

METABUILDING 1st GROW / HARVEST CALL : MEET THE WINNERS !



Unleashing the Innovation Potential of EU Construction SMEs

Construction + Nature-Based Solutions Challenge



- NBS system solutions for renovation
- Digitization of care / maintenance / monitoring for NBS



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Vertical Ecosystem Vertical Garden using Recycling Greywater for Irrigation

• MÁLAGA, SPAIN •

SECTORS INVOLVED : Construction · Nature-Based Solutions



BIOTONOMY
THE DESIGN LANGUAGE OF NATURE
SWEDEN

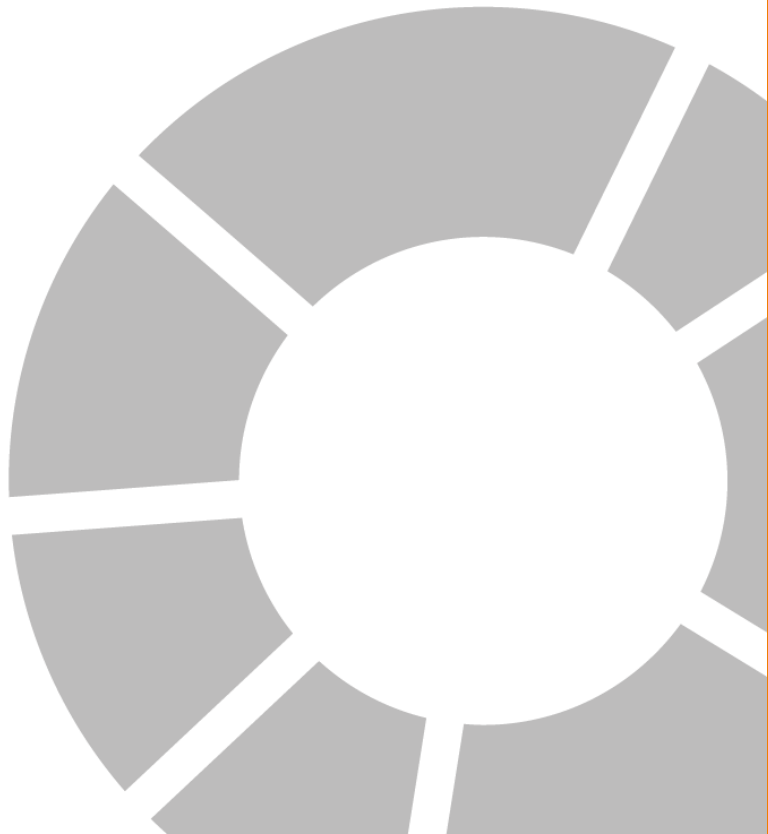


“This project will demonstrate and validate an innovative solution to integrate nature-based solutions in existing buildings during renovation processes while applying a circular economy approach. This validation in a real environment will stimulate the demand for NBS in buildings during refurbishment work while creating new business opportunities for Biotonomy and Bioazul.”

