

Industrialised Retrofit: Research Experiences

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European Challenges

Where are we going to?

Context and Challenges



EU GHG emission cut
by at least 55% by 2030



EU Climate Neutral
by 2050

- **European Green Deal, Circular Economy Action Plan**
- **Renovation Wave Strategy** (2020): 2x renovation rate 2030 Today 0.1% (Deep), Average 1%
- **EPBD 2023: Zero Emission!**
- “No climate-neutrality possible by 2050 without fully decarbonising the buildings sector”
- Buildings **GHG emissions** decrease **by 60% by 2030**; annual **deep energy renovation** rate must be at **3% asap**, no later than 2030
- 2012 to 2016, €127bn/y spent on energy renovations
 - 66.3% *light* (3-30% savings)
 - 28.3% *medium* (30-60% savings)
 - 5.4% deep** (more than 60% savings)

Source:

- https://climate.ec.europa.eu/eu-action/european-green-deal/2030-climate-target-plan_en
- <https://www.switchtogreen.eu/the-eu-green-deal-promoting-a-green-notable-circular-economy/>
- https://ec.europa.eu/commission/presscorner/detail/en/QANDA_21_6686

Context and Challenges

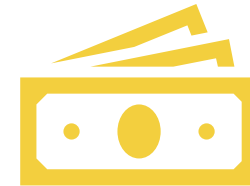
Industrialisation for Deep Retrofit

Expected impacts

- Increase the renovation rates
- Renovation timing: 50% reduction
- Cost: 50% reduction
- LCA standard, carbon and beyond
- User comfort / No disturbance

Applying

- Circularity (low carbon materials & Design4 Assembling-Disassembling)
- Multifunctionality / All-in-one
- LC-thinking
- Stakeholders engagement



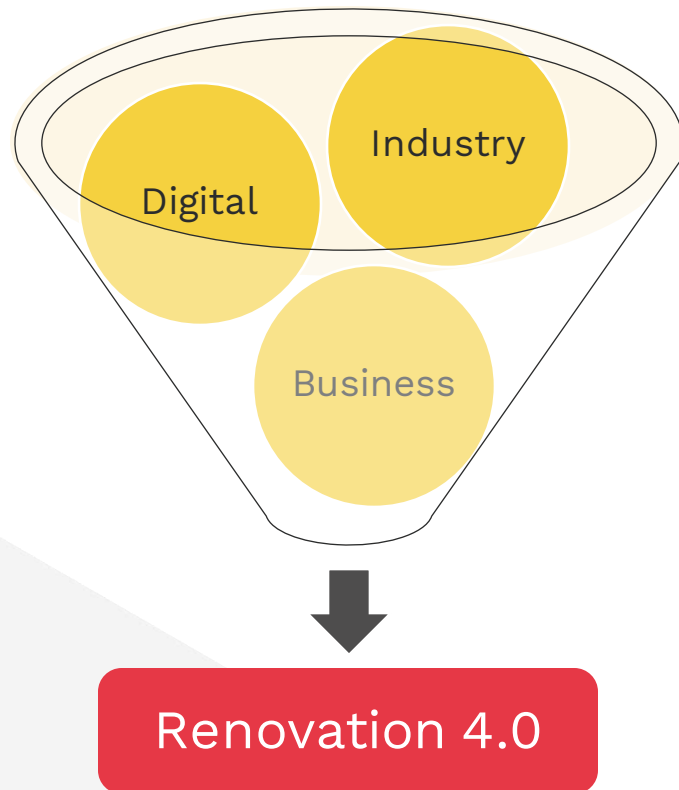
Source: Zsolt Toth, 08/02/2022, EPBD recast
Opportunities for embedding WLC requirement

