

# Potential for sustainable biomass production in urban areas using urban architectural structures

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## Abstract:

Due to the concurrence between biomass and food production on agricultural land and soil resources, water and fertilizers, biomass production is subject to a lot of ethical discussions. While the agricultural lands are shrinking, urban areas are growing. In some parts of the world, urban agriculture grows the same way. In the developed countries, urban areas are unproductive concerning biomass production. Some projects focus on brown fields, fallow lands or try to introduce biomass farming as a form of temporary use.

Parks, green roofs, street trees, facade greening, green balconies and other forms of vegetation in urban areas have mostly been introduced for their ornamental or for recreational or - of growing interest- for climatic functions, but we can also benefit of its biomass.

Facade greening is a form of vegetation, which had been very much adapted to the city's physiognomy dominated by vertical structures. A lot of prejudices and real obstacles hindered the wide spreading of facade greening in our cities. However, facade greening is a measure to re-design cities ecologically: green facades absorb solar radiation, which will no longer contribute to warming of buildings, and consequently to the urban heat island formation. Rather, by transpiration, facade greening can contribute to passive cooling of buildings, given a proper water supply.

In this case study from Berlin, we demonstrate the production potential of facade greening by identifying and quantifying areas to be greened and the approximation of the biomass production at these facades. Finally we give an outlook on the water demand of such vegetation and discuss the question how the rainwater should be used for biomass production inside urban areas and what role do the soils play in this concept.

Keywords: biomass production, facade greening, vertical biomass production potential

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