

Technical
University
of Munich



VENTURE
LABS



JUMPSTARTER

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myconest

let nature nestle in!



Challenge

According to WWF's 2022 *Living Planet Report*, monitored wildlife populations have declined by **73% on average** since 1970, an alarming signal of ecosystem collapse. In biodiversity-rich regions like Latin America, the drop is even more dramatic. The leading causes include land-use change, habitat loss, pollution, and climate disruption—forces that continue to accelerate as infrastructure and energy networks expand globally. These trends threaten not only ecosystems but also food security, climate resilience, and long-term human wellbeing.

Ironically, the same infrastructure driving ecological degradation may also offer one of the most **underutilized opportunities for nature restoration**. **Solar parks**, grid corridors, roadsides, and urban peripheries now span millions of hectares, yet most are **ecologically sterile**—covered in gravel, fenced-off, or routinely mown for maintenance. They serve a **single-use function** (e.g. energy generation or logistics) and are rarely integrated into conservation or land stewardship strategies.

Meanwhile, conventional greening interventions—such as artificial nest boxes or long-term habitat installations—often prove **incompatible** with these sites. They require **frequent maintenance**, may become **ecological traps**, and rarely offer scalable, seasonal solutions.

How might we reverse biodiversity collapse by reimagining infrastructure as a driver of ecological regeneration?

The challenge lies in designing tools that are **modular, measurable, maintenance-free**, and adaptable to the realities of industrial and post-industrial landscapes—transforming ecological dead zones into hubs of biodiversity, soil recovery, and climate resilience.





Outcome

MycoNest is a regenerative habitat system made from **modular, biodegradable forms** using mycelium-bound agricultural waste like hemp hurds and biochar. It includes two nature-based tools designed for overlooked infrastructure landscapes:

- **MycoNest habitat units** provide lightweight, seasonal shelters for birds, insects, and small animals. These mimic natural cavities and **biodegrade in place** after use, enriching soil with organic matter, fungal biomass, native wildflower seeds, and optionally **biochar** for long-term carbon sequestration.
- **Pomaris nutrient pellets** are fully compostable, ball-shaped units originally designed to fit inside MycoNest cavities. Made from dried mycelium and biochar, they can carry nutrients (N, P, K), native seeds, or microbial inoculants—supporting **soil regeneration** and passive nutrient dispersal.

Optimized for **infrastructure-scale deployment**, MycoNest offers a **plug-and-play, compliance-ready solution**:

- Maintenance-free, ideal for remote or scattered sites
- **Designed for one breeding season**, then decomposes naturally
- **Installed by routine staff** without tools or training
- **Single-trip logistics**, each unit weighs only 300g

A **mobile app** is under development to scan QR codes, upload habitat photos, and track usage—enabling **biodiversity monitoring, impact reporting**, and ESG integration.

MycoNest transforms industrial zones into living systems—delivering scalable restoration where nature is often absent.

Context

The project is led by [Alex Toth](#) (Hungary), a nature enthusiast with an academic background in **International Political Economy (MSc, NTU Singapore)**, focusing on **circular economy** and **biomimicry**. MycoNest was inspired by Alex's first hand exposure to the **visible ecological potential of solar parks** in his hometown, his introduction to **mycelium-based design** through Prof. Le Ferrand at NTU Singapore, and his experience working on **nature credit pilots** during a traineeship at the European Commission — aiming to spark a “quiet revolution” in a legacy market: the artificial habitat niche.

MycoNest has received early-stage backing through several prestigious recognitions:

- **Finalist** – IUCN World Conservation Congress *Changemakers Programme 2025* (15 selected out of 1500+ global applicants)
- **Selected** – *EIT Jumpstarter* in the **New European Bauhaus Cohort 2025**, supporting circular bioeconomy startups
- **Affiliated** – *FAB at TUM Venture Labs* (Munich), part of **Europe's #1 start-up hub** (Financial Times 2024 ranking)

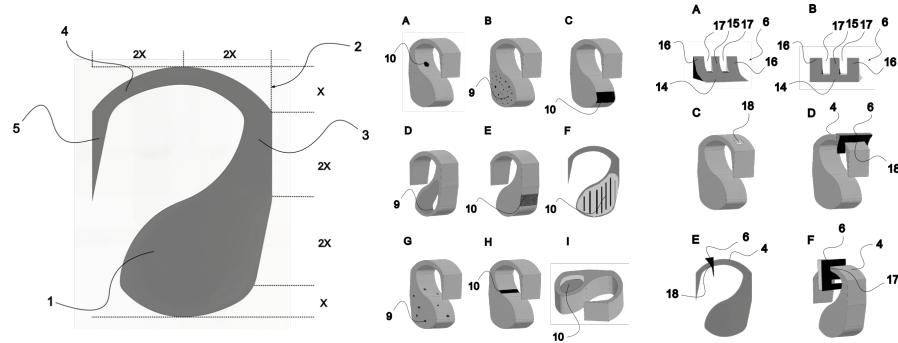
MycoNest is protected by **European patent** (EP 25163874.8) and **design registrations** in the **EU, USA, UK, China, and Switzerland**.

