MEZeroE

Measuring Envelope products and systems contributing to next generation of healthy nearly Zero Energy buildings

Project overview

Sustainable Places 2022, Nice (France)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under **grant agreement No 953157**

eurac research

Senior researcher at Eurac Research (Italy)

- Research area: indoor environmental quality (**IEQ**), health & comfort in the built environment
- Expertise in simulations (e.g. **CFD**) and experimental research
- Project coordinator: H2020 "**MEZeroE**", ERDF "New-Air", and "Breath“
- **Chair** of **IBPSA Publications** Committee
- Member of three **ASHRAE Technical Committees**: 2.1 "Physiology and Human Environment“, 2.3 "Gaseous Air Contaminants and Gas Contaminant Removal Equipment“, and 4.10 "Indoor Environmental Modeling"

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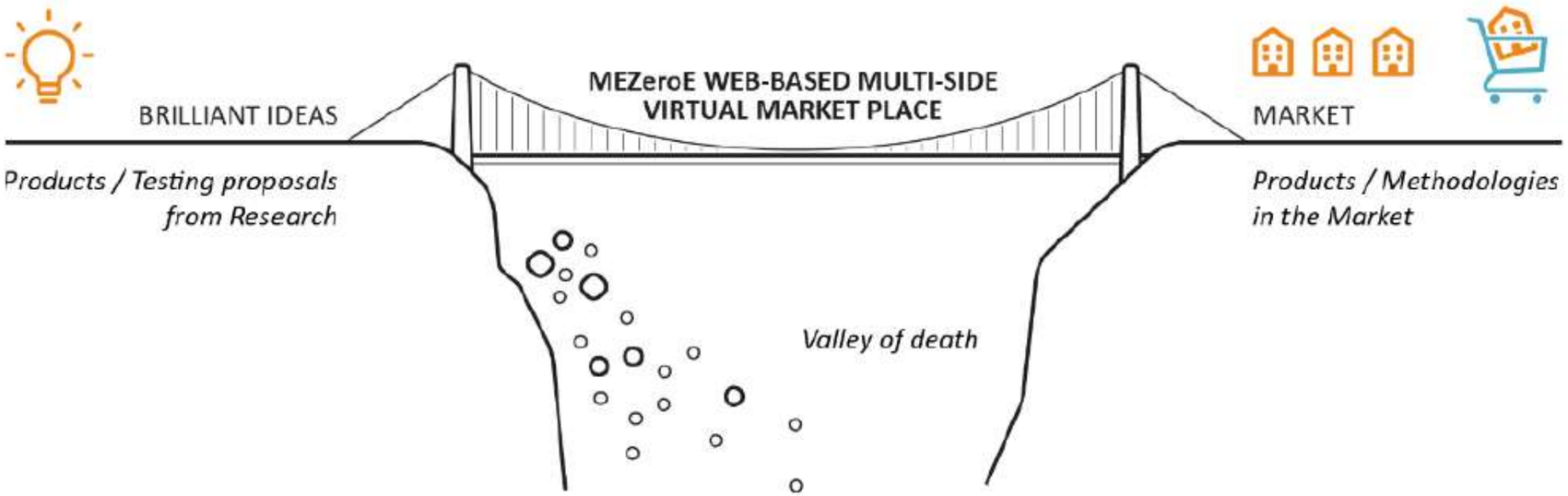

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MEZeroE aims to create an EU distributed **open innovation ecosystem** for:

- developing nearly Zero Energy Building (nZEB) Enabler **Envelope Solutions**;
- transferring **knowledge**;
- **matching** testing **needs** with test **facilities**;
- providing **monitoring** in real **buildings** used as **living labs**;
- **standardizing** cutting-edge **solutions** coming from SMEs and larger industries.

