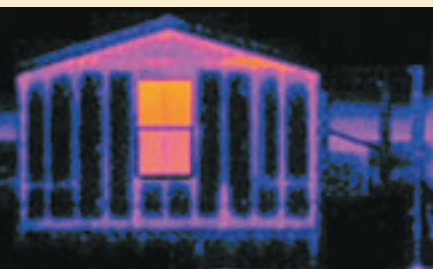




About MHRA

The Manufactured Housing Research Alliance (MHRA), the research arm of the manufactured housing industry, provides content for *Technologies*. ■ *Technologies* highlights the research of MHRA and examines other research and development activities throughout the industry.

■ For more in-depth information about research in the factory-built housing industry, or to find resources mentioned in *Technologies*, visit the MHRA Web site at www.mhrahome.org. ■



Manufactured Housing Research Alliance

2109 Broadway, Suite 200
New York, NY 10023
(212) 496-0900
info@research-alliance.org

Technologies Drive Energy Research

The Energy Roadmap Committee met at the Manufactured Housing Institute's Annual Meeting in October to begin the process of setting comprehensive goals and forming a plan for energy-related research responsive to the needs of the modular and manufactured housing industries.

As one of its first activities, the project committee heard presentations by leading researchers and experts in the area of energy efficiency.

Carolyn Turner, Ph.D. of North Carolina A&T State University described existing consumer research. Her research encompasses issues that impact energy efficiency, defines barriers to better energy use and suggests actions to overcome these barriers.

Subrato Chandra of the



practical tips to builders and consumers to reduce energy inefficiency, has saved \$11 million in energy costs since 1999.

Two labs run by the U.S. Department of Energy (DOE) gave presentations about state-of-the-art energy research and cutting-edge technologies.

Achilles Karagiozis, senior research engineer with DOE's Oak Ridge National Laboratory (ORNL), reported on the application of building materi-

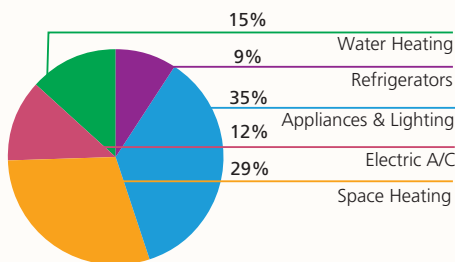
day and releasing it at night.

Steve Selkowitz, head of the Building Technologies Department for DOE's Lawrence Berkeley Laboratory, discussed a number of innovative solutions for improving indoor air quality with highly effective insulation materials, such as gas-filled panels. He also presented new technologies that can make windows more energy-efficient than insulated walls.

Michael Lubliner of Washington State University's Extension Energy Program discussed a successful energy incentive program in the Pacific Northwest. He reported that 58 percent of new manufactured homes produced since 1988 have been built to the efficiency levels established as part of the Super Good Cents/Natural Choice program, saving consumers nearly \$7 million a year.

Chris Early of the U.S. Dept. of Energy discussed the Building America program and its goals for reducing energy use by 70 percent over the long-term. They support applied building-science research to improve

Energy Use in Manufactured Homes by Percentage of Household Expenditures



Source: Energy Information Administration, Table CE-4c: 2001 Residential Energy Consumption Survey: Household Energy Consumption and Expenditures Tables

Florida Solar Energy Center, a research institute of the University of Southern Florida, reported on the Building America Industrialized Housing program. Chandra estimates that the program, which gave

als to improve energy efficiency, such as using heat-reflective roofing materials. ORNL hopes an emerging insulation technology, known as phase change material (PCM), can save energy by absorbing heat during the

energy-efficiency and indoor air quality.

Kathleen Maynard, president of the **Canadian Manufactured Housing Institute (CMHI)**, presented its effort to improve energy efficiency in the Canadian factory-built housing market. CMHA is working to merge the country's many programs into a single effort.

Over the next year, the Energy Roadmap Committee will set the agenda for energy research. ■

Energy IQ Test

Which North American community (town, city) has all of these energy efficiency attributes?

