

M|M≡Si2  
materiali smart per il costruito

## TOWARDS NEW GENERATION SOLUTIONS FOR THE BUILDING ENVELOPE

Building renovation requires deep innovation in technologies, materials and processes in order to meet the growing needs of environmental sustainability, energy saving and well-being.

**MIMESIS PROJECT FACE THIS CHALLENGE.**



# BACKGROUND

- The **Italian Building heritage** is among the oldest in Europe. **15%** of residential buildings were built before the **1900s**
- **2.3 million buildings** are in **poor conditions of maintenance**
- This has major social returns in terms of **well-being of people** and **urban degradation**
- Over **20%** of these houses are concentrated in **historic centers** and subject to "rigid constraints" required by **Urban Building Regulations** which often set limits on façade interventions
- Over the next **20 years**, the majority of interventions will be related to the **refurbishment of existing buildings**
- It is estimated that **98%** of the buildings that will be present in the next **50 years have already been built**, while **new buildings** will be only **2%** on the total

# ACTIVITIES

Within the project duration, the researchers will work on the development of **5 specific results**

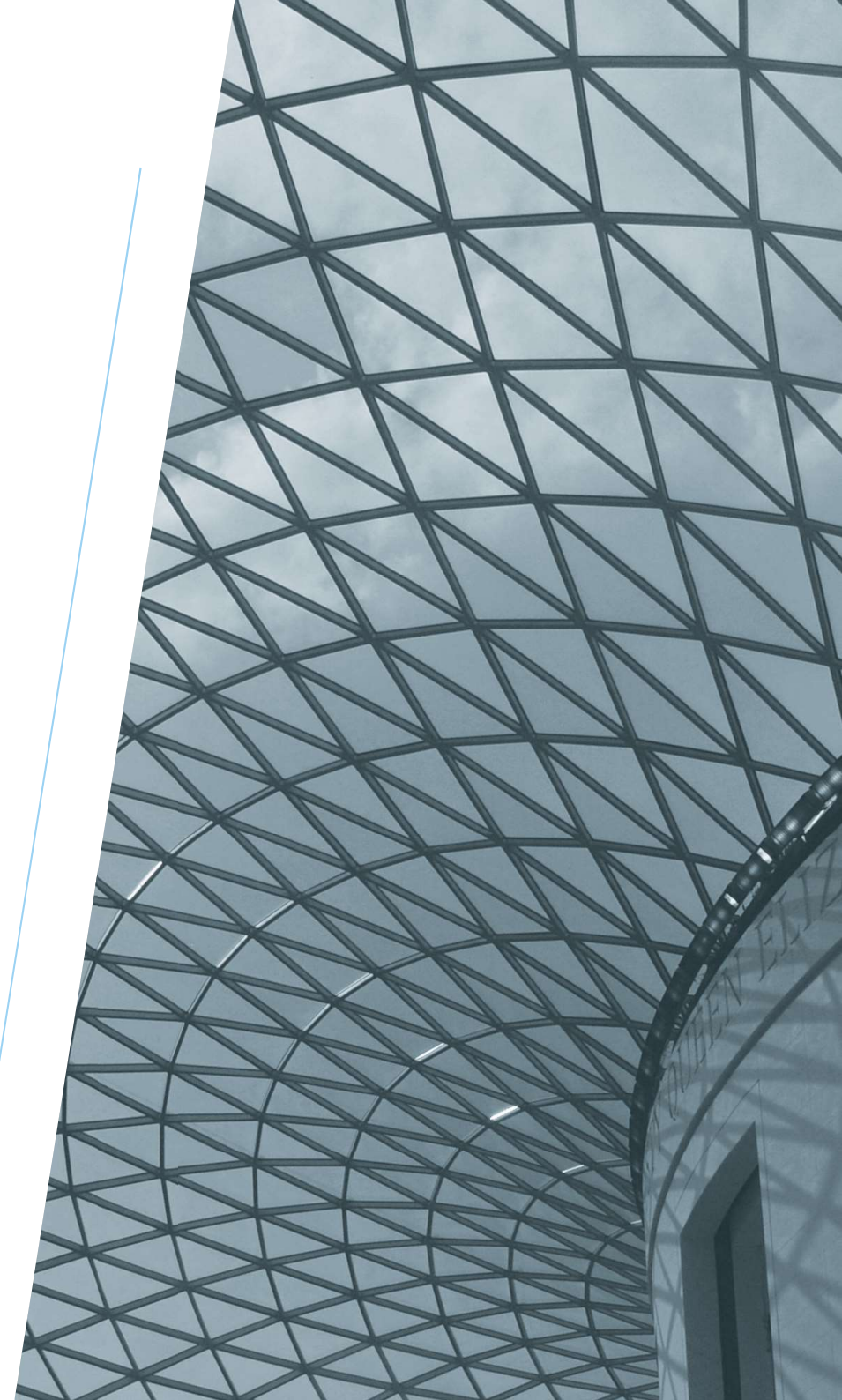
**SENSOR SOLUTIONS** and related **MEASUREMENT CHAINS** able to monitor 24/7 specific key indicators of the "health" of masonries and to identify preventive interventions to ensure optimal operating conditions, thus avoiding major degradation

