

20th Newsletter of the UFZ Green Roof Research



04th November 2024



Example of facade greening
(Author: Lucie Moeller)



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Research partners:



UNIVERSITÄT
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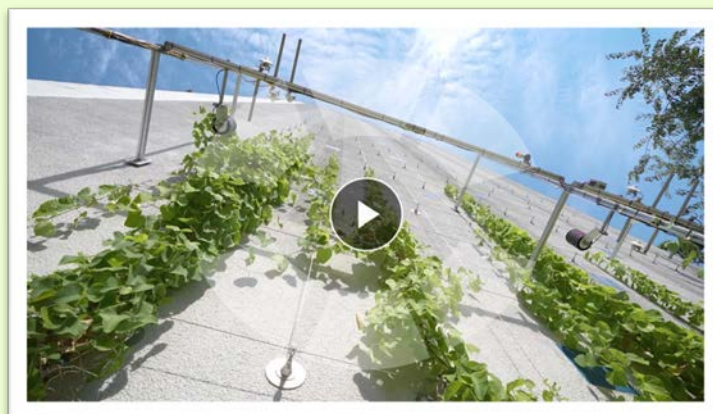
Facade greening for multifunctional climate adaptation

Building greening is becoming increasingly important as a climate adaptation tool in urban areas. It can not only improve the microclimate, but also aesthetically enhance urban landscapes by integrating them into the architecture. Facade greening can be seen as a useful addition to green roofs, as the static loads on buildings caused by this type of greening are low and it can therefore be used flexibly. In addition, the greening of building facades requires almost no additional space, thus avoiding conflicts with other forms of land use in dense urban areas.

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FILM TIP

‘Living walls’: facade greening project in Leipzig
(in German only)



<https://www.sachsen-fernsehen.de/mediathek/video/lebendige-waende-projekt-zur-fassadenbegruenung-in-leipzig/>

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„Living Walls“ project in Leipzig

As part of the ‘Living Walls’ project, UFZ, in collaboration with Leipziger Wohnungs- und Baugesellschaft mbH (LWB), the environmental protection association Ökolöwe e.V. and the ‘Wir im Quartier’ initiative, produced a guide to facade greening. The greening of walls on four high-rise buildings on the street Straße des 18. Oktober was also implemented. Each of the buildings was given a different greening concept: a flowering wall with clematis and hops, an ‘edible wall’ with kiwi and grapes and two climatic walls with pipevine. Pipevine was chosen because it is perennial, winter-hardy and grows very quickly. This variety of greening concepts enables a comprehensive analysis of the effects on their surroundings.

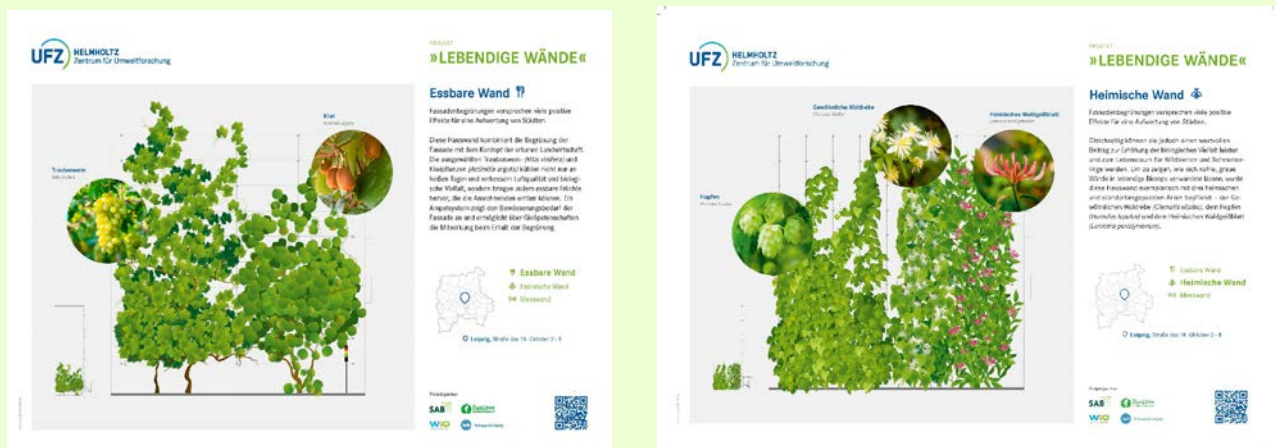


Figure 1: Poster illustrating the greening concepts: ‘Edible Wall’ and ‘Native Wall’
(Images: © Artkolchose GmbH)

Further information:

<https://www.ufz.de/index.php?en=48592>



This measure was implemented as part of the ‘Living Walls’ project co-financed with tax revenue on the basis of the budget approved by the Saxony State Parliament.



Barriers and solutions for the implementation of facade greening

Despite the growing popularity of facade greening, its implementation still lags far behind other forms of urban green infrastructure. One aim of the project was therefore to identify the main barriers through a literature review and targeted interviews with experts. The reasons identified included a lack of political support, financial hurdles and a lack of technical expertise in installation and maintenance. In addition, high initial costs and a lack of incentives, especially in the case of private actors, are also obstacles.

