

# GREEN INNOVATIONS

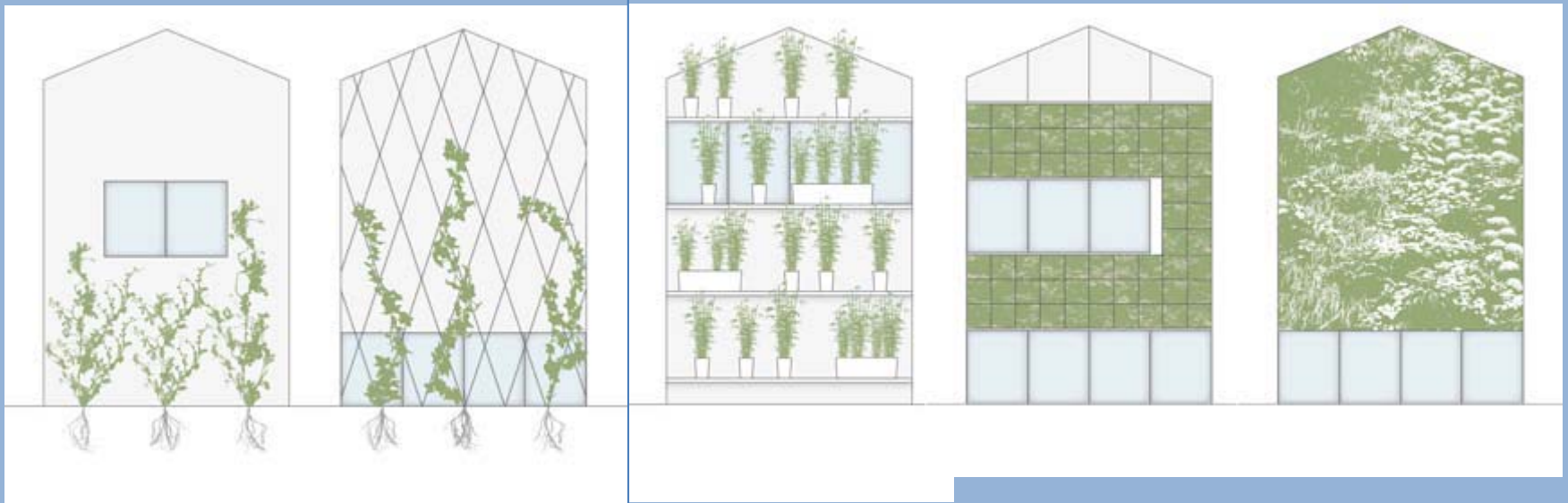
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# What are the advantages of facade greening?

- No lack of the „Green good“
- Work- and living environment is designed more environment-friendly and human
- Indication of seasons within the cities

# What are the differences between a ground- and a wallbound facade greening?



# What are the differences between a ground- and a wallbound facade greening?

Two main categories:

## Groundbound facade greening

- The plants are growing directly from the soil
- Climber are being used either growing directly on the facade or supported by a climbing aid
- Natural water and nutrient supply

## Wallbound facade greening

- The facade greening "replaces" the coat of a building
  - No connection to the soil necessary
  - Immediate effects, having the freedom of design
  - Automatic water and nutrient supply
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# Groundbound systems – directly growing at the facade

## Technical requirements

- Water supply unit, if applicable
- Solid, single-leafed constructions. (Consider an intact
  - outer shell with closed gaps)

## Economic requirements

- Low but progressive maintenance required



## Ecological potential

- Possible diversity of species is low
- Microclimatical relevance after 5 years

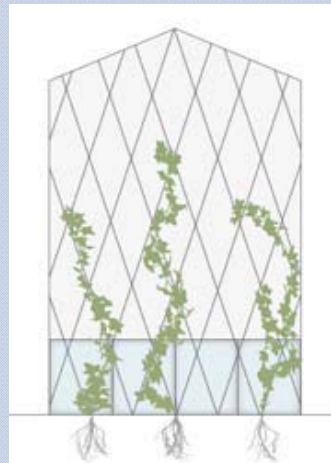
# Groundbound systems – with climberer and support structure

