



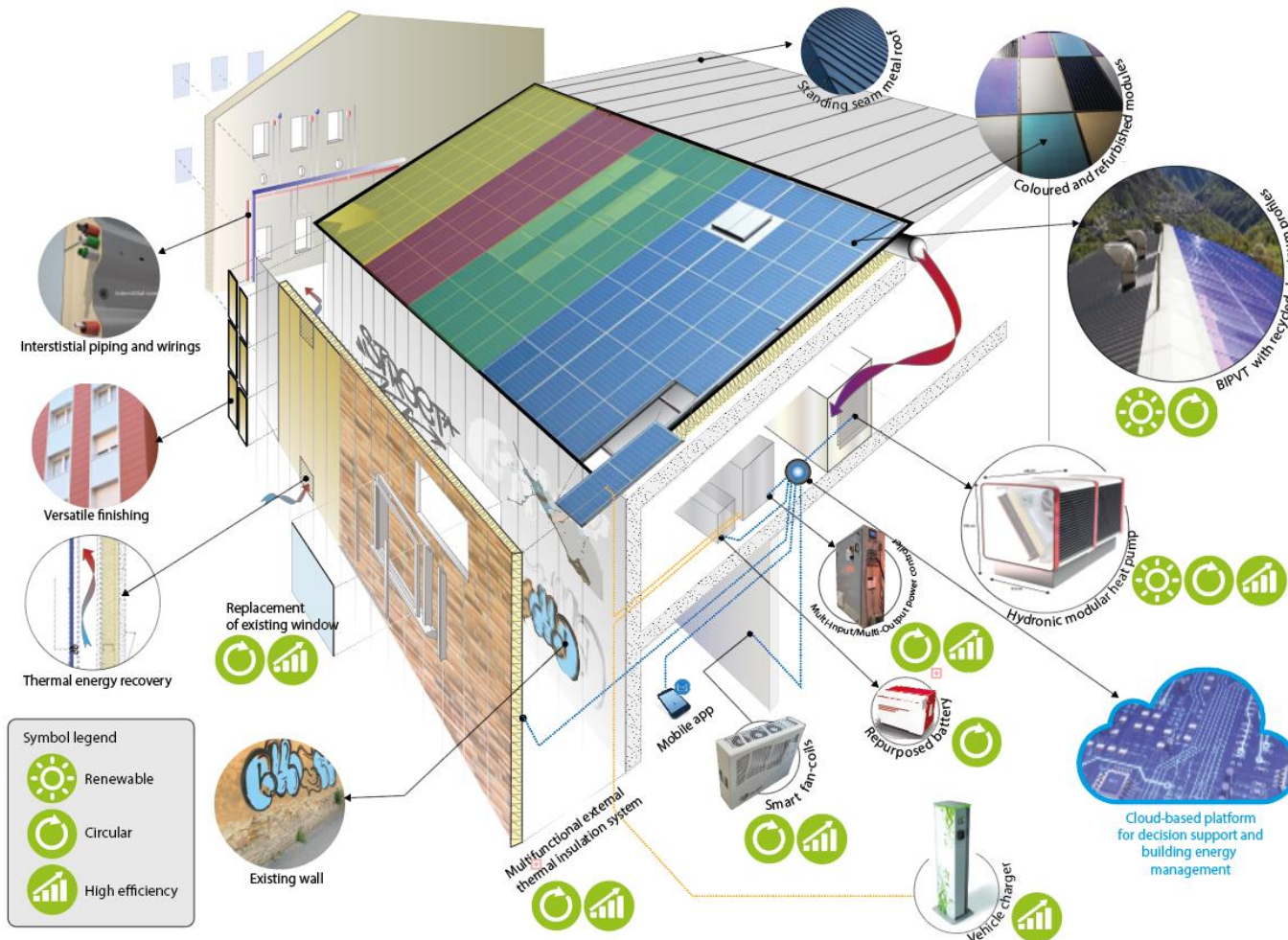
# Renewable and Environmental- Sustainable Kit for building Integration



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# Goals

1. Reduction of building's **primary energy consumption** of about 90% after retrofit.
2. Reduction of **CO<sub>2</sub> emissions** by about 90% in operation, 60% in construction and 30% in decommissioning phase (compared to the existing building and common renovation practices).
3. Development of streamlining and fast-tracking **procedures** for energy retrofit.
4. Enforcement of **Circular Economy** application in the building sector.



