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CITIES



Almere - aquatic plants to paper & bench

# Innovative waste project turns water plants into paper

Almere has turned a local crisis into an economic opportunity by developing a novel way of reusing the city lake's over-abundant aquatic plants. Its novel solution uses this unwanted raw material to make paper and furniture, creating a closed-loop waste system that also improves recreational use of the lake and reduces its management and maintenance costs.

Almere was established just over 40 years ago on land reclaimed from the sea. The beautiful Weerwater lake at its heart became a hub for sailing, fishing and watersport activities and businesses. But the very thing that brings people to the lake, its crystal clear water, also created a problem. The sun penetrates deep down into the water, encouraging aquatic plants to grow in such abundance they were damaging boat engines, preventing yachts from leaving harbour and risking the area's reputation and economy.

The annual bill for mowing, transporting and burning the water plants was €60,000, but the real costs were at least three times this figure. Civil servants were having to spend time solving individual boat owners' problems, communicating with the press and arranging extra mowing ahead of events like sailing competitions. What had become a hot political issue started to look more like a potential circular economy project, however, when Almere's economic affairs advisor went to a seminar led by sustainability champion Gunter Pauli.



The paper is a premium product appreciated by artists and designers that gives local manufacturers a unique competitive advantage and local organisations something special to use - Almere-headquartered Staples has used the paper for its annual environmental report.



**Leon Joor - Founder, Millvision and the Natural Fibre Application Centre**

## Reimagining waste

As a city ambitious to generate zero waste by 2022, Almere was open to Mr Pauli's call to action and started to see the water plants as a raw material that might be used to make other products. It was also keen to comply with another principle of the circular economy and reassign only the original budget to the project, rather than find new money. This involved taking the calculated risk that the €20,000 spent on a report into potential uses of water plants would be recouped by reduced disposal costs the following year. One of the first actions of the Weerwater project team was

cities in action

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where: Almere, The Netherlands  
what: Innovation  
when: 2015 - 2017

to bring together the regional authorities, water boards, local university, watersport companies and housing and residents' associations to draw up a plan agreeing the most effective and sustainable way to mow the plants. The coordination, consensus and communication involved with this task laid foundations that proved helpful for the rest of the project.

### Thinking creatively

Local firm Millvision, which already made paper from tomato skins, was the first to suggest paper could be the simplest thing to make from the aquatic biomass. The stakeholders put together



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a business case for this idea. Antalis, a major paper producer, came on board and both firms contributed to research and development costs. The result was a high quality paper, attractive to designers and architects, which Antalis added to its catalogue and sells at a premium price. The cost to produce five tons of the paper matched the cost of transportation and incineration of the aquatic plants.

The project team didn't draw the line at paper. It went on to create a water plant based biocomposite which has been used to make benches. These are showcased around Almere's park and harbour with information panels telling their story. It also approached a company that provides 200,000 meals a day for the airline and healthcare sectors and is currently developing food boxes and plates for them. Apart from their ecological benefits over plastic packaging, as organic waste they also save airlines €0.70 per rubbish bag when clearing up at the end of each flight.

The cost of mowing the water plants has now been reduced to almost nothing as the entire stock is being used as the raw material for other products. The two main commercial collaborators are also now producing the water plant paper themselves, without any involvement from the city. The benefits of



the project extend deep into the municipality too, encouraging 'outside-the-box' thinking and cooperation along entire value chains, which is vital if the circular economy is to work.

### Changing mindsets

Achieving this level of success has required persistence and persuasiveness from the municipality team as there were a number of challenges to overcome. These include changing the mindset of co-workers who used to be responsible for disposing of the water plants and convincing departments, whose budgets were reassigned to the project, to have faith in the concept. There was also a need to persuade leaders to look at how structures and rules can be made more flexible to support the circular economy.

This first Weerwater lake project has encouraged the city to keep thinking in a circular way, not only in relation to products but also to whole systems. It has already identified, for example, that the water in the lake is particularly warm and could be used to heat local houses. Taking heat out of the lake for this purpose could make it possible for the lake side hospital to dispose of its unwanted heat into the water, as it has been requesting, rather than having to use machines to cool the buildings.

Ideas like these are being considered as Almere prepares to host the world horticultural expo, Floriade 2022. The city is developing a new 60 acre expo site near the lake which will be founded on the principles of the circular economy with the aim of achieving its energy-neutral and zero-waste objectives. To capitalise on the city's growing confidence and expertise in this field, a circular collective open platform has now been established with 35 partners to help boost the circular economy in the area.

