One Gateway to Scale-Up

An Open Innovation Test Bed for Advanced Building Materials

Exploit4InnoMat (E4IM)
Pilot Lines • Testing • Validation • Living Labs • Industrial Uptake

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Exploit4InnoMat : An Open Innovation Ecosystem for exploitation of materials for building envelopes towards zero energy buildings

Exploit4InnoMat has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No. 101092339.

E4IM at a glance

Horizon Europe project building an Open Innovation Test Bed for advanced building-envelope materials

8	6	27	11+4
PILOT LINES	SERVICE GROUPS	PROJECT PARTICIPANTS	FINAL + INTERMEDIATE PRODUCTS

EU funded project
4 years duration (2023-2026)
Project Coordinator: Unisystems (EL)
Technical Coordinator: NTUA (EL)



THE CHALLENGE

Bridging the gap between Research and Industry

E4IM joins expertise and infrastructure that individual innovators often struggle to access

01

ONE CONTACT

A coordinated route to expertise and suitable services

02

ACCESS MULTIPLE CAPABILITIES

Pilot manufacturing, testing, modelling and demonstration

03

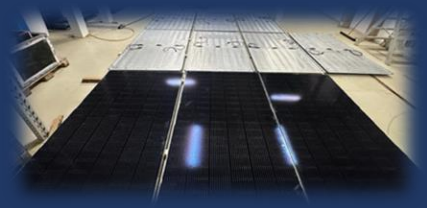
INDUSTRIAL VALUE

Lower technical uncertainty and a clearer path towards adoption

FROM MATERIAL IDEA TO BUILDING APPLICATION

Eight pilot lines, different production routes

The capabilities span materials processing, smart systems and industrialized components



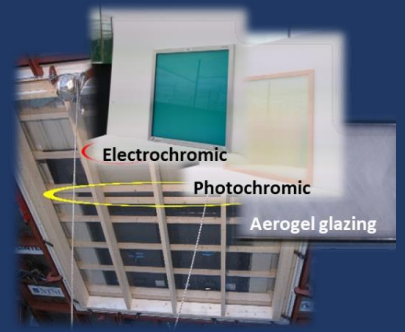
PL1: PVT façade elements
SINTEF - Norway



PL2: 3D printed semi-inorganic elements
NTUA - Greece



PL3: Mortars & premix products
NTUA - Greece



PL4: Smart glazing
NTNU - Norway



PL5: Functional coatings
RISE – Sweden



PL6: Advanced ceramics
CSIC - Spain



PL7: Robotic spraying / prefabrication
USTUTT - Germany



PL8: Cement-free components
CETMA - Italy

A diverse portfolio for high-performance building envelopes

The work covers functional materials, industrialized components and smart energy systems

THERMAL INSULATION

Lightweight and PCM-enhanced mortars

FUNCTIONAL COATINGS

Solar-reflective and protective finishes

ADVANCED CERAMICS

Insulating bricks incorporating secondary resources

INDUSTRIALIZED COMPONENTS

Prefabricated concrete elements, cement-free panels and 3D printed cladding

ENERGY – ACTIVE SYSTEMS

PVT facades and smart glazing

Production completed

Beyond formulations: materials and components produced

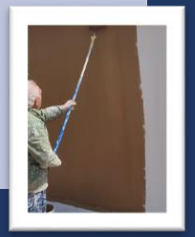
Internal & External Mortar

- 250 L each mortar for upscaling
- 1300 L CSP
- 400 L Hybrid Perlite



Internal & External Paint

- 200 L internal paint
- 600 L external paint



Cement – free panels

- 200 cement-free panels



Bricks

- 4000 bricks



Prefabricated concrete

- 1220 m^2 load bearing
- 40 m^2 of refurbishment
- 1200 Hollow Mineral Bodies



3D printed elements

- 40 L of CPS
- 100 kg filament
- 150 L hybrid perlite
- 200 elements



PVTs

- 25 panels (50 m^2)



Smart windows

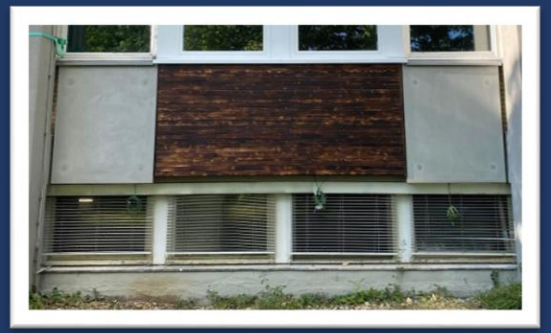
- 20 m^2 electrochromic glazing films



From pilot lines into real buildings

Three living laboratories &a demonstration building







Living Labs - Greece, Germany, Norway



Demo building – LTCP Lavrion, Greece

- Sensors
  - ✓ Temperature
  - ✓ Heat flow
  - ✓ Humidity

- Pyranometers
  - ✓ Global solar radiation
  - ✓ Diffuse solar radiation

- Online weather station
  - ✓ Ambient temperature
  - ✓ Humidity
  - ✓ Solar irradiance
  - ✓ Wind speed
  - ✓ Wind direction
  - ✓ Rainfall
  - ✓ Ground temperature

Beyond Pilot Lines: Integrated Services for Industrial Uptake

Flexible access: one service or a tailored combination of services, depending on the needs

1

Pilot lines

Material development, formulation optimization, scale up and prototypes

2

Characterization & Environmental Assessment

Performance, environmental impact and recyclability

3

Modelling & simulation

Material, process and building-performance prediction & simulation

4

Living laboratories

Installation, real-building demonstration and operational monitoring

5

Standards & regulatory

Test methods, compliance and certification pathways

6

Innovation & exploitation

Business models, IPR and industrial partnerships

From individual technical support to an integrated innovation pathway – tailored to needs

A single-entry point connects needs to capabilities

Coordinated, customer-oriented access model

1

Company need

Product concept, technical challenge or specific service request

2

Assessment

Identify requirements, feasibility and relevant expertise

3

Tailored Service Selection

Select one service or a tailored combination of services

4

Coordinated Delivery

Partners provide the selected services in a coordinated workflow

One point of contact – flexible access to individual or combined services

One gateway. One coordinated solution.

Flexible access to individual services or a tailored combination

INDUSTRIAL CLIENT / Specific need

↓

SINGLE ENTRY POINT / ONE – STOP SHOP

Needs assessment: Service selection; Coordination

↓

Material development	**Pilot manufacturing**	**Testing & Validation**	**Modelling & simulation**
LCA/LCC	**Standards & regulatory**	**Living labs & monitoring**	**Innovation & exploitation**

One service or several services – selected according to client's needs

↓

ONE CONSOLIDATED OUTCOME

A coordinated response and combined results for the client

One gateway.

Multiple capabilities.

One coordinated solution.

Exploit4InnoMat links advanced building materials to the expertise and evidence needed for industrial uptake

Thank you – Dr Aggeliki Skaropoulou – NTUA

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