

Science for Environment Policy

Living walls help cool buildings in hot climates

Covering walls with plants can significantly reduce the temperature of building walls during hot summer months. A recent study of three different types of these 'living walls' in Italy suggests that they can be 20°C cooler than a bare wall on sunny days. An added advantage is that living walls can be retrofitted to existing buildings.

'Green walls' refer to walls that have plants growing up them. This includes 'green façades', which may be covered with creepers planted in the ground, and also 'living walls' that have vegetation growing in special frames attached to the wall. Living walls can have a number of positive influences on the [urban environment](#) including: supporting biodiversity (provided that the plants used are either native or non-invasive), reducing the impact of rainfall runoff from buildings, reducing [air pollution](#), and reducing the urban heat island effect by lowering the temperature of building walls.

Living walls not only shield buildings from direct sunlight, but 'evapotranspiration' (a combination of evaporation of water and release of water vapour) by plants also helps cool walls. In this study, the researchers tested the effect of three types of living walls installed on buildings in three different locations in Northern and Central Italy during the hot summer months.

The first, Wall A, consisted of a triple layer of felt supported in a plastic panel fitted to an aluminium frame. The frame was attached to the building wall, with an open cavity between the wall and the frame. Evergreen and seasonal plants, such as sedums and geraniums, were inserted into the outer layer of felt, and were watered by a hose at the top of the structure.

Compared with a neighbouring bare wall, the surface temperature of Wall A was 12-20°C cooler on sunny days and about 5°C cooler on cloudy days. At night, the surface temperature of Wall A was kept 2-3°C warmer than the bare wall. In addition, the amount of heat that transferred through the covered wall was about 70% of that through the bare wall during the monitoring period, suggesting that the isolating effect of the green wall is higher than the bare wall.

The construction of Wall B was the same as for Wall A, but the outer layer of felt was sown with grass (*Zoysia* species), and there was a closed cavity between the frame and wall. The outer surfaces of this wall were up to 16°C cooler than that of a neighbouring bare wall during the day. At night, Wall B was 6°C warmer than the bare wall.

Wall C consisted of a plastic panel divided into small, soil-filled compartments, attached to an aluminium frame, fitted to the wall. The compartments were planted with a variety of grasses, including *Zoysia* and *Cynodon* species. Some parts were left unplanted to represent a bare wall. The surface temperature of the planted wall area was around 12°C cooler than uncovered areas on sunny days and 2°C cooler on cloudy days. At night, the temperature of the section covered with plants was 3°C warmer than the bare wall.

Living walls using site-adapted plant species can be a valuable element of green infrastructure¹ in urban areas with hot climates as they can be fitted to many existing buildings.



25 July 2013

Issue 338

**Subscribe to free
weekly News Alert**

Source: Mazzali, U., Peron, F., Romagnoni, P. *et al.* (2013) Experimental investigation on the energy performance of Living Walls in a temperate climate. *Building and Environment*. 64: 57-66. [Doi.org/10.1016/j.buildenv.2013.03.005](https://doi.org/10.1016/j.buildenv.2013.03.005).

Contact: mazzali@iuav.it

Read more about:
[Urban environment](#)

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

1: European Commission's Communication: Green Infrastructure (GI) — Enhancing Europe's Natural Capital http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructures/1_EN_ACT_part1_v5.pdf

