

Floating cities: one group's idea for adapting to climate change

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A rendering of an Oceanix floating city as seen from above. Photo by: Oceanix/Bjarke Ingels Group

As waters rise due to climate change — the overall warming of Earth — cities along coastlines are in increasing danger due to the resulting rise in sea levels.

So, a nonprofit group called Oceanix is seeking alternative habitats.

Oceanix is building a floating island as an experimental solution, the company told the United Nations (U.N.) habitat program April 3. The U.N. is a group that fosters cooperation among countries. The U.N. habitat program's focus is on human settlements. Their work involves making sure people in cities have safe places to live.

Self-Sustaining Cities

The buoyant islands would be linked together into floating, self-sustaining cities. They would rise with sea levels and are built to withstand hurricanes, according to a group of architects, engineers and developers who met at the U.N. headquarters. The prototype, or initial version, will be a small-scale kind that could be ready within months, said Marc Collins Chen. He's a founder of

Oceanix and a former politician from French Polynesia, a group of islands in the South Pacific Ocean.

Officials at the U.N. welcomed the proposal. However, they have not officially joined the plan to create floating cities.

The idea might sound unreal, but coastal cities are running out of land. They're becoming increasingly vulnerable as sea levels are estimated to rise as much as 7 inches by 2030, as glaciers melt from global warming. Ninety percent of the largest global cities are vulnerable to climate change, said U.N. habitat deputy director Victor Kisob. To restore shrunken coastlines, Singapore and other large seaside cities already pour sand into the ocean. Sand is quickly becoming a scarce resource.

Amina Mohammed, a leader of the U.N., said the proposal is more unconventional than approaches the U.N. would have taken even four years ago. "We are trying to adapt," she said. "We are trying to think ahead."

Size Of Three White Houses

The full 4.5-acre floating platforms made of wood and bamboo would be the basic unit of "a shared urban system," said Bjarke Ingels of the Bjarke Ingels Group. It's the architecture company partnering with Oceanix. The platforms are about the size of three White Houses.

Each platform would house 300 people. Markets, farms, low-rise apartments and solar panels would stack atop the platforms. The city would grow in a pattern: Six linked platforms, like a hexagon of a honeycomb, would become a village. Six of those villages would be a 10,000-strong town covering 185 acres, about the size of Disneyland.

"We would continue to grow this as the demands grow," Collins Chen said.

Leaders of tech companies had a similar vision of independent city-states that float outside national rule, known as "seasteading." Unlike those, the islands proposed by Oceanix would follow local laws. Nor would these be playgrounds for the rich, Collins Chen said. He told The Washington Post he was "not ready to share" estimated costs. However, he said construction costs would stay low. That's because floating hexagons can be mass-produced in factories and towed to destination bays.

Although not all governments rent out water space, those that do, such as the United States, set prices at a few dollars per acre per year, Collins Chen said. The price of land in a coastal megacity is extremely high. "One square meter of land in Hong Kong costs \$150,000," he said. In the coastal city of Shenzhen, in China, thousands of workers rent cramped, 16-square-foot spaces at \$150 a month, Collins Chen said. That's barely the size of a small bed.

The U.N. will not be paying any of the cost to build a prototype.

Look close, and Oceanix's plans resemble communities that already exist. Some examples are the houseboats that gather in Sausalito, California, or the artificial reed islands in Peru's Lake Titicaca, home to the Uros tribe. Some of these coastal communities are wearing away as people venture on land to find work.

What makes an Oceanix city different, Collins Chen said, is the islands could power and feed themselves. Turbines in the air above the platforms and water below would provide energy, as would solar panels. Rain and desalination, or salt-removal, systems would provide fresh water. Greenhouses, airborne farms and aquatic gardens would provide food. Biorock, electrically charged structures that attract minerals and coral, would hold the platforms in place.

Built To Withstand Category 5 Hurricanes

The first floating communities would be established along warm coasts, such as those in Southeast Asia. Architects claimed the platforms could withstand strong Category 5 hurricanes. However, ocean engineers suggested the initial cities should be built in calm bays, out of reach from cyclones and pounding waves.

"You have to take small steps," said Nicholas Makris, who directs the Center for Ocean Engineering at the Massachusetts Institute of Technology. "If you're just trying to get something to work, do it in a sheltered, harbored area."

Weaving together energy usage, food production, housing and the ocean environment is also a huge challenge.

"The complexity of human systems and ecological systems interacting, we know, is very, very difficult," cautioned Joseph Stiglitz, the Nobel Prize-winning economist. Economists like Stiglitz study how societies make decisions about using resources that are scarce, or insufficient. Stiglitz cited the failure of Biosphere 2. It was a 1990s experiment to build a large self-sustaining ecosystem in the Arizona desert. Cockroaches and microbes that gobbled oxygen were involved. "But the only way we're going to find out is to actually do these things."

Quiz

1

Read the paragraph from the section "Built To Withstand Category 5 Hurricanes."

"The complexity of human systems and ecological systems interacting, we know, is very, very difficult," cautioned Joseph Stiglitz, the Nobel Prize-winning economist. Economists like Stiglitz study how societies make decisions about using resources that are scarce, or insufficient. Stiglitz cited the failure of Biosphere 2. It was a 1990s experiment to build a large self-sustaining ecosystem in the Arizona desert. Cockroaches and microbes that gobbled oxygen were involved. "But the only way we're going to find out is to actually do these things."

Which phrase from the paragraph helps you understand that some groups were trying to create places that power and feed themselves?

- (A) complexity of human systems
- (B) resources that are scarce
- (C) self-sustaining ecosystem
- (D) microbes that gobbled oxygen

2

Read the selection from the section "Self-Sustaining Cities."

Amina Mohammed, a leader of the U.N., said the proposal is more unconventional than approaches the U.N. would have taken even four years ago.

Why did the author use the word "unconventional"?

- (A) to convey a sense of how likely the Oceanix proposal is to fail compared to the ones that the U.N. usually considers
- (B) to convey a sense of how silly the Oceanix proposal is compared to the ones that the U.N. usually considers
- (C) to convey a sense of how different the Oceanix proposal is compared to the ones that the U.N. usually considers
- (D) to convey a sense of how dangerous the Oceanix proposal is compared to the ones that the U.N. usually considers

3

The author starts the article with information about how climate change is affecting coastal cities.

What is a reason why the author chooses to provide information about Oceanix's floating islands next?

- (A) The author wants to explain how one group plans to reverse the damage of climate change.
- (B) The author wants to highlight a group that has made climate change worse for coastal cities.
- (C) The author wants to demonstrate that alternative habitats have already proven successful.
- (D) The author wants to describe one approach to the problem facing coastal cities.

4

What is one reason why the author includes the information about the artificial reed islands in Peru's Lake Titicaca?

- (A) to illustrate that Oceanix's floating islands have already been tested by the Uros tribe many years ago
- (B) to show an example of a floating human-made community that is somewhat similar to what Oceanix is planning
- (C) to point out that Oceanix's floating islands have already failed in other smaller coastal communities as people move back on land
- (D) to indicate that the Oceanix's floating human-made communities will likely be more expensive than predicted