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RTD PARTNERS
- EURAC
- POLIMI
- LEITAT
- UIBK
- ZAG
- CUT
- ITEC
- DTU
- TECNALIA

M&V PARTNERS
- AIRBNCO
- NUVAP
- GREETEG

IND PARTNERS
- FOCCHI
- VELUX
- WINDOWMASTER
- FLEXBRICK
- HELIATEK
- TECNAN
- FLEX&ROBUST
- ROTHOBLAAS
- RIKO
- INDRESMAT

BIZ PARTNERS
- INCURVO
- COMPAZ
- R2M

MEZeroE eco-system

RTD partners: providing testing facilities, research and innovation capacities and knowledge of standardisation and certification processes

IND partners: bringing innovative products or products needing standardise assessment methodologies

M&V partners: providing advanced and comprehensive monitoring systems and data analytics shared environment

BIZ partners: providing capacity and practical tools to support innovation process, results exploitation and knowledge transfer

External participants: providing buildings to be used as living labs (see letter of support)

External participants: market players and early adopters (see letter of support)

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Impact 1 - Realisation of **open and upgraded facilities** at the EU level for the design, development, testing, safety assessment, and upscaling of materials and components for **building envelopes**, easily accessible to users across different regions of Europe

Impact 2 - Facilitated **access** to building testing/monitoring **equipment** and to **finance** (in particular for SMEs) through a **single entry point**

Impact 3 - At least a **20% increase** in the number of new **SME users** for existing test beds

Impact 4 - At least **20% improved industrial process** parameters and **30% faster verification** of materials performance for highly promising applications and at least **30% reduction in energy** consumption across the entire **life cycle**

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Single entry point (SEP) web-based multi-side **virtual marketplace** which will include:

- 9 Pilot Measurement & Verification Lines (**PM&VL**)
- 3 Open Innovation Services (**OIS**)
- Access to real-buildings as living labs (**LL**)
- **Additional resources and support** including training, business model development, systematic IP and knowledge management, and more

MEzeroE will **fast-track prototypes to the market** as fully **characterized** and **exploited** (full potential unlocked) products

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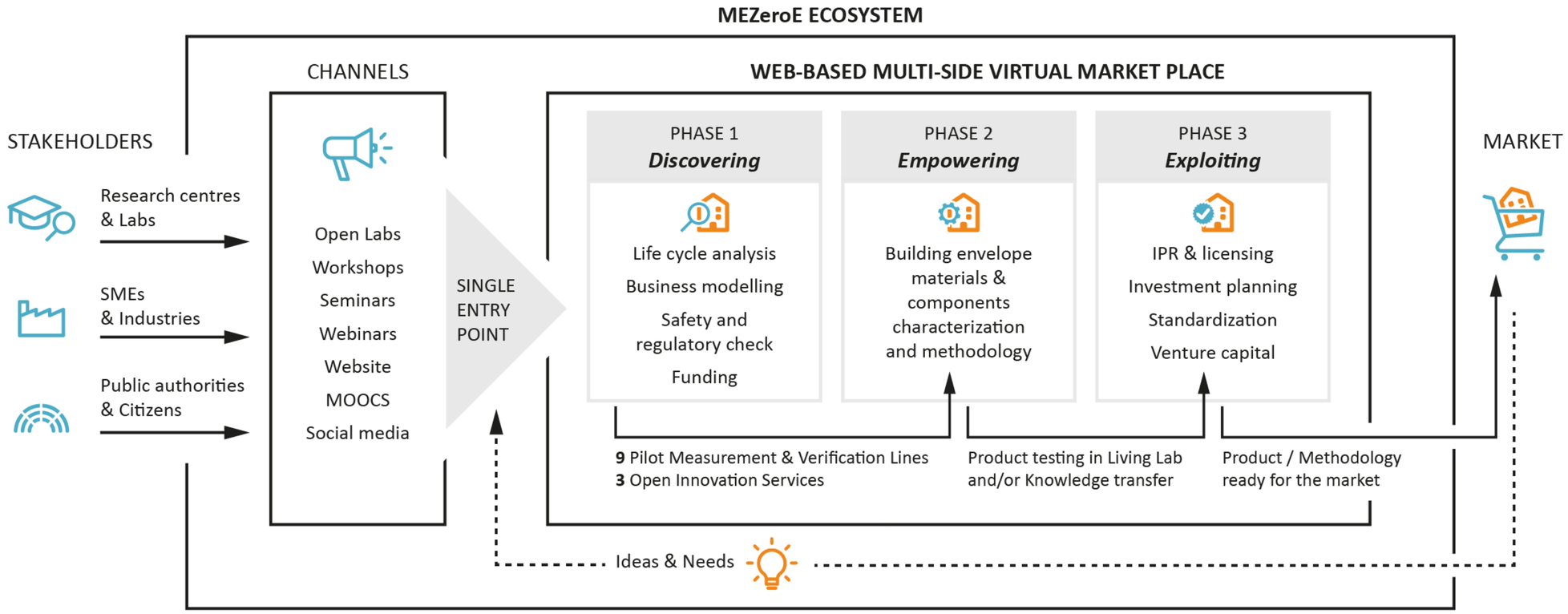

