

**rainwater retention
climate control
green infrastructure**



“Green roof” refers to the space on the top of a building that is covered partially or entirely with vegetation that is planted in a growing substrate. Green roofs are constructed for multiple purposes such as rainwater retention, biodiversity and garden roof.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

WATER MANAGEMENT

MICROCLIMATE IMPROVEMENT

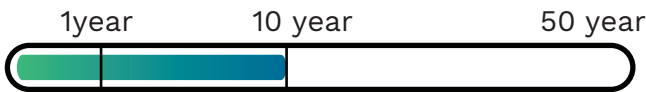
CO2 REDUCTION

HEALTH AND WELLBEING

LAND PRODUCTIVITY

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$ \$

Maintenance cost

\$

Adressed themes

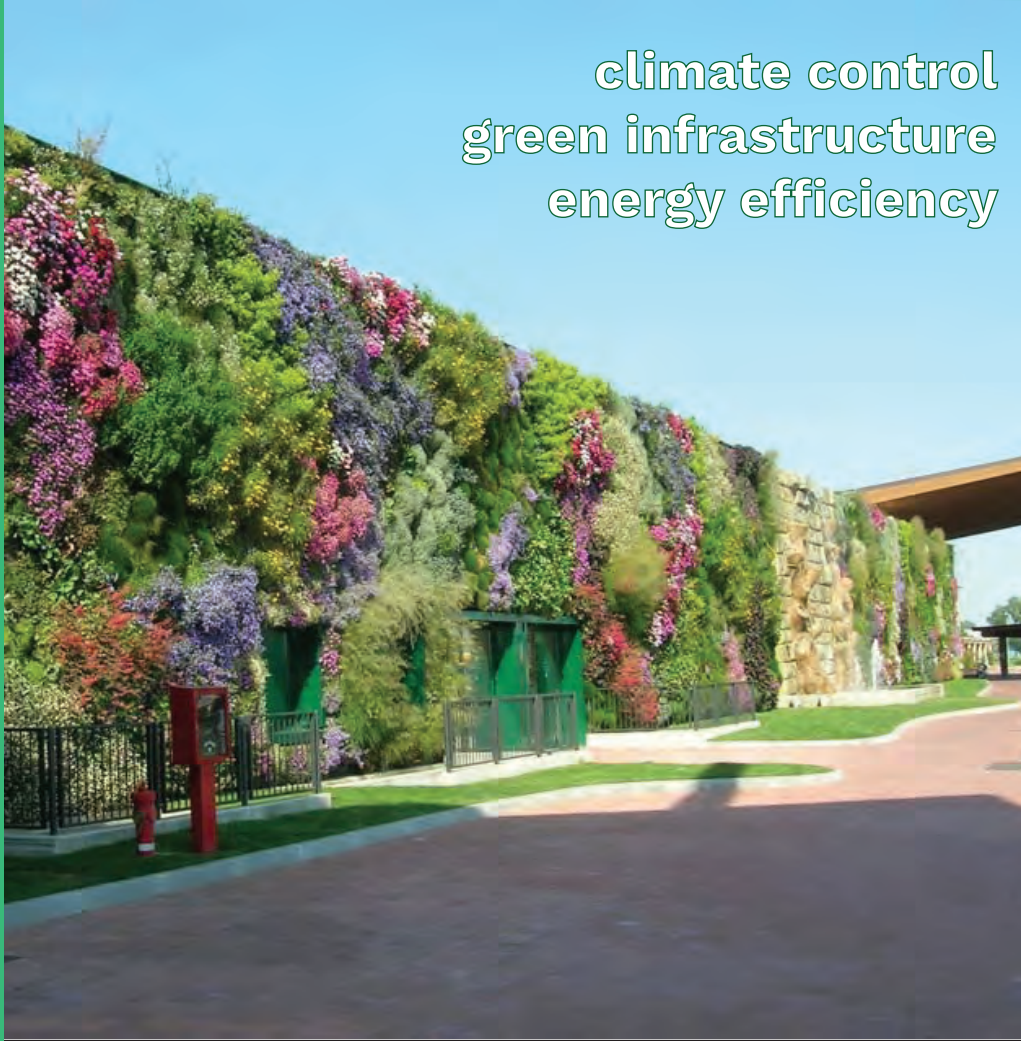
environment
energy
people

Best practice example

[Green Business Center in Hyderabad, India](#)



climate control
green infrastructure
energy efficiency



GREEN WALLS

A green wall is comprised of plants grown in a supported vertical structure attached to an internal or external wall or freestanding. The structures vary from modular systems to sheet or board-based structures with felt pockets to contain soil or other growing medium based on hydroponic principles and irrigation systems to provide the water and nutrient required for the plants to stay alive.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

