Green roofs in Vienna, Austria

Year of issue

2025

Summary

Since 2003 the city of Vienna supports financially the implementation of green roofs with 8-25 € per m². The maximum subsidy can be 2200 €. Until 2010 16000 m² roof were transformed and 150 000 € invested.

Since then in Vienna, there has been plenty of new programs and strategies for funding green roofs and facades, also de-sealing measures and framework has changed as well. Of course, greening roofs is part of the sponge city program. Therefore, in Vienna new buildings and in case of renovation and extensions, roofs of more than 12 m² are to be designed as flat roofs and intensive green according to the standard”. The obligation of green buildings in the zoning- and building plans (binding!) is regulated by Vienna Building Regulation code §5.(1+4) k), amendment 2024. Further relevant for the retention in the Vienna Building Regulation code §79.(6) amendment 2024, that areas to be landscaped (Gardens) must remain unsealed (at least 2/3) and have ground-based greenery. And Vienna Building Regulation § 99 (1): Rainwater must be drained away or fed into the natural water cycle or used in another way. Exceptions: no suitable natural conditions or economically or technically disproportionate effort.

Some of the most important strategic frameworks:

• Urban Heat Islands Strategy Vienna

• Climate Guide "Vienna is climate neutral by 2040"

• Vienna Climate Law: be passed in spring 2025. The aim of the law is to make the city climate-neutral by 2040 and is based on three central pillars: climate protection, climate adaptation, and the circular economy.

Photo Gallery



Location

48.208174, 16.373819

Project

NWRM

National ID

Austria_03

Sector

Urban

Installation Date

2003-ongoing

Implementation status

Ongoing

Contact

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Overview

Location of the project

In the municipality of Vienna

Country

Austria

NUTS2 Code

Wien

Sponge measures implemented in the case study

Green Roofs

Objectives

The recent updates on green roofing Vienna are part of a bigger strategy that aims for climate neutrality by 2040.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
Local water authority	Wiener Umweltschutzabteilung (city's authority for environmental protection)	Other	Initiation of the project, subsidies for house owners	Responsible
Other	Die umweltberatung	Other	Facility of Vienna's adult education center. Consulting office for a near-natural life style. Publicity and information material	Responsible
NGO	Verband fûr Bauwerksbegrünung (Association for greening buildings)	Determination of design details of the measure	Austrian section of the European Federation of Green Roof Associations	—

Documents

cs-at-2-final_version.pdf (940.07 Ko)

Site Information

Climate Zone

Cool temperate dry

Precipitation

500.00 mm

Temperature (°C)

11.50 °C

Runoff

300.00 mm

Slope range

gentle (2-5%)

Vegetation class

Depends on the individual project for intensive green roofs. Extensive green roofs consist of mosses and grass.

Design and Implementation

Project scale

Meso

Project scale specifications

Recording to the city government 20% of the roofs shall be transformed to green ones.

Project area

1,6

Area subject to Land use change or Management/Practice change (ha)

1.60 ha

Design capacity

Depends on : intensity of precipitation event, annual precipitation, amount of precipitation events, individual design of the roof (plant composition, soil type and thickness of soil layer

Principles

Extensive green roofs: soil layer of 2-10 cm thickness, layer for protection, drainage and filtration, layer for separation from the roof
Intensive green roofs: soil layer of 20 - >50cm thickness, layer for filtration, layer for water retention and drainage, protection layer, layer for separation from the roof

Factor constraints

The lack of useable land in big cities such as Vienna and the ongoing sealing force responsible authorities and citizens to think in a third dimension. Green recreational areas are created now on roofs. Due to sealing the amount of rainwater increases. It has to be treated in sewage water plants and pipe systems have to be adapted. During storm-floods critical amounts of waters can be reached. By taking up 50% of rain water and retaining peak flows for a certain time green roofs contribute to reduce flooding risk and ensure the purification standards in sewage water treatment plants.

Constraints

Green roofs can be installed up to a slope of less than 45°. Intensive green roofs require an adaptation of the statics of the roof.

Favourable preconditions

Lack of land, increasing sealing and thus in creasing amount of rain water.

Financing

Total cost information

0,5 Euros/m2 Extensive green roof with a slope <10° on a multi-family house with 7 floors

Costs investment information

0,31 Euros/m2 for extensive green roof with a slope less than 10° on a multi-family house with 7 floors.

Costs capital information

0,31 Euros/m2 for the implementation of the green roof, without potetntial adaptation of the roof's statics.

Costs land acquisition unit

€ (total value)

Costs operation maintenance information

0,19 Euros/m2 for an inspection twice a year, removal of growing trees, cutting grass.

