

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

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



WINNERS OF THE
NATURE-BASED SOLUTION CHALLENGE
FOR THE CONSTRUCTION SECTOR

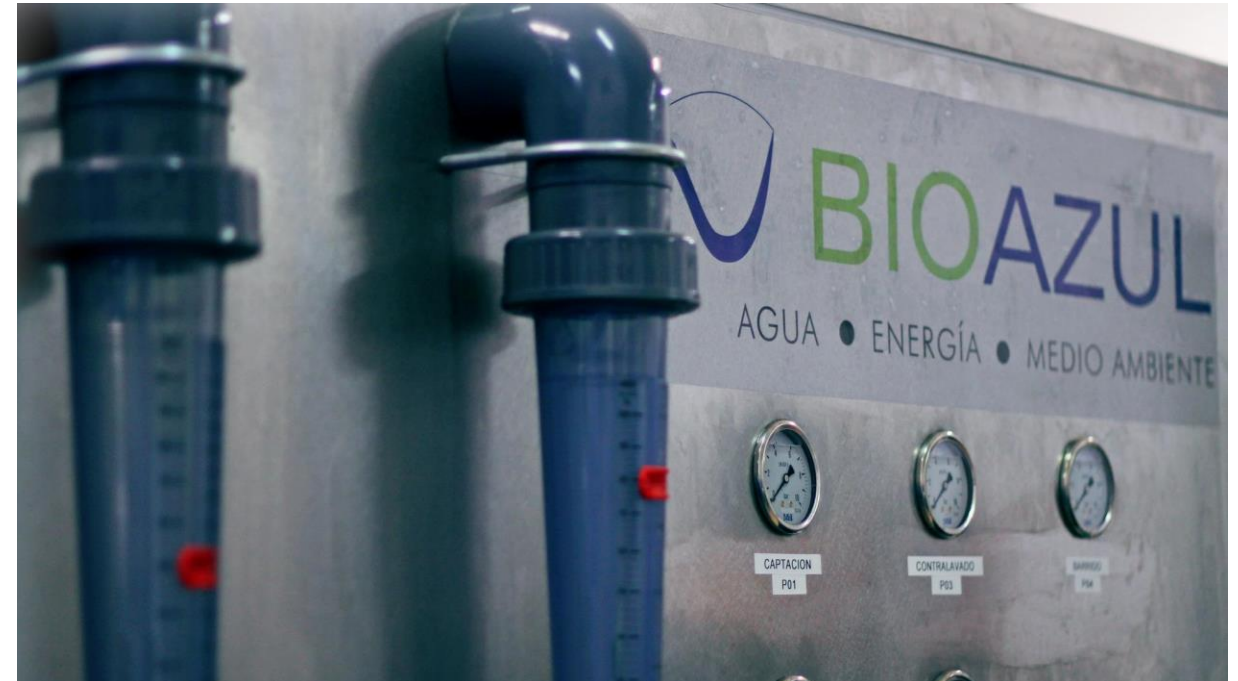


BIOAZUL SL

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





Biotechnology 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 **Biotonomy 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”

Contact details

PROJECT MANAGER

Gerardo González

EMAIL ADDRESS

ggonzalez@bioazul.com

MAILING ADDRESS

Avda. Manuel Agustín Heredia 18, 1º 4, 29001 Málaga, Spain

PHONE NUMBER

+34 951 047 290

+34 951 256 735 (Fax)



Thank you for your kind attention

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METABUILDING Project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 873964. The European Commission and the European Innovation Council and SME Executive Agency (EISMEA) are not responsible for any use that may be made of the information it contains. The sole responsibility for the content of this document lies entirely with the author's view.