Gerardo González Martín
R&D Project Manager
BIOAZUL

Miguel Villén Molina
Head of Business Development
BIOTONOMY



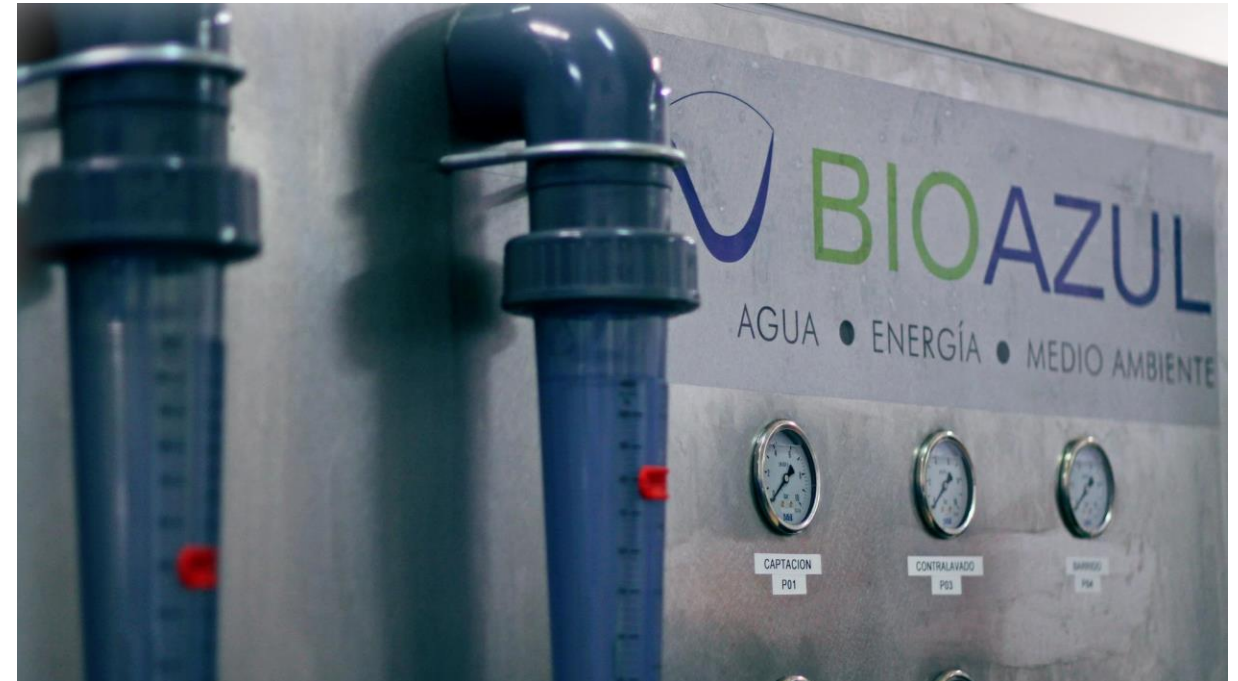


BIOAZUL SL

SME applicant

What is BIOAZUL?

BIOAZUL SL is a Spanish **engineering and technological consultancy** committed to R&D and innovation for the development of sustainable solutions and services in the environmental sector, especially related to **sustainable water management and resources recovery**. They offer tailored-made water and wastewater treatment and reuse solutions based on technologies resulting from their R&D and innovation projects, providing their clients with a broad range of engineering services. Also, BIOAZUL provides an integrated consultancy service, acting as a **catalyst and promoter of R&D and innovation projects** of strategic interest with high market potential.



Our team

Multidisciplinary team integrated by 14 professionals (engineering, chemistry, biology, environment, economics, communication and marketing) with wide experience in applied R&D projects at national and international level, working with responsibility, respect, impartiality, transparency, and being committed to the environmental sustainability.





Biotonomy AB

Consortium partner

What is BIOTONOMY?

Biotonomy is a Swedish architectural studio that offers a holistic & nature-based approach for buildings & cities to address the climate and biodiversity emergency. They provide ground-breaking and nature-based design principles that go beyond passive & green-building certification standards. Together with their international network, they work to accelerate the transformation to autonomous development with nature-based solutions. Biotonomy offers design, construction & consultation services for both ground-up projects & for reforming existing buildings & cities with autonomous solutions.



BIOTONOMY
THE DESIGN LANGUAGE OF NATURE



Our project



Project details

- **Project title:** Demonstration of a prototype vertical hydroponic garden with a greywater recycling station
- **Acronym:** Vertical Ecosystem
- **Duration:** 01/03/2022 - 31/08/2022 (6 months)
- **Budget:** 60,000 EUR
- **Funding programme:**
 - Horizon 2020
 - METABUILDING Project
 - GROW/HARVEST collaborative project grants – Call 1
- **Agreement number:** 440
- **Partners:** BIOAZUL SL (Spain) & Biotonomy AB (Sweden)



Goals

- This collaborative, cross-border and cross-sectoral project will **demonstrate and validate** an **innovative solution** to integrate **nature-based solutions** in existing buildings during renovation processes while applying a **circular economy** approach.
- We will design and build a prototype consisting in two modules: a **greywater recycling station** connected with a **vertical hydroponic garden** to be tested in a real and operational environment, a hotel.
- The implementation and demonstration of the prototype will not only provide an added value to the pilot building through **environmental, economic and social benefits** (e.g., decrease of water consumption, reduced GHG emissions, aesthetic value), but it will also allow for a **strong and strategic partnership** between the two participating SMEs, creating new market opportunities and business lines.