Costs maintenance information

0,19 €/m² Inspection twice a year, removal of growing trees, cutting grass

Financing authorities

Authority name	Type of funding	Comments	Financing share
Vienna municipality	Local funds	Subsidies	depends on the roof
Owners	Private funds	Fortune of the house owner.	depends on the roof

Compensations

Oui

Compensations annual information

Financial support given by the city's authorities only once: 8-25€/m² up to 2200€.

Compensations basis information

The house owner installs the green roof and sends bills to the authority. The work has to be done after ÖNORM 1131. The project mustn’t supported by other official funds.

Policy and Governance

Policy description

The more people are moving to cities, the more surface needs to be sealed and green areas are disappearing. In Austria 15 to 25 ha of usable ground get sealed every day. However green areas are important for recreation, mood lifting and health. Green roofs are a possibility to regain green areas and offer a manifold of advantages. A cadastre of potential roofs was developed. It proved that 20% of Vienna's roofs could become green roofs.

Policy targets

Runoff control

Peak-flow reduction

Groundwater Recharge

Pollutants Removal

Oher Societal Benefits

Target remarks

Due to sealing 15 – 25 ha get lost as potential habitats every day in Austria. Green roofs therefore have the potential to serve as replacement habitats and support biodiversity in strongly urbanized areas. With reference to Swiss investigations those responsible for the Viennese project act on the assumption that the installation of green roofs provides habitats and food/nesting material for the following birds: Northern lapwing (peewit), Eurasian skylark, Little ringed plover, Crested lark (endangered), Black redstart, Common redstart, Sparrow and Tit. It is moreover possible to create an animal food chain. Green roofs incorporate a variety of plants that attract different kinds of insects. In combination with solar panels a variety of habitats with different light intensity is achievable. Moreover green roofs are able to buffer “electro smog” by 99.4%, a climate regulation for the underlying rooms is achieved, in combination with solar cells a power increase of 4% is achievable

Policy pressure

Directive	Relevant pressure

WFD identified pressure	Diffuse - Urban run off
WFD identified pressure	Diffuse atmospheric deposition
Floods Directive identified pressure	Defense or infrastructural failure: here failure of the sewage system

Policy impact

Directive	Relevant impact
WFD identified pressure	Chemical pollution
WFD identified pressure	Elevated temperature
Floods Directive identified pressure	Human health
Floods Directive identified pressure	Community
WFD identified pressure	Altered habitats
Other EU	Property, infrastructure

Requirement directive

Requirement directive	Specification
WFD-mitigation of significant pressure	Retention of funoff
WFD-achievement of good chemical status	Adsorption of air pollutants, purification of rain water
Other EU	Bird and Habitat directive - Creating new habitats and connections of living space
Floods Directive-mitigating Flood Risk	Less risk of failure of the sewage water system.

Policy challenges requirements

1. National Water Act: Any intervention which might have a significant effect on water quality/ecology (hydropower, flood protection, water abstraction, waste water discharges, ...) needs authorization
2. Negative ecological effects have to be minimized, ecological functioning has to be ensured
3. RIWA-T (technical guidelines for flood protection): One general principle is the preferential use of near-natural building methods that correspond to the latest development in technology.
4. Improvement of Vienna’s living quality

Part of a wider plan

Non

Public consultation

Non

Consultation activities

Activity stage	Activity type	Key issues
Implementation phase	information material	in general the publicity for the project is not sufficient. It is criticised that people already have to know the term "green roof" to find information. The public don't know about the manifold advantages of green roofs. It is just reduced to a garden

Has contractual arrangements

Non

Impacts and Monitoring

Monitoring System

Monitoring parameters

During the project the retained amount of rain water was measured. Moreover, the pollutants removal was documented as well as the composition of plant and animal population. The temperature was recorded in the surroundings of the green roofs

Maintenance

Maintenance requirements

Extensive green roofs: inspection twice a year, removal of tree seeds and shooting trees

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Performance impact estimation information

Collection of the runoff from a green roof and a traditional roof during a precipitation event.

Cost assessment method

First of all only the installation of an extensive roof is seen. Adaptation of statics and the planning of intensive green roofs depend on the individual project and can’t be generalized. Moreover the costs are broken down to the gross-floor-surface (sum of the surfaces of the single floors). The actual prices were gained by asking architects and firms specialized to green roofs.

Socio-economic Impacts

Benefits and co-benefits

Air condition for underlying rooms
Longer lifespan of the roof due to balancing environmental impacts (heat, cold, UV rays…)

Direct benefits information

Energy savings and a longer lifespan compared to a traditional flat roof. Savings meet the additional costs of implementation and maintenance.

Ancillary benefits information

A combination of green roofs and solar power should be considered. During summer the cooling effect of green roofs increases the power of photovoltaic modules by 4%.

Biophysical impacts: Hydrology

Information on retained water

The microclimate improves. That means: the increased evapotranspiration leads to an ambient temperature. The underlying rooms profit from this "natural air condition".