INFINITE project

The Renovation 4.0 approach

Goals and Scope

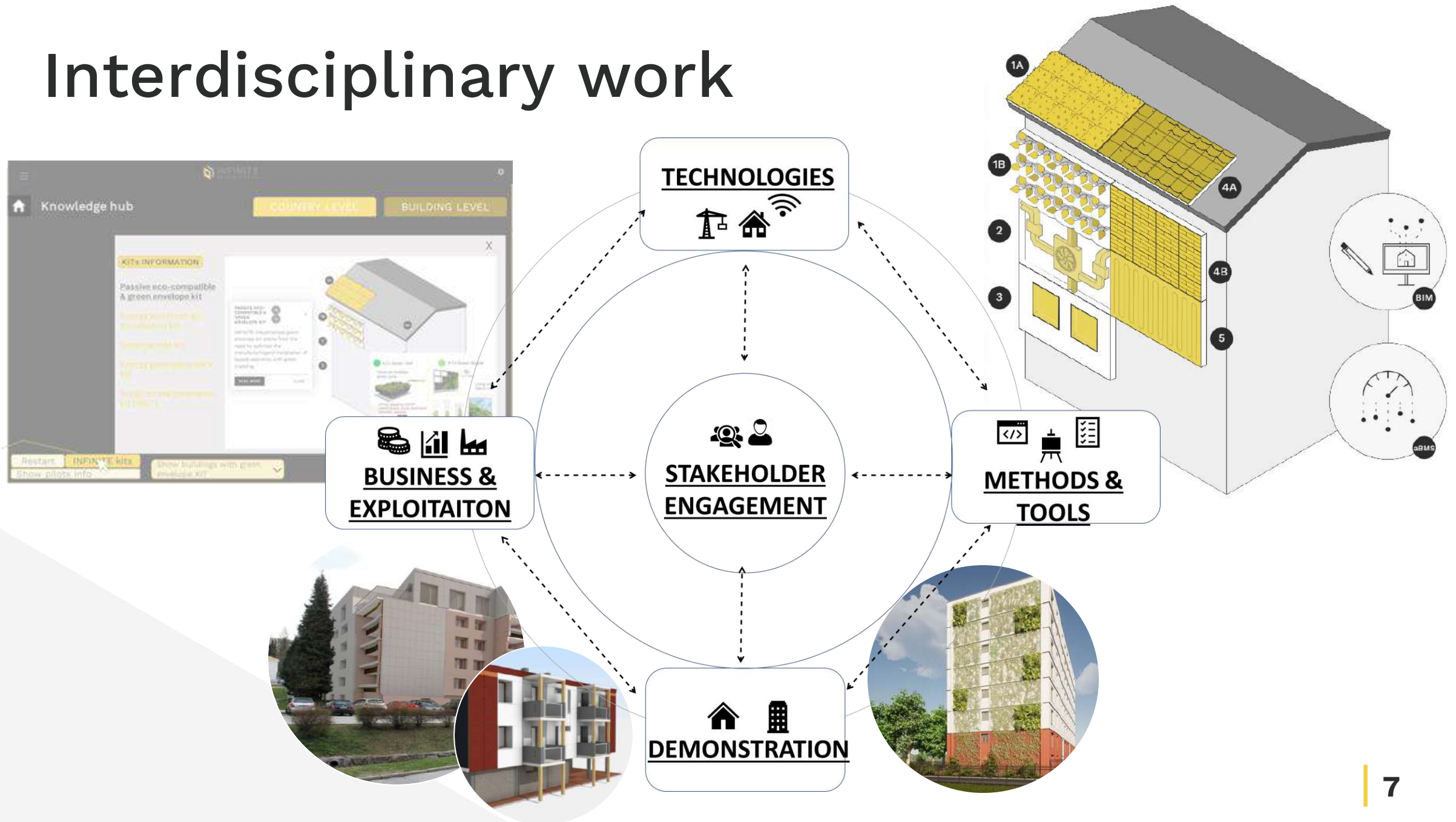
Increase the **market penetration** of **industrialised all-in-one** envelope systems for the **nZEB building renovation** ... from 1st to 2nd generation of systems.



Ultimate goals:

- To demonstrate **tools, techs, business to boost the adoption in real market.**
- To (understand and) show the **“where and how” Renovation4.0 can have success.**

Interdisciplinary work



Industrialised Technologies



Prefabricated wooden based facade-roof



+

Claddings

Integrated elements

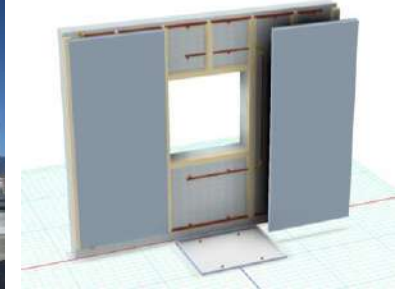
GREEN



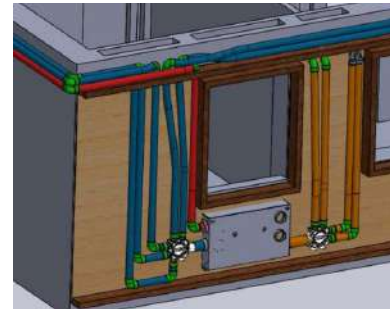
BIPV



BIST



Energy and Fresh air distribution



Smart Glazing



Key question: Technology definition standardization?
Methodology for performance assessment?

