

Forget the Cleavers: Beaver Now Builds on Innovation

The Partnership for Advancing Technology in Housing is designing and building a technological vision for the nation's homes. » by **CHRISTINE BARBOUR**



WHEN INDUSTRY LEADERS DISCUSS HOUSING INNOVATION, THEY FREQUENTLY MAKE COMPARISONS TO THE AUTOMOBILE INDUSTRY. Though two very different segments, the production of homes in the near future is likely to take place on an assembly line, much like automobiles. Before a new car design reaches the market, substantial research occurs. Car shows feature “concept cars,” which are prototypes that demonstrate the latest innovations that have resulted from R&D. Now the housing industry has its own response: the PATH Concept Home.

The Partnership for Advancing Technology in Housing (PATH), an initiative between the U.S. Department of Housing and Urban Development (HUD) and America's homebuilding industry, is designing and building a technological vision for the nation's homes. Leading up to the Concept Home, PATH developed a whole-house technology road map; conducted market research with builders, architects and homeowners; explored homebuyer demographics; and researched state-of-the-art technologies.

Market research, conducted by Newport Partners LLC, a housing research firm in Davidsonville, Md., indicates that builders are keenly interested in reducing construction cycle time. “Builders are looking for solutions to the ongoing labor shortage, as well as reducing the impacts of price spikes for building materials and costly landfill fees for waste

and scrap materials,” stated James Lyons, the PATH Concept Home program manager at Newport Partners. He added, “Architects envision energy efficiency, affordability and flexible design as the most important issues that housing design will contend with in the future.”

Meanwhile, the results of consumer research show that America's home buyers are interested in “flexible” homes that can be easily updated and renovated as their needs change over time or as technologies advance. Despite what you hear about Americans moving every five to seven years, there are a number of homeowners who would prefer to stay in their homes if they could renovate them more easily when that baby arrives, their youngest child goes off to college, their aging parent moves in or they can't get up the steps to the second-floor master bedroom anymore. This is especially true as housing prices increase across the nation, and moving to a different house can also mean moving further out.

PATH also reviewed an analysis of changing household demographics that was conducted by the National Association of Home Builders and presented at the 2005 International Builders Show. The analysis demonstrated that America's home buyers are increasingly diverse and household size is getting smaller. While the relative share of traditional family households (married with their own children) is shrinking, the portion of single households is growing. As the first of the infamous baby boomer generation nears retirement, their desires need to be considered. In fact, one statistic from Adaptive Environments in Boston, Mass., suggests that 83 percent of those 45 and older want to “stay-in-place” as they age. According to the U.S. Census (2000), nearly one in five Americans has some type of long-lasting condition or disability.

MODERN CONCEPT HOME DESIGN » Based on these demographic changes and the market research conducted for this project, PATH developed scenarios for the people who might live in the “home of the future.” Armed with occupancy scenarios and the Concept Home principles, PATH contracted with Torti Gallas and Partners to create a modern townhome suitable for urban infill.

Mark Bombaugh, Torti Gallas' lead architect for the project, explained the design in terms of space and flexibility: “The organizing principle for this project was to divide the house into two distinct zones: the service area and the served area.

RESOURCES:

To view designs, visit pathnet.org/concepthome or call 301.889.0017.

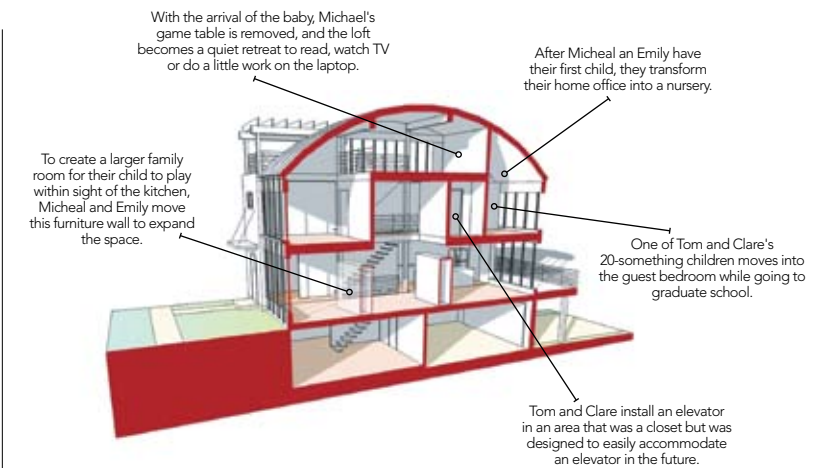
The majority of the building systems are contained in the spatially efficient service zone. This frees the served zone for complete flexibility of use and adaptation to changing needs over time.”