The system is currently undergoing **pilot projects in Hungary** (1 hectare and a 150-hectare regenerative solar park) and with the **University of New England (Australia)**. These pilots test its impact on **biodiversity enhancement, soil recovery, and carbon credit viability** across renewable and linear infrastructure.

MycoNest proposes a new ecological logic for infrastructure — what we call “**Quadrivoltaics**”: the integrated delivery of **energy production, biodiversity restoration, soil regeneration, and carbon sequestration** in one scalable, nature-based solution.



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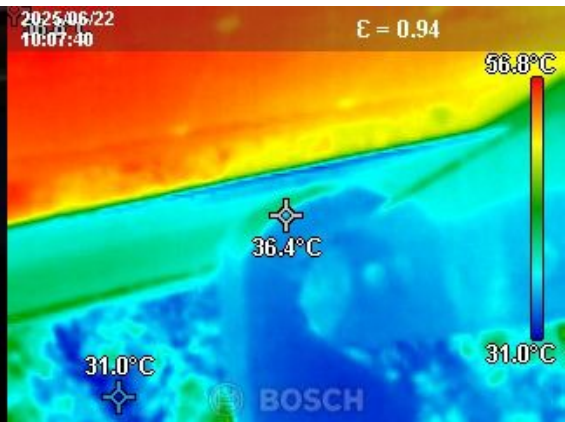
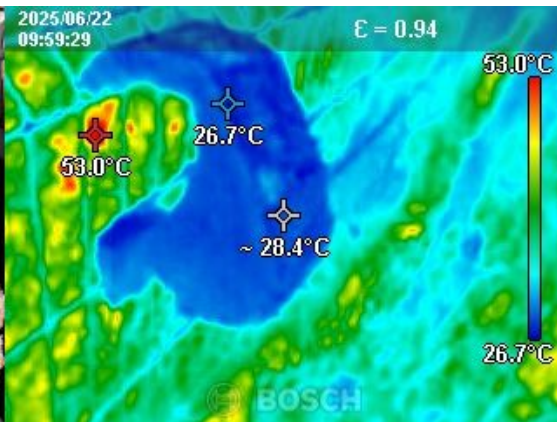
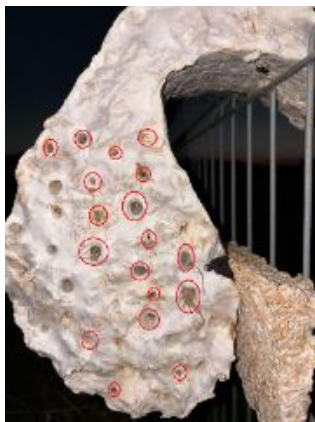