## Technical requirements

- **Water supply unit, if applicable**
- **Solid, single-leafed constructions**
- **Wooden constructions full holohedral vestedored filled-in**
- **Metall constructions isolated or filled-in, limited**
- **Facing formwork, limited**
- **back-ventilated façade(VHF), limited**
- **insulation composite systems(WDVS)**

## Economic criteria

- **moderate to medium investment costs**
- **low maintenance, increasingly .**
- **maintenance and repair costs are low**



## ecological potential

- **biodiversity, low**
- **microclimatic relevance after 3 years**
- **year-round energy relevance with hardy plants and the deciduous plants**

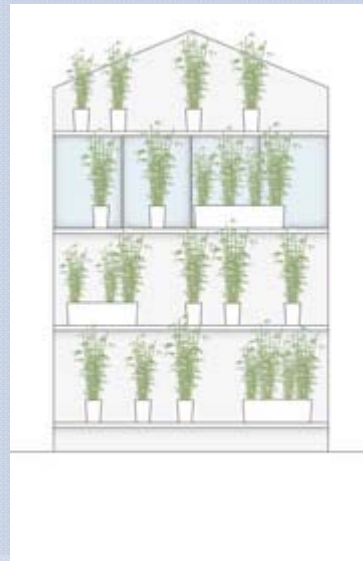
# Facade bound systems– Direct on the fassade in growing boxes

## Technical requirements

- water- and fertiliser supply
- Officially relevant, structural analysis necessary,
- load-bearing components : stainless steel
- Protection of the facade against humidity and protection against root penetration.
- massive, single-shell structures.
- Wooden structures held all over or infilled, conditional
- free-standing metal structures infilled, conditionally
- [facing formwork](#), conditionally
- back-ventilated façade(VHF)
- insulation composite systems(WDVS)
- Luftkollector-Fassaden

## Economic criteria

- Medium to high investment costs
- middle maintenance, increasingly.
- maintenance and repair costs are medium to high



## ecological potential

- Middle biodiversity
- microclimatic relevance after 1 years
- year-round energy relevance with hardy plants and the deciduous plants

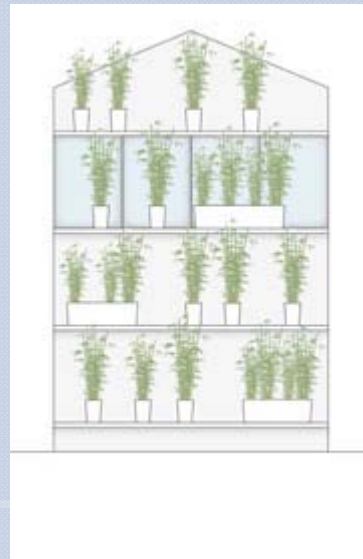
# Facade bound systems– with climbers and support structure in growing boxes

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- load-bearing components : stainless steel
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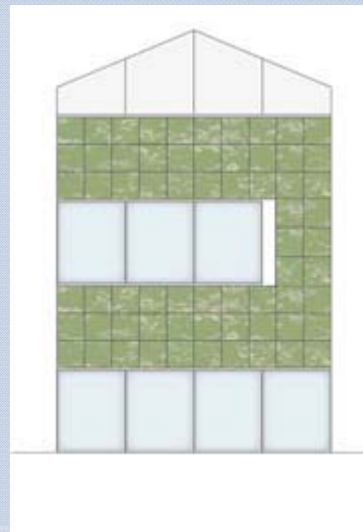
# Facade bound systems – „Living Wall“

## structural requirements

- Water and nutrient supply system
- Officially relevant, stability proof is required
- Supporting members: Corrosion protection or rust-proofed material
- Protection against moisture and root penetration of the façade required
- Massive, single-shell structures.
- Wooden structures held all over or filled in, due
- Free-standing metal structures. Due
- Linings, due
- back-ventilated façade(VHF), instead
- insulation composite systems(WDVS)

## economic criteria

- high investment costs
- moderate to high levels of maintenance
- Maintenance and repair costs high



## Ecological potentials

- Big potential biodiversity
- Microclimatic relevant, directly

# How much is the facade greening in production?

- The cost for ground bound facade greening varies, depending on the structure and size, by about 15 to 35 € / sqm.
- The production costs start around € 400 / m<sup>2</sup>.
- Facade bound greening is much more complex in construction and maintenance. And the price range is comparable to the front and rear-ventilated natural stone facades.
- The production cost depends on the area size, on structural conditions, the irrigation and the desired goal.

