



**Asia-Pacific
Economic Cooperation**

2011/SCSC/WKSP2/009

Session 2

Case Study 2 - Green Commercial Building Rating Systems in the APEC Region

Submitted by: United States



**Green Buildings and Green Growth:
Approaches to Encouraging a Positive
Green Building Climate
Singapore
12-13 September 2011**

Case Study #2 Green Commercial Building Rating Systems in the APEC Region



Dr. Cynthia A. Lowry
APEC SCSC Green Buildings
Conference
September 12, 2011



APEC Green Building Rating Systems: Overview

- I. Four Primary Clusters of Rating Systems**
- II. Five Broad-Based Attributes of Rating System Review Criteria**
- III. Technical Content Review Criteria: Five Primary Environmental Attribute Categories**

I. Four Primary Clusters of Rating Systems



Cluster 1: Non-Government (8)

- Australia: Green Star Australia
- Canada: LEED Canada
- Hong Kong, China: BEAM Plus
- Indonesia: Greenship
- Malaysia: Green Building Index
- New Zealand: Green Star NZ
- United States: LEED-USA
- Vietnam: LOTUS

Cluster 2: Government (4)

- China: Evaluation Standard for Green Buildings
- Japan: CASBEE
- Singapore: BCA Green Mark
- Chinese Taipei: Green Building Labeling System

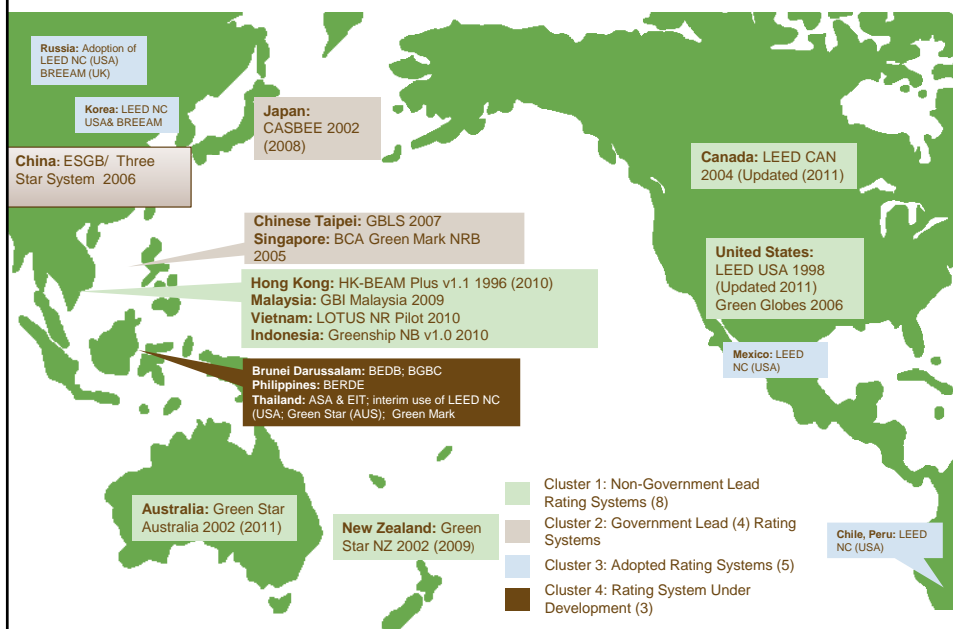
Cluster 3: Adopted (5)

- Chile, Korea (South), Mexico, Peru, Russia
- Adopt LEED-USA (All); BREEAM (Korea & Russia)

Cluster 4: Under Development (3)

- Brunei Darussalam-Strategic Planning Phase
- Philippines-Planning Implementation of BERDE
- Thailand-Architect & Engineering Associations Planning, Interim Use of LEED, Green Star, Green Mark

I. APEC Economy Rating System Clusters



II. Five Broad-Based Attribute Categories of Rating System Review Criteria

Applicability

- Type of Projects
- Building Type
- Voluntary or Mandatory

Development

- System Management
- Development Approach

Usability

- Product Support: Case Studies; Record of Inquiries, FAQs, Training Availability
- Openness of Operations: Membership
- Information publicly available, e-mail help desk

