

Vertical farm in abandoned pork plant turns waste into food

July 4 2012, by Mira Oberman



Greens grow on floating beds in a factory called "The Plant" in Chicago. Urban farming is being taken to new heights in an abandoned Chicago pork processing plant where environmentalists hope to "get off the grid" by using the waste from one crop to feed and power another.

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Schools of tilapia are already swimming in water cleaned by the roots of [leafy greens](#) that feed on the nitrogen and other nutrients in the fish waste.

A bakery is moving in that will be able to use mash from the brewery upstairs to fire its oven.

And a generator that can convert compost into bio-gas to power everything from the grow lights to the air conditioning is expected to be up and running sometime next year.

"What we're trying to do is teach people that there's a better way," said John Edel, who bought the factory dubbed "The Plant" two years ago and is spearheading its development.

"The path we're on right now is unsustainable," he told AFP. "We have to do something and we have to do it quickly or we're all stuck."

Vertical farming was once relegated to science fiction -- the stuff of lunar colonies or dystopian metropolises.

It was too costly to try to build -- and heat -- multi-storey [greenhouses](#) and it didn't make sense when [farmland](#) was so cheap, abundant and fertile.

A growing interest in locally-produced, sustainable food -- coupled with increased concern about the impact of [climate change](#) and [population growth](#) on available, good farmland -- has spurred scores of experiments with vertical farming.

So far, it hasn't proven to be commercially viable. But that doesn't mean it won't be.

"What you're looking at right now are the early stages of a Thomas Edison light bulb," said Dickson Despommier, a professor of public health at Columbia University, and author of "The Vertical Farm".

The potential benefits are huge.



A tilapia swims in water cleaned by the roots of leafy greens that feed on the nitrogen and other nutrients in the fish waste. A growing interest in locally-produced, sustainable food has spurred scores of experiments with vertical farming.

Indoor farming eliminates the need for harmful pesticides and herbicides and protects crops from drought, early freezes and storm damage.

It can also drastically increase yield per acre (.40 hectare) by stacking farm on top of farm and allowing for year-round production. With fast-growing but sensitive strawberries, for instance, an acre of greenhouse can produce up to 30 times more than a farmer's field, Despommier said.

Growing food in the cities where it is eaten cuts down on fuel used to truck it in from farms that can be thousands of miles away and also means people get to eat fresher and tastier produce.

The problem is the cost.

Sunshine is free, while grow lights and greenhouses are expensive. Farmland costs a lot less than urban skyscrapers. And large-scale harvesters can collect crops from a field a lot faster than people can pick

them.

The technology exists to drastically reduce the cost of vertical farming, Despommier said. It's just a matter of figuring out how to efficiently integrate and automate indoor farming systems.

"We need a lot more work, and the work that needs to be done needs to be done in a way that can be shared with everybody else," he said in a telephone interview.

That's exactly what Edel is trying to do at The Plant, where the goal is to reduce waste, increase efficiency and achieve "net zero" energy use by closing loops.



Volunteers clean a tilapia grown in an experimental aquaponics farm called The Plant in Chicago. The goal at The Plant is to reduce waste, increase efficiency and achieve "net zero" energy use by closing loops.

Finding the right building was critical to keeping costs down.

Edel bought the abandoned pork processing plant in 2010 for just \$525,000 -- pretty much the value of the scrap inside.

The four-storey, 93,500 square foot (8,690 square meters) building had solid brick walls to keep the pork cool, a recently upgraded electrical system, and it was filled with food-grade stainless steel, rubberized concrete floors and other materials that Edel and his tenants are repurposing for their own use.

It has been a slow process.

Much of the renovation work has been done by Edel and a small group of dedicated volunteers, who also help manage The Plant's non-profit experimental aquaponics farm.

While they've managed to secure a \$1.5 million (1.2 million euros) grant from the state of Illinois to help pay for the bio-gas generator, getting permits from the city to sell their food has been a bureaucratic nightmare.



John Edel, director of a project called The Plant, at his experimental aquaponics farm in Chicago. "What we're trying to do is teach people that there's a better way," said Edel, who bought the factory two years ago and is spearheading its development.

Several tenants have already moved in -- three private aquaponic farms, a craft brewery and a fermented tea company -- and their rent is helping to pay for things like new windows and a conference room near the old bacon smokers.

The Plant has also been able to generate a bit of money by offering tours to school groups and people interested in what they've accomplished so far.

The plan is to eventually have an education center, a swank tasting room, a plant-filled lobby with a little shop, a commercial kitchen that start-ups can rent by the hour, and to expand the garden dug in the yard to include an orchard of heirloom fruit trees.

The hope is that the various businesses will be able to share knowledge as well as materials.

"It's a hard thing to force, but an easy thing to encourage," said Melanie Hoekstra, The Plant's director of operations.

The big draw for David Ellis and Eric Roth was the sustainable -- and cheap -- energy offered by the bio-gas generator.

They've been working on a business plan for commercializing aquaponics for the past two years. A rural greenhouse looked to be the only economical option until they heard about The Plant.

They're in the process of setting up a proof of concept farm called Greens and Gills in a corner of The Plant's basement with tilapia and leafy greens to see if it will be profitable at a large scale.

"It's about lowering the carbon footprint of food production, giving people what they deserve -- the best tasting, best looking, most delicious

produce available -- and also keeping the money in the local economy," Ellis said.

"We want to be a pioneer in helping to do that here in Chicago."

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Citation: Vertical farm in abandoned pork plant turns waste into food (2012, July 4) retrieved 20 April 2024 from <https://phys.org/news/2012-07-vertical-farm-abandoned-pork-food.html>

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