Interior wall brings breath of fresh air to home of the future

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Bill Hutzel, a professor of mechanical engineering technology, and Danielle LeClerc, an undergraduate student who works on the Biowall team, are inspecting the plants used for the project. Credit: Purdue Research Foundation image/Hope Sale

More than 3.8 million deaths worldwide each year are blamed on household air pollution, and scientists are turning to many strategies to try to clean the air in homes and business, including the use of everyday plants.

A Purdue University project called the Biowall is showing promise at using a wall of plants to clear the air within businesses and homes.

"The Biowall is an eco-friendly air filtration system that can be used in residential buildings to improve air quality," said Bill Hutzel, a professor of mechanical engineering technology in Purdue's Polytechnic Institute, who leads the research team. "We combine Purdue expertise in building design, engineering and agriculture to help with the home of the future."

This system uses plants grown in a loosely packed growth media, allowing air to pass through the media. The plant's roots absorb volatile organic compounds from the passing air, removing these compounds from circulation. The system is integrated into the return duct of a HVAC unit, so the biowall can affect the air quality for the entire home.

"I come from the design side where we know that energy efficient homes are very well insulated, but they also trap and accumulate volatile organic compounds like toluene," Hutzel said.

In 2014, Whirlpool Corp., along with Purdue, transformed an existing home near Purdue's campus into a research laboratory and sustainable living showcase called the ReNEWW house. Purdue researchers installed the Biowall in the ReNEWW house to monitor the performance of the biofilter, the health of the plants present and comfort of residents.

"I work with data from NASA and other research organizations to figure out which plants are likely to perform the best in keeping the air clean inside the home," said Danielle LeClerc, an undergraduate student who

works on the Biowall team. "It is interesting to incorporate data from a space agency like NASA into the everyday home of the future."

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Provided by Purdue University