
- hazardous materials

Assessment Criteria



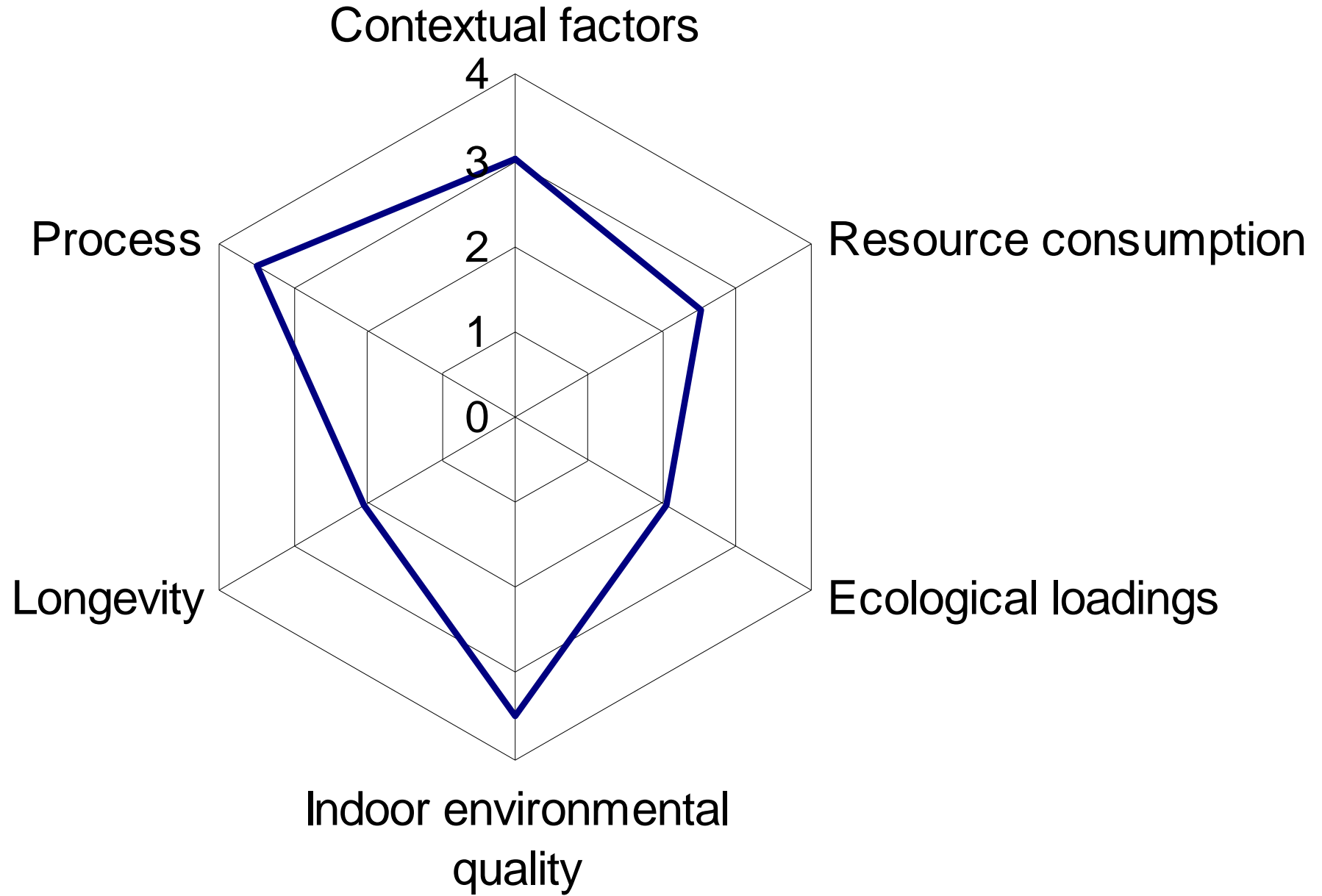
- Assessment process
 - Examine the performance of a building or its sub-system against a declared set of criteria
 - Usually voluntary (aim to stimulate the market)
- Scale of performance
 - Measure & assess relative performance
 - Assign 'points' or 'score' to various aspects
 - Quantitative criteria: relative to a baseline
 - Qualitative criteria: presence/absence of such features

Assessment Criteria



- Assessing multiple criteria
 - Indicate the ‘best’ overall performance
 - Methodology
 - Cost (or monetary value \$)
 - Equivalence method (e.g. air/water pollution index)
 - EcoCost (in common Gaia scale 0-1)
 - EcoPoint or EcoProfile
- Weighting system
 - To show relative importance, scale and urgency

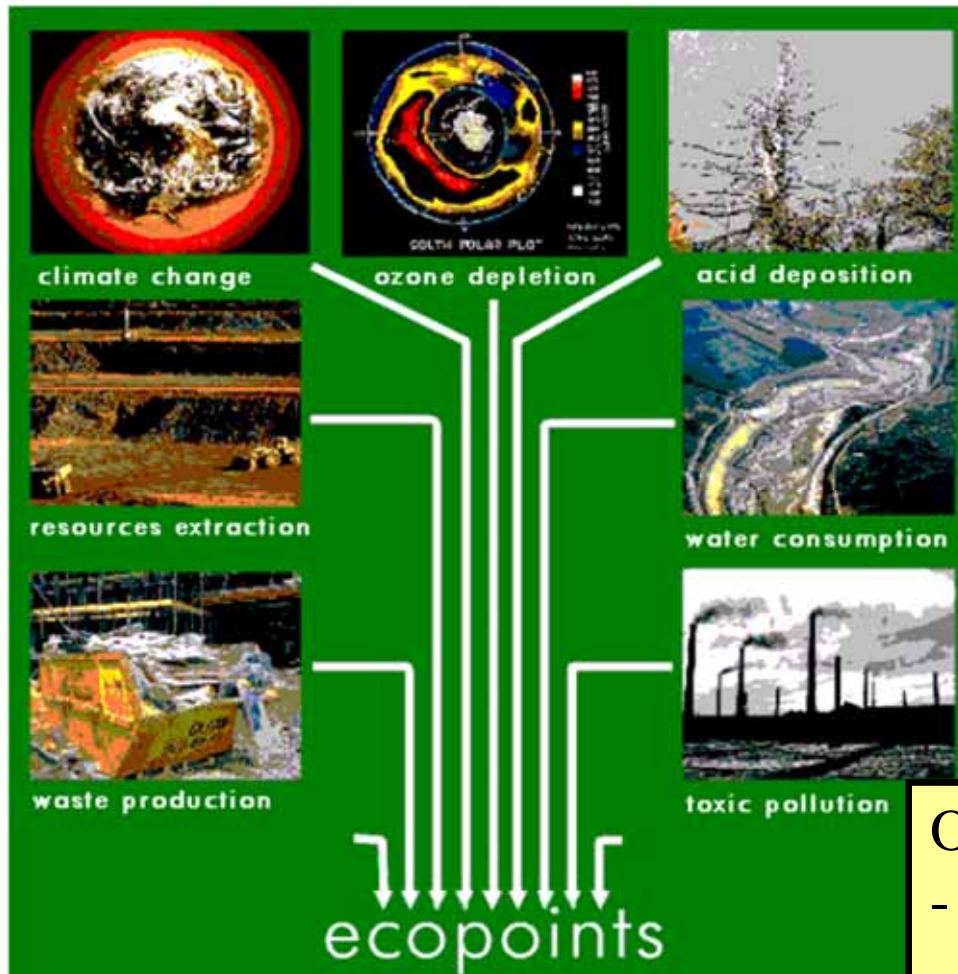
How to visualize assessment results?



Radar chart for assessing multiple criteria

How to combine different criteria?