MEZeroE accompanies enterprises in adopting the open innovation approach, namely discovery (phase 1) → empowering (phase 2) → exploiting (phase 3)

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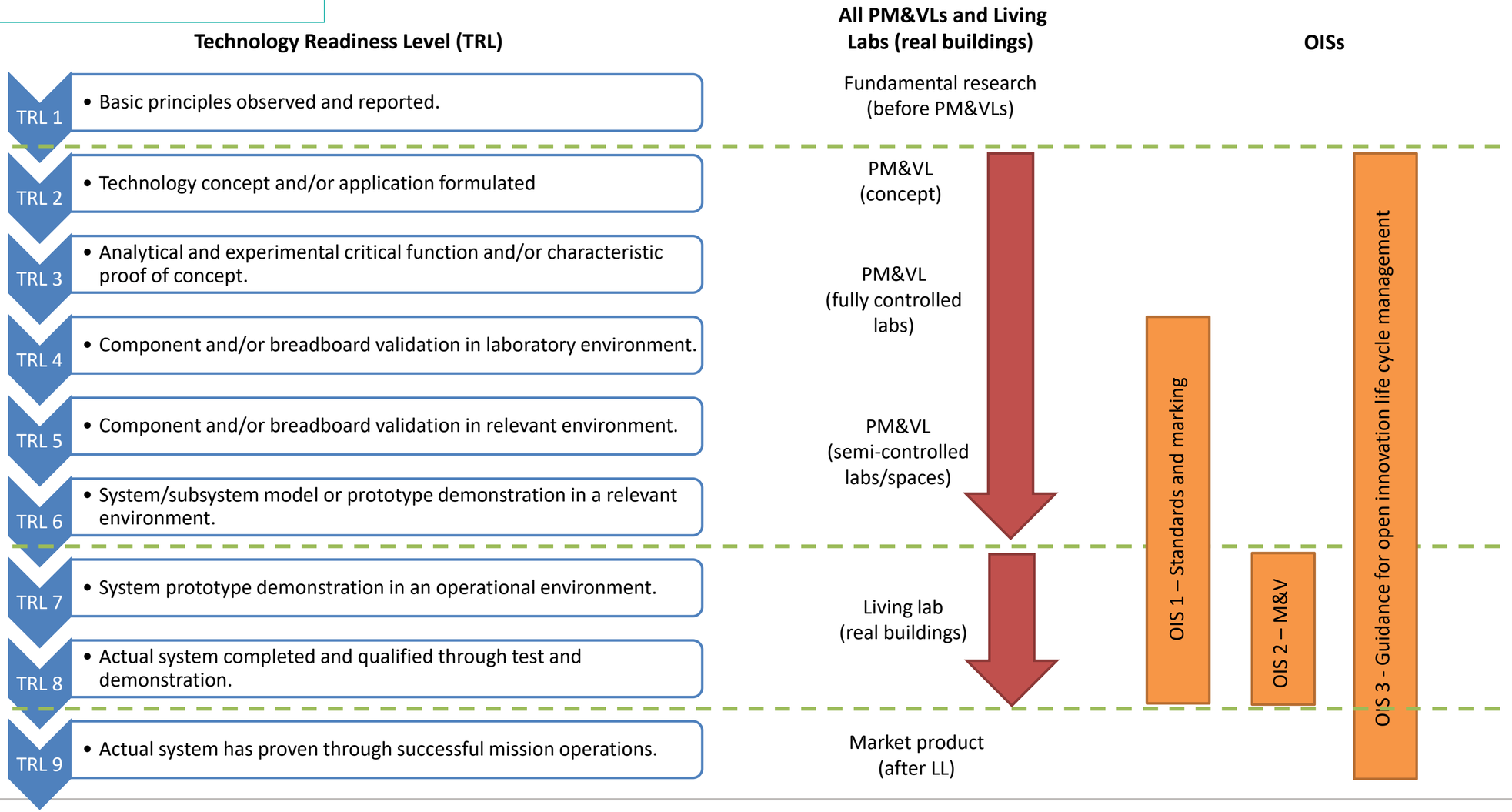

