



## **Biomass production in the city - productive vertical greening systems**

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The rising consumption of biofuels endangers global food security ("food or fuel debate"). Further conversions of land for energy plant production will aggravate this problem.

Instead, the extension of biofuel production on former unproductive lands, such as cities could moderate this problem. Inside the city vertical structures (walls, facades etc.) have a high potential to be greened in order to produce biomass. Such vertical urban green(ed) infrastructures would additionally provide ecosystem services like climatic regulation, biodiversity improvement, aesthetic improvements and others.

The aim of this study is to assess the biomass production potential of typical vertical green plants such as *Hedera helix*, *Fallopia baldschuanica*, and *Parthenocissus tricuspidata* and to investigate their energy production potential in terms of biogas and wood pellets.

Therefore, we investigated five different established facade greenings in Berlin, Germany. The three different species have been harvested, dried and weighed. Samples of the green parts were tested for their biogas yield according to the Hohenheimer Biogasertragstest (HBT). The wood pellet yields and its heating values were calculated based on own heating value measurements. The energy balance was calculated for a best case and a worst case scenario for the construction (steel parts) and management (50 years, maintenance, harvesting) of such greened walls.

In Conclusion, it is generally possible to produce bioenergy from vertical greenings in urban areas in a energy-positive way. All investigated facade greening plants are suitable for the production of biogas and partially also for the production of wood pellets. In order to assess the potential of urban vertical greening for bioenergy production, we finally calculated the yields for available vertical areas for a typical quarter in Berlin and we will discuss possible side effects of such greening strategies.