Challenge addressed

While **vertical gardens** rise as a key pathway towards decreasing buildings' environmental footprint and creating healthier urban environments, **one-third of the world's population is facing "high" or "extremely high" water stress.** Mediterranean countries such as Spain, Portugal, Greece or Italy are currently facing **challenges to expand and maintain urban green infrastructure** due to the **shortage and lack of water resources.**

Moreover, the way **buildings** have been traditionally designed and built to **consume water and generate wastewater** following a **linear and centralized approach** has proved very inefficient, leading to increasing **pressure on ecosystems and biodiversity** while giving citizens a false sense of abundance and disconnection to the problem.

Integrating **nature-based solutions** in the built environment and more specifically in **residential and commercial buildings** will depend not only on the availability of water resources to maintain green infrastructure, but also on a paradigm shift where buildings will become more **autonomous following decentralised approaches.**

This transformation into "green buildings", taking advantage of **refurbishment and renovation processes** in existing buildings, represents a huge opportunity to apply **decentralised and innovative approaches** such as **circular economy, nature-based solutions or hydroponic farming.**

Our approach

BIOAZUL SL (water engineering and technology consultancy) and **Biotomy AB** (architectural studio specialised in vertical gardens) will join to design and build an **innovative prototype** consisting of a **greywater recycling station** and a **vertical hydroponic garden**, characterised for lower water consumption than conventional vertical gardens.

This innovative technology will also include elements for the automated and telematic management through **phyto-irrigation** with **nutrient control**, minimizing human intervention in its maintenance.

This prototype will be tested in a **real and operational environment**, counting with the support and commitment from a **4-Star Hotel** (end user) offering its facilities for this purpose.





Impact on construction sector

Vertical gardens are a great option to bring nature and provide ecosystem services to the built environment and citizens, **reducing carbon footprint, increasing biodiversity, and creating resilience against climate change**. For instance, just 1 m² of vertical garden installed on a building façade produces the amount of oxygen consumed by a person in a year, captures 130 g of dust, and processes up to 700 kg of harmful gases and 0.25 kg of heavy metals.

Vertical gardens also provide **thermal insulation** for the building, reducing the interior temperature up to 5°C, meaning a reduction of around 43.5% of air conditioning. The outside temperature can also decrease up to 3°C, mitigating the **heat island effect** in cities. Moreover, they contribute to **acoustic insulation**, provide **aesthetic value** and increase the **value of the property**.

On the other hand, the **treatment and reuse of greywater** from residential and commercial buildings translates into **lower volumes of wastewater discharged** to the sewage system and **reduced water consumption** in buildings (up to 30%) while supporting the implementation and maintenance of water demanding NBS, a critical issue in regions suffering from water scarcity and droughts.



Support from METABUILDING

Thanks to the METABUILDING project and financial support, we will demonstrate and validate a **cross-sectoral solution** that can be **integrated into a building** undergoing **renovation** or refurbishment processes.

The design and construction of the prototype will imply the readjustment and adaptation of certain elements proving the **feasibility, replicability and easy integration** of **vertical gardens** and **greywater recycling stations** during refurbishment processes in different buildings typologies and scenarios.





METABUILDING ecosystem

“ We are METABUILDERS because we support innovation in the construction sector as a means to bring vertical ecosystems into the built environment.”



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Thank you for your kind attention

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www.metabuilding-project.eu



Platform :

www.metabuilding.com



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