Mock-up installation

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research



Mock-up installation

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Performance Mock-up

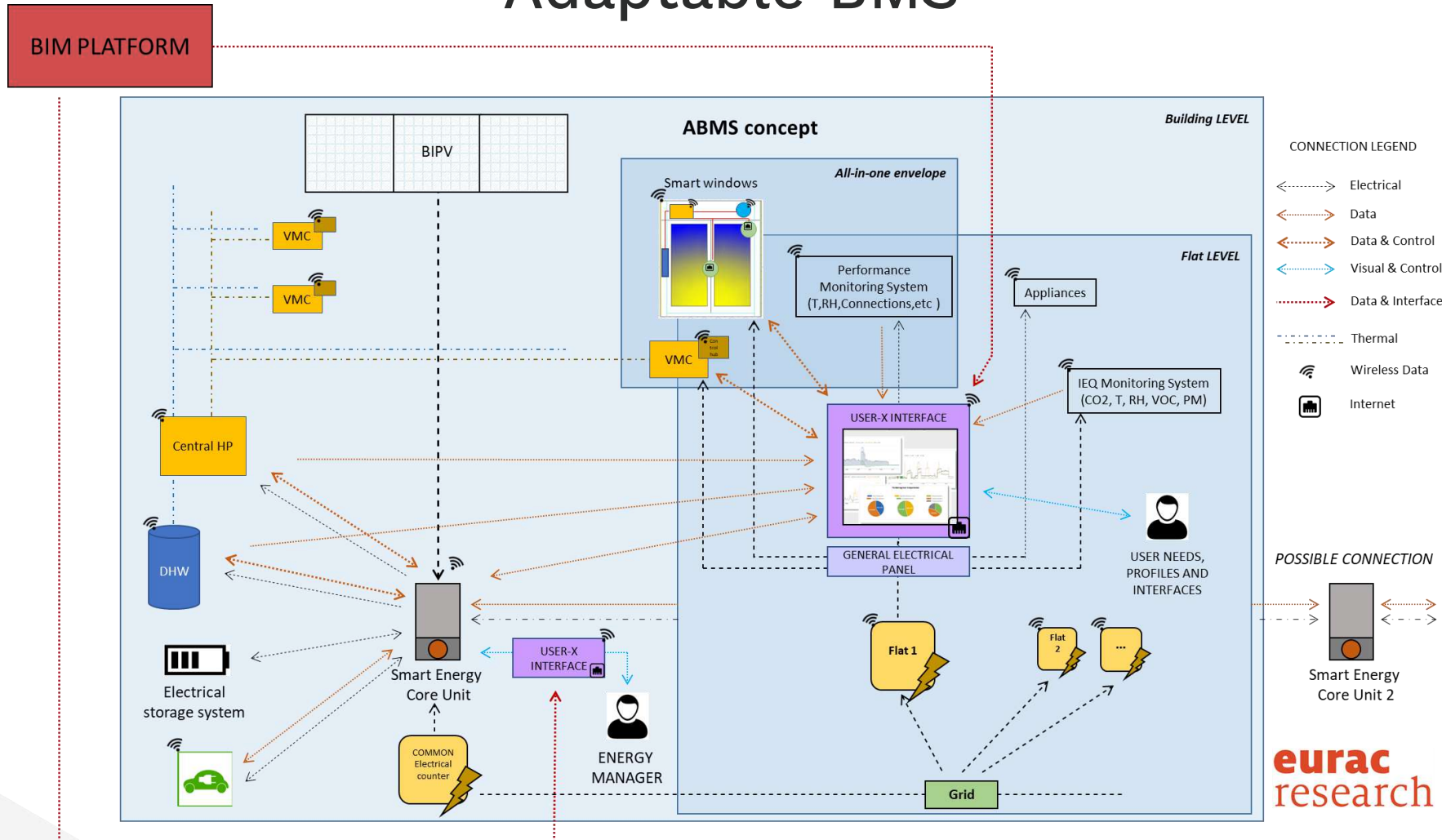


Performance Mock-up

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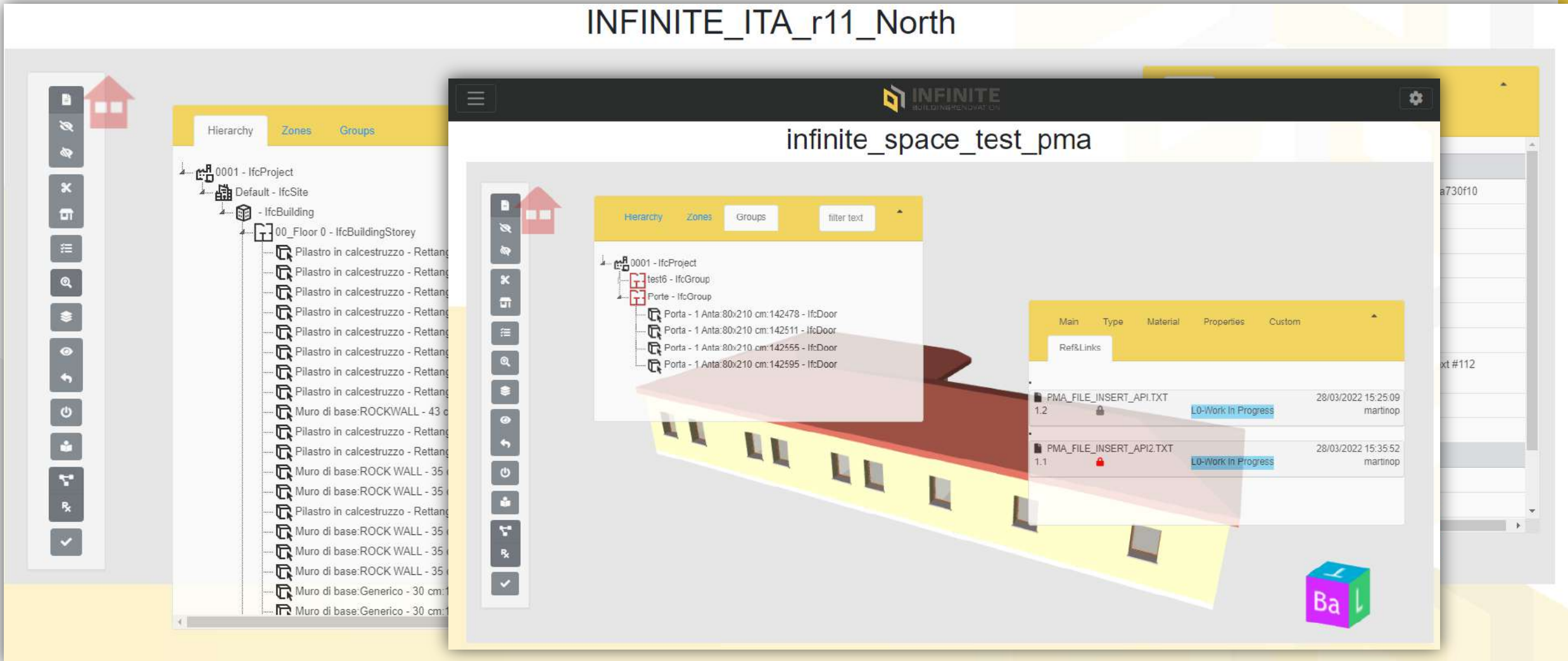
Adaptable BMS