# Technologies

1. **Hybrid prefabricated photovoltaic-thermal roof**, with refurbished PV modules, recycled aluminium profiles, sustainable steel and biosourced insulation.
2. **Back-insulated standing seam metal roofing**, with sustainable steel and biosourced insulation.
3. **Multifunctional prefabricated façade** with self-supporting panels and biosourced insulation.
4. **Techniques/components for partial or total window substitution**.
5. **Multi-Input/Multi-Output power controller** to optimize interconnection among generation, storage and electric loads.
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8. **Smart DC fan-coils** for heating/cooling.
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# Case-studies

## DEMO CASE ITALY

**Location:** Milan, Italy, continental climate.

**Owner:** Municipality of Milan

**Year of construction:** 1965.

**Destination:** non-profit reception center.

**Description and features:** small-size building (290 m<sup>2</sup>), 2 storeys.

**HVAC:** gas boiler with radiators, no A/C.



## DEMO CASE FRANCE

**Location:** Lille, France, temperate oceanic climate.

**Owner:** VILOGIA social housing company

**Year of construction:** 1962

**Destination:** dwellings

**Description and features:** medium-large building (1330 m<sup>2</sup>), 4 storeys + ground floor.

**HVAC:** centralized gas boiler, no A/C.



## DEMO CASE BULGARIA

**Location:** Burgas, Bulgaria, humid subtropical climate.

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**Year of construction/retrofit:** 1938/1995.

