The UPSURGE Project Final Conference

Guiding Cities to Deliver Regenerative Urban Transformation

Biophilic Urban Spatial Design through NbS-based Green Urban Bus stops in Katowice.

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UPSURGE Project Final Conference,

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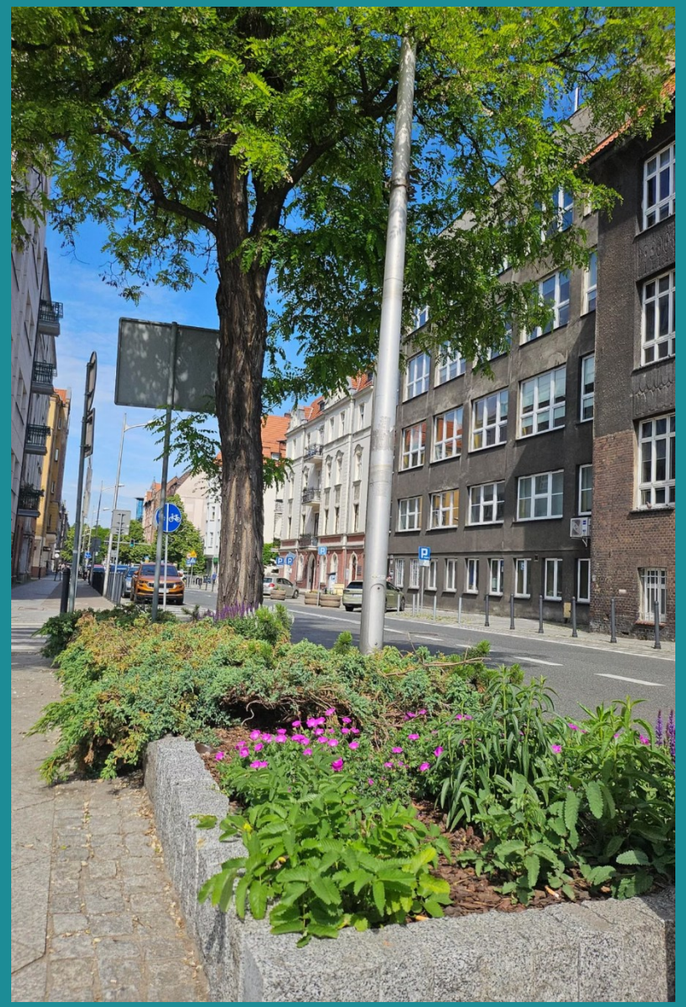
Starting Point and Key Challenges



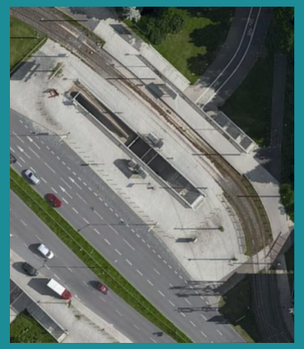
Urban Context

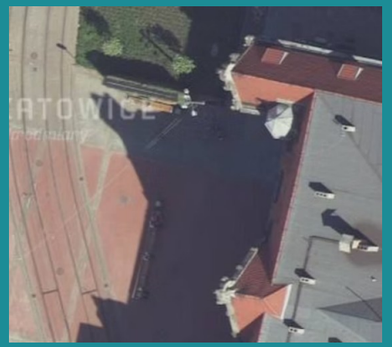
Katowice is actively developing towards greater social inclusion, operating within a dense urban fabric where public spaces experience intensive daily use.

Transit users face consistent exposure to urban heat islands, traffic noise pollution, and compromised air quality — environmental stressors that disproportionately affect vulnerable populations waiting for public transport.

Key Question

How can Nature-based Solutions be implemented where people are present every day, not only in parks or large-scale projects?