System Maturity

- System Age: Initiated, Most Recent Revision
- Number of Buildings: Enrolled, Completed
- Stability of System: Testing, Revision
- Path for Professional Accreditation

Communicability

- Clarity: Well-defined, Results Easily Communicated, Information Clearly Understood
- Versatility: Basis for Development by Others

Other: Technical Content

- Part of Overall Structure of Rating Systems Review Criteria, Specific & Discussed Separately

II. Broad-Based Attribute Category: Applicability

- **Type of Projects**
 - Typically a Versatile Suite of Tools
 - New Construction common to all 12
 - Major Renovations common to most
 - Operations & Maintenance recently added for performance rating
- **Building Type:**
 - Commercial Office Buildings common to all 12
- **Voluntary or Mandatory:**
 - From an economy-wide perspective, Voluntary for all rating systems
 - Mandatory in Chinese Taipei for Public Buildings at national level
 - Mandatory on a selective basis at local level for public buildings in multiple economies, in Singapore for all buildings in specific high-density area

II. Broad-Based Attribute Category: System Development

- **System Management:**
 - In Cluster 1, all 8 systems managed by Non-Government Lead, and include government, industry and academe working relationships
 - In Cluster 2, all 4 with a Government Lead. Japan and Singapore also include non-government, industry and academe

- **Development Approach:**
 - All currently consensus-based
 - Currently half include Life Cycle Analysis

II. Broad-Based Attribute Category: Usability

- **Product Support categories include Case Studies; Record of Inquiries; Frequently Asked Questions; and Availability of Training**
 - Established systems evidenced high level of product support
 - In process for newer programs and those under development
- **Openness of Operations per Membership Numbers**
 - Half of Cluster 1 report membership details
- **Transparency per how much information is available publicly (e.g. rating system; checklist; credit interpretations; application guides; and FAQs), including e-mail help desk**
 - Established systems evidenced higher level of transparency in support of system
 - In process for newer programs and those under development
- **A few systems have no information publicly available yet**

II. Broad-Based Attribute Category: System Maturity


- **System Age:**
 - Available for all systems
- **Number of Buildings Enrolled & Completed:**
 - Available for two-thirds of systems, total is approx. 33,000 enrolled and 7,500 certified
- **Stability of System per Testing & Development and System for Revisions:**
 - Included by all systems except for a few newer programs
- **Path for Professional Accreditation:**
 - Included for all systems except for a few newer programs

II. Broad-Based Attribute Category: Communicability

- **Clarity, i.e. well-defined; results easily communicated; process & rating system information clearly understood**
 - Full or partial clarity for almost all systems
- **Versatility, i.e. use as a basis for development of other rating systems:**
 - Most only in use in a single economy
 - Exceptions are use during system development phase by others of Green Star Australia and HK-BEAM; of LEED-USA by most other economies

III. Technical Content: Environmental Attributes of Rating Systems

- **Five Primary Environmental Attribute Categories:** Site; Energy; Water; Materials; Indoor Environmental Quality; (Other)
- **Climate Zone Relationship to Attribute Category Content:** Temperate; Sub-Tropical; and Tropical Climate Zones
- **Trends in Content and Prioritization of Categories:** Avg. % for 5 categories of 12 systems: Energy 30%, IEQ 15%, Site 15%, Other 12%, Materials 11%, and Water 10%, with trends for energy & IEQ to increase over time; and additions of GHG emission, transport, ecology etc. calculators; and design stage sensitivity analysis of data using Building Information Model (BIM)

