Vertical greenlining: Improving the micro climate and reducing fine dust

With vertical greenlining, the façades of buildings can be equipped with plants long-term – with the additional objectives of positively influencing the micro climate, reducing the fine dust concentration, and improving sound insulation. At the BAU 2017 trade fair, Fraunhofer UMSICHT is presenting a pilot system for vertical greenlining that is deployable now already on a small scale.

More and more people live in cities. As a result of this development, the greenlining of the urban space inevitably enters into the field of vision of architects and planners as well. On the one hand, there is the desire to utilize green areas as a design element. On the other, positive impacts on the binding of CO₂, fine dust filtering, micro climate, and sound insulation are expected.

For the greenlining of roofs, there are already numerous solution approaches by now. The greenlining of vertical areas such as building façades, on the other hand, is still in its infancy. In this context, the Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT in Oberhausen (Germany) has developed a pilot system for vertical greenlining. The modular system functions independent of the ground and is based on mineral components made of sandy limestone which can be built-out into large-area elements and greenlined with different types of plants.

Better air through greenlined walls

At the BAU 2017, the world’s leading trade fair for architecture, materials, and systems, taking place from January 16th to January 21st in Munich (Germany), Fraunhofer UMSICHT will present a component for wall-mounted vertical greenlining. “In addition, we are presenting a video at the trade fair booth that showcases the functionality of the wall based on 3D animations,” said Dr. Holger Wack, deputy head of the Material Systems and High Pressure Technology department, who is overseeing the project at Fraunhofer UMSICHT. “We are looking forward to discuss acceptance and potential areas of utilization of systems for vertical greenlining at the BAU trade fair.”
Since early 2015, pilot systems have been installed for research purposes in Castrop-Rauxel in Germany (UNIKA), in Orihuela in Spain (biolit), and in Oberhausen in Germany (Fraunhofer UMSICHT). In addition to researching the watering behavior, plant growth, and fine dust sorption, the focus currently is particularly on the positive influencing of the micro climate: Especially in large cities, there are areas that are significantly warmer than their environment, so-called urban heat islands. "Vertical greenlining is a means to reduce overheating in the urban space," explains Dr. Wack. Thermal imaging camera captures were, for example, already able to show that the pilot wall is significantly cooler than the environment.

Modular system scalable at will

The system for wall-mounted greenlining developed by UMSICHT can be used in practical application already now, for example as a separating wall between two houses, says Dr. Wack: "Through the individual components, we are offering a scalable system with which surfaces of any size can be created." From a long-term perspective, even noise barriers at highways could be realized with it, for example. In the sense of vertical gardening, the system also poses an interesting option for private individuals: Due to an automatic watering system, the construction modules are suitable for growing fruit and vegetables such as strawberries or zucchini on one’s own terrace as well.

Furthermore, Dr. Wack and his team are currently working on techniques for measuring and visualizing vertically greenlined walls that – down the line – are intended to also be made available to other vertical greenlining operators. That way, statements regarding the current condition can be made and controlling strategies derived from – for example by how many degrees the temperature is being influenced or how watering has to be performed dependent on the weather situation.

BAU 2017, the world's leading trade fair for architecture, materials, and systems, is taking place in Munich (Germany) from January 16th to January 21st. Fraunhofer UMSICHT is going to be represented on all days of the trade fair in Hall C2, Booth 538.

Project partners:
biolit GmbH & Co. KG und UNIKA GmbH

Expertise of UMSICHT in the area of construction
In addition to vertical greenlining, Fraunhofer UMSICHT is also conducting research in the areas of materials development for the construction industry (e.g. optimized heat insulation plaster systems), recycling of rubble (BauCycle project) and regarding energy technology questions in the buildings sector at the Fraunhofer-inHaus-Center.
Additional Information
Product sheet "Urban greenlining" (GER)
s.fhg.de/8Ec

Product sheet "Façade finishes (GER)
s.fhg.de/J3Y

Material Systems and High Pressure Technology department
http://s.fhg.de/aGB

Photos
UMSICHT-BAU-2017-Pilotwand.jpg
Component for vertical greenlining.
© Fraunhofer UMSICHT

UMSICHT-BAU-2017-Bauelement.jpg
Pilot wall for vertical greenlining at Fraunhofer UMSICHT.
© Fraunhofer UMSICHT

UMSICHT-BAU-2017-Erdbeere.jpg
Vertical gardening: Strawberries that have grown in the UMSICHT pilot wall.
© biolit/Fraunhofer UMSICHT

Media Contact
Dipl.-Chem. Iris Kumpmann | Fraunhofer Institute for Environmental, Safety and Energy Technology | Phone +49 208 8598-1200 |
Osterfelder Straße 3 | 46047 Oberhausen | www.umsicht.fraunhofer.de | iris.kumpmann@umsicht.fraunhofer.de

Scientific Contact
Dr. rer. nat. Holger Wack | Phone +49 208 8598-1121 | holger.wack@umsicht.fraunhofer.de