

Ultracompact Minimodules

The prototype of a high-design, super-small dwelling unit offers the potential of affordable sustainability.

TWO YEARS AGO in *Urban Land*, it was suggested that the 675-square-foot (63-sq-m) Inhabit modular housing units designed by two Seattle architecture firms could be dubbed “iMods” because they are urban, modern, and green (“From Habitat to Inhabit,” May 2008, page 157). Now Vancouver, British Columbia, architect Michael Katz has produced a modular system less than one third that size, at only 220 square feet (20 sq m). The L41 home—the name is intended to suggest “all for one” while inferring “one for all”—is designed as a studio house for one person or one couple. Because Katz and his partner Janet Come envision the units not only as stand-alone dwellings but also as elements of stacked, multifamily systems that would be to the house what the Smart car and Mini Cooper

are to the automobile, one might also call them “mini-Mods.”

The L41 prototype unit is nestled in the trees at the edge of a parking lot at Great Northern Way Campus, an academic and business community consortium of four Vancouver universities, less than a mile from the Olympic Village on the southern edge of the False Creek Flats in Vancouver.

The unit is surprisingly light and open. One enters through a glass door at one end, next to which is a U-shaped full kitchen with windows between its white reconstituted quartz counters and knobless white cabinets above. A deep, narrow stainless-steel sink with a gooseneck faucet overlooks the trees. A core value of the L41 is efficient dual use of space and equipment. A two-element

induction cooktop is set into the counter with a slide-out miniature overhead fan above; a convection oven that doubles as a microwave oven is installed below. A Sub Zero refrigerator and freezer are below the counter, as is an Asko clothes washer that doubles as a dryer.

At the opposite end of the unit, a covered balcony with a tempered-glass railing opens the unit to the trees through a three-panel sliding glass wall that disappears behind an outdoor storage closet. A cantilevered edge of the kitchen counter forms a dining bar that shelters several bar stools on one side. Opposite the eating area is a living room that doubles as a bedroom with a sofa that turns into a double bed. Above the sofa/bed is a large window that has a pull-down blind that can convert to a screen for a



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Above: At one end of the mini-Mod units, a covered balcony with a tempered-glass railing opens the unit to the trees through a three-panel sliding glass wall that disappears behind an outdoor storage closet.

Right: Architect Michael Katz has designed stacked multifamily versions of the mini-Mods built from three to nine stories tall to take advantage of the strength of the cross-laminated timber bearing walls. Green features of the L41 units include solar thermal heating panels and photovoltaic cells on the green roof, a heat-recovery system, a dual-flush toilet, LED lighting, and triple-glazed windows.



MICHAEL KATZ ARCHITECTS

projector. Oak hardwood floors, contrasted with the pristine white minimalism of the kitchen, along with other high-quality finishes and equipment and the liberal use of glass, help give the L41 a custom-home quality of design unexpected in such a small space.

Next to the sofa/bed is a computer desk with a quartz top and shelves above. Behind the desk is a closet where the unit's mechanical, electrical, and plumbing equipment are stacked. The house is heated through radiant coils embedded in the ceiling. The mechanical system provides continuous air circulation through a heat-recovery ventilator that transfers heat to incoming fresh air. A transom above the entry door opens to vent warm air from the kitchen and moist air from the bathroom.

Behind the closet, opposite the kitchen, is a green sliding glass door that opens to a compact bathroom with an aluminum-oxide vinyl floor and a floor drain that facilitates cleaning. The shower area is surrounded by green glass that extends into a shower screen. The shower fixture is mounted low on a variable-height rod with a handheld showerhead that can be stretched anywhere in the bathroom for use in cleaning.

The L41 was manufactured by Ledcor, a large Vancouver-based contractor, in three modules that were shipped on a flatbed truck to the site and assembled in less than a day. Through addition of modules, the L41 can be made larger—290 square feet (27 sq m) for a one-bedroom unit or 360 square feet (33 sq m) for a two-bedroom unit.

Katz is a South African architect and sometime inventor who immigrated to Toronto and then to Vancouver, where he designed and patented the first universal folding mobile keyboard, called the Pocketop. In an effort to make the L41 sustainable, affordable, and innovative, Katz chose to construct the unit using cross-laminated timber (CLT), a new wood building product.

Constructed of planks, laminated in layers at right angles to each other and glued together under great pressure to create panels up to 18 feet wide by 60 feet long (5.5 by 18 m) and two to 24 inches (5 to 60 cm) thick, CLT is strong and stands up well enough to earthquakes and fires that it has been used in London as a substitute for concrete in buildings up to nine stories tall.

Use of CLT would also take advantage of lumber created by massive infestations of the pine beetle in the U.S. Northwest, British Columbia, and Alaska. Katz notes that in British Columbia alone, over 35 billion cubic feet (1 billion cubic meters) of beetle-killed trees are available, which will be rotten in ten to 15 years if it is not used. With an L41 studio requiring only 353 cubic feet (10 cubic meters) of wood, that 35 billion cubic feet of beetle-killed wood in British Columbia would be enough to build 100 million units.

Beetle-killed lumber is structurally sound. A bluish color in the wood results from a blue stain fungus carried into the trees by the bark beetles that is harmless to humans, pets, and livestock and does not affect the structural integrity or strength of the wood. One sponsor of the L41 prototype, the large Canadian forest products company Canfor Corporation, has manufactured CLT harvested from pine beetle-infested lodgepole pine. It has also conducted research that suggests the infestation is caused by the warmer winters and hotter summers that have resulted from global warming.

The L41 units are clad with durable, waterproof, gray zinc panels. The amount of energy used to produce zinc from ore is the lowest among all nonferrous metals on the market, and energy consumption is even lower when zinc is produced from recycled material, which it commonly is. Other green features are solar thermal heating panels and photovoltaic cells on the green roof, a heat recovery system, a dual-

The unit is entered through a glass door next to which is a full, U-shaped kitchen with windows tucked between the white reconstituted-quartz counters and knobless white cabinets above. A deep, narrow, stainless-steel sink with a gooseneck faucet overlooks the trees.



JOHN BENJAMIN PHOTOGRAPHY

flush toilet, LED lighting, and triple-glazed windows.

Katz says the L41 system is being priced by a major U.S. prefabricated house manufacturer and refrains from saying what he expects that price to be. Reporters have determined a targeted goal to sell a mass-produced L41 mini-Mod for \$50,000, fully equipped, which would equate to \$227 per square foot (\$2,500 per sq m). Although this might seem high for residential construction on a per-square-foot basis, the small size of the fully equipped unit would reduce total cost below that of comparable complete homes.

Katz thinks the market for the L41 will be first-time homebuyers, universities providing student housing, and developers of workforce housing and hotels. Perhaps more likely buyers of the stand-alone models will be existing homeowners who will use them as accessory dwelling units—in Canada, often called accessory suites or laneway housing—or as vacation homes. In fact, the first commissioned L41 was purchased by a young couple that owns property on Gambier Island, a mostly summer community in Howe Sound

northwest of Vancouver popular with artists and writers and reachable only by boat and ferry.

But Katz has designed stacked multifamily versions of the mini-Mods built from three to nine stories tall to take advantage of the strength of the CLT bearing walls. Katz and Come envision clusters of stacked units, either as condominiums or apartments, with residents sharing Smart cars and gardens in small communities in which they will live in small spaces with comparably small carbon footprints. Developers may find that the high quality, durability, and potentially affordable cost of mass-produced units—along with a very short construction period that reduces capital and financing costs—make such communities feasible. **UL**

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