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PM&VLs	Title	Leader
PM&VL1	Advanced BIPV and hybrid PV/T systems characterisation	Tecnalia
PM&VL2	Building envelope/IEQ interaction	Eurac
PM&VL3	Active energy component characterization	Leitat
PM&VL4	Visual and thermal performance analysis of dynamic glass systems	Leitat
PM&VL5	Building/user interaction characterization	DTU
PM&VL6	Multi-layers dry nEES characterization	PoliMI
PM&VL7	Mechanical resistance and stability characterization of connections/joints btw component materials and supporting structures	CUT
PM&VL8	Solar gain control in semi-transparent envelope component	UiBK
PM&VL9	Wooden prefab components assessment line	ZAG

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PM&VL	Technical requirements	Requirements categories under EU Regulation 305/11	Requirements implementation
1, 7, 9	Safety	Mechanical resistance and stability	Statics, durability, Seismic resistance
		Safety in case of fire	Reaction to fire, fire resistance, propagation
		Safety and accessibility in use	Building as a safe to use system
2, 6, 8	Health	Hygiene, health, environment	High IEQ, water tightness, vapour permeability
		Protection against noise	Airborne sound insulation, soundscape, vibration
3, 4, 5	Efficiency	Energy economy, heat retention	nZEB, SRI, air permeability
		Sustainable use of nat. sources	GPP, envelope circular economics

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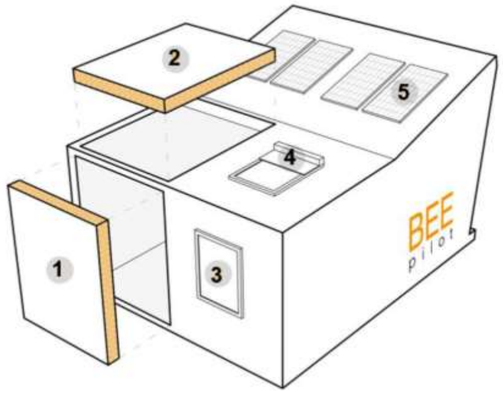
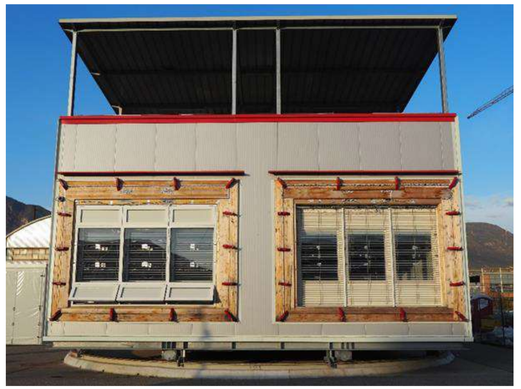
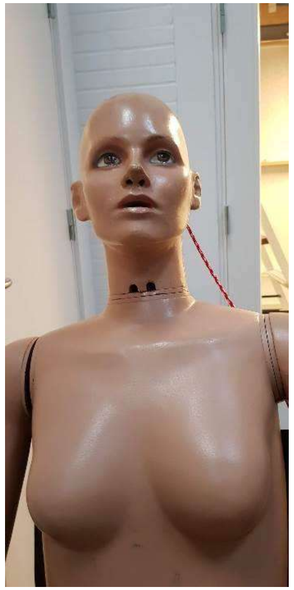
BEE pilot (PoliMIi)



