

The World's Greenest Buildings: Promise vs. Performance in Sustainable Design
By Jerry Yudelson and Ulf Meyer
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Brief for Participating Projects

The worldwide discussion of anthropogenic climate change has accelerated since 2006, and many decision makers have become aware of the significant contribution of buildings to global carbon dioxide and other greenhouse gas (GHG) emissions. Green building and energy performance rating schemes have become established in much of the world, but what most researchers and practitioners are finding is that building performance does not nearly match up to the level needed to avoid catastrophic climate change over the next several decades. In particular, research has shown many high-level green certified buildings in the U.S., U.K. and elsewhere are not delivering effective reductions in energy use.

The World's Greenest Buildings provides a review of how far green buildings have come, based on actual measured performance over at least 12 months of operations, including both energy and water use. Research for the book will review those buildings rated at the highest level of each national rating system and then select about 60 to 70 buildings from various countries, based primarily on lowest resource consumption, especially lowest energy use per sq.ft., taking the building type into account. Each building selected will be profiled in a detailed case study, using a common reporting format, although the presentation of the case study will highlight specific design and operational solutions.

Case study formats will provide some of the information contained existing case study series like *Greensource* magazine and the U.S. Department of Energy's "High Performance Buildings" website. Appendix A provides a list of data requirements for each case study.

We are inviting your participation in this research and publishing effort!

The World's Greenest Buildings will be the first book to compare actual building performance among the highest-rated green buildings, using cost and energy use data verified (whenever possible) by independent third-parties. The analysis of this data will provide readers with an understanding of how building performance can be upgraded in future designs. The book provides a good overview of the rating systems and shows "best in class" building performance in North America, Europe, the Middle East, India, China, Australia and the Asia-Pacific region.

We aim to develop normative design criteria, such as annual electrical consumption (kWh per unit area), fuel consumption and water use, for use by future design and construction projects that aspire to the highest level of green building certification.

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This book will provide practical contemporary examples of best practices for greening new buildings, useful for architects and engineers, contractors, building owners and managers, facility professionals, developers, lenders and investors, brokers and appraisers, and everyone charged with managing commercial and institutional buildings.

We believe the need is intense for a practical reference for design professionals, building owners, developers and facility managers on how the world's greenest buildings actually perform at the highest level, one that takes them step-by-step through many different design solutions.

For this reason, we invite your participation in this research and publishing effort!

The book will be based on responses to surveys conducted through December of 2010. Only those projects that provide complete and verified operating data and construction cost data will be considered for inclusion in the book. We expect that the prospect of being included in the first global listing of “the world's greenest buildings” from two leading authorities on the subject, and from a prestigious publisher such as Routledge, will enable us not only to gather the required information, but also to source project photos and to secure interviews.

A 30-person panel of leading architects and engineers, building owners and facility managers from around the world, will serve as advisors to this project.

The book will contain about 25 interviews with architects, engineers, building owners and developers and industry experts, to give it added authority. It will build on Jerry Yudelson's 12 previous books treating the subject of green building and green development, including two from McGraw-Hill, Green Building through Integrated Design (2008) and Greening Existing Buildings (2009), as well as his 2009 book, Green Building Trends: Europe (Island Press.) The co-author, Professor Ulf Meyer, is himself the author of six books and more than 200 articles on contemporary architecture in Europe and Japan.

We will provide two types of case studies; about 12 detailed studies of 6-8 pages in length and a larger number of “Profiles” of 2-4 pages in length. We intend to publicize the effort through the various national green building councils, as well as through an extensive network of building industry contacts in North America, Europe, Japan and Australasia. We anticipate that many architects, engineers and green building consultants will want to alert their clients to the benefit of being included in this landmark book.

To avoid controversy about which countries have the greenest buildings, coupled with the lowest annual energy and water use per occupant or per unit floor area, we will limit representation from each major climatic region and geographical area. This will of course exclude some good candidates from the U.S., where more than 300 buildings are already LEED-Platinum certified, from the U.K., where the BREEAM system has already certified more than 1,000 non-domestic buildings and from continental Europe, where

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third-party certification is relatively new but where there are many highly energy-efficient buildings.