The service core with all the mechanicals can easily be manufactured as a module and craned into place on the site. This creates production efficiencies that reduce cycle time and secures the site more quickly, making it less likely that equipment will run off during the night. The served area can be built with components such as structural insulated panels and adjusted to fit any unusual urban infill site.

The plan responds to a growing family by allowing the later finishing of loft and basement spaces. The design features moveable furniture walls to quickly adapt the space to meet the homeowners' needs. Aging-in-place or provisions for a disabled family member are accommodated by easily adding an elevator.

The utilities are not only organized and accessible within the mechanical core, but HVAC ducts run through the floor and ceiling assemblies rather than the walls, increasing the flexibility of the floor plan. Wireless, self-powering (no batteries) lighting systems and wiring that runs through removable base boards mean that updating the home to incorporate the latest telecommunications technology is a snap.

“The Concept Home program provides a vision of what mainstream new housing will be five to 10 years out. It couples technology and consumer desires to make homes better and more livable,” summarized Liza Bowles, general manager with Newport Partners, who has worked on the program since the beginning. She added: “The PATH program is working closely with innovative manufacturers to conduct R&D and incorporate new and emerging technologies into the first Concept Home demonstration.”



OCCUPANCY SCENARIOS

See how a few families might live in the urban infill Concept Home design.

MICHAEL AND EMILY, A RECENTLY MARRIED YOUNG COUPLE, PURCHASED A HOME DOWNTOWN SO THEY COULD EASILY COMMUTE TO WORK AND ENJOY THE LIFE THE CITY HAS TO OFFER. Emily works at a start-up biotechnology company and Michael works for the local government. They both frequently bring work home. They take public transportation to work and only have one car for their expeditions to the suburbs for serious shopping. While living in their townhome, they become pregnant with their first child and transform one of their rooms into a nursery. They still eat out frequently and enjoy putting their child

in the stroller to visit local shops and playgrounds. When they find they are pregnant with their second child, they realize they need more space and more amenities for the kids. They decide to move to a nearby suburb. Michael and Emily sell their house to Tom and Clare. They moved from the local suburbs where they raised their children. They always wanted to live in the city and enjoy all the amenities it has to offer. Tom is retired, but Clare continues to enjoy work since she took time off to raise their children. Tom and Clare are very active now. They plan to age-in-place in their urban townhome, so they install an elevator in stacked closets.

CONCEPT HOME PRINCIPLES

The PATH Concept Home design is based on six principles for improving the future of U.S. home building.

FLEXIBLE FLOOR PLANS feature designs and building systems that enable interior spaces to be reconfigured more easily.

ORGANIZED AND ACCESSIBLE SYSTEMS disentangle mechanicals from each other and separate them from the structure and floorplan providing easy access to the systems for repairs, upgrades and remodeling.

IMPROVED PRODUCTION PROCESSES increase building quality and efficiency while reducing production time.

ALTERNATIVE BASIC MATERIALS are new advanced materials or those adapted from other industries and applied to home building.

STANDARDIZATION OF MEASUREMENTS AND COMPONENT INTERFACES simplifies product installation and enhances design flexibility by adopting a standardized approach throughout the design and fabrication of a house.

INTEGRATED FUNCTIONS combine systems to increase efficiency, reduce equipment needs and promote multi-functional designs.

- 1 Whole-house mechanical ventilation integrated into heating/cooling duct-work
- 2 Movable partitions to readily reconfigure living spaces
- 3 Consolidated mechanical systems with the option of modular construction for the house
- 4 Modular plumbing connections to simplify installation and equipment change-outs
- 5 Electrochromic windows to control daylight, solar gain and privacy
- 6 Self-powered wireless switches eliminate wiring and add flexibility

