



Living Lab Turin-Mirafiori Sud, Italy



Indoor wall at primary school in Mirafiori Sud

Green roofs and walls

Green indoor and outdoor walls



Outdoor wall at a homeless shelter in Mirafiori Sud

NBS Green indoor and outdoor walls

The NBS consists of two implemented green walls in the Mirafiori Sud district: Indoor green wall in the atrium of elementary school IC Cairoli and outdoor green wall of a homeless shelter:

- Indoor wall of 20 m² positioned at a height of 3 m off the ground floor in a hallway with large roof-windows. The chosen plant species were investigated in depth in regard to potential indoor contaminants of the vegetation.
- Outdoor green wall of 80 m² (made of a self-supporting structure) was positioned at a height between 0 and 3 m above the ground floor. The wall is mounted on an independent structure and not resting on the building. A gap between the green wall and the building allows for future maintenance work on the facade.

Both green walls include a similar irrigation system. Water intake was set up at a distance of 10 m from the green wall. The contractor is responsible for the final hydraulic connection and possible collection system for run-off water from the panels.

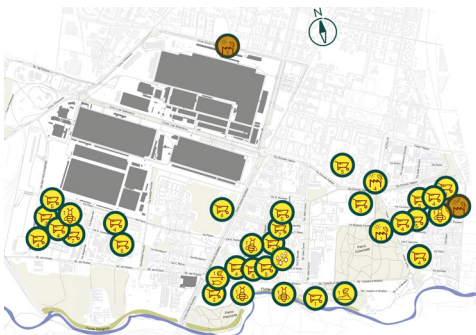
- conditions of inhabitants.
- Working with schools to spread the knowledge about NBS to users of the buildings and raising awareness about the importance of plants in everyday life.
- Promoting the collaboration with school teachers and staff of the homeless shelter to schedule activities that supported learning “science” disciplines, as well as Italian language skills, civic education and social studies.
- Consulting a nursery to achieve aesthetic and botanically valuable green walls in line with botanical characteristics of small seedlings that attract pollinating insects (bees, bumblebees, butterflies) for the outdoor wall
- To encourage homeless and staff participation in daily maintenance of the green outdoor wall and introduce the people.
- To foster social inclusion and homelessness prevention policy of the cooperative in the framework of occupational internships offered to homeless people.

Aim & goals

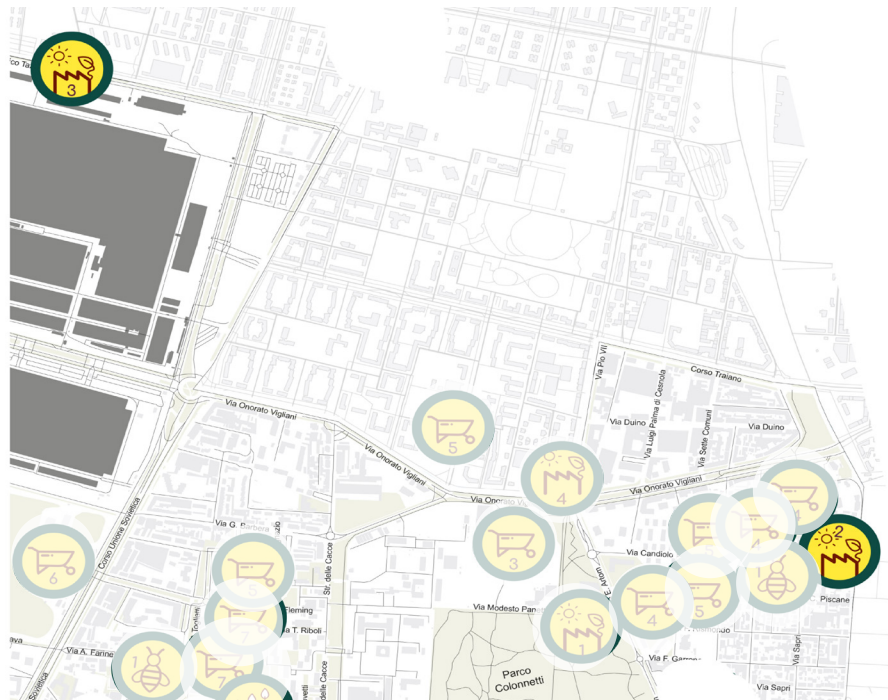
- The experimental features of this NBS are intended as replicable examples in enhancing urban environments and improving living

Area of implementation

The indoor green wall is installed in Cairoli primary school. The outdoor green wall at the shelter homeless is a precast building.



