Finding the Right Tools

While the increased interest in sustainable building design has encouraged research into building products and performance, it continues to be a challenge to measure the overall impact of buildings on the environment over the course of their service lives – and advice is often contradictory.

Product directories, rating systems and other tools are available to support design and construction decisions. However, these must be evaluated carefully to ensure they meet the specific needs of each application, and to identify any limitations. For example, some green building rating systems may be too narrowly focused, ignoring the importance of far-reaching strategic decisions, while rewarding less important ones disproportionately.

Green building tools include:
• product labelling by third-party certifiers such as independent forest certification programs
• rating systems that evaluate products/designs such as LEED (Leadership in Energy and Environmental Design), Green Globes and the National Association of Home Builders (NAHB) National Green Building Standard
• practice guidelines such as green home building guidelines
• software such as the ATHENA Institute’s EcoCalculator
• procurement policies such as the U.S. Environmental Protection Agency’s environmentally preferable purchasing.

Green design requires smart tools to decipher all the conflicting information, lack of clarity on definitions, and a constantly changing landscape as the field evolves and expands.
Green Building Rating and Assessment

Environmental rating systems can help building industry professionals evaluate and differentiate their product or design. The standards set by rating systems generally exceed those required by building codes.

The best systems measure performance rather than prescribe solutions, and are based on life cycle assessment. They offer a credible, consistent basis for comparison, evaluate relevant technical aspects of sustainable design, and should not be too complex or expensive to implement or confusing to communicate.

Most developed countries have adopted one or more green building rating systems, beginning with the United Kingdom, which introduced the BREEAM (Building Research Establishment Environmental Assessment Method) in 1990. In North America, green rating systems include LEED, Green Globes and the NAHB National Green Building Standard. A choice in rating systems helps to strengthen green design, with processes to meet the diversity of building needs, sizes and budgets. It also encourages market competition, ensuring continuous improvement.

The LEED green building rating system, developed by the U.S. Green Building Council, addresses specific building-related environmental impacts using a whole building environmental performance approach. In addition to LEED-NC (for new construction and major renovations), there are versions for existing buildings, commercial interiors, core and shell, homes, and neighbourhood development. In 2013, the US Green Building Council (USGBC) released the latest version of the LEED green building rating system (LEED v4). (For information in the United States: www.usgbc.org/LEED. For information in Canada: www.cagbc.org)

Green Globes, is a web-based environmental assessment and certification system that bills itself as offering an effective, practical and affordable way to assess and improve the sustainability of new and existing buildings. In the U.S., it is offered exclusively by the Green Building Initiative (GBI) who initiated the first ANSI standard for commercial green building. In Canada, the federal government uses the Green Globes suite of tools and it is the basis for the Building Owners and Managers Association of Canada’s (BOMA) “Go Green Plus” program. (For information in the United States: www.thegbi.org. For information in Canada: www.greenglobes.com)

The NAHB National Green Building Standard is the first green building rating system to be approved by the ANSI. Building on the Model Green Home Building Guidelines developed by the NAHB Research Centre, it provides a common benchmark for recognizing and rewarding green residential design, development, and construction practices in the United States. Known as ANSI/ICC 700-2008, the National Green Building Standard is a joint effort between the International Code Council and NAHB. (More information is available at www.nahbgreen.org)
Environmental Data Sources: Life Cycle Assessment

Software
Life cycle assessment software allows a designer to capture and account for the breadth of environmental and economic considerations in one application.

The Building for Environmental and Economic Sustainability (BEES) software program was created by the U.S. National Institute of Standards and Technology. BEES has 10 impact categories: acid rain, ecological toxicity, eutrophication, global warming, human toxicity, indoor air quality, ozone depletion, resource depletion, smog and solid waste. (For more information: www.wbdg.org/tools/bees.php)

The ATHENA Institute is a non-profit organization that provides life cycle assessment services and tools to support green building. Its Impact Estimator for Buildings is a full-capability tool that allows designers to evaluate the environmental impact of each decision as they go through the process of putting a building together conceptually. Its EcoCalculator is a simplified tool, where hundreds of common building assemblies have been pre-calculated, requiring minimal input from the designer. (For more information: www.athenasmi.org/tools/impactEstimator)

Environmental Product Declarations
An Environmental Product Declaration, or EPD, is a standardized report of environmental impacts linked to a product or service. An EPD is based on life cycle assessment, which provides a basis for comparing environmental performance and substantiating marketing claims. Until recently, EPD development was limited to organizations associated with the ISO 14000 series of standards within the International Organization for Standardization (ISO) and the government agencies of several European countries. Now, the EPD concept is moving rapidly into the mainstream. The American Wood Council (AWC) and Canadian Wood Council (CWC) have released EPDs for North American wood products, including softwood lumber, plywood, oriented strand board, and glue-laminated lumber.