# Which facade types can be used for facade bound or climbing aid systems?

For front and rear-ventilated facades, insulated intent facades, wood-clad walls and trapezoidal walls mainly scaffolding climbing plants or bound facade greening systems are recommended. The shoots of self climbing climbers will grow into cracks and joints and cause damage to the facade.

# Which walls are suitable for self-climbing climbers (e.g. Ivy and Virginia Creeper)?

When using self-climbers and self-climbing climbers the suitability of the substrate needs to be considered. Self-climbing climbers should only be used on intact substrates without cracks, crevices or open joints. Facades with external insulation are insufficient.

# „Planning checklist“

Wall construction, wall consistency and location

additional wind loads

suitable facade greening module

Suitable plant species

Suitable climbing aids

Drainage

Water supply

Access to the facade

Fall protection

Coordination with other assembly sections

# Which trade rules must be followed by openings in the construction of green walls? (in Germany)

FLL: Richtlinien für die Planung, Ausführung und Pflege von Wand- und Fassadenbegrünungen.–  
Forschungsgesellschaft Landschaftsentwicklung  
Landschaftsbau, Bonn.

DIN 1055-4 „Windlasten“, Anhang A (Windzonen) und  
Anhang B (Geländekategorien).

# Which plants are suitable for the facade greening?

- For the ground-bound facade greening many well-known plant species are suitable, for instance Virginia Creeper, Ivy, Climbing Hydrangea (without additional climbing aid), and honeysuckle, wisteria, clematis, climbing rose, whistling winds, evergreen climbing euonymus, climbing trumpet (with additional supporting climbing aids).
- For the facade bound greening systems, bound geraniums, Bergenieen, saxifrage, Waldsteinien, wood rush, strip and shield ferns, cotoneaster, euonymus, St. John's wort, periwinkle, etc. can be used. The plant selection should be discussed with the garden and landscaping operations of each landscape

# How long does facade greening last for?

They can last as long as the building.

However, this requires the proper

installation and regular and proper care and maintenance.



# What conservation measures are required?

## For groundbound greening:

- Pruning, braiding in climbing aids if applicable
- Kept free of vegetation: windows, shutters, roofs, downspouts, lightning rods, blinds and air outlet openings
- Removal of dead vegetation
- Fertilization if applicable

## Facade bound greening:

- pruning
- Kept free of vegetation: windows, shutters, roofs, downspouts, lightning rods, blinds and air outlet openings
- Removal of dead vegetation
- Replacement of dead plants
- Maintenance of water and nutrient supply system
- Before winter: frost protection irrigation system
- Fertilization (if not automated through the water supply)

# 90 DeGreen – The garden for the wall

Based on a facade system, attached to front of the actual building, it can be mounted on each bearing wall. Thermal insulation of up to 30 cm thickness can be installed. The structure of starch and vegetable selection can be tailored to customer requirements. The wall bound greening prefers semi-shady to shady locations.

90<sup>DE</sup> GREEN



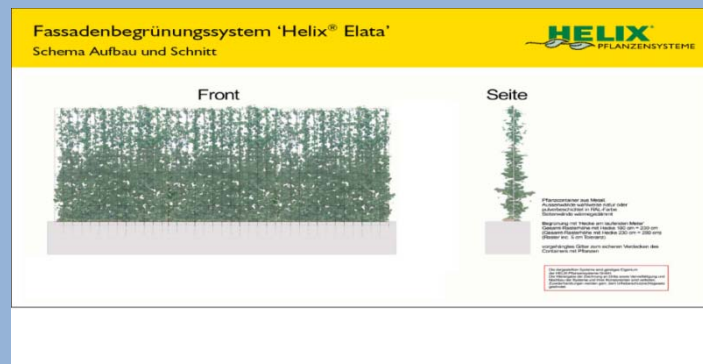
# Carl Stahl greening system

- easy installation
- Suitable for small to large areas
- Often no static necessary
- Rope  $\varnothing$  4mm