Calorimeter (Eurac)

MultiLab (Eurac)





Thermal manikin (DTU)

High capacity fan (Tecnalia)

Acoustic manikin (Eurac)

Kubik (Tecnalia)

PASSYS outdoor test cells (UIBK)

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OISs	Title	Leader	Other partners
OIS1	Standard framework procedures for certification and marking	ZAG	ITEC, Eurac, Tecnalia
OIS2	Cost-effective M&V smart kit for living labs	Eurac	Arbnco, greenTEG, Nuvap, DTU, PoliMi
OIS3	Guidance for open innovation life cycle management	Incurvo	Eurac, R2M, PoliMi, Tecnalia

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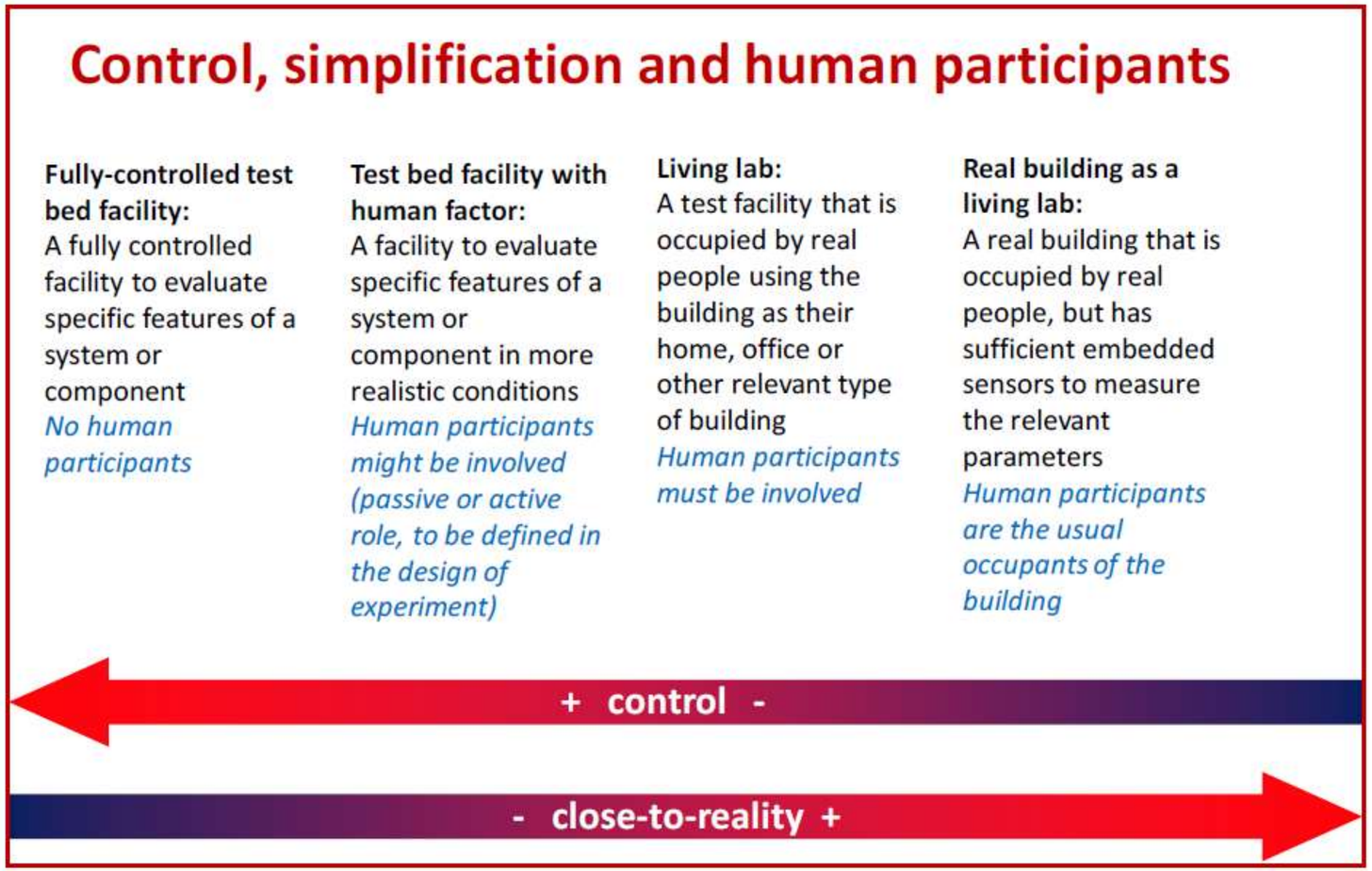