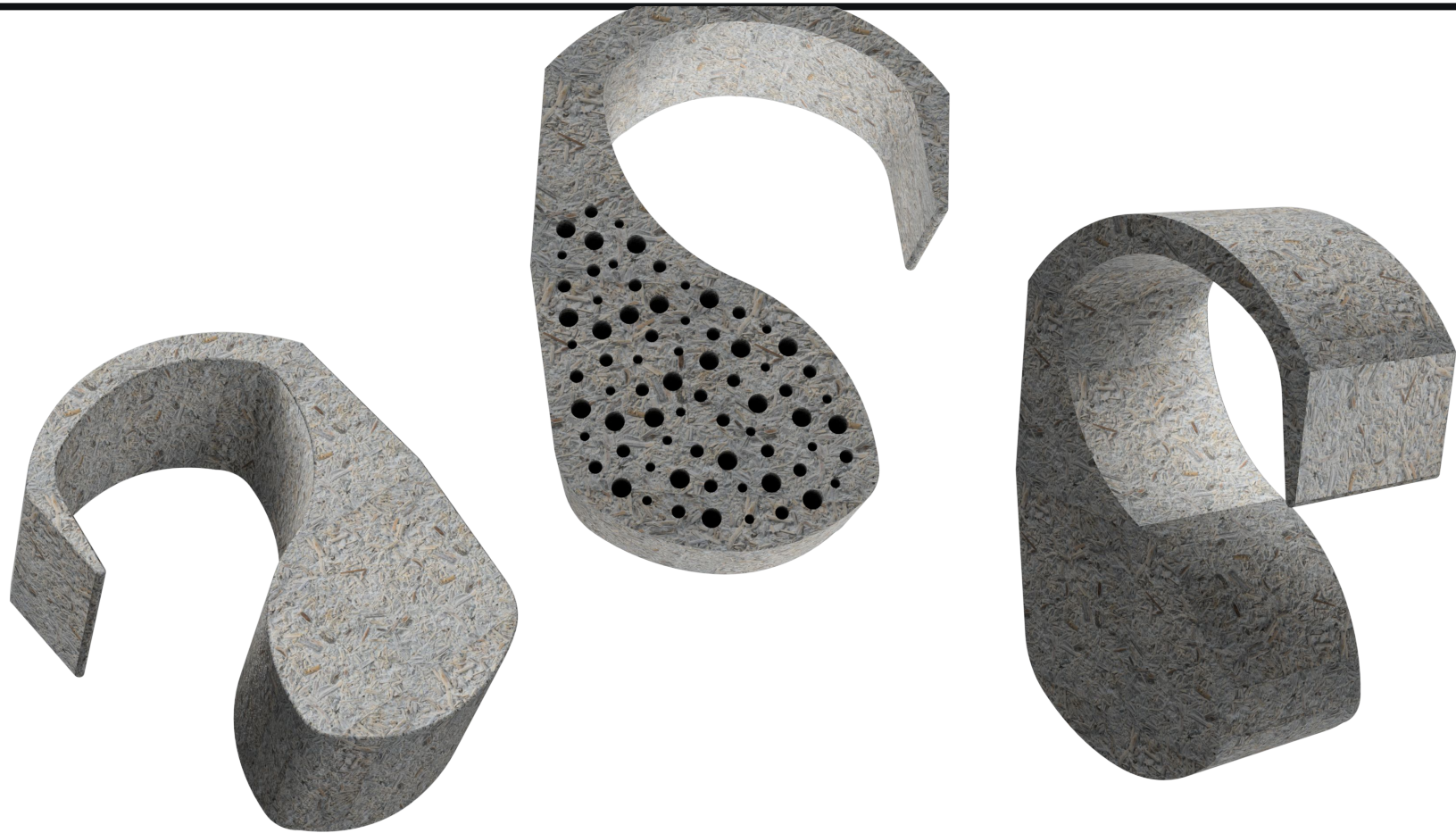










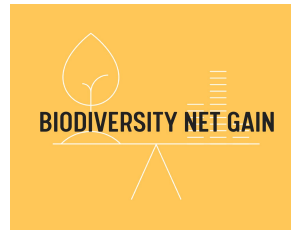
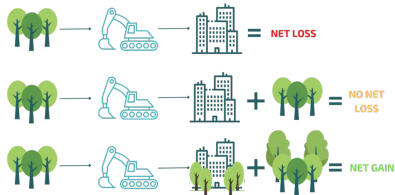
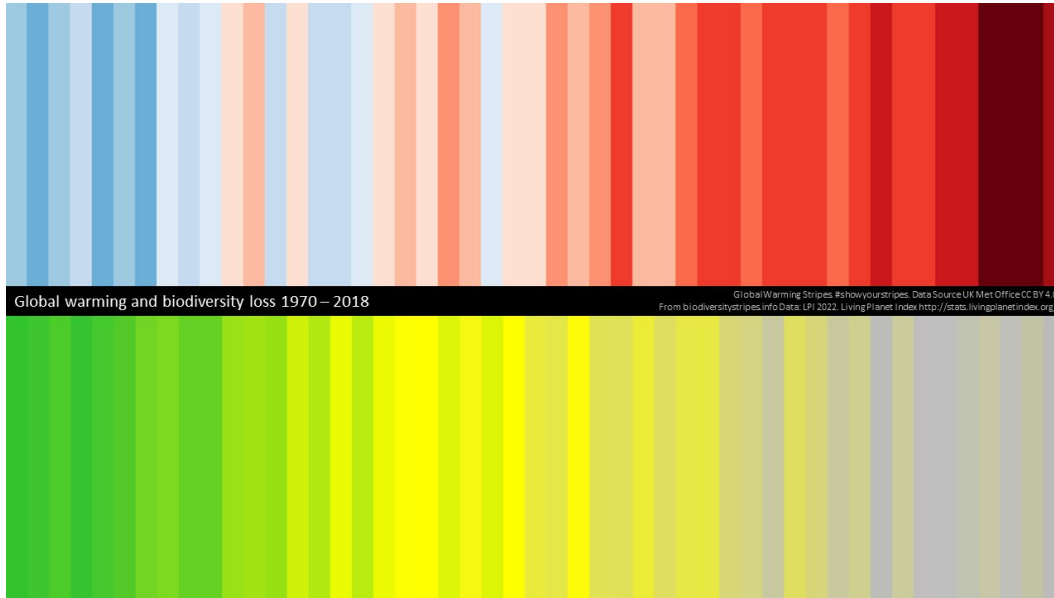