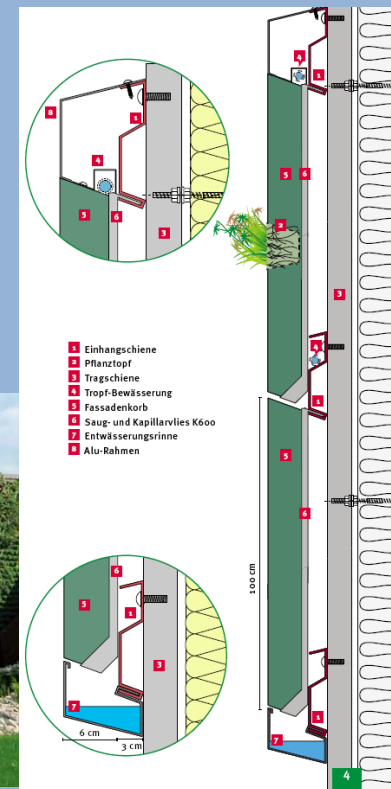
# Helix greening systems

- Effective immediately, vivid green facade with high environmental impact
- No ground-connection = Low use of surface area (keeping areas under greening system free for traffic, vandalism protection)
- suitable for parking garages due to the nature of aerated plants
- low maintenance, easily accessible, even during repairs



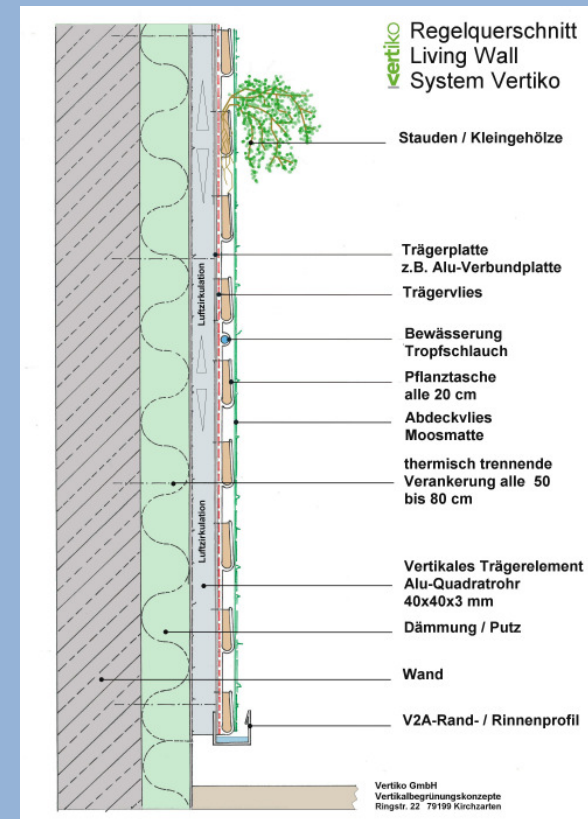
# Optigrün-Systemlösung „Fassadengarten“

- High flexibility in surface color / fill
- Alu frame
- Extreme weather-resistant, non-flammable
- Easy to install with less installation time
- Substrat: better frost resistance of Plants, increased water storage and buffering of water
- Planted and unplanted facade elements  
Plants can also set on the facade and replaced



# Vertiko Begrünungssystem

- back-ventilated façade(VHF)
- Under construction: aluminum profiles, matched to wall former, insulation, etc.
- Carrier: aluminum composite panels
- Vegetation support: fleece folded with drippers and water storage substrat
- substrate weight: max. 30 kg/m<sup>2</sup> in vegetation and irrigated condition



# Zinco greening systems

Vertigreen<sup>®</sup> focuses on the simplest possible installation on the principle "front, rear-ventilated facade".

Wall mounted brackets are carrying furring channels which attach to aluminum panels. The spacing of the supporting profiles to each other in this construction