“Ecopoint” concept in the ENVEST (environmental impact estimating) tool (UK BRE)



One “**ecopoint**” is equivalent to:

- 320 kWh electricity
- 83 m³ Water: enough to fill 1,000 baths
- 65 miles by articulated truck
- landfilling 1.3 tonnes of waste
- manufacturing 3/4 tonnes brick (250 bricks)
- 540 tonne kms by sea freight
- 1.38 tonnes mineral extraction
- 300 miles of urban driving in new petrol car

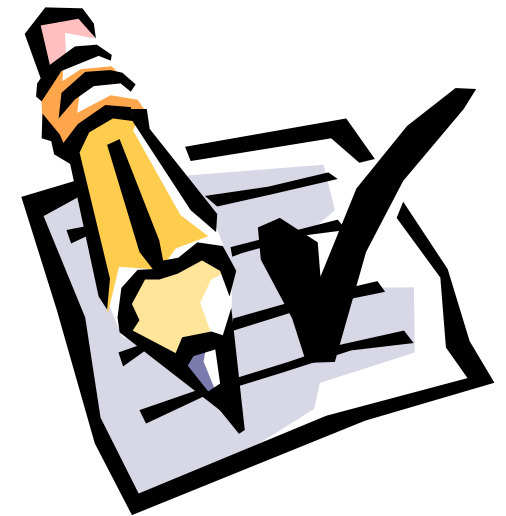


(Source: UK BRE)

Assessment Methods



- Common approaches
 - Checklists or forms
 - Computer-based methods
 - Spreadsheet or computer programs
- Assessment models used
 - Environment model
 - Product model
 - Life cycle model
- Data required: from simple to very detailed



Assessment Methods



- Examples
 - Europe:
 - BREEAM (UK)
 - CEPHEUS (Germany)
 - ECO-PRO (Germany)
 - EcoProP & PIMWAQ (Finland)
 - EQUER (France)
 - ECO QUANTUM (Netherlands)
 - MINERGIE (Switzerland)
 - BREEAM-NL (Netherlands)
 - VERDE (Spain)



Further info: http://en.wikipedia.org/wiki/Green_building

Assessment Methods



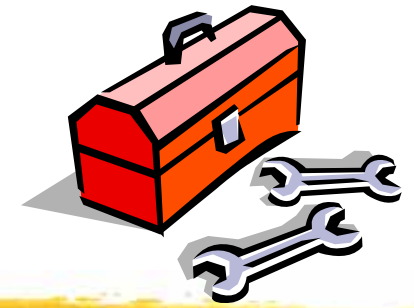
- Examples (cont'd)
 - Canada & USA:
 - BREEAM-Canada & BEPAC-Canada
 - LEED Canada
 - LEED (USA)
 - BEES (USA) (for building products)
 - GreenGlobes (Canada & USA)
 - Australia & New Zealand
 - Green Star (Australia)
 - Green Office Scheme (New Zealand)

Assessment Methods



- Examples (cont'd)
 - Asian countries:
 - Japan Green Building Guide & CASBEE
 - Korea Green Building Rating System
 - GB/T 50378-2006 and GOBAS (Mainland China)
 - Taiwan Green Building Label
 - HK-BEAM / BEAM Plus and CEPAS (HK)
 - Green Mark Scheme (Singapore)
 - Green Building Index (Malaysia)
 - TGBRS (India)

Current Tools

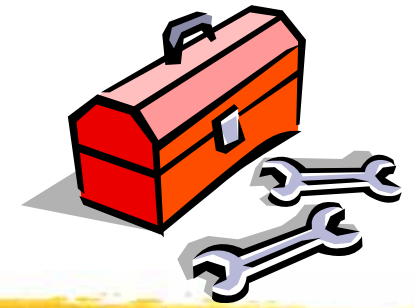


- BREEAM – UK (since 1990)
 - **B**uilding **R**esearch **E**stablishment **E**nvironmental **A**ssessment **M**ethod
 - Used as a reference in many countries
 - BREAM family of assessment methods & tools
 - Any types of buildings (new and existing)
 - BREEAM International (outside of UK)
 - BREEAM In-Use (building management)
 - BREEAM Communities (planning stage)
 - Website: www.breeam.org/

breeam

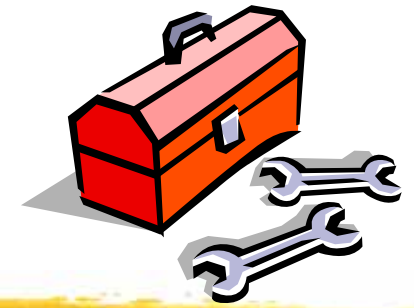


Current Tools



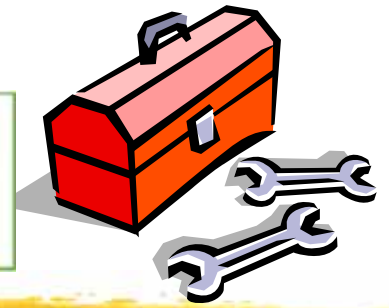
- BREEAM – UK (cont'd)
 - Credits awarded for a set of performance criteria
 - Energy, water, pollution, materials, transport, ecology and land use, health and well being
 - Construction & building operational management
 - A weighting system is applied to determine final rating
 - Stages of building development
 - Design & procurement
 - Management & operation
 - Post construction review

Current Tools



- BREEAM – UK (cont'd)
 - Overall score rating:
 - Pass, Good, Very Good, Excellent, Outstanding
 - BREEAM Assessors
 - BREEAM Accredited Professional (**BREEAM AP**) and examination/training
 - Up to two credits if a BREEAM AP is engaged

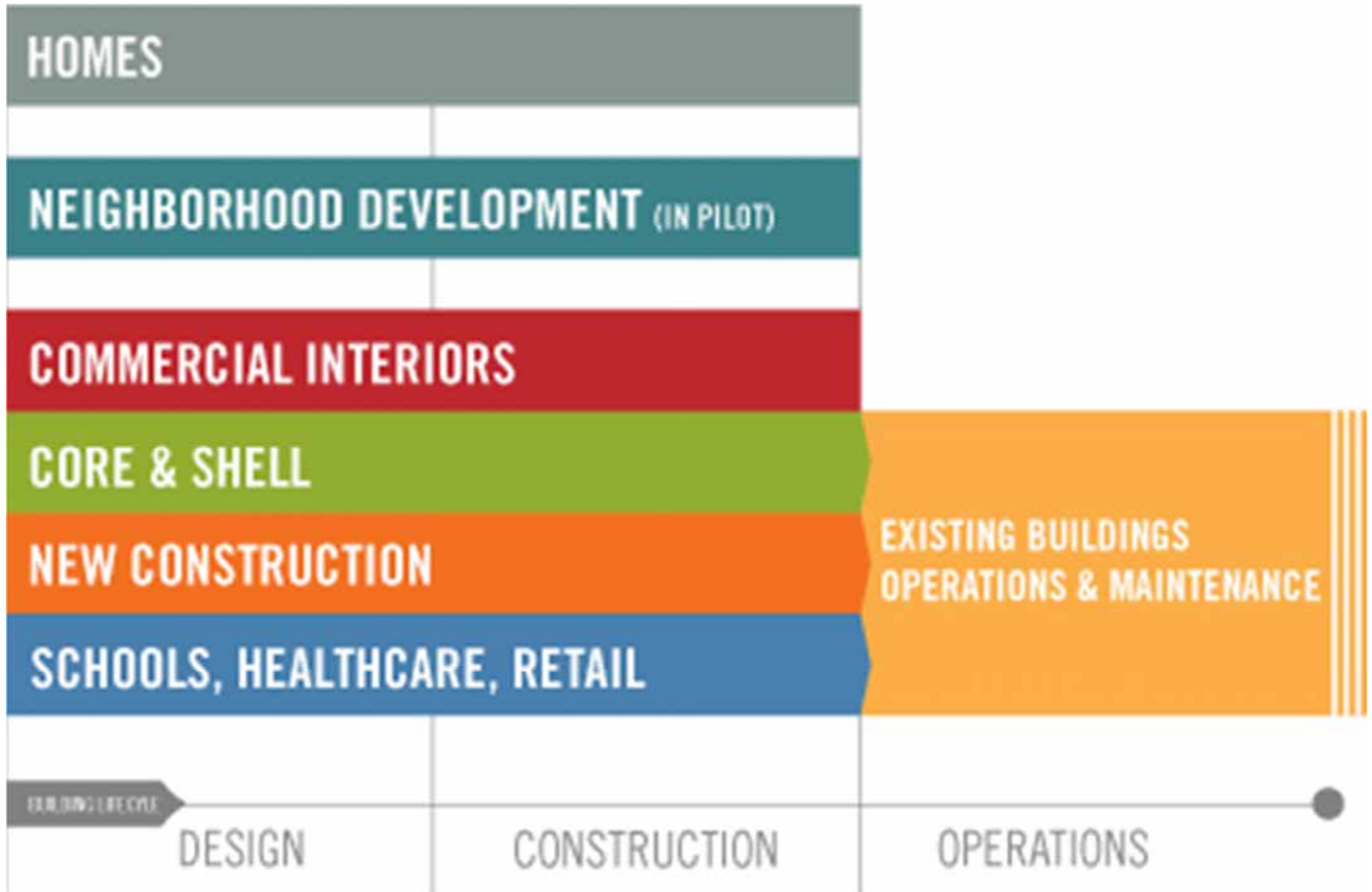
Current Tools



- LEED Green Building Rating System
 - Leadership in Energy & Environmental Design
 - By US Green Building Council
 - Current LEED systems:
 - New construction (LEED-NC)
 - Existing buildings operations & maintenance (LEED-EBOM)
 - Commercial interiors (LEED-CI)
 - Core and shell (LEED-CS)
 - Homes
 - Schools, Healthcare, Retail
 - Neighborhood development (LEED-ND)