**Destination:** public school

**Description and features:** medium-size building (500 m<sup>2</sup>), 2 storeys + basement.

**HVAC:** gas boiler, no A/C.



## DEMO CASE SPAIN

**Location:** Langreo, Spain, temperate climate.

**Owner:** Viviendas del Principado de Asturias (VIPASA)

**Year of construction:** 1997.

**Destination:** dwellings

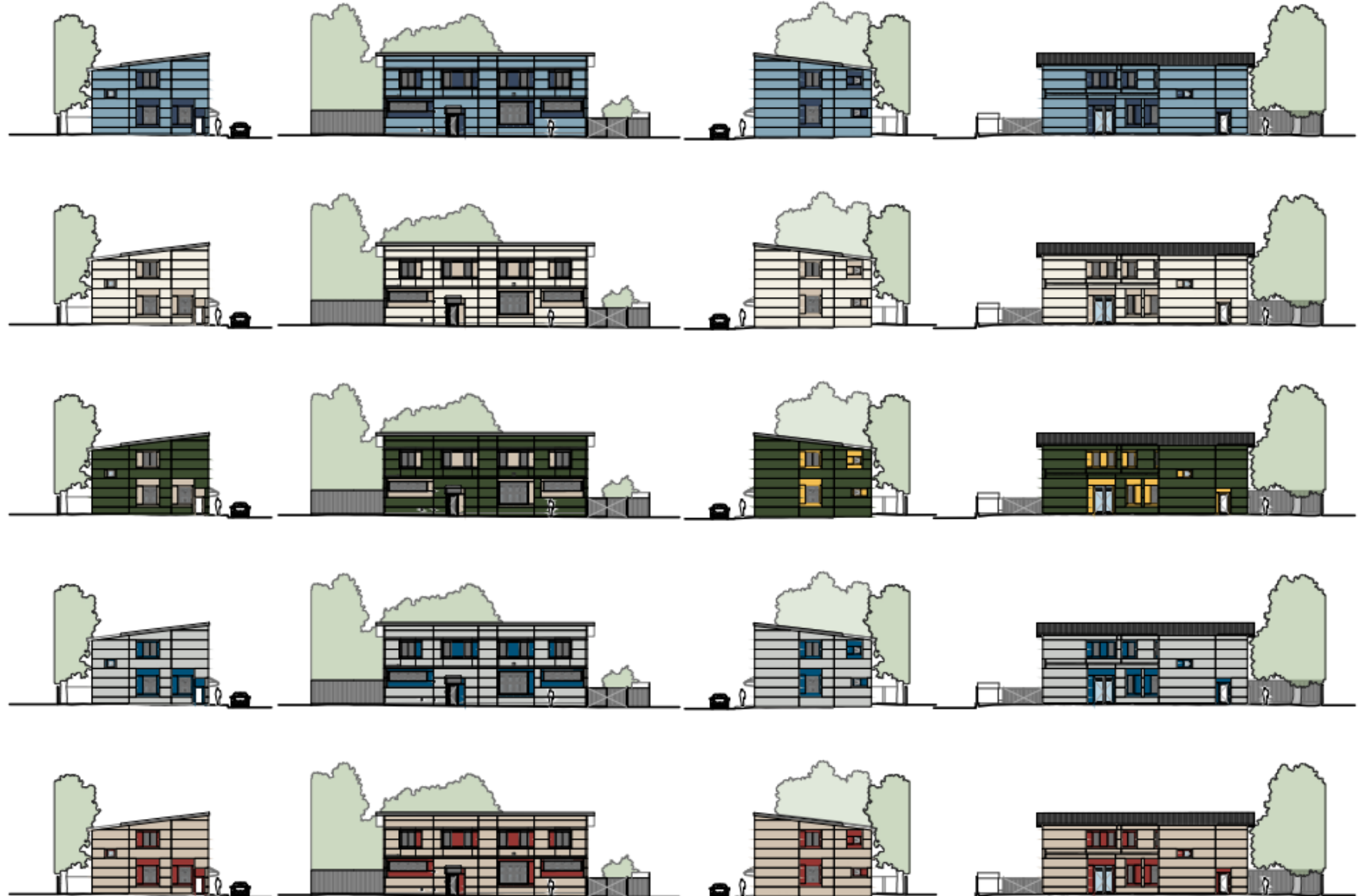
**Description and features:** large building (1700 m<sup>2</sup>), 4 storeys.

