

FinEst Centre
for Smart Cities

SMART CITY CHALLENGE 2025

City Challenge

Max 3 pages

send to smartcity@taltech.ee by Sept 30, 2025

Challenge Title – Scanning for circularity

Rotterdam, The Netherlands and Tallin, Estonia

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1. What is the future urban challenge that would need a solution to?

Category: Climate Resilient City

Challenge Overview

Rotterdam and its neighboring municipalities face a major challenge in transitioning toward circular construction and energy-efficient buildings. A key barrier is the lack of insight into existing building materials — especially when planning renovations or insulation upgrades. Without accurate data on material types, quantities, and conditions, it's difficult to:

- Assess reuse potential.
- Plan sustainable retrofits.
- Comply with circular economy and energy regulations.

This challenge is amplified in older urban areas where documentation is incomplete or outdated.

Why It's Important

- Circular material use reduces waste and carbon emissions.
- Building insulation is critical for energy efficiency and climate goals.
- Accurate material data enables targeted interventions, reducing costs and improving impact.
- Solving this is a high priority for Rotterdam's climate strategy and renovation roadmap.

Is This a Unique Challenge?

This is not unique to Rotterdam. Many European cities with aging building stock — such as Tallin, Brussels, Berlin, and Milan — face similar issues. The challenge is especially relevant for cities aiming to meet EU renovation wave targets and circular economy directives.

2. Innovation.



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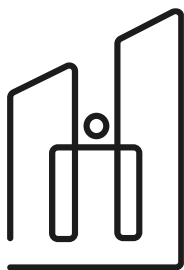


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Rotterdam has begun exploring **drone-based scanning technologies** to identify building materials from façades and rooftops. These scans can be processed using AI to recognize material types and insulation status. However, current solutions face limitations:

- **Accuracy and reliability** of material recognition algorithms.
- **Lack of legal validation** for using this data in official renovation planning or subsidy applications.
- **Fragmented data ecosystems**, making it hard to integrate scan results with city planning tools.

To overcome this, the future solution must:

- Combine **drone scans with AI-powered material recognition**.
- Be **validated by researchers** to ensure scientific and legal credibility.
- Integrate with **city databases and renovation planning platforms**.
- Be scalable and adaptable to different building typologies and urban contexts.

3. Expected impact of your pilot solution.

Impact on the City Environment

- Accelerated transition to **circular construction**.
- Reduced material waste and carbon footprint.
- Improved energy efficiency through targeted insulation upgrades.

Impact on Citizens

- Better access to **subsidized renovations** and energy-saving measures.
- Healthier living environments due to improved insulation and reduced emissions.
- Increased trust in city-led sustainability initiatives.

Impact on City Governance

- Data-driven renovation planning.
- Enhanced ability to meet **EU climate and circularity targets**.
- Reduced administrative burden through automated material assessments.

4. Piloting

Rotterdam is highly motivated to become a piloting partner for this solution because it aligns directly with our strategic goals in **circular construction, energy efficiency, and climate resilience**. We are actively seeking innovative ways to accelerate building renovations and insulation upgrades, and gaining accurate insight into existing materials is a critical missing link.



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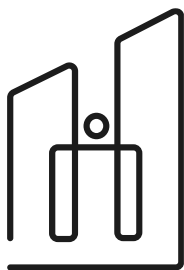


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We already have experience in **urban data ecosystems**, and have begun exploring **drone-based scanning technologies**. Our city has the technical infrastructure, stakeholder networks, and policy frameworks to support a real-world pilot. We also collaborate closely with local universities and research institutes, which positions us well to **validate and refine AI-based material recognition models** in line with legal and regulatory standards.

By participating in this pilot, we aim to:

- **Improve renovation planning** and circular material reuse.
- **Support legal acceptance** of new technologies through research-backed validation.
- **Share learnings** with other cities facing similar challenges.

Rotterdam's capability to participate includes:

- Access to diverse building typologies for testing.
- Strong partnerships with academic and technical experts.
- A governance structure open to innovation and cross-border collaboration.



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