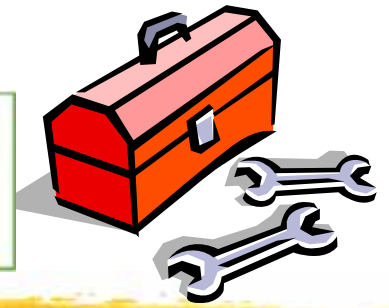


LEED Green Building Rating



(Source: USGBC)

Current Tools



- LEED Green Building Rating System

- Evaluates and recognizes performance in accepted green design categories, including:



- Sustainable sites

- Water efficiency



- Energy and atmosphere

- Materials and resources



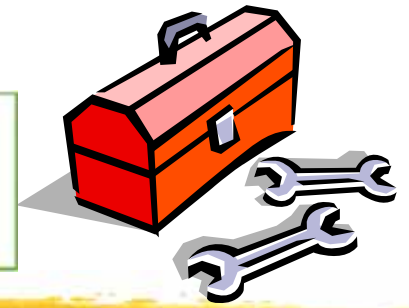
- Indoor environmental quality

- Innovation credits



- Website: www.leadbuilding.org

Current Tools

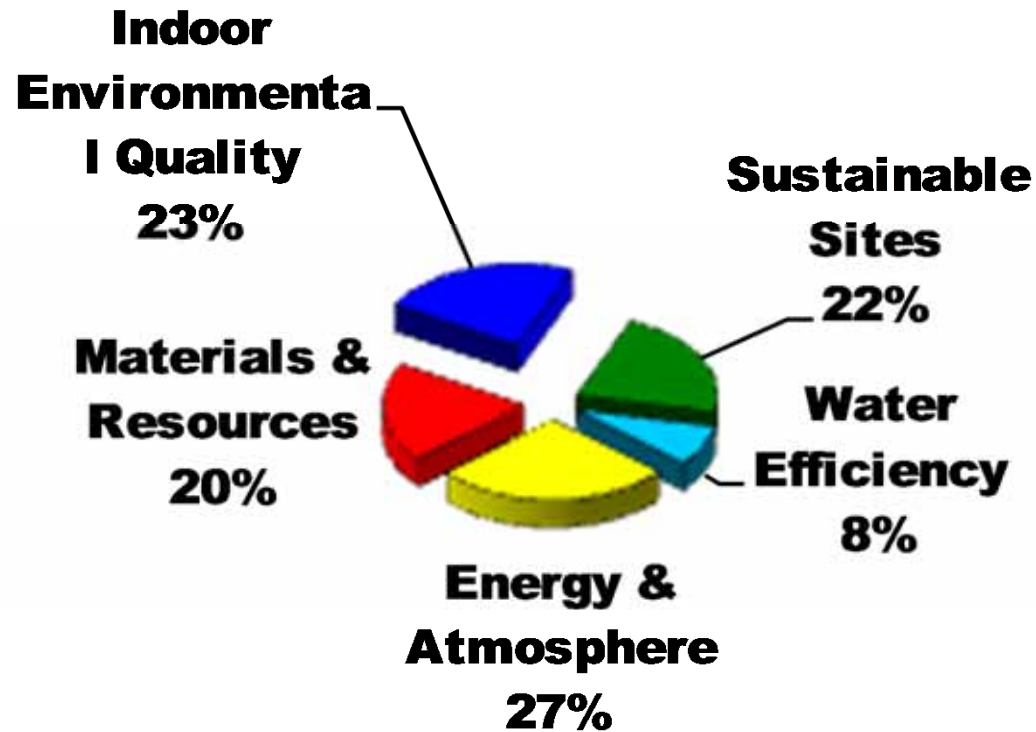


- LEED Green Building Rating System
 - Whole-building approach encourages & guides a collaborative, integrated design & construction process
 - Optimizes environmental and economic factors
- Four levels of certification (for version 2 or before)
 - LEED Certified 26 - 32 points
 - Silver Level 33 - 38 points
 - Gold Level 39 - 51 points
 - Platinum Level 52+ points (69 possible)
- LEED Accredited Professional



Which are the most important criteria?

LEED Point Distribution (version 2)



(Source: USGBC)

The relative importance of the criteria may change from one society to another one.

Phillip Merrill Environmental Center Headquarters Annapolis, Maryland



LEED™ 1.0 Certification:
PLATINUM

Notes from the Project Team: *LEED™ was instrumental in conveying the importance of the sustainable elements of the design to CBF's Board of Trustees.*

Sustainable Sites

- **Site Selection:** *Erected in Smart Growth Funding Area on footprint of existing structure. 26.6 acres remain undisturbed in Land Trust.*
- **Educational Model:** *Interpretive trails & demonstrations for public visitors*
- **Storm/Waste Water:** *All Composting Toilets & Bioretention/Wetland*
- **Resource Protection:** *Woodland, Wetland, & Tidal Water Restoration*

Water Efficiency

- **Water:** *Rainwater Catchment & Reuse for Hand Washing & Irrigation*

Energy and Atmosphere

- **Domestic Hot Water:** *Thermomax-Solar Technology*
- **Energy:** *Exceeds ASHRAE/IES Standard 90.1-1989 by 50%*
- **HVAC:** *Natural Ventilation and Desiccant Dehumidification & Heat Recovery*
- **Controls/Monitoring:** *Building Energy management System, "Green Light" notifies staff to open windows when outside conditions comply*
- **Power Source:** *30% Renewable with Geo-Exchange & Photovoltaics*
- **Lighting:** *Daylight Harvesting and time clock lighting controls*
- **Rapidly Renewable:** *Bamboo, cork and linoleum floorings*
- **Recycled Content:** *Metal roofing and siding, acoustic ceiling, ceramic tile, and MDF cabinetry*

Materials and Resources

- **Structure:** *Rapidly Renewable-Paralam Post, Beam, and Truss system*
- **Envelope:** *Structural Insulated Panels (SIP) R-20 walls, R-30 roof*

Indoor Environmental Quality

- **Indoor Environmental Quality:** *CO₂ and VOC monitors.*
- **Furniture:** *Small, open offices allow for communal space. Systems furniture allows flexible layout to accommodate "churn"*



Owner: Chesapeake Bay Foundation

Project Team: Architect: *SmithGroup, Inc.*
Engineer: *SmithGroup, Inc.*
P.Manager: *Synthesis, Inc.*
Contractor: *Clark Construction Group*
Consultant: *Janet Harrison, Architect*

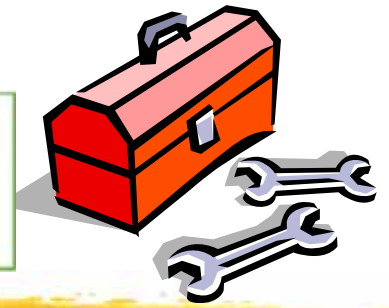
Building Statistics:
Completion Date: *November, 2000*




Cost: *\$6.36 M*
Size: *30,600 gross square feet*
Footprint: *12,000 square feet*
Construction Type: *3B, Two Stories over Open Parking*
Use Group: *Business(B), Assembly(A-3), Storage(S-2)*
Lot Size: *33 acres*

Annual Energy Use: *23 kBtu/sf/year*

Occupancy: *90 staff*
(Source: USGBC)

Current Tools



- LEED version 3 and new schemes
 - Include other criteria
 - Locations & linkages 
 - Awareness & education 
 - Regional priority 
 - LEED Professionals
 - LEED Green Associate
 - LEED AP (different types)
 - Bldg design & construction, O&M, Homes, Interior design, Neighborhood development