**HVAC:** single gas boilers, room A/C.



# Achievements, challenges and barriers

## Case studies selection and bureaucratic barriers

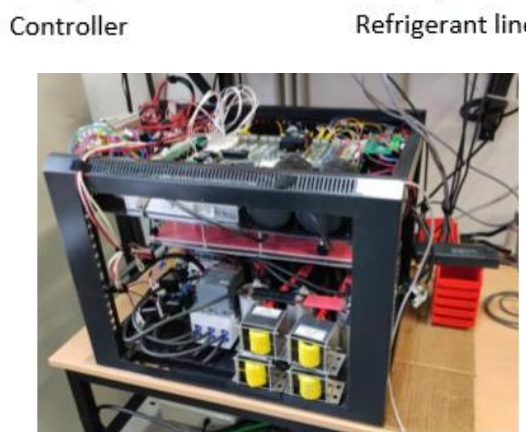


# Achievements, challenges and barriers

## Prototypes



Smart fan-coil



MIMO prototypes



Battery pack



# Past, present and future

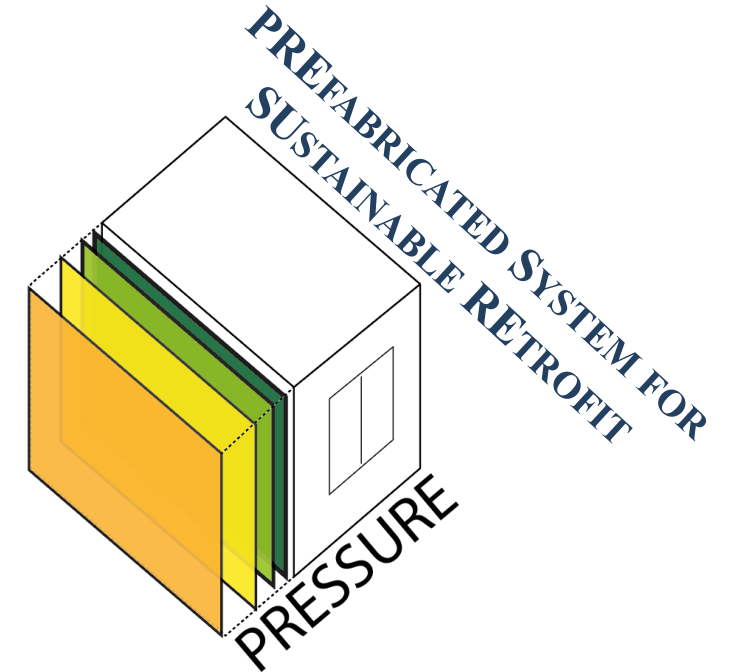
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[www.reskinproject.eu](http://www.reskinproject.eu)



**The RE-SKIN project is developing an advanced, integrated and multifunctional retrofit system targeting the renovation of the European building stock by combining energy efficiency, smart readiness, sustainability and circular economy.**



# Consistency and Certification

**Building Rating Instruments  
Brussels 21-22 May 2024**

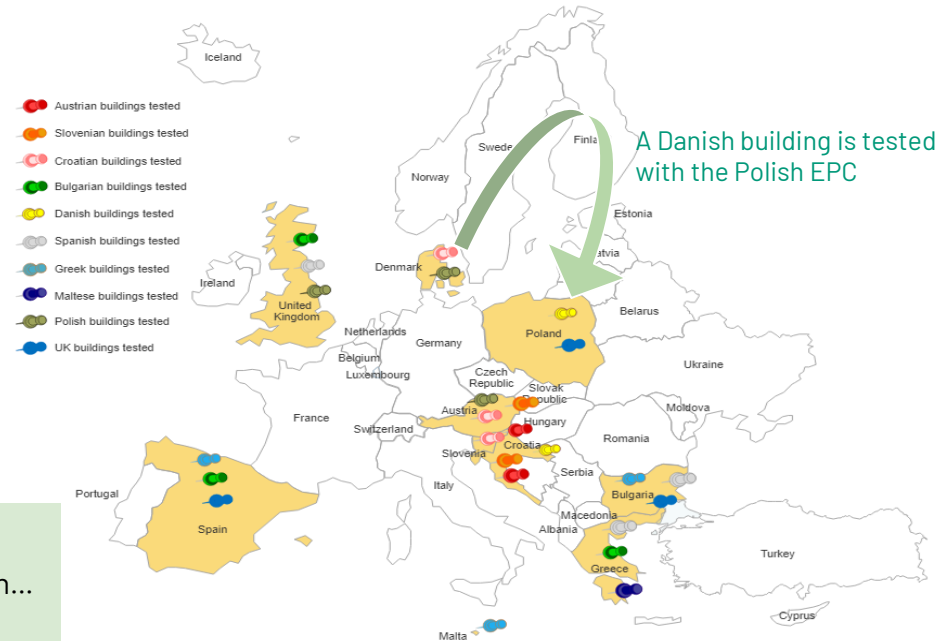




# The crossCert “experiment”



- Certification of one’s building **using certification procedures of other countries**
- Comparison of EPC procedures and results
- Difficulties?
  - Climate!
  - Language
  - Definitions