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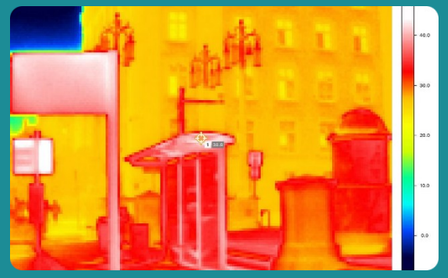
Why Bus Stops? Biophilia as a Response

Bus stops represent high-frequency touchpoints in urban life — micro-environments where diverse populations converge daily. By integrating biophilic design principles and Nature-based Solutions into these overlooked transit nodes, we can deliver measurable social, environmental, and economic benefits at the human scale.

Social Meeting Points

Bus stops serve as informal gathering spaces where people from diverse backgrounds interact daily — fostering chance encounters, community connection, and shared public life across demographic boundaries.



Environmental Response

Green bus stops directly address urban heat waves, improve localised air quality, reduce psychological stress, and mitigate surface overheating through strategic placement of vegetation and climate-responsive materials.

Social & Economic Benefits

Enhanced thermal comfort increases dwell time and rider satisfaction, while durable, low-maintenance green infrastructure provides long-term cost savings and improved accessibility for all users.

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Green Bus Stops: Transforming Everyday Spaces

Implementation Scope

- Four pilot green bus stops strategically located across diverse urban contexts
- One green urban oasis installation at Market Square, serving as a demonstration hub

Strategic Locations

1. **Ziołowa Street** – Adjacent to Ochojec Hospital, serving patients and medical staff
2. **Jagiellońska Street** – Near Silesian Parliament Square, high civic foot traffic
3. **Market Square** – Central commercial district with diverse user demographics
4. **Silesian Park Area** – Connecting recreational green space with urban transit network

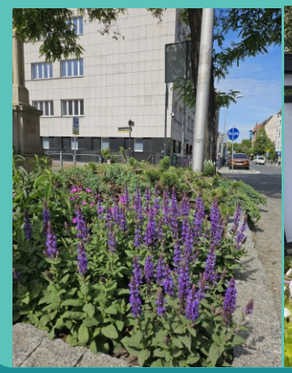
Transformation Impact

1

Before: Overheated, uncomfortable waiting areas with minimal weather protection and no environmental amenities

2

After: Sheltered, user-friendly, thermally comfortable spaces integrating environmental education signage and biophilic design elements



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Key NbS Innovations

These green bus stops demonstrate that Nature-based Solutions can function as essential urban infrastructure — not merely decorative elements. Each intervention integrates multiple ecological functions to address specific urban challenges whilst enhancing the daily user experience.

Greenery Integration

Native plant species sourced from regional post-industrial landscapes, deliberately selected for resilience to urban microclimates, pollution tolerance, and minimal irrigation requirements.

Rainwater Retention

On-site stormwater management systems capture and infiltrate precipitation, reducing urban runoff whilst passively irrigating vegetation — creating closed-loop hydrological cycles.

Thermal & Acoustic Comfort

Strategic placement of vegetation and permeable surfaces moderates surface temperatures by up to 8°C, whilst dense foliage attenuates traffic noise and creates sensory-rich waiting environments.

Design Philosophy: Nature-based Solutions treated as functional urban infrastructure, not decorative elements — delivering measurable environmental services at the neighbourhood scale.

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Non-Stop Action: Media Coverage & Public Engagement

The green bus stop initiative generated significant media attention and public interest, demonstrating strong appetite for visible, human-scale climate interventions. Coverage spanned national television programming, urban planning publications, and grassroots community channels — amplifying project visibility and inspiring replication discussions in neighbouring municipalities.

"Clean Poland" — Featured on Polsat TV's environmental programming, reaching a national audience of 2.3 million viewers

"ZIELEŃ MIEJSKA" — Cover story in Abrys Publishing House's premier urban landscape architecture journal

Data, Monitoring and BeeOmonitoring

Evidence-based urbanism requires continuous measurement. Rather than relying on intuition or assumptions, the project integrates multi-scale monitoring systems to quantify environmental performance, validate design hypotheses, and inform future Nature-based Solutions (NbS) investment priorities across the city.

