

Energy-positive with natural ventilation

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Buildings can be air-conditioned using entirely natural means, without mechanical ventilation systems. This is the claim made by 78-year-old Benjamin Bronsema, who will be awarded his PhD for his thesis on the subject at TU Delft on Thursday 7 June. He wants to create an energy-positive office environment using sun, wind and cascading water. Bronsema is now looking for a building in which to carry out a large-scale trial of his Earth, Wind & Fire concept.

Earth, Wind & Fire

The Earth, Wind & Fire system has three main components: a Ventec roof, a 'climate cascade' and a 'solar chimney'. The Ventec roof uses underpressure and overpressure to draw in fresh air and expel stale air. Air is drawn in via the climate cascade and expelled via a solar chimney.

Together with Peutz, Bronsema constructed a mock-up of the solar chimney

in the form of an eleven-metre-high tower that uses heat from incoming sunlight to warm the ventilated air.

The air flow is created in the 'climate cascade'. This is a structural shaft which is sprayed with water from above that cools or warms the air.

Building sought

Bronsema now wants to carry out integrated tests: 'We have already

shown in the laboratory and in theory that the concept works. But obviously, for the 'proof of the pudding', you want to provide proof on a large scale, preferably in a free-standing office building with at least five storeys because the system needs unobstructed sun and wind in order to function properly.'

Better indoor climate

Bronsema emphasises that, apart from the fact that Earth, Wind & Fire can improve the energy efficiency and cost efficiency of buildings, his system can also help to create a better indoor climate. Circulating air through buildings spreads bacteria; air-filtration systems often prove to be a source of infection. 'This system enables nature to inhabit the building through architectonic means. That is much more healthy.'

Provided by Delft University of Technology

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