LEED® for New Construction

Total Possible Points 110***

 Sustainable Sites 26

 Water Efficiency 10

 Energy & Atmosphere 35

 Materials & Resources 14

 Indoor Environmental Quality 15

** Out of a possible 100 points + 10 bonus points*

*** Certified 40+ points, Silver 50+ points,
Gold 60+ points, Platinum 80+ points*

 Innovation in Design 6

 Regional Priority 4

LEED® for Existing Buildings

Total Possible Points 110***

 Sustainable Sites 26

 Water Efficiency 14

 Energy & Atmosphere 35

 Materials & Resources 10

 Indoor Environmental Quality 15

** Out of a possible 100 points + 10 bonus points*

*** Certified 40+ points, Silver 50+ points,
Gold 60+ points, Platinum 80+ points*

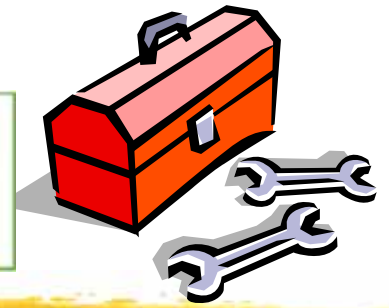
 Innovation in Operations 6

 Regional Priority 4

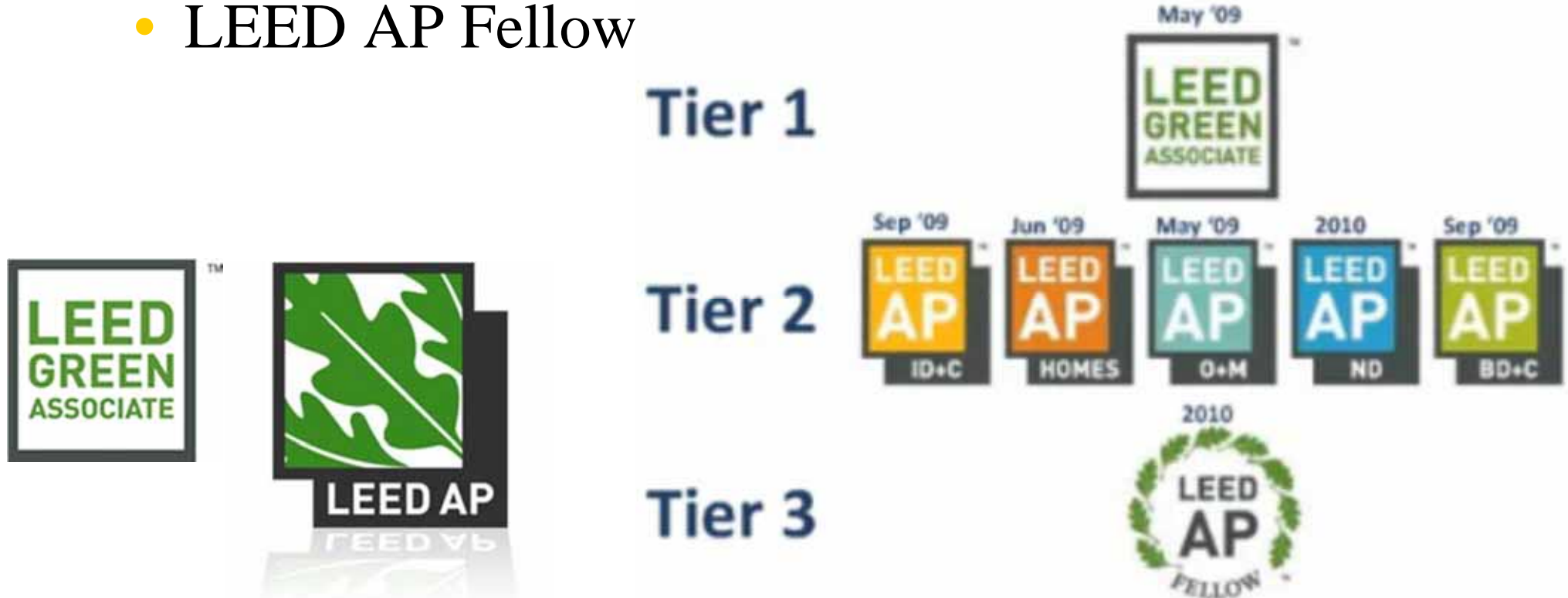
(Source: USGBC)

For LEED version 3

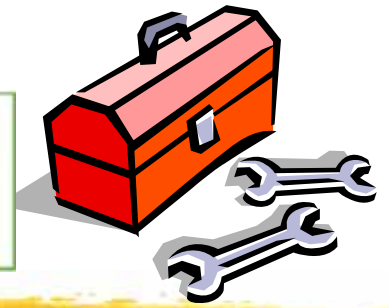
Current Tools



- New LEED professionals system (3 tiers)
 - LEED Green Associate (GA)
 - LEED AP+ with specialty
 - LEED AP Fellow



Current Tools



- LEED v4 (coming in 2013/2014)*
 - Location & Transportation (LT)
 - Sustainable Site (SS)
 - Water Efficiency (WE)
 - Energy and Atmosphere (EA)
 - Materials and Resources (MR)
 - Indoor Environmental Quality (EQ)
 - Innovation (IN)
 - Regional Priority (RP)

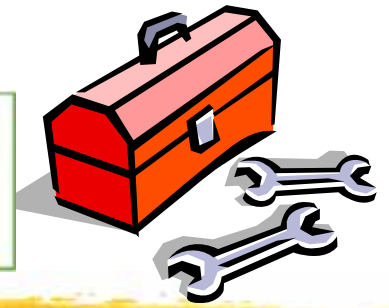


(* See also <http://new.usgbc.org/leed/v4>)

LEED v4

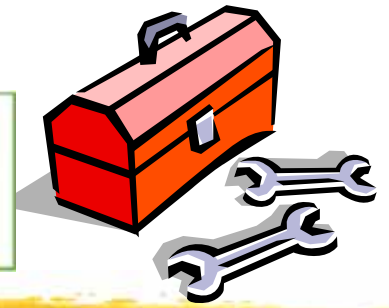


Current Tools



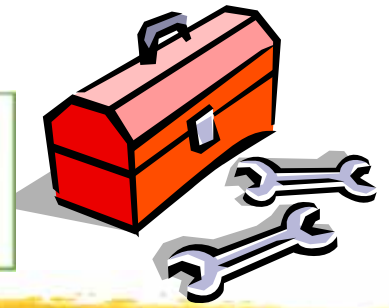
- LEED project registration and certification
 - Submit online registration form (www.gbci.org)
 - Fees vary depending on project type, size
 - LEED Platinum will receive a rebate of the fees
- Choose a project's market sector
 - New construction & major renovation (LEED-NC)
 - Commercial interiors projects (LEED-CI)
 - Core and shell projects (LEED-CS)
 - Existing buildings O&M (LEED-EBOM)
 - Schools, Retail, Healthcare, Homes

Current Tools



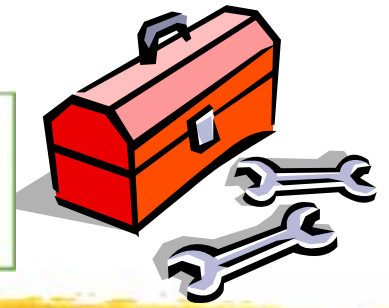
- Application process
 - The project team submits LEED letter templates and other documentation for credit review and certification
 - Decision makers: the professional responsible for submitting the templates and documentation
 - Such as LEED AP, architect, building services engineer, civil engineer, commissioning authority, facility engineer, interior designer, landscape architect
 - Two phases of submission:
 - Design phase + Construction phase

Current Tools



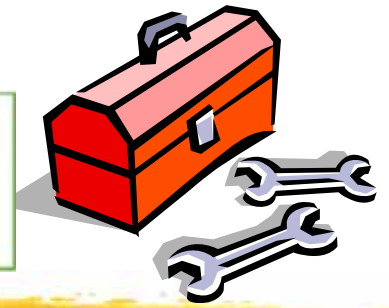
- Minimum program requirements (MPRs)
 - Define minimum characteristics that a project must possess in order to be eligible for LEED
 - Must comply with Environmental Laws
 - Must be a building
 - Must use a reasonable site boundary
 - Must comply with minimum floor area requirements
 - Must comply with minimum occupancy rates
 - Must allow USGBC to access whole building energy & water usage data
 - Registration & certification activity must comply with reasonable timetables

Current Tools



- Prerequisite (New Construction)
 - SSp1: Construction activity pollution prevention
 - WEp1: Water use reduction
 - EAp1: Fundamental commissioning of building energy systems
 - EAp2: Minimum energy performance
 - EAp3: Fundamental refrigerant management
 - MRp1: Storage and collection of recyclables
 - IEQp1: Minimum IAQ performance
 - IEQp2: Environmental tobacco smoke control

Current Tools

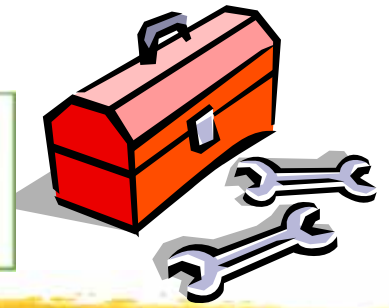


- Sustainable sites



- Develop only on appropriate sites
- Provide for non-auto access
- Preserve open space
- Manage stormwater
- Reduce urban heat island effect
- Reduce light pollution of the night sky

Current Tools



- Water conservation



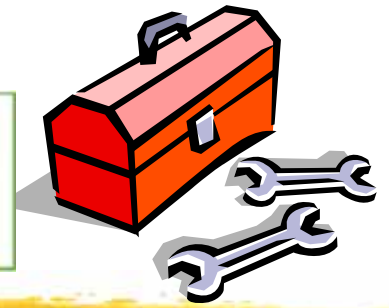
- Reduce use of potable water for irrigation and for building water use and sewage conveyance