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Real buildings as living labs - main steps:

1. **Definition** of real **buildings** to be used
2. **Appointing** of a **quantitative surveyor** to follow the different demonstration activities and manage the available budget
3. Definition of **Bill of Materials** (BoM) and detailed **Gantt** chart each building LL
4. **Implementation** of renovation package
5. **Engagement** action to involve the **building users** in the experimental campaigns with the aim to collect their feedbacks
6. Installation and commissioning of **M&V system in each building**
   LL and establishment of data flow and connection with common data base
7. **Data post- processing** and reporting

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VMKP-KER	Web-based multi-side virtual marketplace	R2M
PM&VL-KER-1	Advanced BIPV and hybrid PV/T systems characterisation facing Efficiency and Safety requirements	TECNALIA
PM&VL-KER-2	Energy demand and indoor occupants' comfort performance characterisation	EURAC
PM&VL-KER-3	Active energy component characterization facing Efficiency requirement	LEITAT
PM&VL-KER-4	Dynamic glass systems facing Efficiency requirement	LEITAT
PM&VL-KER-5	Mutual behavioural control and interaction through IoT and AI solutions based on building envelope and users' needs and corrections	DTU
PM&VL-KER-6	Thermal, air, acoustic, structural and fire resistance characterization of the multi-layers dry nEES	POLIMI
PM&VL-KER-7	Durability characterisation of block-walls	CUT
PM&VL-KER-8	Thermal-optical characterisation of advanced façade system	UIBK
PM&VL-KER-9	Fire safety, hygro-thermal, and acoustic characterisation of wooden-based prefab façade systems	ZAG
P-KER-1	Multifunctional Facade system	FOCCHI
P-KER-2	Comprehensive comfort and IEQ-based skylights	VELUX
P-KER-3	Building integrated natural ventilation solutions	WINDOW MASTER
P-KER-4	Super-insulation materials	INDRESMAT
P-KER-5	Integration of PV in an interwoven steel wire mesh, enclosed in a mosaic of brick to control sunlight for energy production and lighting	FLEXBRICK
P-KER-6	Lightweight, easy-to-install Organic BAPV film for existing roofs functionalization	HELIATEK
P-KER-7	Glass integrated Organic BIPV elements for façade integration	HELIATEK
P-KER-8	Durable Advanced Functional Coatings	TECNAN
P-KER-9	Advanced Nanomaterials for Energy Efficient Glazing Systems	TECNAN
P-KER-10	Flexible structural connectors	FLEX&ROBUST
P-KER-11	Tailored roof/facade membranes	ROTHOBLAAS
P-KER-12	Sustainable prefab wooden envelope components	RIKO HISE
OIS-KER-1	Legislative and standard framework services for CE mark	ITEC, ZAG, EURAC, TECNALIA
OIS-KER-2	Data collection in living labs	ARBNCO, GTEG, NUVAP, EURAC, DTU, POLIMI
OIS-KER-3	Innovation Management; (Business plan services, Investor capital services and IPR and licensing services)	INCURVO, EURAC, R2M, POLIMI, TECNALIA