Given the relative maturity of various rating systems, with U.S., Canada, U.K., Japan, India, UAE and Australia currently the most advanced, we anticipate a distribution of case studies as follows:

North America: 20

Europe: 20

Australia: 5 to 10

Japan: 5 to 10

India: 5 to 10

China and Rest of World: 10 to 20

To keep the comparison between buildings relatively sharp and to reflect contemporary design and construction practices, we will also include **only those buildings realised (completed) in 2004 through 2009**, a six-year period in which green building certification really “took off” worldwide. We anticipate updating this book on a 2-3 year cycle to include newer projects, as their performance data become available.

The book will have a Foreword written by a leading green building authority in the U.S., Professor Dr. Alison Kwok of the University of Oregon School of Architecture.

To participate, please advance to us the name of a specific green building project rated at the highest national ranking level, along with contact information for the building owner and/or facility manager who can provide the resource consumption data.

Contacts: Jerry Yudelson, Yudelson Associates, jerry@greenbuildconsult.com, or Professor Ulf Meyer, ulfmeyerb@aol.com. You may reach us by phone at +1-520-243-0996 (Yudelson), or +49-030-69599176.

Appendix A – Data for Case Studies (some data will be calculated from source data)

Overview

- Year of start of design
- Year of start of construction
- Year of occupancy/realization
- Location (City, state/province, exact address)
- Building Type (commercial office, government, academic, etc.)
- Construction Type (new or major renovation only)
- Square footage (plus Net Leasable Area for commercial buildings)
- Number of floors (above ground); basements or below-ground floors
- Site description (urban core, urban, suburban, etc.)
- Owner or client (original and current, if different)
- Property manager (if available)
- Occupant(s), type of business, name of major tenants; single-tenant vs. multiple-tenant property
- Retail included on ground-floor?
- Full and part-time occupancy (Full-Time Equivalents)
- Data Center, Winter Gardens or other special-use portions of the project
- Programming/space designations (percentage office, conference, public use, etc.)
- Verbal description of the building and its important green/environmental aspects (Project Narrative)

Design/Construction Team & Process

- Pre-design Activity/Environmental Studies/Competition
- Design Process (brief)
- Primary design team members (Architect/key consultants)
- Construction team (General contractor)
- Operations/occupancy team (key people)

Finance & Cost Data

- Total project cost (for building construction, for site, by sq. ft.)
- Annual savings by system, energy and water (contribution of renewable components such as solar power, rainwater harvesting, wastewater re-use, daylighting, etc)

Water Use

- Annual indoor potable water use (estimated or metered)
- Annual cooling tower potable water use
- Annual outdoor potable water use
- Total potable water use (must have at least this)
- Water supply from municipal reclaimed water (yes/no)
- Water supply from onsite wells (yes/no)
- Potable water use intensity (per sqm, sq.ft. or person)
- Rainwater harvested/runoff reduction
- Graywater and/or blackwater reuse

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- Reduction in stormwater runoff from site (if known)
- Landscape water conservation features
- Water use intensity (potable or non-potable)

Energy Use

- Annual quantities and costs of electricity, natural gas, fuel oil purchased
- Annual quantity of renewable energy produced onsite/purchased for use
- Energy use intensity (site and primary, per sqm or sq.ft./per occupant)
- Renewable energy intensity (per sqm or sq.ft./per occupant)
- Net imported energy intensity (must have this, per sqm or sq.ft./per occupant)
- Imported energy type (hydro, nuclear, coal, etc.) and/or carbon intensity (kg/sqm, or lbs/sq.ft.) for region/nation; factor used to convert site energy use to source or primary energy use/carbon emissions (both for mains gas and electricity)
- Energy end-use requirements by source of demand, if available (heating, cooling, ventilation, pumps, plug loads, etc)
- Emissions data (carbon, calculated/estimated)
- Was the building formally commissioned, and by what standard?

Lessons Learned

- Green rating (level of achievement, which standard used?)
- Estimated energy use vs. actual performance
- Behavioral issues with occupant energy/water use (how were conservation objectives communicated?)