- Energy efficiency and atmosphere protection



- Reduce building energy use
- Use less harmful chemicals for refrigerants
- Generate renewable energy on-site
- Provide for ongoing energy savings
- Purchase green power for project use

Current Tools

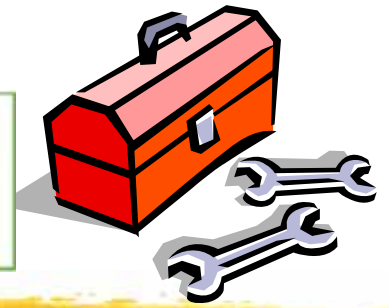


- Materials and resource conservation



- Provide for recycling
- Reuse existing buildings
- Reduce construction waste generation
- Use salvaged and recycled content materials
- Source materials regionally
- Use rapidly renewable (agricultural) materials and certified wood products

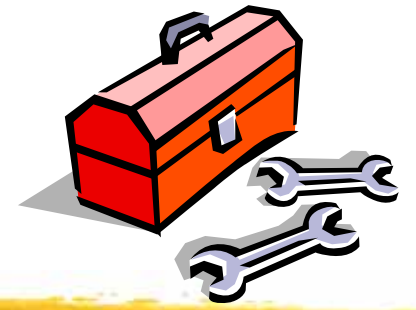
Current Tools



- Indoor environmental quality



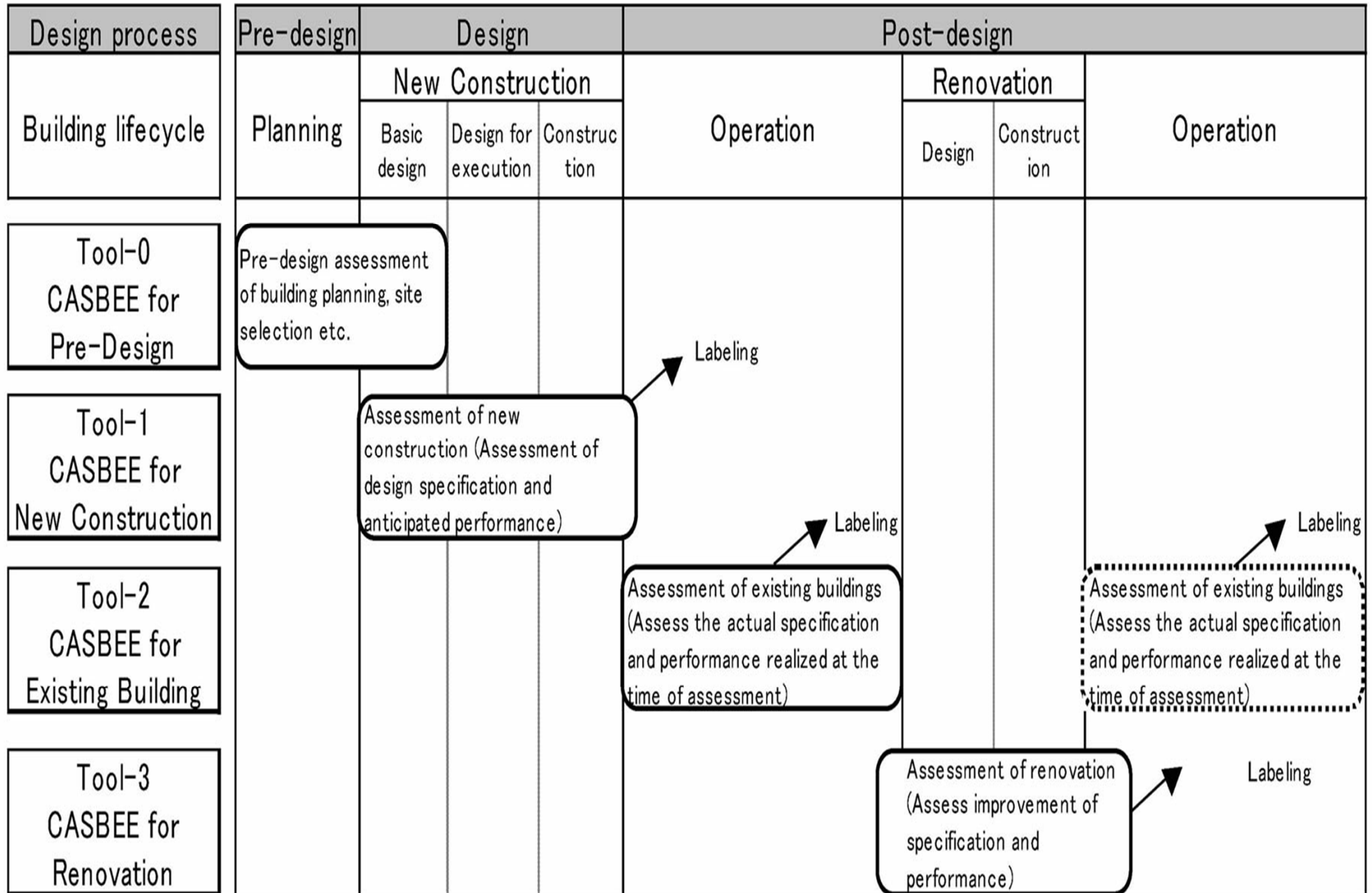
- Improve indoor air quality
- Increase outside air ventilation
- Manage air quality during construction
- Use only nontoxic quality finishes, carpets, and composite wood products
- Reduce exposure to toxic chemicals during building operations
- Provide for individual comfort control
- Maintain thermal comfort standards



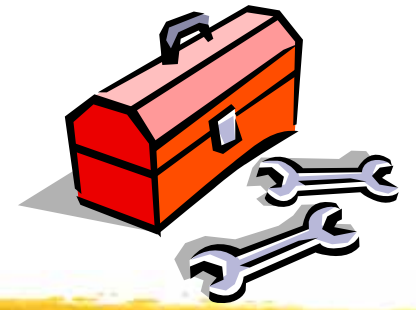
Current Tools

- CASBEE (Comprehensive Assessment System for Building Environmental Efficiency), Japan
 - Tool-0: Pre-design
 - Tool-1: New Construction
 - Tool-2: Existing Buildings
 - Tool-3: Renovation
 - Website: www.ibec.or.jp/CASBEE/