 **DAI**

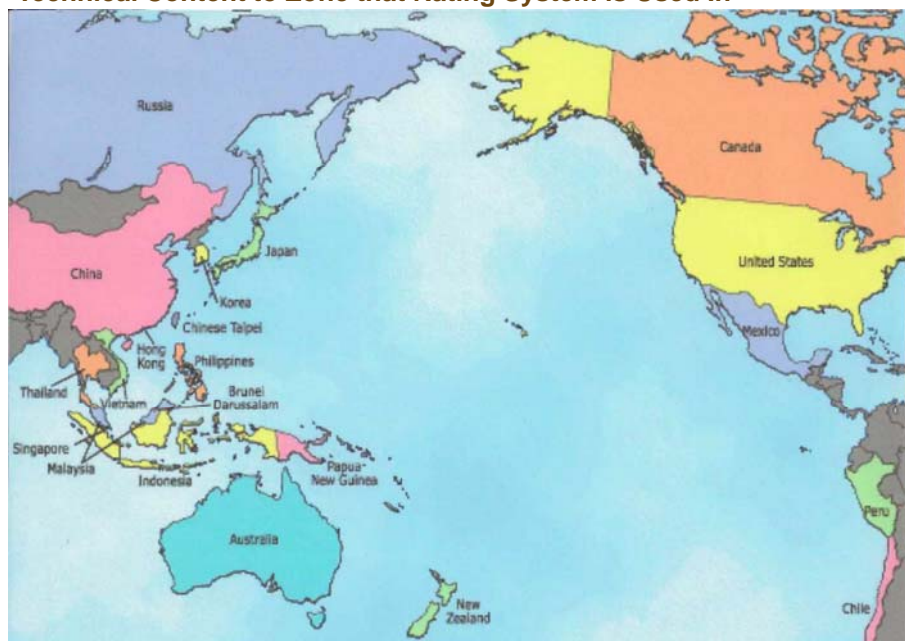
III. Five Primary Environmental Attribute Categories of Rating Systems

Site	<ul style="list-style-type: none"> • Optimize site potential • Density, connectivity, transportation, habitat, storm water controls, heat island effect, light
Energy	<ul style="list-style-type: none"> • Optimize energy use • Optimize HVAC energy performance, on-site renewable energy, green grid power, MR&V
Water	<ul style="list-style-type: none"> • Protect and conserve water • Water use reduction, wastewater re-use, water efficient landscaping,
Materials	<ul style="list-style-type: none"> • Use environmentally preferable materials • Construction waste and materials/products recycled, reused, rapidly renewable, regional
IEQ	<ul style="list-style-type: none"> • Enhance Indoor Environmental Quality • Controllability of thermal comfort & lighting, low-emitting materials, CO2 & toxicity control
Other	<ul style="list-style-type: none"> • Management, Innovation, Transport, GHGs, Regional Priorities etc. • “Other” may include attributes above in some cases

III. Technical Content: Energy is Top Category

- **High Priority:**
 - At 30% of total points on average for all environmental attribute categories, currently twice as high as next highest priority categories, and four times higher in Singapore
- **Low-Carbon Society Linkage:**
 - Increasing priority linked at national level with goal of becoming a low-carbon society through greater energy efficiency and use of renewable energy supplies
- **Indoor Environmental Quality Linkage:**
 - Equipment to improve IEQ consumes energy
 - Lower fossil fuel use over time reduce pollution
- **Materials, Water and Site Category Linkages:**
 - Embodied energy in materials & water pumping
 - Attention to Site details, e.g. high Leaf Area Index

III. APEC Green Building Climate Zones: Relationship of Technical Content to Zone that Rating System is Used In



III. Technical Content: Commonalities and Impacts on Trade

Commonalities:

- **Tropics:** Rating systems of half of APEC's economies operate in the tropical climate zone, with increasing attention to fine-tuning credits to optimize energy and IEQ attributes, facilitating trade for associated building inputs
- **Common Metrics:** GHG emissions and transportation aspects are increasingly a priority in most systems, both requiring common metrics to facilitate trade
- **Materials Waste Management:** Materials category credit systems increasingly prioritize construction waste management & materials reuse and recycling, increasing trade in used building materials
- **Low-Emitting Materials:** Materials category credit systems increasingly prioritize low-emitting materials for adhesives, sealants, paints, coatings, flooring systems, composite wood and agrifiber products, facilitating trade in low-emitting products

III. Technical Content: Differences and Potential Impact on Trade

- **Citation of Standards in System**
Documentation: Systems cite internationally recognized standards, e.g. conformance to ISO or ASHRAE-based standards, for environmental and energy-efficiency attributes
- **Green Industry Innovation:** Innovative firms with a reputation for building inputs prioritized in environmental attribute category credit systems of APEC economies will increasingly target markets that are open and transparent, with lower transaction costs

Thank You

Thank you very much for your Attention. The region will benefit from your integrative and synergistic contributions to APEC's exciting and evolving agenda.

***Dr. Cynthia A. Lowry
lowryc@mac.com***