1. The average amount of gasoline consumed per resident is about equal to what the country consumed per resident in the mid-1920s (era of the Model T)!
2. If the community was a state it would rank 51st in per capita energy use.
3. Buildings in this community are among the most energy-efficient structures in the world.
4. It has some of the "greenest," environmentally friendly structures in the world.
5. Most of these attributes were created accidentally.

Source: *The New Yorker* magazine, October 18, 2004.

Answer: **New York City.** Most New Yorkers use mass transit, ride bikes or walk, and they live in compact high-rise apartment homes that are inherently energy efficient.

Japan Imparts Lessons to U.S. Visitors

In a continuation of its efforts to share building techniques and marketing efforts across cultural divides, the Manufactured Housing Research Alliance and representatives of seven U.S. manufacturers visited Japanese builders late last year.

The delegation found that the average Japanese home buyer considers factory-built homes a high-end commodity, superior to homes built on-site. Most factory-built homes in Japan utilize materials that offer superior fire and earthquake resistance. This emphasis on the advantages of factory-built homes was something that the delegation felt could be adopted by U.S. manufacturers.

Alan Sheaffer, an industrial engineering manager for Fleetwood Enterprises Inc., was impressed by several engineering systems used by the Japanese, including a foundation system that can endure a magnitude 7.0 earthquake without damage to the home or its furnishings, and a zero-energy package that allows the home to produce more energy than it consumes.

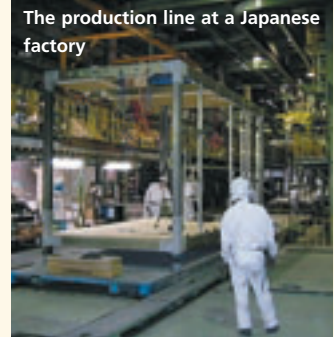
Sheaffer noted that the Japanese engaged in the principles of lean manufacturing and employed impeccable housekeeping in the plant, with clearly labeled stocking locations, ergonomic tooling and the use of appropriate devices to deliver parts.

Another clear difference

between the U.S. and Japanese markets is vertical integration. Japanese companies control every step of the process. Japanese homes are passed down from generation to generation and manufacturers develop long-term relationships with customers.

Dennis Jones, president and CEO of R-Anell Housing Group noted that such a dynamic doesn't exist in America. However, he would like to see the U.S. industry adopt the Japanese intolerance for manufacturing defects.

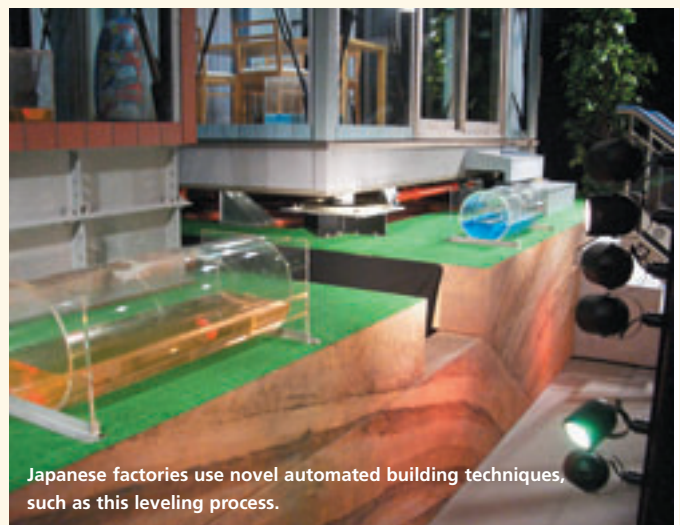
Marketing is another area in which Jones believes domestic builders could take a cue from the Japanese. The Japanese increase efficiency by carefully researching consumer needs and creating designs based on the findings. This helps to dramatically reduce slow and costly custom work while driving con-



The production line at a Japanese factory

sumer demand. Michael Mullens, of the University of Central Florida (UCF), was impressed by the sheer scale of production technology, the empowerment of employees and the involvement of high-profile companies (such as Toyota and Panasonic) in Japanese factory-homebuilding.

Mullens, who is the founder and principal investigator of the UCF Housing Constructability Lab, would like to see more of a long-term commitment to quality and an understanding of how technology, research and development, engineering and employee empowerment can drive improvements in the industry. ■



Japanese factories use novel automated building techniques, such as this leveling process.