CASBEE Building Lifecycle and Four Assessment Tools

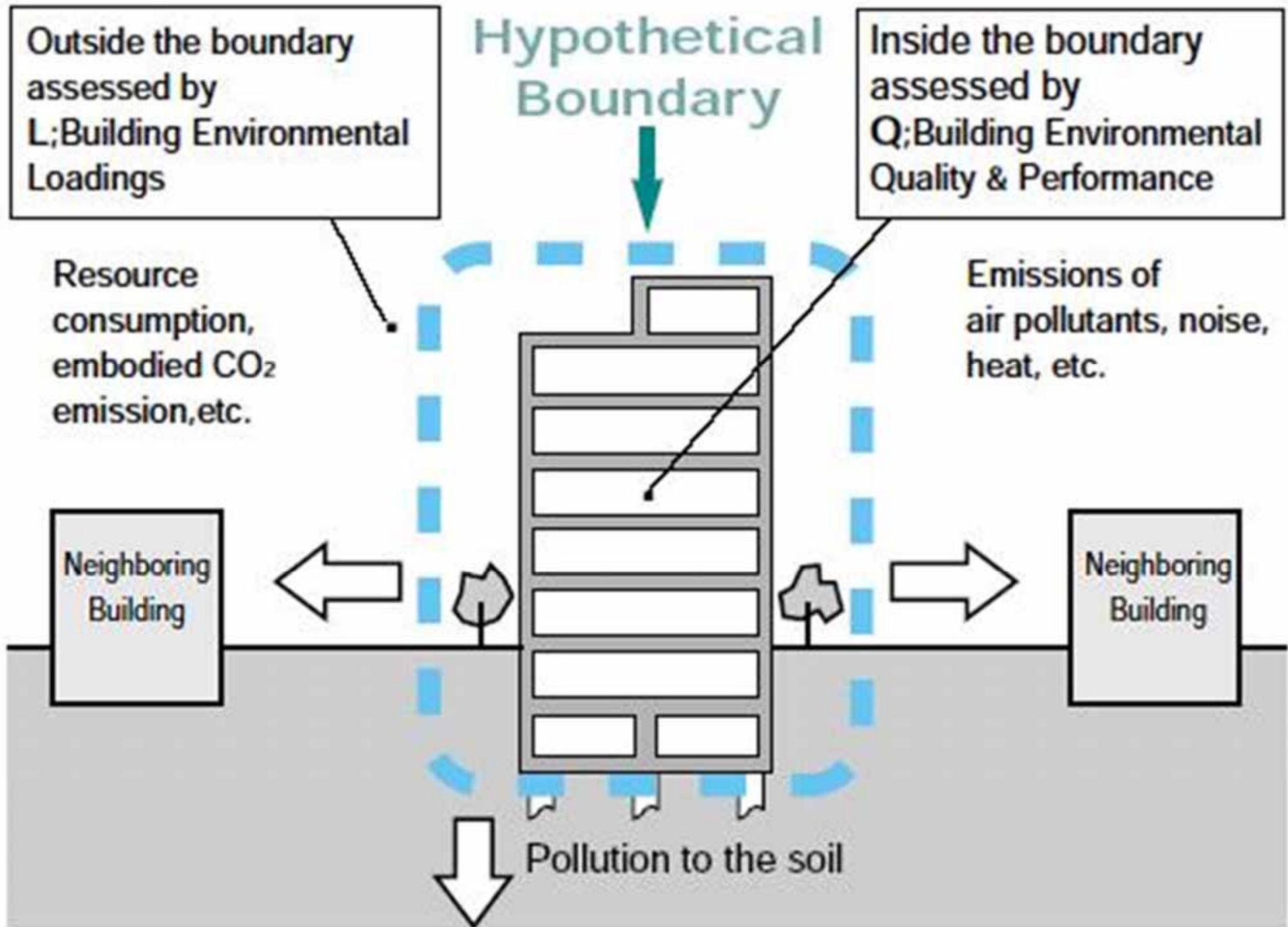


(Source: IBEC, Japan)



Current Tools

- CASBEE system:
 - CASBEE for New Construction
 - CASBEE for Existing Building
 - CASBEE for Renovation
 - CASBEE for Heat Island
 - CASBEE for Urban Development
 - CASBEE for an Urban Area + Buildings
 - CASBEE for Home (Detached House)

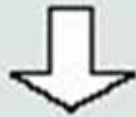


(Source: IBEC, Japan)

From Eco-efficiency of a building to BEE

Original definition:
(WBCSD)

$$\frac{\text{Values of products or services}}{\text{Environmental load unit}}$$



Modeled definition:

$$\frac{\text{Beneficial output}}{\text{Input} + \text{Non-beneficial output}}$$



Definition of BEE
in CASBEE:

$$\frac{\text{Building Environmental Quality \& Performance}}{\text{Building Environmental Loadings}}$$

Building Environmental Efficiency (BEE)

$$= \frac{\text{Building Environmental Quality \& Performance}}{\text{Building Environmental Loadings}}$$

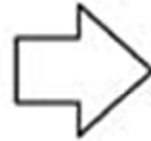
(1) Energy efficiency

(2) Resource efficiency

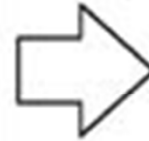
(3) Local environment

(4) Indoor environment

(Approx. 80 sub-items in total)



Recategorized into
Q (Quality)
and
L (Loadings)



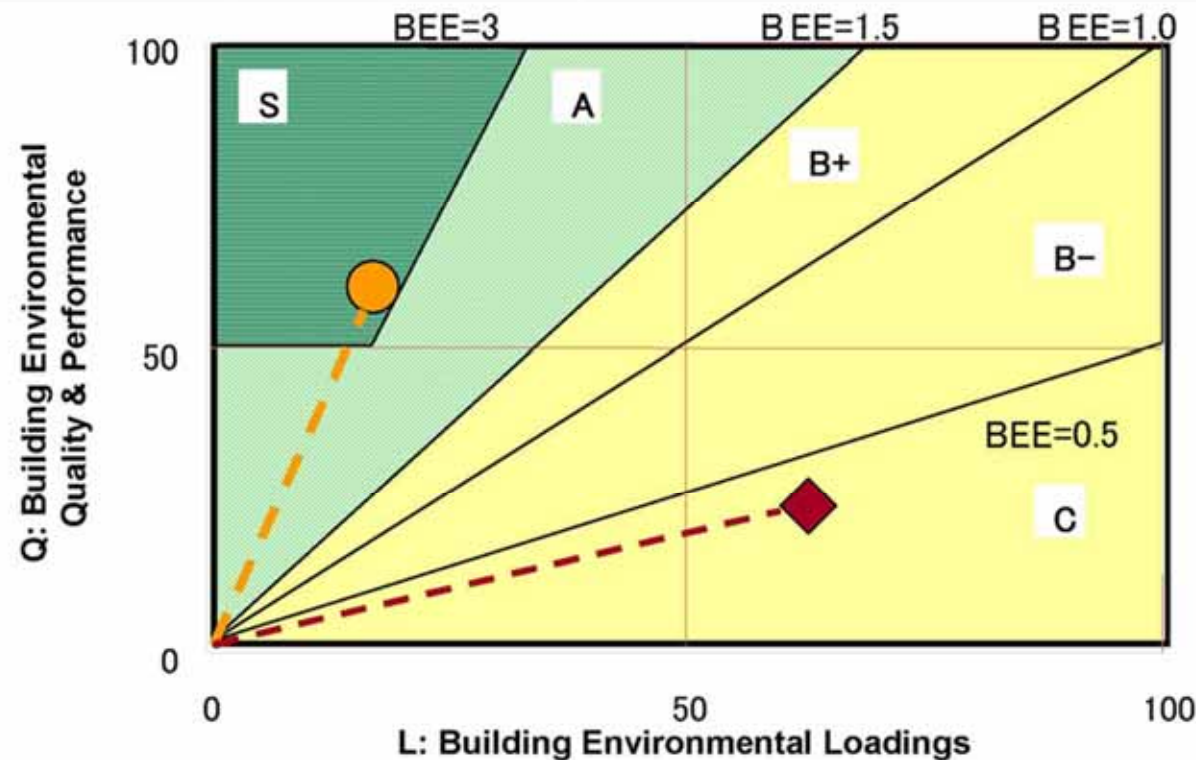
Q-1 Indoor environment
Q-2 Quality of service
Q-3 Outdoor environment on site

Numerator
of BEE

L-1 Energy
L-2 Resources and materials
L-3 Off-site environment

Denominator
of BEE

Sustainability Ranking of Building by BEE



: Ordinary Building



: Sustainable building
(Sample)

(Source: IBEC, Japan)

CASBEE® 評価内容

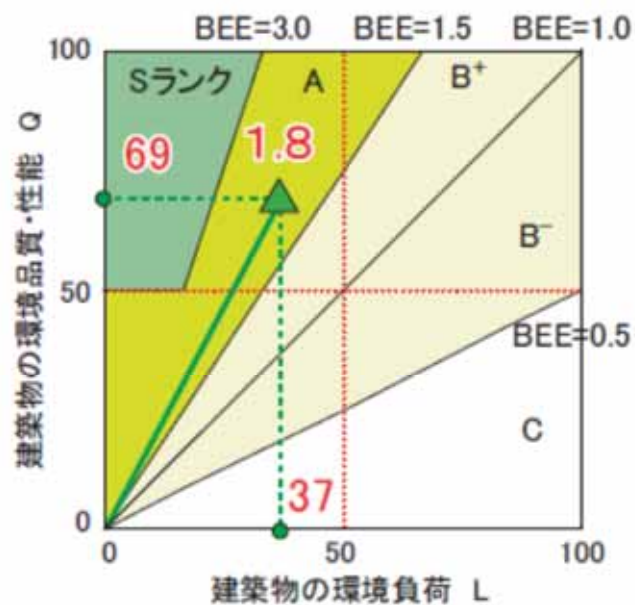
CASBEE-新築(簡易版)

評価ツール CASBEE-NCb_2006v1.2
 認証番号 IBEC-C0046-NCb(c)
 交付日 2009年3月10日

建物名称	NBF豊洲ガーデンフロント	敷地面積	12,551.33㎡
建物用途	事務所	建築面積	5,092.29㎡
建設地	東京都江東区豊洲5丁目6-7	延床面積	36,310.82㎡
気候区分	—	階数	地上10階
地域・地区	準工業地域、準防火地域、第三種高度地区	構造	S造
竣工日	2007年9月30日	平均居住人員	5,660人
		年間使用時間	2,500時間/年

建築物の環境性能効率 (BEE: Building Environmental Efficiency)