Information on runoff reduction

Up to 60% runoff attenuation (extensive) and 90% (intensive)

Information on peak delay effects

The peak flow is retained 15 Minutes which means a relief for the sewage water system.

Biophysical impacts: Biodiversity

Improved biodiversity

Oui

Information on improved biodiversity

Green roofs can act as bridge between different habitats and populations. Birds find there material for building nests. Some observations even document that some ground breeding species take green roofs as new habitat. Insects find new food/habitat resources with the green roofs.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Positive impact-WQ improvement

Information on water quality overall

Rain water is filtered by the vegetation. Normal flat roofs aren’t able to retain pollutants such as Cu, Pb, Zn, Cd and N. Green roofs can retain 96-99% of Cu, Pb, Cd and N pollution. Moreover plants are increasing air humidity by transpiration. Thus dust is easily adsorbed.

Information on water quality Improvements (N)

Reduction by more than 90%.

Information on water quality improvements (Cu)

Reduction by more than 90%.

Information on water quality improvements (Zn)

Reduction by 16%.

Soil quality overall improvements

Not relevant for this application

Biophysical impacts: Others

Ecosystem impact climate regulation

Impact on GHGs (net emissions and storage) including soil carbon

Information on ecosystem impact climate regulation

Vegetation stores CO_2 by photosynthesis. The increased evapotranspiration enhance dust adsorption, leads to an ambient temperature in the underlying rooms and takes up the summer heat of a city.

Increased evapotranspiration information

That increased evapotranspiration leads to an ambient temperature.The microclimate improves.

Lessons Learned

Key lessons

Green Roofs are able to provide a lot of benefits such as climate regulation, water retention, or "island habitats" for plants and animals. These advantages have to be communicated more intensively to the public.
Green roofs cause only little additional costs compared to a traditional flat roof. These costs are often compensated by the longer lifespan of the roof and energy savings
The most economically effective are (intensive) green roofs on multifamily houses. The additional costs of extensive green roofs are quickly compensated by energy savings and the other benefits.

Barriers

Barrier type	Barrier role	Comments
Expected maintenance needs	Main barrier	House owners are often afraid that the installation of a green roof is combined with high costs. However this is not the case for extensive green roofs and the additional costs are often balanced by energy savings and the longer life span of the roof
Other	Main barrier	Lack of communication. Citizens are not sufficiently informed about the many advantages of green roofs. The majority thinks, it is just another kind of garden
Missing regulatory support	Secondary barrier	Architects/planners are liable for 30 years for the construction of a green roof. Since there is the risk that they aren't leakproof, architects partly refuse to consider green roofs in their plannings

Drivers

Driver type	Driver role	Comments
Legal obligations	Main driver	Technical standard for building green roofs. The technical code of Vienna gives the legal framework for green buildings.
Availability of subsidies	Main driver	The local authorities support the construction of green roofs with 8-25€/m² and with a maximum of 2200€.
Organisation committed to it	Main driver	Both organisations inform the public about the advantages of green roofs. Moreover the Verband für Bauwerksbegrünung is composed of planers, architectures and specialised firms. They developed a certification system for green roofs and consult house owners and planners.

Success factors

Success factor type	Success factor role	Comments
Attitude of relevant stakeholders	Secondary factor	Many firms specialised on the construction of green roofs. They organised together with architects on national and european level to support the implementation of green roofs
Attitude of decision makers	Main factor	Adaptation of the building code, information of the public.
Existing technical standards	Main factor	Legal framework for the construction of green roof and liabilities of firms, architectures and house owners.
Financing possibilities	Secondary factor	The local authorities support the construction of green roofs with 8-25€/m² and with a maximum of 2200€.

Cost effectiveness

During the first 10 years house owners with green roofs have to face additional costs compared to traditional flat roofs. Energy savings and the longer lifespan of a green roof compensate the additional costs

Transferability

When a roof has a slope of less than 20% no special constructions are needed that prevent slipping. In this case one has the most creative freedom to design an intensive green roof. A good ratio between roof surface and rest of the house permits a transformation of the roof into a green area at low costs. For instance the costs to transform the roof of a multiple-family house are low, since the can be divided by many tenants. Skyscrapers only have small roofs-so the transforming costs are low as well. However due to the height of the building only extensive solutions are possible. Elevated costs have to be considered for single family houses. Extensive green roofs are possible on every house. To create a real roof garden on existing houses, roof structures have to be re-considered and adapted, as roof gardens are much heavier than simpler green roofs. The thicker the soil layer and more complex the plant composition the more water can be retained.
A slope over 45° is unsuitable for green froof conversion.

Sources

Sources

„Logisch gedacht ist ökologisch bedacht" Ein Leitfaden für die Dachbegrünung

dachgrün

Dachbegrünung - Vorteile, Beratung und Förderung