Procurement Policies
Globally, governments are introducing policies to increase the use of wood in an attempt to reduce greenhouse gas emissions and support their sustainability programs. Examples include:

• Changes in national building regulations in many European countries to encourage multi-storey wood buildings – in the United Kingdom, a nine-storey apartment building that includes eight stories of wood over one storey of concrete is considered the first modern tall timber residential building. The world’s tallest wood building is currently the 10-story Forte Building completed in 2012 in Melbourne, Australia. Additional projects have been proposed, including a potential 34-storey building in Stockholm, Sweden and a 20-storey tower in Vancouver, Canada. A 30-storey wood building has been approved for construction in Sweden.

• In Canada, the governments of British Columbia and Quebec have policies that encourage the use of wood in public buildings.

A mixed-use project, Avalon Anaheim Stadium includes 251 luxury apartment units and 13,000 square feet of retail and restaurant space over a 210,000-square-foot podium deck with two levels of subterranean parking. It is located in the heart of Anaheim’s Platinum Triangle district. “Podium” buildings, which include multiple stories of wood over an elevated concrete “podium deck,” have become especially prevalent. With ever increasing land costs and the rising cost of steel and concrete, developers are turning to wood designs that offer greater density and a higher percentage of rentable square footage than traditional garden-style apartments while also being cost effective—both in terms of material and labor. Wood’s other benefits, such as speed of construction, design flexibility, and reduced environmental impact, add to the value proposition.

Avalon Anaheim Stadium Apartments, Anaheim CA
Architect: Withee Malcolm Architects
Photos by Michael Arden - Arden Photography
Organizations and Networks

The **U.S. Green Building Council (USGBC)** and the **Canadian Green Building Council** are non-profit organizations that aim to transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life. USGBC has developed the LEED rating system. For more information:
www.usgbc.org (United States)
www.cagbc.org (Canada)
www.worldgbc.org (international)

The **National Association of Home Builders (NAHB)** is a trade association for the housing and building industry in the United States. NAHB is a federation of more than 800 state and local associations. Its affiliates include the NAHB Research Centre. For more information: www.nahb.org

The **Green Building Initiative** is a not-for-profit education and marketing initiative dedicated to accelerating the adoption of building practices that result in energy-efficient, healthier and environmentally sustainable buildings by promoting credible and practical green building approaches for residential and commercial construction. For more information: www.thegbi.org

The **American Institute of Architects (AIA)** serves as the voice of the architecture profession and the resource for their members in service to society. They carry out advocacy, information, and community outreach. Each year the AIA sponsors hundreds of continuing education experiences to help architects maintain their licensure, provides web-based resources, conducts market research and provides analysis of the economic factors that affect the business of architecture. For more information: www.aia.org

The 23,000-square-foot James and Anne Robinson Nature Center reflects years of creative and innovative efforts of educators, community leaders, designers, wildlife experts, historians, and resource conservationists. Designed by GWWO Architects, the building demonstrates the latest in sustainable design ideas, craftsmanship, and materials, including geothermal heating, green roofing, and even recycled wood from the Robinsons’ own barn. The Center has been recognized by Associated General Contractors as the “Best Sustainability Project of the Year in New Construction” and was recently awarded Platinum LEED (Leadership in Energy Design) Certification, the highest rating from the U.S. Green Building Council.
Other Resources

Energy Star
(www.energystar.gov) is an international standard for energy-efficient consumer products. First created as a U.S. government program in 1992, it operates in Canada, Europe, Japan and Australia. Energy Star rates energy-related value for products in more than 35 categories, including HVAC systems, lighting fixtures, office equipment, roofing products, windows, doors and skylights.

The U.S. Environmental Protection Agency’s Environmentally Preferable Purchasing (www.epa.gov/opptintr/epp) rates building materials and products based on pollution prevention, life cycle analysis, comparison of environmental impacts, environmental performance, and environment/price performance ratio. Product categories include: paints, plumbing, HVAC, lighting, gypsum board, carpets, concrete, coatings, sealants, flooring, doors, and windows.

Green buildings
- Mitigate climate change
- Use less energy and water
- Use fewer materials
- Reduce waste
- Are healthy for people and the planet

On the cover:
Campus Services Building,
Western Washington University, Bellingham
Zervas Group Architects

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