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PROJECT
Floating Pavilion

Rotterdam,
the Netherlands

The prototype pavilion (below) was towed into Rotterdam in May. The Floating Utility Unit (bottom) illustrates how utilities can be delivered to water-based communities.

At Home on the Water

A Dutch team's floating buildings shed their ties to the land.

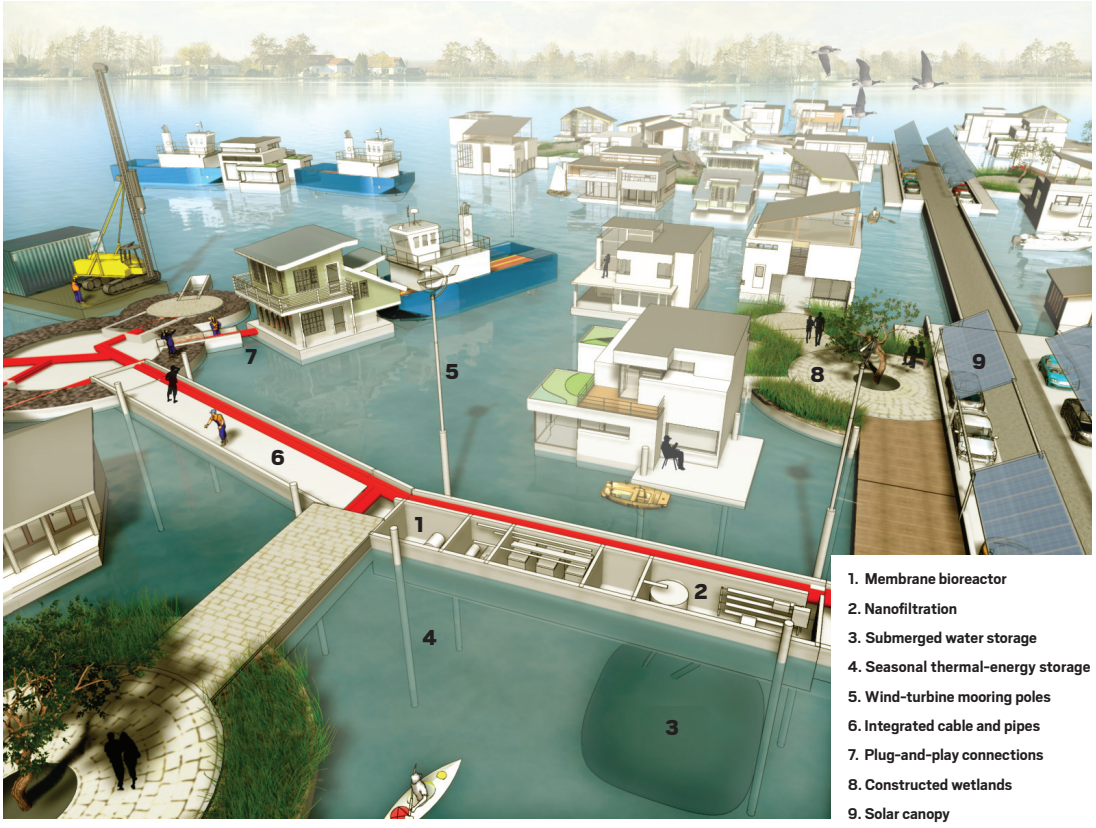
Inhabiting a densely populated country, a significant part of which lies below sea level, the Dutch have become experts in fighting off water invasion by constructing dikes. Now, since the Netherlands is one of the places most at risk from climate change, they may be forced to solve a global problem. Rotterdam, a city that has become a laboratory for innovative architecture since its near destruction during World War II, has fittingly planted the seed for the world's first off-the-grid floating building.

Towed into place in the Rijnhaven harbor late this spring, the 10,764-square-foot pavilion is made of three geodesic domes designed by Bart Roeffen, a local architect. It grew out of a competition proposal for a floating city developed by Roeffen and fellow students at the Delft University of Technology. "We thought it was a brilliant idea to promote Rotterdam as a city on the water to anticipate the effects of climate change," says Arnoud Molenaar, program director of the Rotterdam Climate Proof Program. "Lots of old harbors will be transformed into residential areas, and other areas close to the center will become available for floating communities." The port of Rotterdam—Europe's largest—is being expanded by 20 percent into the North Sea, leaving open for development some of the historic harbors, where the city has plans for 5,000 floating structures.

"Although we already have houseboats on the canals, this is the first floating structure in a harbor, which is subject to tidal conditions," Molenaar explains. Moreover, houseboats have hollow hulls that sink when they are punctured, while the pavilion has a lightweight foundation of expanded polystyrene reinforced with concrete beams, made buoyant by tiny air-permeated cells. "It is impossible to sink such a building," Roeffen says, "which makes it handy in getting a mortgage."

Another advantage? "The building is not dependent on the land for its energy and infrastructure, making it possible to go farther from the shore," Roeffen says. Instead, it incorporates a smart, use-adaptive climate-control system, passive solar energy, and a wastewater system that recycles and self-purifies.

DeltaSync, the water-based urban-development firm formed by Roeffen and his university colleagues, has conceived a plan for a group of six self-sufficient two-and-a-half-story houses sharing a single utility plant in a canal in neighboring Delft. Perhaps unsurprisingly, they ran into the issue of how to regulate this new type of real estate: "It was funny—the notary did not know whether to say we were selling the water or how to document it," Roeffen says. "In the end, it was defined as the underlying land, so they don't have to adjust the regulations." It was just the first step toward charting a course for this brave new water world. ◘



1. Membrane bioreactor
2. Nanofiltration
3. Submerged water storage
4. Seasonal thermal-energy storage
5. Wind-turbine mooring poles
6. Integrated cable and pipes
7. Plug-and-play connections
8. Constructed wetlands
9. Solar canopy

Courtesy DeltaSync