

# Science for Environment Policy

## Green walls' economic sustainability assessed

**Costs** of installing, maintaining and disposing of some green wall systems may outweigh the value of some of their benefits for householders, a recent study suggests. While the researchers omitted some of the wider social benefits, they found that reductions in heating and air conditioning costs, longevity of green walls and increases in property values did not compensate for their costs. The researchers suggest that government incentives to lower set-up costs could significantly increase the walls' economic sustainability.

**There are a number of potential benefits** from greening the sides of buildings with plants, particularly in [urban areas](#). For example, they can help reduce air pollution and high urban temperatures, leading to improved public health and comfort levels. As part of greening a city's infrastructure, green walls can have positive effects on peoples' psychological and physical well-being, satisfaction and identity of place. They can also help make a city more attractive as a tourist destination. While these benefits seem substantial it is as yet unclear whether they financially outweigh the costs of installation and maintenance.

In this study, the researchers used a cost-benefit approach to assess the [economic sustainability](#) of four types of green wall on a hypothetical building in Genoa, Italy. 1) a direct green façade with ivy growing up the wall; 2) two types of indirect green façades, with ivy growing in the ground and supported by a plastic or steel mesh; 3) two types of indirect green façades, with ivy planted in boxes and supported with a mesh; and 4) a living wall, with a special panel in which evergreens and small shrubs are planted.

The costs of the walls were compared with the value of their personal benefits over the lifetime of the installations (50 years). Three possible cost scenarios were considered: low, medium and high cost. These were based on costs of installing, maintaining and disposing of the systems. The values of personal benefits were based on reductions in heating and air conditioning costs, longevity of covered walls and increases in property values.

Only the direct green façade was found to be economically sustainable across all three cost scenarios. It is relatively cheap to set up, maintain and dispose of direct green façade systems compared to the other systems. The study estimated it had a positive net present value, ranging from €9 500 in the highest cost scenario, to €30 139 in the lowest cost scenario, giving an internal rate of return above the current interest rate of 5%. It has a payback period of 16 to 24 years, depending on the scenario.

With high installation and disposal costs, indirect green façade systems were only economically sustainable in the best, or in some cases medium, cost scenarios. Maintenance costs are also higher for the indirect green façades with planter boxes, than for direct and indirect façades with ivy planted in the ground. The living wall system was calculated to be economically unsustainable in all scenarios, as it has high installation, disposal and maintenance costs. The researchers suggest that government incentives, such as tax reductions, may be valuable to lower costs and promote the wider uptake of green wall systems.

While the results suggest that the costs of green walls can outweigh some of the benefits it should be noted that while costs are relatively easy to estimate some of the wider benefits to society are harder to quantify, and were omitted from this study. In particular, this study investigated the costs and benefits of greening a single wall. It is expected that the widespread installation of green walls would have wider social benefits, including, for example, potential reductions in public health costs through improved air quality and a reduction in the urban heat island effect. Social benefits extend even further if reducing CO<sub>2</sub> levels, creating habitats to conserve biodiversity and contributing to the feeling of well-being associated with green areas are included.



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