Microclimate Monitoring

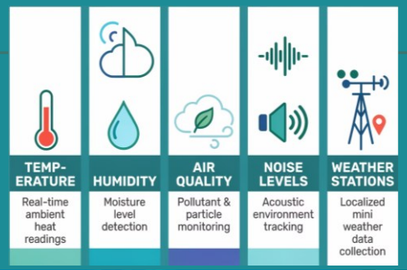
Temperature, humidity, and air quality sensors deployed at each site, generating real-time data on thermal performance and pollution mitigation effectiveness.

Vegetation Health Tracking

Seasonal plant vigour assessments, species survival rates, and phenological observations inform adaptive management protocols.

User Behaviour Studies

Dwell time analysis, usage patterns, and qualitative feedback surveys measure social impact and community acceptance.



BeeOmonitoring

Apicultural hives positioned near green bus stops enable novel ecosystem health assessment through pollen analysis. Bees serve as biological sensors — their foraging patterns and pollen composition reveal local biodiversity, pollutant exposure, and plant community dynamics within a 3km radius.

Environmental quality assessment from an ecosystem perspective — monitoring heavy metals, pesticides, and floral diversity through naturally collected pollen samples.

Why This Matters: Data-driven decisions replace intuition, enabling improved planning of future NbS interventions and demonstrating return on investment to municipal decision-makers.

Role of Stakeholders: Place Labs in Action

Co-design processes ensured interventions responded to actual user needs rather than top-down planning assumptions. On-site consultations involved residents, hospital patients and staff, older adults, environmental activists, pupils, and university students — building social legitimacy and local stewardship from project inception.

Concept Guidelines

Define goals, scope, and user needs

Collaborative Thinking

Co-design workshops with stakeholders

Detailed User Planning

User journeys, prototypes, and feedback

Implementation & Handover

Deploy solution and transfer ownership

This participatory approach transformed bus stops from purely functional infrastructure into community-valued assets, increasing long-term maintenance commitment and social ownership.

On-Site Workshops

Design charrettes held directly at pilot locations, enabling contextual feedback and immediate spatial problem-solving with actual users.

Diverse Voices

Intentional outreach to underrepresented groups — including accessibility advocates and non-Polish speakers — ensured inclusive design outcomes.

Iterative Refinement

Multiple feedback loops between concept development and community review prevented costly late-stage redesigns and built consensus.

Cooperation and Financing Models

Sustaining green infrastructure requires moving beyond traditional council maintenance budgets. Katowice piloted innovative partnership models that distribute responsibility, leverage private-sector resources, and build community stewardship — creating financially resilient systems for long-term NbS care.

🏢 "Adopt a Stop"

Companies or institutions sponsor the maintenance of individual bus stops, gaining modest brand visibility whilst directly supporting local environmental quality. Participating organisations commit to 3-year care agreements covering plant health, irrigation, and seasonal upkeep.

🤝 Corporate Social Responsibility

Local businesses integrate green bus stop support into existing CSR frameworks, aligning environmental investments with workforce transit patterns and neighbourhood engagement goals.

📢 Green Advertising

Revenue from eco-friendly advertising placements on green bus stop shelters funds ongoing horticultural care and monitoring infrastructure — creating self-sustaining maintenance mechanisms.

🌱 Community Collaboration

Resident groups, NGOs, and university research labs co-manage sites through volunteer workdays, citizen science programmes, and educational programming — deepening social connection to place.

Key Insight: NbS becoming a driver of cross-sector cooperation, not just a council capital investment — building resilience through distributed responsibility.