BEEによる建築物のサステナビリティランキング

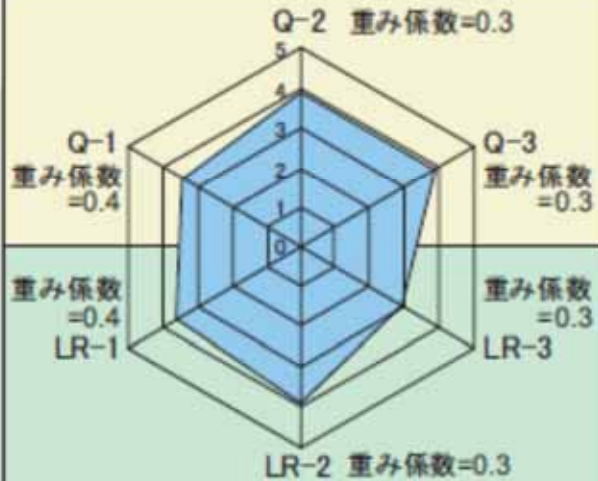


$$BEE = \frac{\text{建築物の環境品質・性能 } Q}{\text{建築物の環境負荷 } L} = \frac{25 \times (S_Q - 1)}{25 \times (5 - S_{LR})} = \frac{69.0}{37.0} = 1.8$$

(Source: IBEC, Japan)

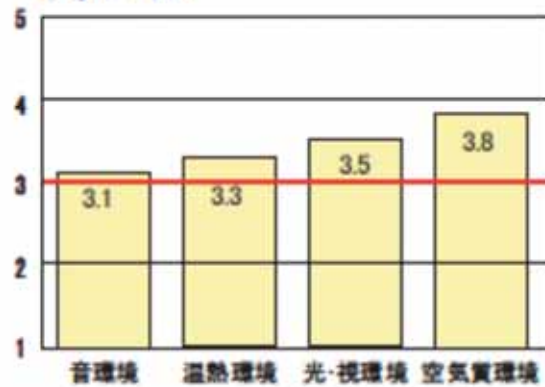
建築物の環境品質・性能と環境負荷低減性

レーダーチャート

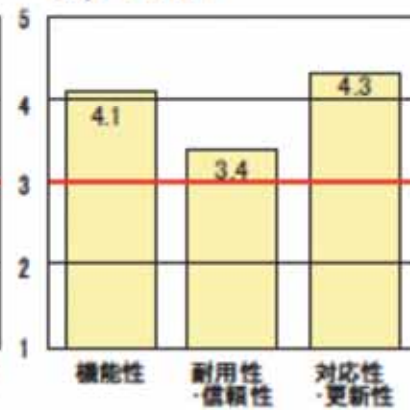


Q 建築物の環境品質・性能 (建築物の居住環境のアメニティを向上させる性能評価) $SQ = 3.7$

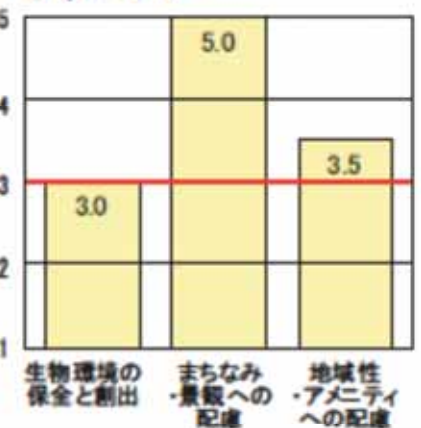
Q-1:室内環境 $SQ1 = 3.4$



Q-2:サービス性能 $SQ2 = 3.9$



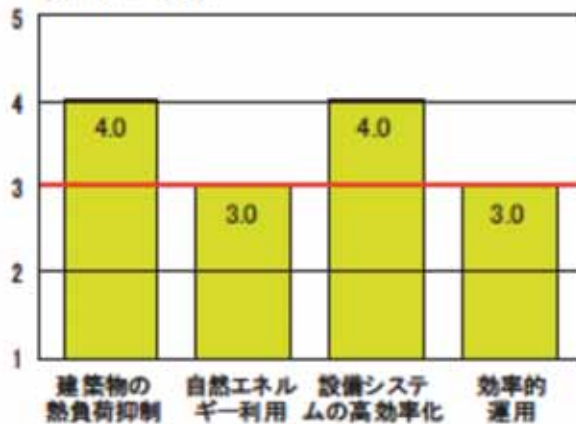
Q-3:室外環境(敷地内) $SQ3 = 3.9$



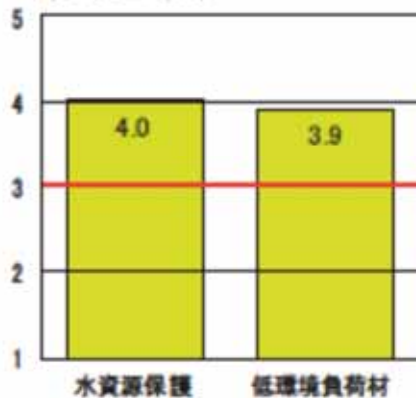
LR 建築物の環境負荷低減性 (建築物の環境負荷を低減させる性能評価)

$SLR = 3.5$

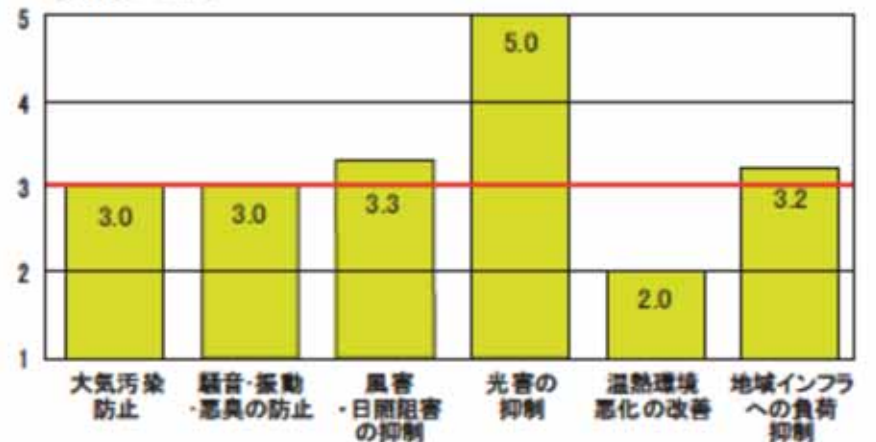
LR-1:エネルギー $SLR1 = 3.6$



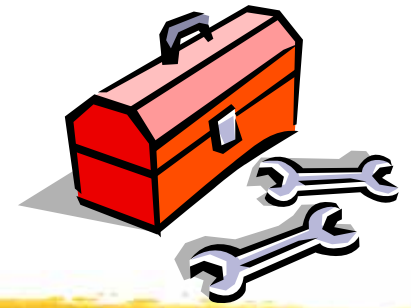
LR-2:資源・マテリアル $SLR2 = 3.9$



LR-3:敷地外環境 $SLR3 = 2.9$



Current Tools



- **Green Mark (GM) Scheme, Singapore**

- Started 2005

- http://bca.gov.sg/GreenMark/green_mark_criteria.html

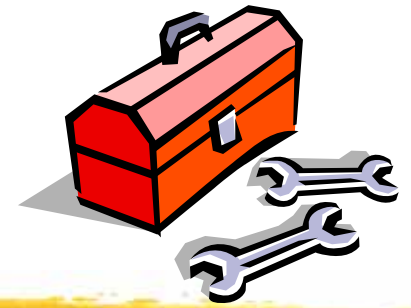
- **Categories:**

- Non-Residential New Buildings
 - Residential New buildings
 - Existing Buildings
 - Office Interior
 - Landed Houses
 - Infrastructure
 - District



BCA GREEN MARK

Current Tools



- **Green Mark (GM) Scheme, Singapore**

- Assessment criteria

- Energy Efficiency [79]
- Water Efficiency [14]
- Environmental Protection [32]
- Indoor Environmental Quality [8]
- Other Green Features and Innovation [7]

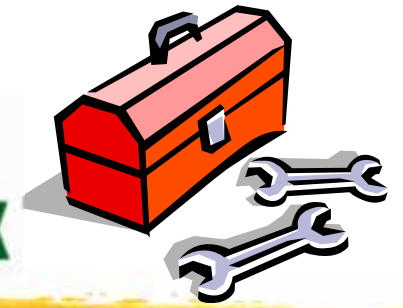
- GM ratings: max 140 + 20 bonus points

- Platinum (90+), GoldPlus (85-90), Gold (75-85) or Certified (50-75)