MICROCLIMATE IMPROVEMENT

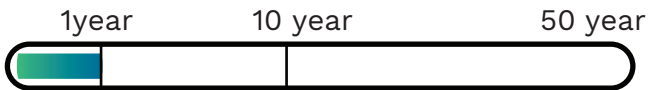
LAND PRODUCTIVITY

HEALTH AND WELLBEING

AIR QUALITY

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$\$\$

Maintenance cost

\$\$

Adressed themes

environment
energy

Best practice example

Universidad del Claustro de Sor Juana, Mexico City



climate control
vegetable production



Nano gardens or square meter or balcony gardens are gardening techniques that allow people to grow plants using the constructed house space and do not require separate green areas for gardening practices.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

ECONOMIC GROWTH

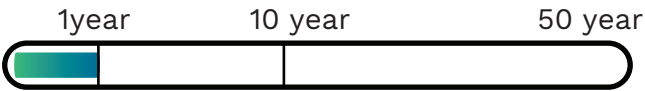
AIR QUALITY

MICROCLIMATE IMPROVEMENT

HEALTH AND WELLBEING

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$

Maintenance cost

\$

Adressed themes

environment

Best practice example

Centro Commerciale “Il Fiordalizo”
(Rozzano, Milan, Italy)





**CLEVER
Cities**

Productive Façade Systems



Productive facade systems are used for energy and food harvesting. Facade elements that enhance indoor daylight conditions, shading, and thermal performance, and wind permeability and productivity benefits (food, alternate energy source or air-conditioning).

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

MICROCLIMATE IMPROVEMENT

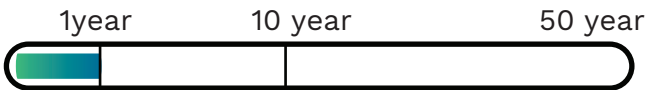
ECONOMIC GROWTH

HEALTH AND WELLBEING

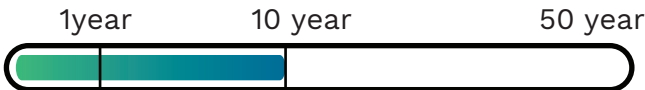
AIR QUALITY

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$ \$

Maintenance cost

\$

Adressed themes

environment
energy

Best practice example

Housing and Development Board (HDB), Singapore



**climate control
vegetable production**



Urban rooftop farms are the spaces/areas located on the building's rooftops, used for growing vegetables, fruits and herbs generating benefits such as reduction of the urban heat-island effect, avoided stormwater runoff, nitrogen fixation, pest control, and energy savings.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

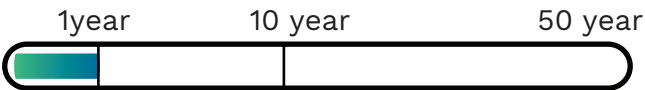
MICROCLIMATE IMPROVEMENT

ECONOMIC GROWTH

HEALTH AND WELLBEING

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$

Maintenance cost

\$

Adressed themes

environment
energy
people

Best practice example

Le Cordon Bleu, Paris



CO₂ reduction
Air quality

Algae Production



In the process of growing, algae consume CO₂, as well as producing an oil that can be turned into an environmentally-friendly fuel. At the end of its lifecycle, the biomass of the algae can be processed into organic fertiliser.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

MICROCLIMATE IMPROVEMENT

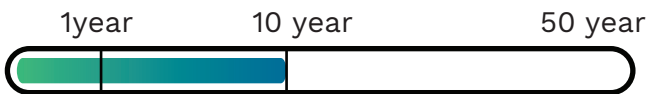
HEALTH AND WELLBEING

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$ \$

Maintenance cost

\$

Adressed themes

environment
energy

Best practice example

The Algae House, Hamburg, Germany, at the International Building Exhibition (IBA)



Wetland Roof (Sumpfpflanzendach)



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A special type of extensive green roof that is evenly planted with wetland or marsh plants. It can help slow things down and spread the impact of heavy rain out over a longer period along with rainwater collectors.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