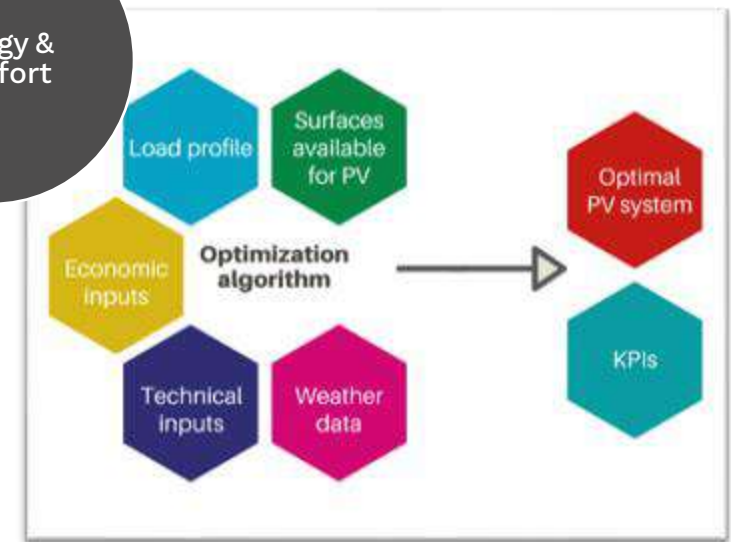
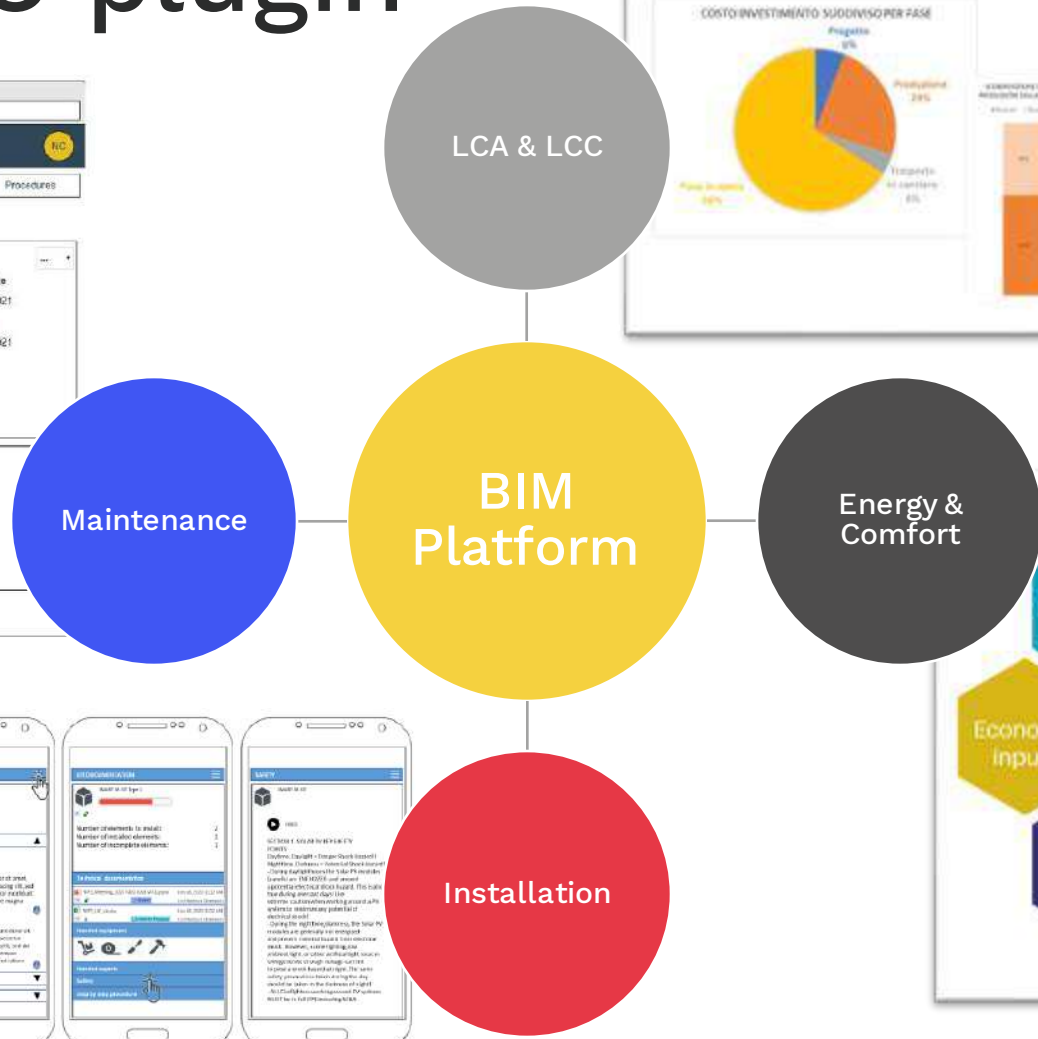
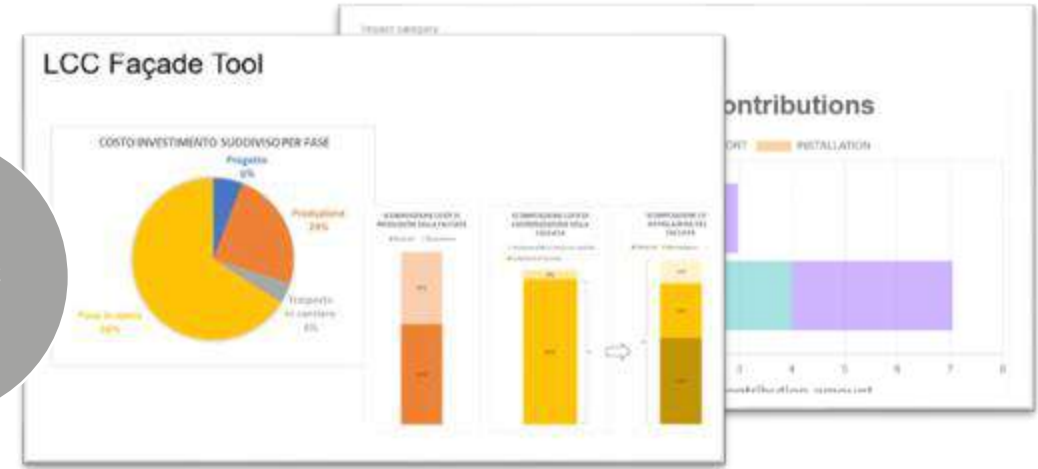