Living Lab Turin map - total and NBS zoom-in



Indoor wall: GPS coordinates 45.019222, 7.608875 4
 Outdoor wall: GPS coordinates 45.032972, 7.63377 4

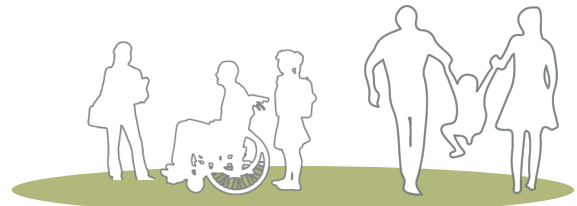
Target groups (beneficiaries)

Key target groups include:

- Students, teachers, parents of the school children
- Homeless users and staff of the shelter

Indirect beneficiaries:

- Local residents living near the homeless shelter who benefit from the enhanced aesthetics of the green wall



Stakeholder constellations

Main responsible partner

City of Turin incl. departments:
EU and Innovation department,
Urbanisation department,
School building department,
Social building department

- Administrative tasks and overall coordination

ProGReg partners involved

Polytechnic di Torino
(Department of Environment,
Land and Infrastructure
Engineering – DIATI):

- responsible for co-design and co-creation processes

University of Turin (Department of Life Sciences and Systems Biology, DBIOS and Department of Agricultural, Forest and Food Sciences, DISAFA):

- scientific coordinators for plant species selection

Other stakeholders involved

Teachers and alumni of Cairoli primary school:

- involved in the co-design and in the elaboration of educational and training activities for engaging students

NGO managing the shelter:
Stranaidea Impresa Sociale Onlus (<https://www.stranaidea.it>)

- was trained to manage and maintain the wall

Verde Profilo - construction company (<https://verdeprofilo.com/it>)

- realized the two green walls following the public tender requirements



Co-design activities, stakeholder engagement, and pre-implementation activities



Planning and preparatory activities (administrative/technical procedures)

Given the different green wall technologies, a pre-tender procedure (avviso esplorativo) by the municipality, subsequently, the City put out a single tender for both technologies (indoor and outdoor wall).

University of Turin was directly involved during the preparation of the vertical panels. Several exploratory site visits in order to analyze the features of potential spaces, strengths and constraints.

Preliminary meetings with the school administrator and teachers to explore interest in the project and to establish a baseline to develop a place-based learning experience with students.



Implementation budget

Total implementation budget and proGReg funds:

40.000 €



Co-design and engagement activities

The co-design process established a set of guidelines and technical requirements essential to select the most appropriate technical solution, both for the construction and maintenance of the vegetation and the structure itself.

Organizing several activities and meetings to spread basic knowledge about varied plant species, plant physiology and plants care. Young students are invited to observe and recognize the plants' health status to be aware about how to take care of an indoor green wall and which environmental parameters can affect plants behavior and their growth.

Direct observation and site exploration have been promoted and supported to understand technical features of the indoor living wall. While plant propagation techniques have been introduced to students.

Key achievements and implementation results

A strong and fruitful synergy has been developed thanks to this NBS: the issues related to the

abatement of indoor contaminants due to the presence of vegetation were investigated in depth by POLITO and UNITO.

Critical implementation issues and barriers encountered



During the implementation process, a number of technical and social barriers arose:

- The green wall's structure had to be durable for several years and it should require minor interventions like plant relocation, fertilizing control and hydraulic system monitoring
- Ensuring the state-of-the-art installation, set up and maintenance by the contractor in compliance with the defined technical specifications.
- The didactic-disseminating meetings required the presence of an expert technician to illustrate the characteristics of the NBS: structure set up and possible applications
- Specific requirements necessary to teach children how to interact with the plants of the green wall to allow changing and keeping plants, to learn about NBS benefits, and avoid any safety risks.

Synergies with other proGReg activities



NBS 8 Butterfly Garden

Plant selection in collaboration with the team involved in NBS Butterfly gardens (University and Polytechnic of Turin).

Both experiences are useful and concrete examples of technologies and challenges related to the implementation of an NBS in diverse contexts (indoor and outdoor) with different beneficiary typology (students and users). This allowed the partners involved in other NBS (POLITO, UNITO, The City of Turin) in developing similar technologies or participation methods in other contexts.

Links with other external projects or activities

No concrete links with other projects running yet. However, this NBS could inspire to upgrade the grey courtyard of the homeless center, adding some trees and green area to have a better place

Communication activities



- Communicating and explaining the intervention typology and the NBS benefits to students and the homeless shelter's staff and users
- Before the school's summer break, organising a closing activity in the school garden involving students and teachers of different classes.
- POLITO (DIATI) designed and realized specific summer "homework" and distributed to students during the final activity.
- Torino City Lab social media: Facebook/ Twitter/LinkedIn/ YouTube

for outdoor living. The up scaling of the green wall could be considered as a requirement in the next public tender for managing shelter or similar buildings.