*“Reaching all
overlooked spaces
to restore Nature”*



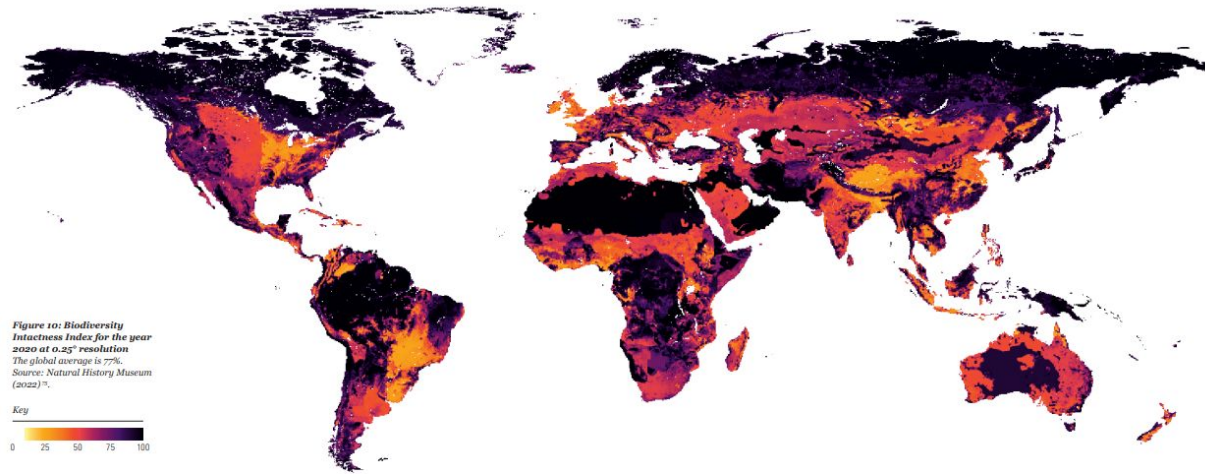
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Background

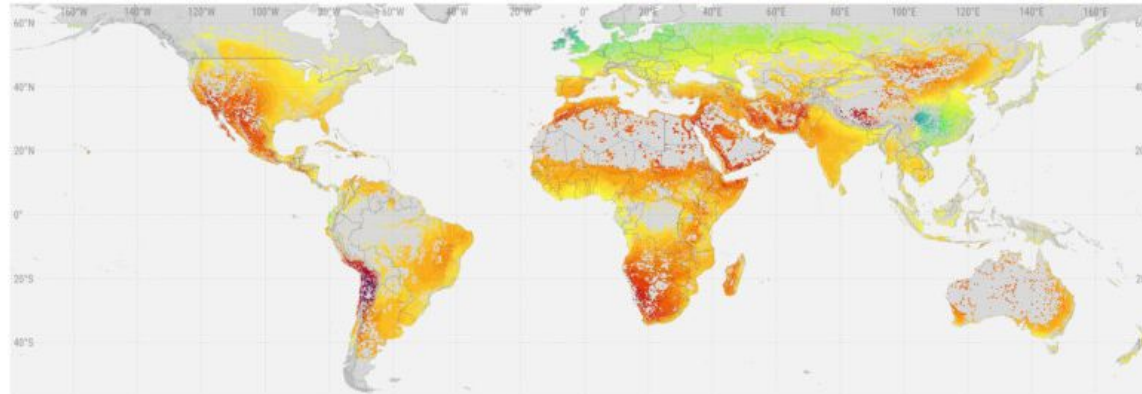


“Glocal” solutions wanted

- the triple planetary crisis—climate change, pollution emissions, and biodiversity decline—requires urgent solutions
- improving biodiversity aligns with corporate ESG strategies, integrating sustainability and environmental responsibility
- the UK's Biodiversity Net Gain scheme mandates biodiversity enhancements in development projects, inspiring the EU to introduce biodiversity credits soon
- biodiversity credits could incentivize companies to achieve conservation goals and realize financial benefits at the same time



