Architecture

Unplugged

Architect Martin Liefhebber has seen the future and it's in Riverdale. He's designed a house that's completely off the grid *and* affordable. But can real people live there? *By Michael McGowan*

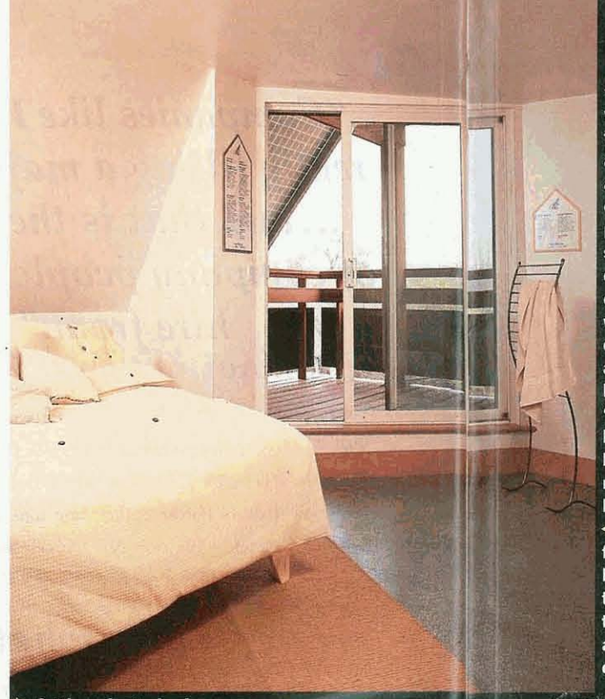
ON A TIRED stretch of street in Riverdale rising above a row of dilapidated garages, a piece of land has been transformed into the future. At first glance, the vivid yellow siding and the deep-green angled front wall might be dismissed as a modernist's whimsical indulgence. But the four-storey, 1,700-square-foot semidetached unit, unconnected to city sewage, water, hydro or gas, is anything but indulgent. Designed to operate using only the resources that fall on the site—sun and rain—this could be the prototype for a housing revolution.

That is, if it works. And eighty organizations, including Ontario Hydro, the Canada Mortgage and Housing Corporation and the provincial Ministry of Health, which have donated services and materials, are betting their reputations that it will. So is architect Martin Liefhebber, the visionary behind the "Healthy House," which won a 1991 CMHC competition to promote environmental responsibility. With a portfolio that runs from the institutional (Calumet College at York University) to the inspired (current projects include a strawbale house and another made with discarded rubber tires), he has a long history of incorporating environmental alternatives into traditional architecture. But his mandate is grounded in pragmatism, not righteousness. "I don't want to be a moralist. It's such a drag. I think environmental alternatives are the way to make things more affordable." With everything from water usage to lighting fixtures under scrutiny, Liefhebber whittled away at consumption, but not modern amenities. All the conveniences—washing machines to flush toilets—are incorporated into the design, it's just that they require considerably fewer resources to operate.

Impressed that Liefhebber's design combined the practicality of folk knowledge (ivy growing on the side of the house to cool it off in summer, for instance) with the science of modern technology, builder Rolf Paloheimo decided to turn the project into reality. After a suitable site was found, he spent thousands of hours researching in libraries, on the Internet and consulting with other eco-builders to learn as much as he could. Although he admits that by becoming totally autonomous "we are really pushing the envelope," he has confidence in the technology. In fact, he and his family will live in one unit while the CMHC opens the doors to the public for tours and demonstrations in the other. But confidence, enthusiasm and promises aside, the real crucible comes when these untested technologies are subjected to the rigours of daily use. Here, then, a visual guide to the science behind the revolution.

For information and tours, call 218-3343.

Photography by Joy von Tiedemann



◀ Billed as "smart windows," they're triple-paned and argon-filled, with an invisible coating of metallic particles that stops heat from escaping. Because many of the windows are oriented to take advantage of the lower winter sun, "they actually heat the house like little furnaces," explains Liefhebber.
◀ The drywall is finished with a lime-based plaster that uses fewer toxic chemicals and doesn't require painting

▶ Cutting-edge technology designed by Waterloo University engineer Craig Jowett, the Waterloo biofilter deals with all the wastewater the occupants produce. Biofiltration begins as effluent passes out of the septic tank, then circulates five times through the foam (pictured at bottom), where micro-organisms and bacteria break the waste down into nearly pure water. Further purification takes place as the water passes through layers of sand. Finally, another layer of bacteria eats up leftover micro-organisms and spores and an ultraviolet light kills any remaining bacteria. The clean water is stored in a holding tank and reused for toilets, showers and laundry. This technology could be beneficial to new communities, which wouldn't need to build sewage treatment infrastructure, as well as countries where fresh water is at a premium, not to mention Canadian Shield cottagers who must blast through Precambrian rock to bury a septic tank

▲ Eight solar panels on the roof produce enough electricity to run the house and also act as awnings in the summer. Excess energy is stored in batteries for up to five days' use when the sun isn't out. Liefhebber believes that "with Ontario Hydro onboard, it sends the message that solar power's time has come." Ironic as the notion of a utility company in the business of promoting energy alternatives is, Hydro sees the long-term revenue potential of energy-related products like solar-powered hot-water heaters.
▼ The average four-person house consumes 1,400 litres of water per day. The Healthy House uses 120. The Waterloo biofilter, low-flush toilets and aerated showerheads all contribute to radically reducing consumption. By collecting rainwater and snow off a fifty-metre roof and funnelling it into a cistern with 22,000-litre holding capacity, there is a water supply for five months without precipitation.
▼ The roof is made of recycled plastic, comes in prefab sheets that are easy to install and costs a fraction of the price of slate

▲ The floors are a combination of cement and steel, which not only reduces the noise between storeys, but also sponges up excess heat energy (cement, like bricks in an oven, absorbs heat) and releases it when the temperature cools down. Tubing in the floors replaces radiators and pumps hot or cold water, depending on the season.
▲ Large beams made from strips of wood glued together at high temperatures support the floors. Since smaller trees can be used, waste is cut in half, and old-growth forests are preserved

▶ Because termites have the potential to reduce a house to dust, Toronto's building code requires that the soil be treated with chemicals. But University of Toronto professor Tim Myles has come up with an alternative. By encapsulating the foundation in a layer of specially graded sand whose grains are too big for termites to pick up and too small for them to crawl through, he has eliminated the need for toxins