

SUSTAINABLE BUILDINGS

Energy Performance Data Largely Lacking

New buildings may be more energy-efficient, but building energy use overall continues to rise

While there are awareness-raisers galore about the need to put buildings on crash energy diets, there is an equivalent dearth of performance data to indicate whether new buildings designed to be “green” actually gobble up less or more energy than predicted. Despite all of

the hoopla around LEED-certified buildings, there has been so much development that buildings, as a group, are using far more energy than they did a quarter century ago, say sources. To make matters worse, the trend is toward still more energy use in coming decades.

“I’m excited about the green building momentum but there’s very little information” on actual energy performance compared with design targets, said mechanical engineer Adam W. Hinge, managing director of Sustainable Energy

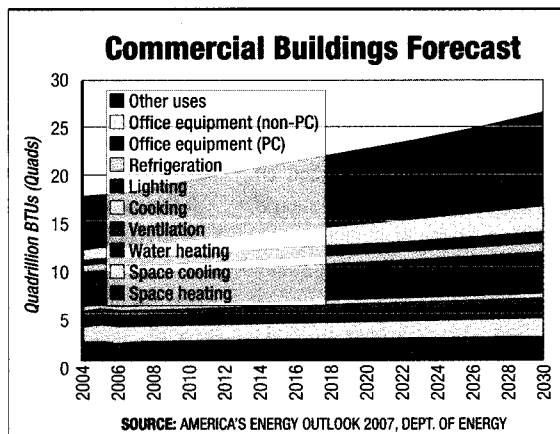
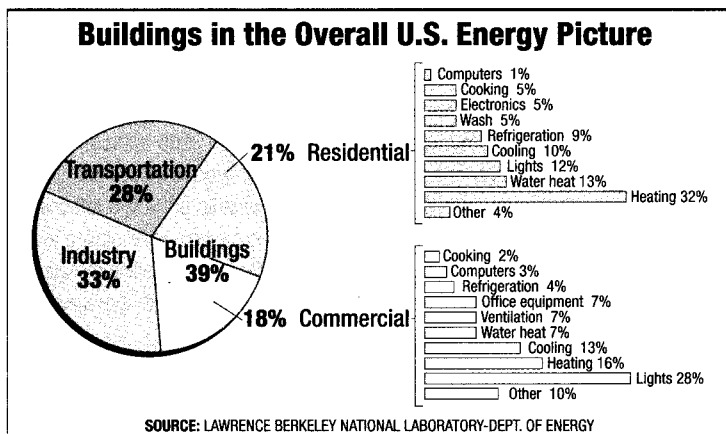
Partnerships, a Tarrytown, N.Y.-based energy consultant. “In some ways there are more questions than answers,” added Hinge, who spoke at an Oct. 30 lecture on green buildings, organized by the New York Academy of Sciences, New York City, and sponsored by the local office of builder Skanska.

The problem isn’t that there is little data, said Noel Morrin, senior vice president, sustainability for Skanska AB, Stockholm. It is that there is no standard for collecting and analyzing it.

According to statistics from the U.S. Dept. of Energy, U.S. commercial buildings alone will be using more than 25 quads (quadrillion Btu) in 2030, up from about 18 quads in 2004. In 1980, commercial buildings used 208.2 MBtu (million Btu per sq ft); in 2000, they used 250.2 MBtu. There are more efficient building envelopes and equipment, but energy use keeps growing, mostly because more electronic equipment increases cooling loads, say sources.

“There is a wide gap between current forecasts for building energy use and efficiency and some of the planned targets,” said Hinge. “Just because you have the latest toys doesn’t mean you are operating efficiently.”

An example would be Four Times Square, which was touted as New York City’s first “green” speculative office tower when it opened in 1995. The building,





▲ One of a Few. Seattle office building is meeting target carbon-dioxide emission reductions.

developed by the Durst Organization, uses more energy per square foot than an older Durst building nearby, said Hinge.

Barriers

Many barriers work against building energy efficiency, said Jens Laustsen, an energy-efficiency policy analyst for the International Energy Agency, Paris. These include split incentives, where owners of buildings pay for efficiency and renters save money on utility bills, financial constraints and lack of knowledge and awareness by owners and advisors.

To try to overcome these barriers, IEA is conducting a perception study on energy efficiency, says Laustsen. The goal is to come up with recommendations for policies to improve efficiency globally in new as well as existing buildings.

Myriad other studies are under way by various organizations in the U.S. and

elsewhere. The Energy Efficiency in Buildings Initiative from the World Business Council on Sustainable Development (www.wbcsd.org) commissioned a study to identify attitudes, knowledge and understanding among professionals and opinion leaders, as well as the readiness to adopt more sustainable practices. The United Nation's Environment Program (www.unep-sbci.org) has a Sustainable Buildings & Construction Initiative.

Some owners are reluctant to release building energy performance data. An exception is Vulcan Real Estate and PEMCO Insurance, both Seattle, which opened the mixed-use Alley24 development in 2006. The building houses the local offices of Alley24's architect, NBBJ, and its general contractor, Skanska USA Building Inc. The building was awarded LEED-silver for its core and shell and both Skanska's and NBBJ's offices have

received LEED-gold certification.

According to NBBJ, the office building's carbon dioxide emissions are within a few percentage points of the 50% reduc-

tion target of various green organizations. Results are based on current energy use information from the U.S. Dept. of Energy ENERGY STAR Program. Both the city's Dept. of Planning and Development and the utility, Seattle City Light, audited the building's energy-use records, says NBBJ.

The development contains 185,000 sq ft of office space, 28,000 sq ft of retail and 172 apartments. NBBJ and consulting engineers Flack + Kurtz and McKinstry incorporated motorized sunscreens that track the sun's rays, automatic reflector blinds and low-energy-use fixtures. The building has a hybrid heating and cooling system that includes both operable windows for natural ventilation and a raised floor system that can selectively deliver heated or cooled air. The raised floor design allows conditioned air to be delivered beneath an occupant's feet for personal control, providing several hundred more hours of "free cooling" than overhead air conditioning, says NBBJ. In addition, each floor has operable windows and the ability for fan-assisted natural ventilation that affords building occupants the option of eliminating air conditioning.

For the newcomers to green buildings, guides are coming out of the woodwork. Last month, the U.K.'s Royal Institute of British Architects published climate change guidelines. RIBA's "Climate Change Toolkit" covers factors affecting carbon dioxide emissions and energy and environmental standards (www.architecture.com/climatechange). It also covers environmental performance simulation software for buildings, post-construction performance testing and monitoring and evaluation methods. ■

By Nadine M. Post

U.S. Building Energy Intensity Trends

Year	Residential			Commercial	
	Households (millions)	Avg. House Size (sq ft)	KBtu*/household	Floor space mil. sq ft	MBtu**/sq ft
1980	79.6	1,746	199.0	50.9	208.2
1990	94.2	1,800	180.8	64.3	207.1
2000	105.7	1,963	193.8	68.5	250.2

*1,000 BTU, **1,000,000 BTU
SOURCE: DOE ENERGY INFORMATION ADMINISTRATION