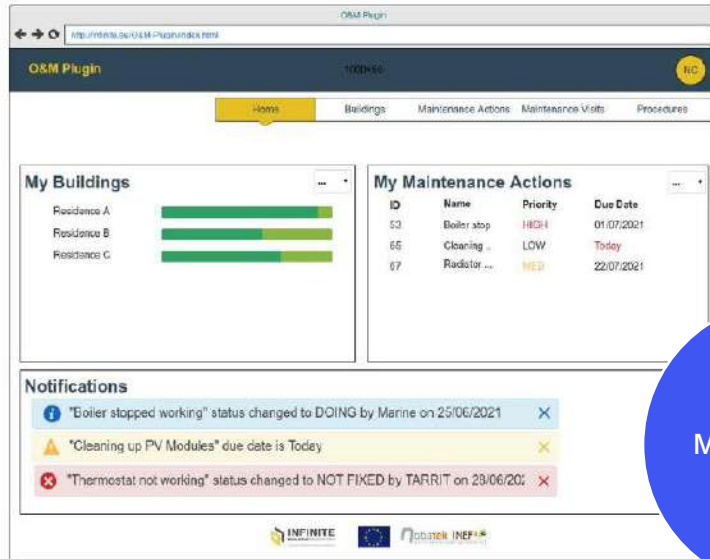
Key question: How far measured data can play a role in empowering the deep renovation business?