City-centered approach to catalyze nature-based solutions through the EU Regenerative Urban Lighthouse for pollution alleviation and regenerative development

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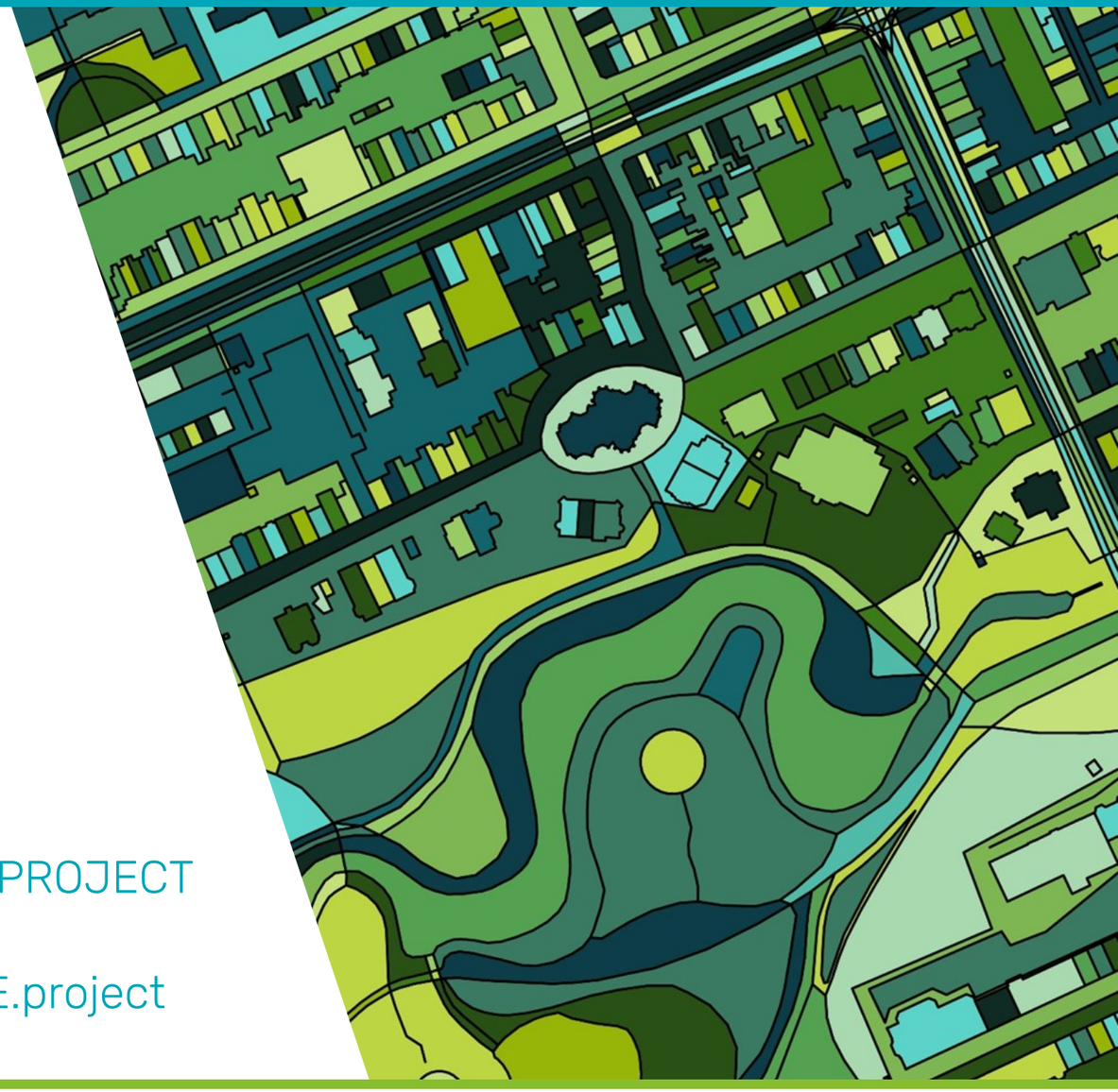

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Join the Urban Regeneration Movement

The UPSURGE Project demonstrates that regenerative urban transformation is achievable through collaborative innovation, evidence-based design, and community-centred implementation. Green bus stops represent just one scalable intervention in a larger portfolio of Nature-based Solutions reshaping European cities.

Explore Project Resources

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