- Re-assess every 3 years to maintain GM status

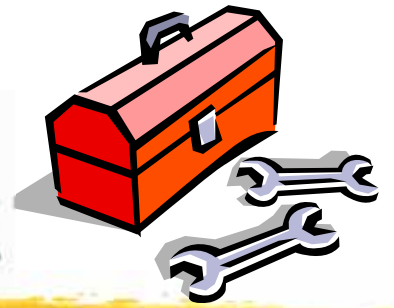


Current Tools



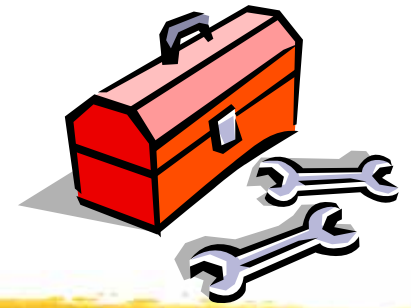
- **Green Building Index (GBI), Malaysia**
 - Started 2009 (www.greenbuildingindex.org)
 - New Construction (NC)
 - Non-residential (NRNC) and residential (RNC)
 - Procedures:
 - Stage 1. Application & Registration
 - Stage 2. Design Assessment
 - Stage 3. Completion & Verification Assessment
 - GBI Accreditation Panel (GBIAP)
 - GBI Certifiers and GBI Facilitators

Current Tools



- **Green Building Index (GBI), Malaysia**
 - Six main criteria: [max. point for new construction]
 - Energy Efficiency (**EE**) [35]
 - Indoor Environment Quality (**EQ**) [21]
 - Sustainable Site Planning & Management (**SM**) [16]
 - Materials & Resources (**MR**) [11]
 - Water Efficiency (**WE**) [10]
 - Innovation (**IN**) [7]
 - Total score = 100
 - GBI ratings: Certified (50-65), Silver (66-75), Gold (76-85) and Platinum (86+)

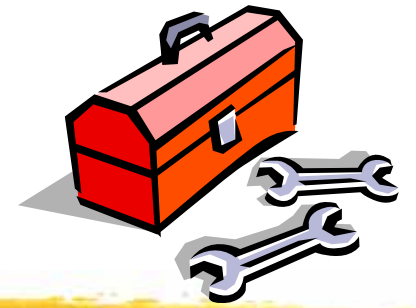
Current Tools



- Mainland China
 - GB/T 50378-2006, Evaluation Standard for Green Building (綠色建築評價標準)
 - Similar to LEED in structure and rating process
 - A three-star Green Building certificate will be awarded to the qualified buildings
 - Green Olympic Building Assessment System (GOBAS) (綠色奧運建築評核系統)
 - Developed from the Japan's CASBEE method
 - Applied mainly in Beijing



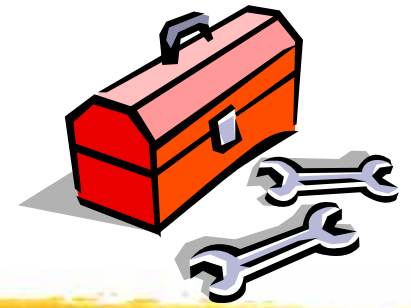
Current Tools



- Taiwan Green Building Label
 - Nine sets of assessment criteria/indicators:
 - 1. Biodiversity 生物多樣性
 - 2. Greenery 綠化量
 - 3. Water retention 基地保水
 - 4. Energy efficiency 日常節能
 - 5. Carbon dioxide reduction CO2減量
 - 6. Waste reduction 廢棄物減量
 - 7. Indoor environment 室內環境
 - 8. Water resources 水資源
 - 9. Wastewater and garbage 污水垃圾改善



Current Tools

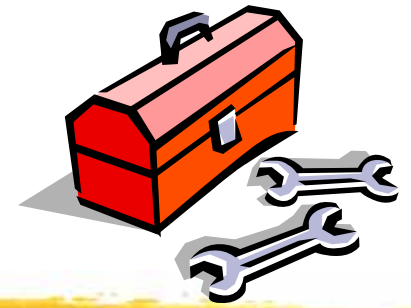


HONG KONG BUILDING ENVIRONMENTAL
ASSESSMENT METHOD

香港建築環境評估法

- HK-BEAM
 - Previous versions:
 - Version 1/96R - for new office designs
 - Version 2/96R - for existing office buildings
 - Version 3/99 - for new residential buildings
 - Hotel Building Environmental Assessment Scheme (HBEAS)
 - Issues covered:
 - Global issues & use of resources
 - Local issues
 - Indoor issues

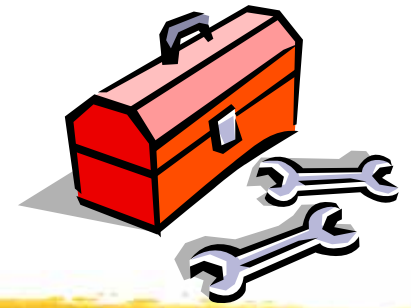
Current Tools



HONG KONG BUILDING ENVIRONMENTAL
ASSESSMENT METHOD
香港建築環境評估法

- HK-BEAM
 - Versions 2004:
 - HK-BEAM 4/04 New Buildings
 - HK-BEAM 5/04 Existing Building
 - Approach and criteria
 - Site aspects
 - Materials aspects
 - Energy use
 - Water use
 - Indoor environmental quality (IEQ)
 - Innovation & performance enhancements

Current Tools

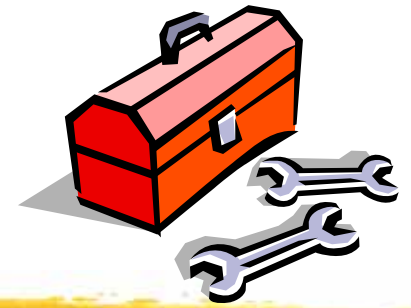


HONG KONG BUILDING ENVIRONMENTAL
ASSESSMENT METHOD
香港建築環境評估法

- **HK-BEAM**

- Weighting system to reflect
 - Relative importance of criteria
 - Relative areas of the spaces
- Overall assessment grade (IEQ must meet min. %)
 - Platinum 75% (Excellent) min. IEQ 65%
 - Gold 65% (Very Good) min. IEQ 55%
 - Silver 55% (Good) min. IEQ 50%
 - Bronze 40% (Above average) min. IEQ 40%
- Website: <http://www.beamsociety.org.hk>

Current Tools



- BEAM Plus development
 - Version 2009: (Nov 2009)
 - BEAM Plus for New Buildings
 - BEAM Plus for Existing Buildings
 - Version 1.1 (Apr 2010)
 - With minor refinements
 - Introduce BEAM Professionals
 - Version 1.2 (Jul 2012)
 - Addresses issues on passive design
 - Minor amendments to other aspects
 - Starting from 1 Jan 2013, version 1.2 must be used



BEAM Society
香港環保建築協會



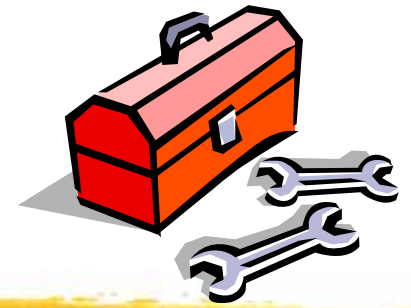
HKGBC
香港綠色建築議會

BEAM Plus assessment criteria [credits] [weighting]

New Buildings	Existing Buildings
Site aspects (SA) [22+3B] [25%]	Site aspects (SA) [18+1B] [18%]
Materials aspects (MA) [22+1B] [8%]	Materials aspects (MA) [11+2B] [12%]
Energy use (EU) [42+2B] [35%]	Energy use (EU) [39+2B] [30%]
Water use (WU) [9+1B] [12%]	Water use (WU) [7+2B] [15%]
Indoor environmental quality (IEQ) [32+3B] [20%]	Indoor environmental quality (IEQ) [30+3B] [25%]
Innovations and additions (IA) [5B+1]	Innovations and additions (IA) [5B+1]



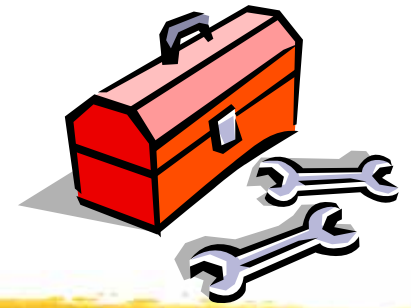
Current Tools



- BEAM Plus (Version 1.1 or 1.2)
 - Overall grade: (with min. for SA, EU and IEQ)

	Overall	Site Aspects	Energy Use	IEQ	Innov. & Addn.	
Platinum	75%	70%	70%	70%	3 credits	Excellent
Gold	65%	60%	60%	60%	2 credits	Very Good
Silver	55%	50%	50%	50%	1 credit	Good
Bronze	40%	40%	40%	40%	---	Above Average

Current Tools



- BEAM Professionals (BEAM Pro)
 - Accredited by HK Green Building Council (HKGBC) (www.hkgbc.org.hk)
 - Facilitate BEAM Plus submission
- BEAM Assessors (BAS)
 - Undertake the building assessment on behalf of HKGBC
- BEAM Faculty
 - Experienced professionals to drive BEAM Plus & BEAM Professionals development and training