Maintenance & Sustainability beyond proGReg

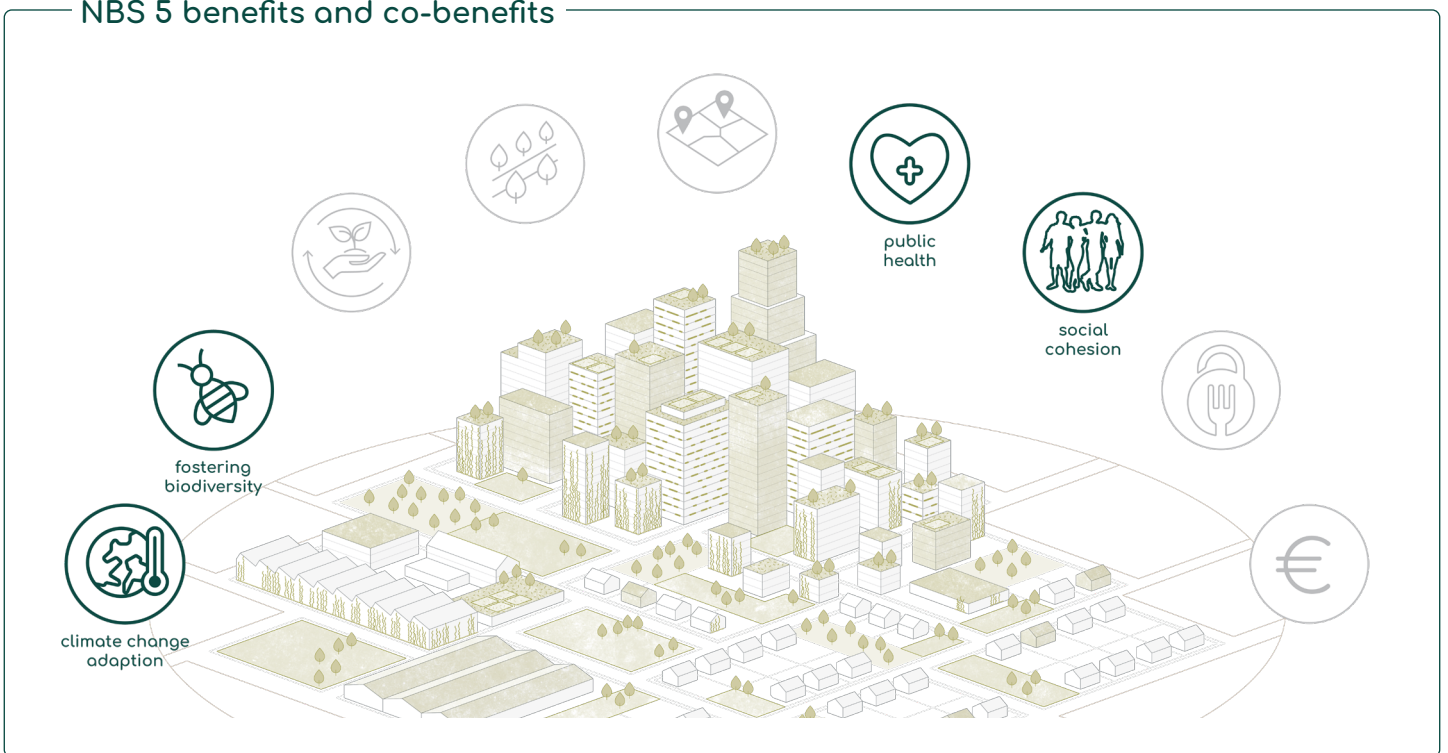
The construction company of the two walls Verde Profile will maintain the NBS for three years. Afterwards, the cooperative managing the homeless shelter will maintain the outdoor wall. The maintenance and long-term suitability of the indoor wall will be ensured by the municipality through public tenders.

Since the plants chosen are easy to grow inside and are safe for children, the indoor wall represents a positive experience to be replicated in other public or private buildings.

NBS benefits and co-benefits for the Living Lab Turin

The NBS serves as an inspiring example for improving the green quality of indoor and outdoor spaces, and promotes green knowledge among citizens. It also fosters social inclusion and cohesion, notably in the case of the homeless shelter, with the value-add of aesthetic and technical upgrading to a place that is typically marginalised.

NBS 5 benefits and co-benefits



Indoor wall (c) Verde Profile



Outdoor wall (c) A. Timpe

Fact Sheet



Green roofs and walls



Green indoor and outdoor walls

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Partners