Possible solutions include:

- **Financial incentives:** Funding programmes and tax concessions for owners who green their facades.
- **Information campaigns:** Education about advantages and long-term benefits to promote acceptance.
- **Bureaucratic simplifications:** Simplification of authorisation processes and reduction of administrative hurdles.
- **Technical support:** Consultancy services and professionally qualified maintenance services for sustainable and professional implementation.

Further information:

Knifka, W.; Karutz, R.; Zozmann, H. Barriers and Solutions to Green Facade Implementation - A Review of Literature and a Case Study of Leipzig, Germany. *Buildings* 2023, 13, 1621.

<https://doi.org/10.3390/buildings13071621>

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Effects of facade greening on the microclimate and indoor climate

Climate change is intensifying heat waves and worsening thermal comfort. In densely built-up areas, there is a lack of green spaces that could provide cooling effects. By shielding the building facade from solar radiation, plants can reduce the energy input into buildings and thus improve the indoor climate in summer. This can also reduce energy consumption for air conditioning systems. By increasing evaporation, the ambient air can also be cooled. By using sensors to measure the air temperature, radiation and soil moisture on the climate wall, the cooling potential of the green facade can also be quantified.

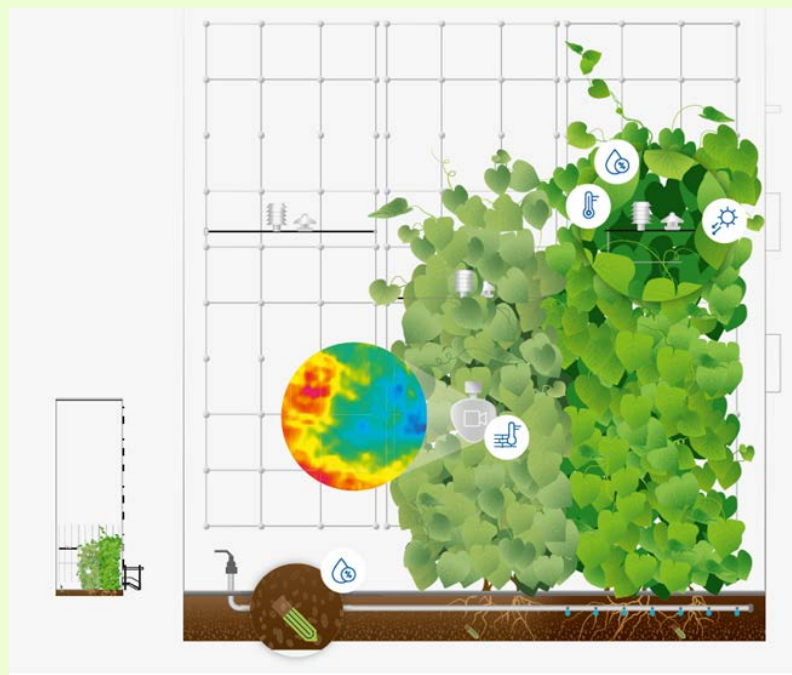


Figure 2: Poster illustrating the concept of the 'measuring wall' green facade
(© Artkolchose GmbH)

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As sufficient water availability is necessary to maintain plant vitality and maximise the cooling effect, an automated irrigation system was implemented on the facade in order to collect representative data on irrigation requirements. This cooling effect can be clearly visualised with the help of a thermal camera. The plants significantly reduce the surface temperature of the facade, whereby this cooling effect is even more pronounced in the irrigated part of the facade.

Of course, it is clear that a single facade cannot cool the entire city. However, several green buildings can have a comprehensive influence on the climate in the neighbourhood.