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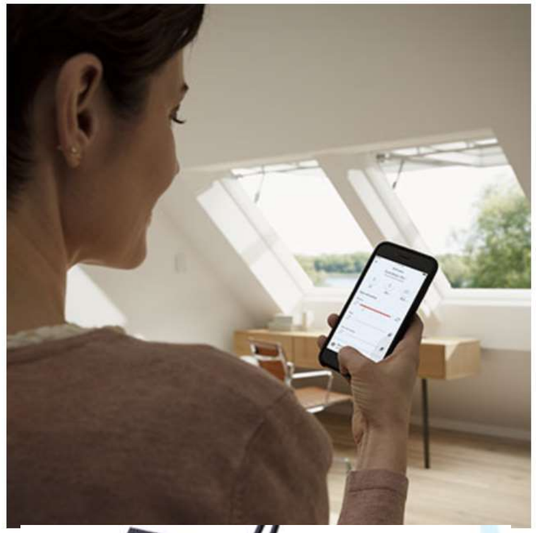
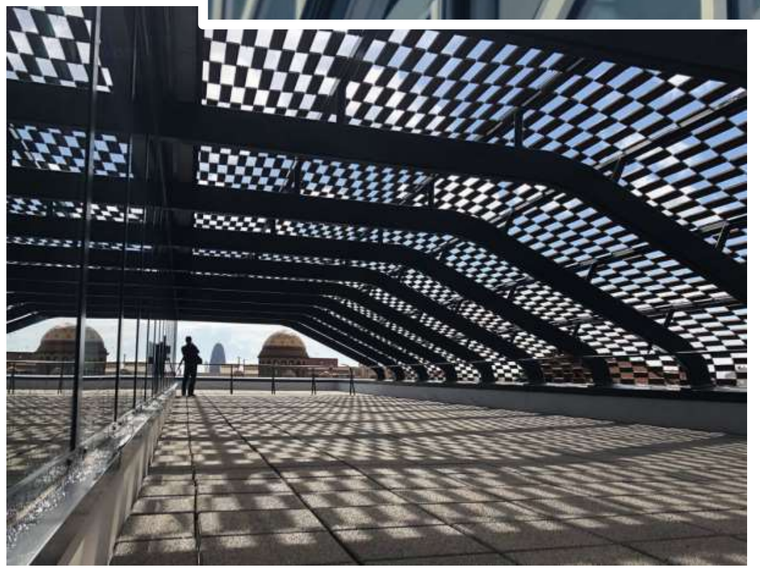
Smart control strategies for skylight windows (VELUX website)

Multifunctional Façade Module by Focchi (RenoZEB Project)



Flexible Organic PV (Heliatek website)

Smart actuators for windows (WINDOW MASTER website)



Flexbrick application (Flexbrick website)

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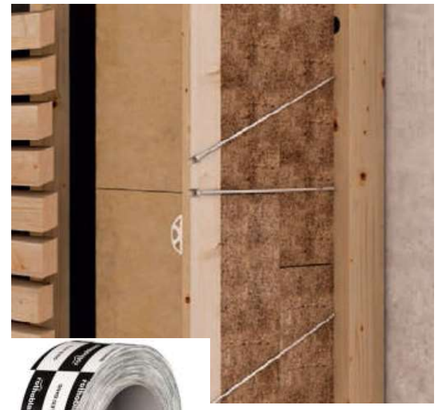
Hydrophobic coating on porous material (TECNAN website)

Vapor control membrane (Rothoblaas website)



DGZ screws (Rothoblaas website)

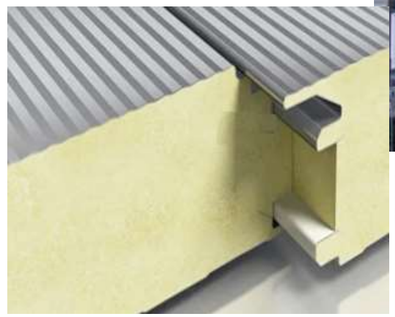
Prefabricated façade on new building (RIKO HISE website)

Sealing tape (Rothoblaas website)

Nanotechnology treatment for glass surface (TECNAN website)

Use of flexible polymer to repair a crack between masonry and concrete (Flex&Robust website)

Wood external cladding (RIKO HISE website)



Insulation foam (INDRESMAT website)

