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REPORT

# THE SMARTER HOME

The dwellings of the future will make you calmer, safer, richer and healthier—and they already exist

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on the water. “People think, Oh, it’s much easier to build on land,” says Marlies Rohmer, one of the lead architects. “But we have knowledge now to build in different circumstances.”

The experiment is less esoteric than it sounds. Experts predict that climate change will cause sea levels to rise 3 ft. (0.9 m) or more by 2100, putting hundreds of low-lying cities—including Bangkok, London and Miami—at risk of massive and permanent flooding. Faced with that reality, urban planners say, local officials have a choice: force residents off valuable coastal land, like Miami Beach, or accommodate the rising waters using dikes, sea gates and floating (or amphibious) structures.

“The urban population is growing exponentially, and the seas are changing,” says Michael Sorkin, an architect and director of the urban-design graduate program at City College of New York. “We need to think of living in all kinds of new conditions.”

The Netherlands is uniquely qualified to offer solutions that float. Because more than two-thirds of the population lives below sea level, the country has spent billions keeping water at bay and is widely regarded as the world’s leading source for flood-proof architecture. In the past 20 years, local builders have erected a parking garage that doubles

as a water basin during surges, a set of domed exhibition pavilions in the middle of Rotterdam’s old harbor and a pair of pivoting sea gates, called the Maeslantkering, that together are twice as long as the Eiffel Tower is tall. “We are used to building on water,” says Rohmer, who has lived on a houseboat in Rotterdam. “It’s our nature.” If Waterbuurt succeeds—and early signs indicate it will—the rest of the world may well follow in its wake.

As you might expect, the idea for Amsterdam’s floating city was born during a land shortage. More specifically, local contractors were running out of affordable land to develop in the early ‘90s—the existing neighborhoods were too dense, and everything else was underwater—just as the city’s population was starting to boom. So officials greenlighted the construction of a new urban district, meant to house some 45,000 people, that would sit atop artificial islands (much as parts of Chicago and Boston, among other cities, sit on filled-in land).

Then the officials did something wholly unconventional: they zoned the water itself near one of the islands for an experimental housing development.

There city officials hoped to take Amsterdam’s storied tradition of houseboat living—about 2,300 converted barges float along the capital’s canals—and reimagine it as a contemporary community. By 2001, the chosen developer had laid out rough designs for what would become the world’s largest planned floating city. It would be called Waterbuurt, or “water quarter.” But crucial questions remained: Who would design the homes, and how would they actually work?

That’s when Rohmer, then a budding architect and technical engineer advising on the IJburg project, was tapped to join the team. The developers “had a lot of courage to give the commission to an inexperienced architect,” she says. “But I was very enthusiastic about doing something so new and different. I didn’t think it was at all impossible.”

The challenges, however, immediately became clear. Although officials had signed off on water-based construction, they hadn’t modified city emergency codes. That meant that despite being surrounded by water, any house Rohmer built had to be able to connect to the fire brigade’s land-based waterpump system and include a traditional fire escape.

Moreover, there was the issue of transportation. The homes were set to be built at a shipyard about 40 miles (65 km) north

of IJ Lake, then tugged through canal locks that were fairly narrow—meaning home widths couldn’t exceed 21 ft. (6.5 m). It was all tricky, says Rohmer, “but we found ways to make it work.”

Compared with those snags, Rohmer’s main task—making the houses buoyant—was the simplest. Much like boats, a home will float safely as long as its base is sealed, hollow and large enough to displace a set amount of water. With that in mind, Rohmer designed the Waterbuurt buildings atop airtight concrete tubs designed to submerge no more than half a story. (The only way one might sink is if an object pierced a tub, but the walls are too strong for such a thing to happen by chance, Rohmer says.) To ensure that the homes don’t drift away or into one another, they’re anchored to the lake bed by steel mooring poles.

Residents, who began moving in shortly after the first structures were completed in 2009, were impressed. It helped, of course, that some of them were boaters who were excited they could finally float home on a whim. But others were regular city dwellers who were willing to pay a 10% premium to settle in a burgeoning neighborhood with its own natural swimming area (in summer) and skating rink (in winter). “When I visited, I really felt this holiday feeling,” says Leo Noordergraaf, who

lives in Waterbuurt with his family. “I said, ‘Let’s do this.’”

Today the floating community is as densely populated as downtown Amsterdam, and other cities have expressed interest in similar projects.

It remains unclear if these developments will work outside the Netherlands. As Harvard architecture professor Felipe Correa explains, humans are “inherently more comfortable” living on land because it seems more permanent. That’s why water building is usually more a reactive solution—such as when New York City drew up a \$20 billion plan to build flood walls and more after Hurricane Sandy—than a proactive one.

But Rohmer hopes the success of Waterbuurt, alongside less structured floating communities in places like Seattle and Sausalito, Calif., will start to change the tide. Already she has been selected to build another housing development on the Thames in London, and she has fielded inquiries from Singapore and South Korea (though projects there have yet to materialize). Meanwhile, in Helsinki, another firm is on track to make 40 homes float in the Finnish capital’s former industrial port. “It’s not the solution to every urban water problem,” says Rohmer. But for cities facing rapid climate change, it may eventually be the one that sticks. —Noah Rayman

## BEST OF THE REST

There’s no one way to build a floating home, so architects and residents around the world are experimenting with provocative new techniques. A sampling of their most innovative designs:

### 1. THE EGG HOME Exbury, England

Artist Stephen Turner has spent almost a year living aboard the experimental dwelling he built, which floats along southern England’s Beaulieu River. Its wooden exterior is tethered to the shore like a boat and houses a bed, worktable, kitchen and bathroom.

### 2. THE BAMBOO HOME Vietnam

Designed by Vietnam-based H&P Architects as an affordable concept home for villagers in some of the country’s most flood-prone regions—it costs just \$2,500 to build—it has a bottom layer that can be filled with empty oil drums that allow it to float in wet conditions while steel beams keep it anchored.

### 3. THE ISLAND HOME Ontario, Canada

This two-story structure, designed by the architecture firm MOS, is connected to a privately owned island—which is a 20-minute boat ride from the mainland—by a bridge from the top floor. It floats on steel pontoons, which allow it to rise and fall with the water level of Lake Huron. —N.R.