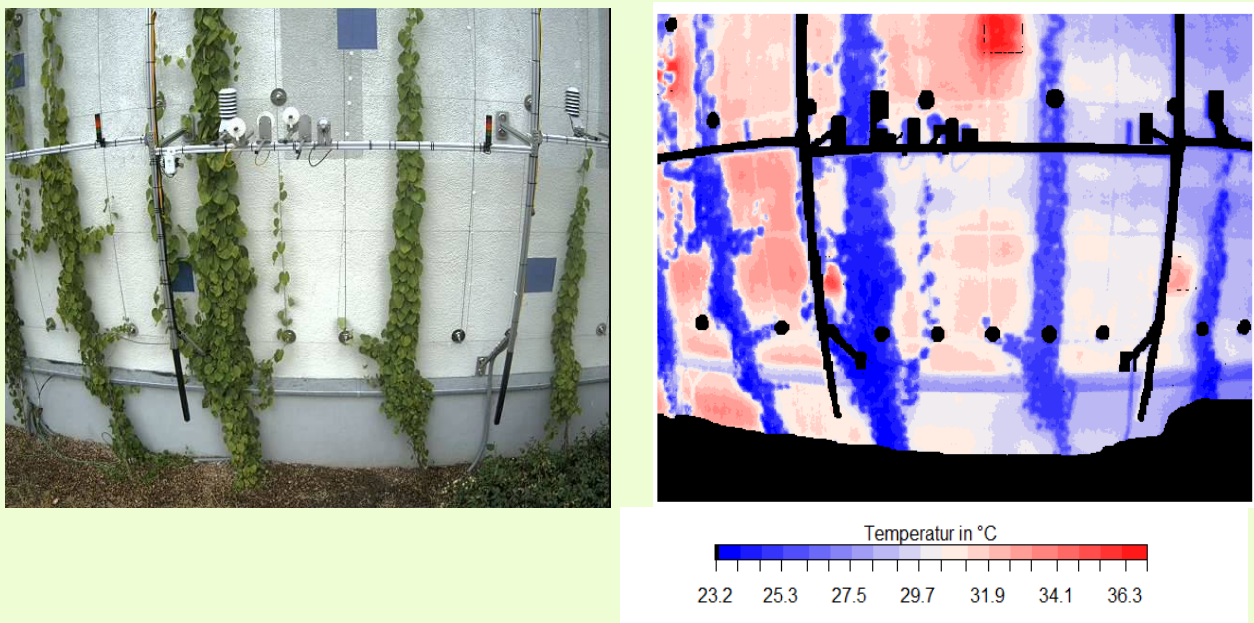


Figure 3: Comparison of the RGB and IR channels of the thermal camera

(Date of recording: 14.07.2024 12:00, Author: Niels Wollschläger, UFZ)

Further information:

Fraaß, L. (2023): Bestimmung der Oberflächentemperatur von Grünfassaden in Abhängigkeit des Pflanzenbedeckungsgrads bei unterschiedlichen Bewässerungsregimen. Masterarbeit, TU Dresden (in German)

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Residents' perspectives and acceptance

To analyse the subjective perception of facade greening, residents from two Leipzig districts were surveyed and the completed questionnaires were analysed. The Kolonnadenviertel, already equipped with facade greening, and the neighbourhood at Bayerischer Bahnhof, without greenery, were specifically chosen for this survey. Overall, 60% of residents in greened buildings rated the effects of facade cooling and the aesthetic ambience positively. The main concerns of the respondents were increased care requirements and possible rent increases. Residents of green neighbourhoods cited biodiversity and natural aesthetics as the greatest benefits and were in favour of more greenery. Protection against graffiti and improved air quality were also among the most frequently cited benefits. In houses with greenery, some residents expressed concerns about maintenance and pest infestation, while in neighbourhoods without greenery, the costs and lack of information were seen as particular hurdles.

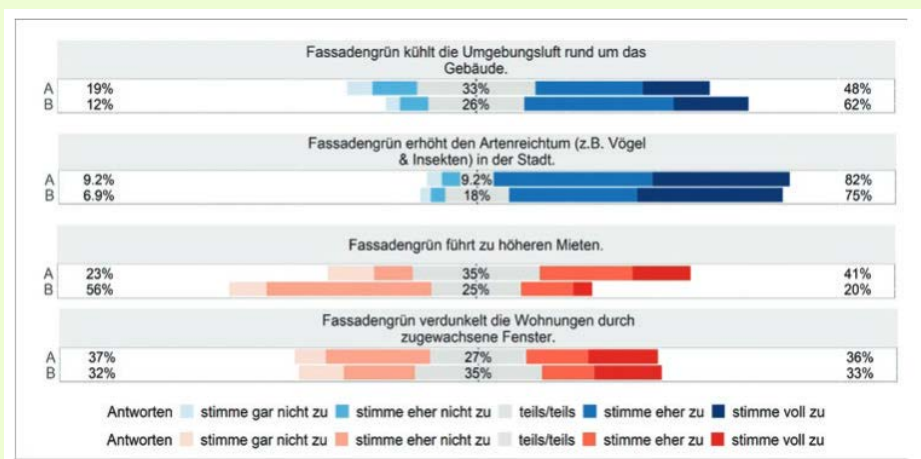


Figure 4: Agreement with positive and negative statements on facade greening (FG) in a comparison of the surveys in the neighbourhoods Bayerischer Bahnhof (A, without FG) and Kolonnadenviertel (B, with FG) (Karutz et al., 2024, in German only)

Further information:

- Karutz, R., Zozmann, H., Wollschläger, N. & Schlink, U. (2024). Fassadenbegrünung als multifunktionales Anpassungsinstrument gegen Hitze: Ergebnisse des Leipziger Pilotprojekts „Lebendige Wände“. In S. Kabisch, D. Rink & E. Banzhaf (Hrsg.), Die resiliente Stadt: Konzepte, Konflikte, Lösungen. Springer Spektrum.
- Zozmann, H.; Dietrich, S.; Karutz, R.; Wollschläger, N. & Schlink, U. (2024). Does having a green facade impact perceived benefits and concerns? A case study with tenants in two neighborhoods of Leipzig, Germany. (Working title of an article in preparation for publication in an international journal).