BIM-Platform and Plugins

INFINITE_ITA_r11_North



LCA and LCC plugin



Key question: How to define benchmarks?

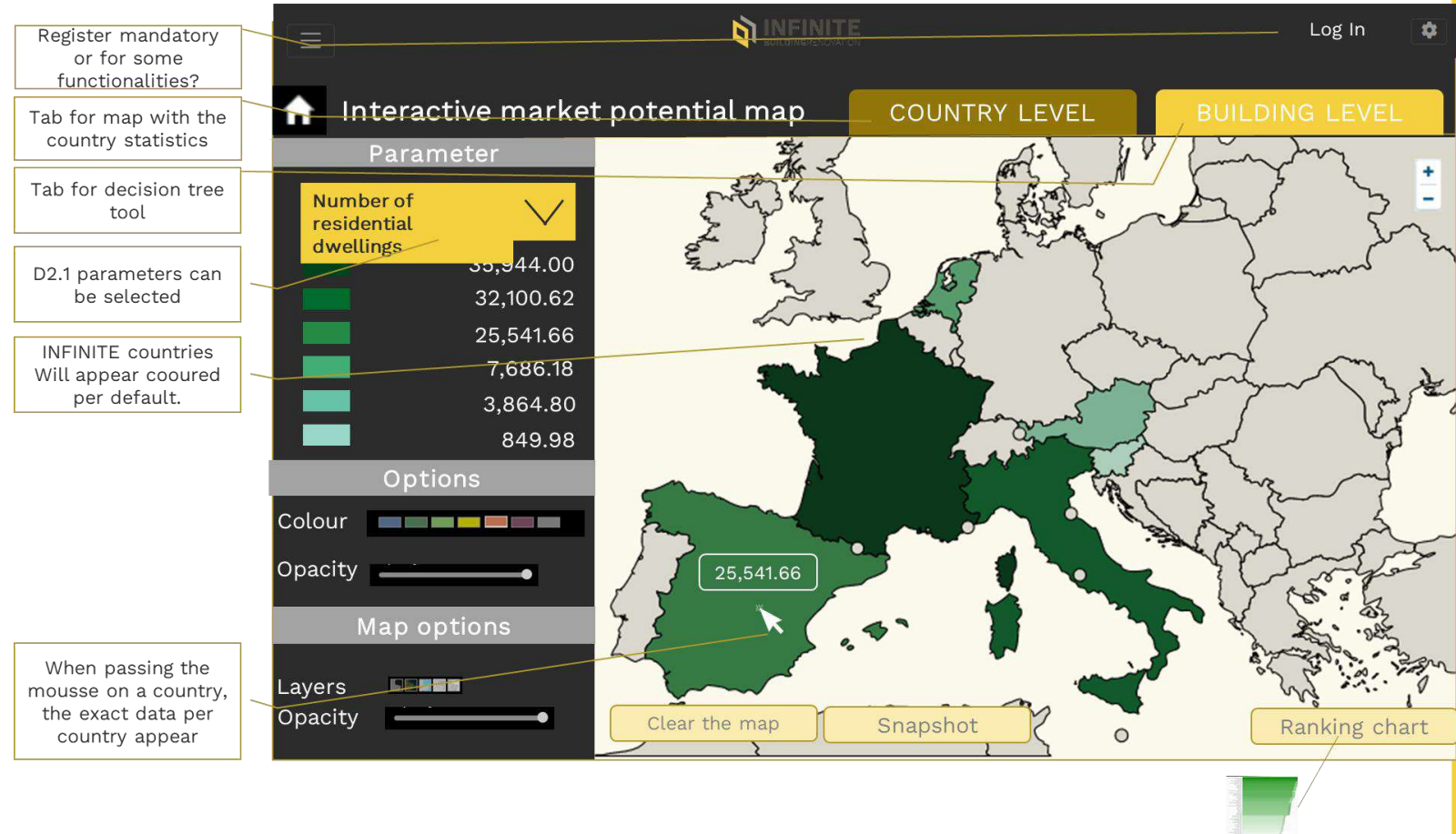
Market potential map

To support stakeholders

- Evaluate industrialised renovation
- Choose IDR

Through

- EU based existing data
- Decision tree tool on specific building



Knowledge hub and EU Observatory

Provide hard-facts based knowledge on Industrialised Deep Retrofit

- Products
- Lighthouse experiences

Periodic report on IDR market

Lobbying / Networking

The screenshot displays the INFINITE Knowledge hub interface. At the top, there is a navigation bar with a home icon, the text "Knowledge hub", and two filter buttons: "COUNTRY LEVEL" and "BUILDING LEVEL". The main content area is titled "KITS INFORMATION" and lists several kits: "Passive eco-compatible & green envelope kit", "Energy and fresh air distribution kit", "Smart windo kit", "Energy generation BIPV kit", and "Solar-thermal generation kit (BIST)". A detailed view of the "Passive eco-compatible & green envelope kit" is shown on the right, featuring a 3D diagram of a building facade with numbered components (1A, 1B, 2, 3, 4A) and a text box describing the kit's purpose. Below the main content, there are three buttons: "Restart", "INFINITE kits" (with a mouse cursor), and "Show pilots info". At the bottom right, there is a dropdown menu labeled "Show buildings with green envelope KIT".

Key question: How to track industrialised deep retrofit experiences?

Barriers and open points

What's next?

Network of Research and Innovation

energie
sprong



Barriers and Open points

- EU harmonized testing and certification framework for hybrid-active facades
- New manufacturing processes to include new components = Difficult business models and new value chains players!
- Transportation - installation risky
- Circular markets with disassembled components still far
- Lack of knowledge in the sector: traditional manufacturing and installing!
- Matching businesses for deep renovation still complex (co-benefits, scale up to mass activation, ...)

Let's enable carbon deep renovation...

...with the industrialisation-digitalisation keys!

Consortium

Coordinator



Project Partners



Thank you

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