**PROTOTYPES OF SENSORIZED MASONRY**, manufactured with materials commonly used in construction and in the renovation of the building envelope: bricks, mortars, plasters, adhesives, reinforcement systems, coatings, ...

**EXPERIMENTAL VALIDATION**, both in laboratory and on-field, of the functionality, effectiveness and durability of the smart systems (material - sensor integration). Definition of specific **PROTOCOLS** of experimental tests to verify the reliability and durability of smart systems over time

**GUIDELINES** for the installation and maintenance of integrated sensorized solutions

**DEMONSTRATION LABORATORY**, both physical and digital, to accelerate the technology transfer





# EXPECTED RESULTS

## NEW GENERATION SOLUTIONS FOR THE BUILDING ENVELOPE

Connected. Integrated. With high performance in terms of: living comfort, environmental impact and low energy consumption.



### CONNECTED

Sensorized materials for 24/7 self-diagnosis and alerting

**PROS** MAINTAINING OPTIMAL WORKING CONDITIONS



### INTEGRATED

Perfectly integrated into historical buildings, both listed and non-listed

**PROS** POSSIBILITY OF APPLICATIONS IN MANY REGULATED BUILDING CONTEXTS



### SUSTAINABLE

Compliant to the standards of circular economy

**PROS** REDUCED IMPACT ON THE URBAN ENVIRONMENT AND THE PLANET



### HIGH-PERFORMANCE

Optimal thermo-hygrometric conditions and durability

**PROS** ENERGY SAVING. INDOOR WELLNESS. RELIABILITY OVER TIME.

# THE NUMERBS OF

**M|M=Si2**  
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**5**

Research laboratories

**7**

Highly specialised  
partner companies

**2**

On-field demonstrators

**1**

Physical and digital demonstration lab  
to accelerate technology transfer



# Discover more

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GET IN TOUCH WITH THE RESEARCHERS

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MimesIS project is financed by the European Funds of the Emilia-Romagna Region – ERDF ROP 2014-2020 – Axis 1 Research and Innovation, Strategic Industrial Research Projects aimed at the priority axes of the Intelligent Specialization Strategy (DGR n.986 / 2018).

PROJECT LEADER

**certimac**  
certificazione materiali per costruzioni



RESEARCH PARTNERS



**GeoSmart Lab™**  
Laboratorio delle Scienze e Tecnologie Geografiche e delle Smart Cities



**Consiglio Nazionale delle Ricerche**  
istec Istituto di Scienza e Tecnologia dei Materiali Ceramici

INDUSTRIAL PARTNERS

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**Regione Emilia-Romagna**