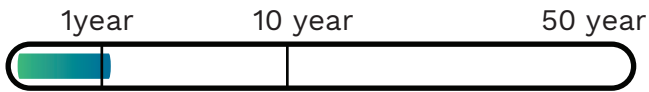
CO2 REDUCTION

MICROCLIMATE IMPROVEMENT

HEALTH AND WELLBEING

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

Maintenance cost

Adressed themes

\$ \$

\$

environment

Best practice example

Zofingen, Switzerland





**CLEVER
Cities**

vegetable production
green infrastructure



Vertical Farming

“Vertical Farming”, “Z Farming” or Horizontal Growing is the practice of using stereoscopic space to grow plants by utilising the concept of cultivating plants or animal life within skyscrapers or on vertically inclined surfaces.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

MICROCLIMATE IMPROVEMENT

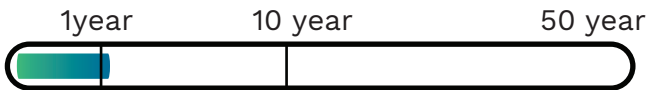
HEALTH AND WELLBEING

GREEN ECONOMY AND JOBS

AIR QUALITY

LAND PRODUCTIVITY

Process of impact measure



Lifespan of the solution



Construction cost

Maintenance cost

Adressed themes

\$ \$ \$

\$

environment
energy
people

Best practice example

“Vertical Farming” example in Singapore:
“Sky Urban Solution” Company





**CLEVER
Cities**

**energy consumption
climate control**



Climate Façades

Climate façades help reduce energy consumption for interior climate using plants grown in a supported vertical structure, cutting down heat loss in the winter and heat gain in the summer.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

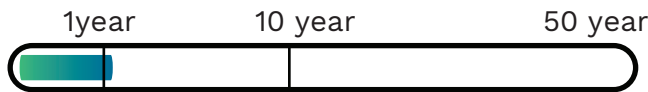
MICROCLIMATE IMPROVEMENT

HEALTH AND WELLBEING

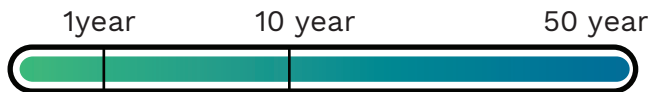
INDIVIDUAL AND COLLECTIVE OUTCOME

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$ \$

Maintenance cost

\$

Adressed themes

environment
energy

Best practice example

The headquarter building of the Municipality
Department 48 'Waste Management' of the
City of Vienna





**air quality
climate control**

Living Walls

Climate façades help reduce energy consumption for interior climate using plants grown in a supported vertical structure, cutting down heat loss in the winter and heat gain in the summer.

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

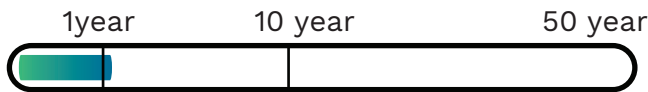
MICROCLIMATE IMPROVEMENT

HEALTH AND WELLBEING

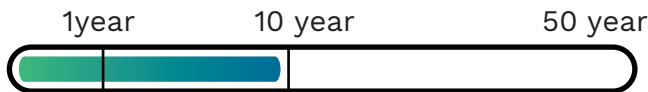
INDIVIDUAL AND COLLECTIVE OUTCOME

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$\$\$

Maintenance cost

\$\$

Adressed themes

environment

Best practice example

The Oasis of Aboukir Living wall by Patrick Blanc, Paris – France





CLEVER
Cities

climate control
sustainable resource



Construction with different types of timber and wood resources to minimise the effect on nature by creating sustainable building typologies.

Wooden Built Structures

Building Scale Interventions



Related Main Indicators



Expected Co-Benefits

CO2 REDUCTION

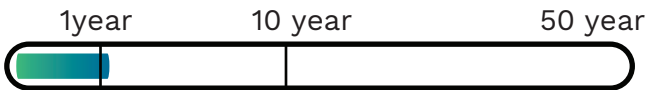
MICROCLIMATE IMPROVEMENT

HEALTH AND WELLBEING

CLIMATE CHANGE ADAPTATION

AIR QUALITY

Process of impact measure



Lifespan of the solution



Construction cost

\$\$\$

Maintenance cost

\$\$

Adressed themes

environment
people

Best practice example

Treehouse designed by Olson Kundigarchitects,
Costa Rika