Biodiversity Intactness Index (2020)
 (WWF - Natural History Museum, UK)

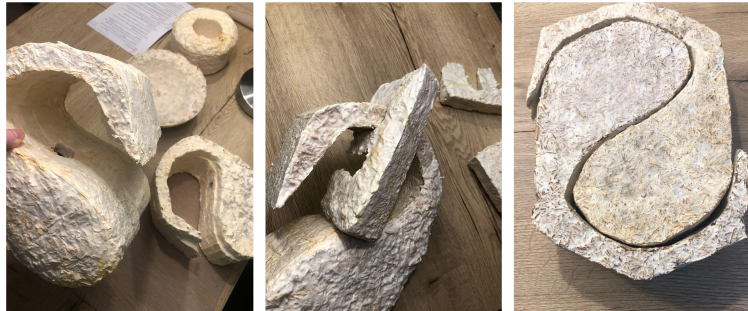


Practical photovoltaic power potential (PVOUT):
 Long-term yearly average of daily and yearly totals (Global Solar Atlas)



Potential wildlife havens?

- large-scale solar parks offer renewable energy potential and could support nature's regeneration
- over 30-35 years of operation, solar parks remain undisturbed, enabling the gradual return of flora, fauna, and fungi
- accelerating natural restoration can complement climate change mitigation with local ecosystem recovery
- biodiversity hotspots in solar parks can positively impact surrounding agricultural areas by boosting pollinator populations and birdlife, which also aids in pest control



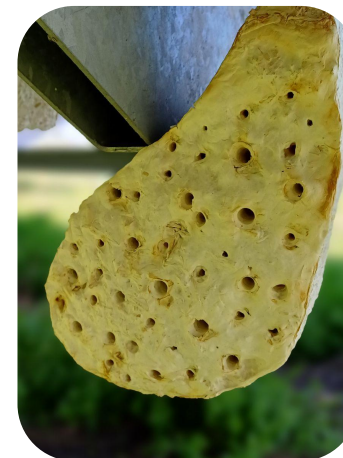
Circularity with biomaterials

- made from renewable bio-based residues
- mainly straw, hems or chop
- fully biodegradable
- decomposing within a year
- could be sourced locally
- with easy on-site disposal



Biodiversity regeneration

- enriches soil with mycelium nutrients, enhancing local flora
- embedded native flower seed capsules to support grassland rehabilitation
- provides habitats for birds, avian and terrestrial insects, ground-dwelling mammals and possibly bats, contributing to local ecosystem services
- *large and relatively undisturbed solar parks could serve as **biodiversity hubs** for surrounding areas, supporting both conservation goals for future biodiversity credits and agricultural production*

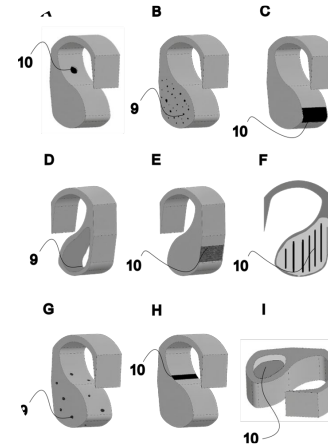
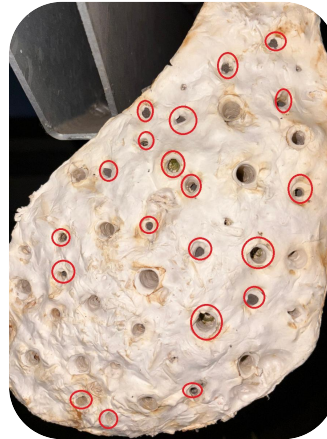


Patent (EP 25163874.8)

- soil-enriching biodegradable base
- dynamic outsourcing possibilities
- **lightweight** and flexible structure
- unique additives such as **biochar** or **seeds**
- creating '**quadrivoltaics**':
 - besides energy production,
 - biodiversity enhancement for nature credits,
 - agrivoltaic potential by increased soil fertility,
 - carbon sinking capacity via biochar

Design registration (EUIPO 015100183)

- practical form for **simple installation**
- customizable for different species
- functional for future **monitoring** by apps
- logistically efficient design





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Turning Infrastructure *into Habitat*
— No Excuses Left.



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