Foamed frame (INDRESMAT website)

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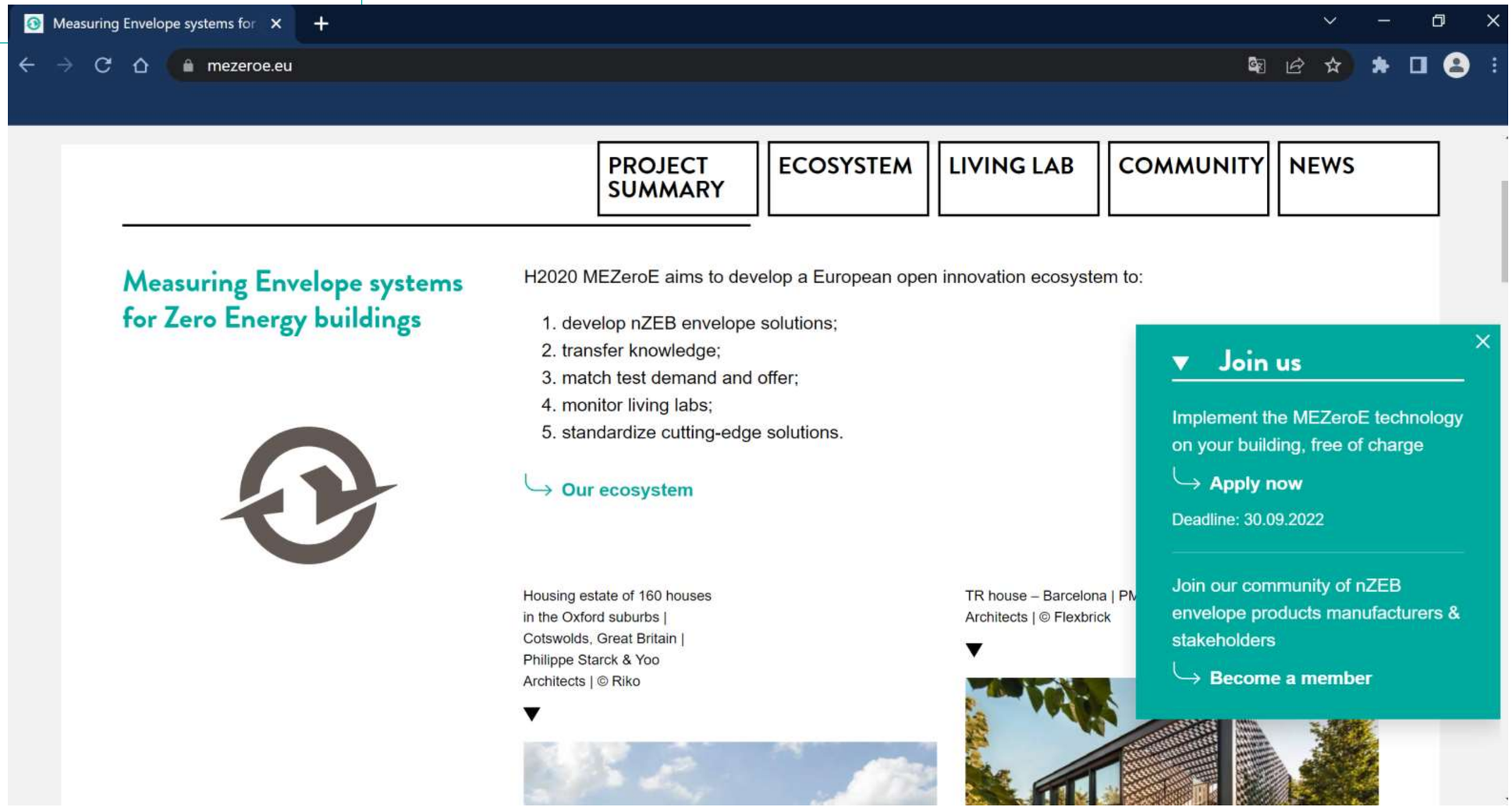

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THANK YOU

francesco.babich@eurac.edu

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