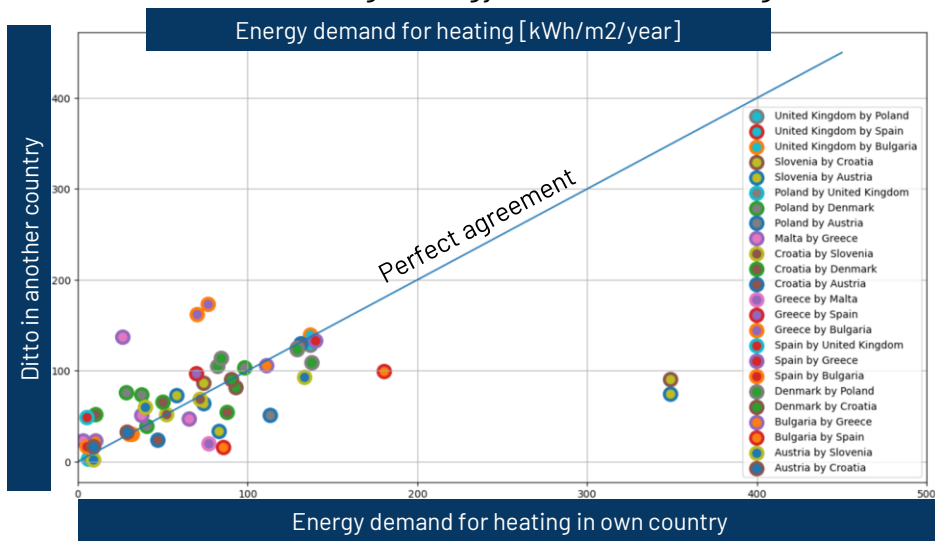


## crossCert in a nutshell

- An ongoing (2021-2024) Coordination and Support Action...
- ... involving 11 European countries (7 energy agencies)...
- ... to cross test EPCs across European countries

# Consistency: crossCert results

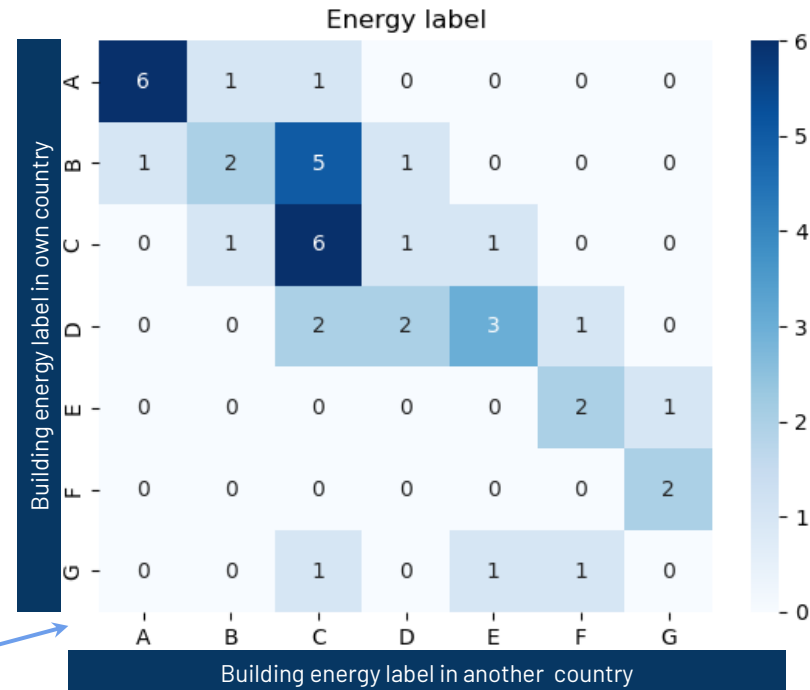
- Expected discrepancy in energy values among countries, (e.g., energy demand for heating)...



Source: crossCert Deliverable D2.5

Number of times that **different** countries assign a given label to the same building (Diagonal: perfect match)

- ...But good agreement in energy labels!



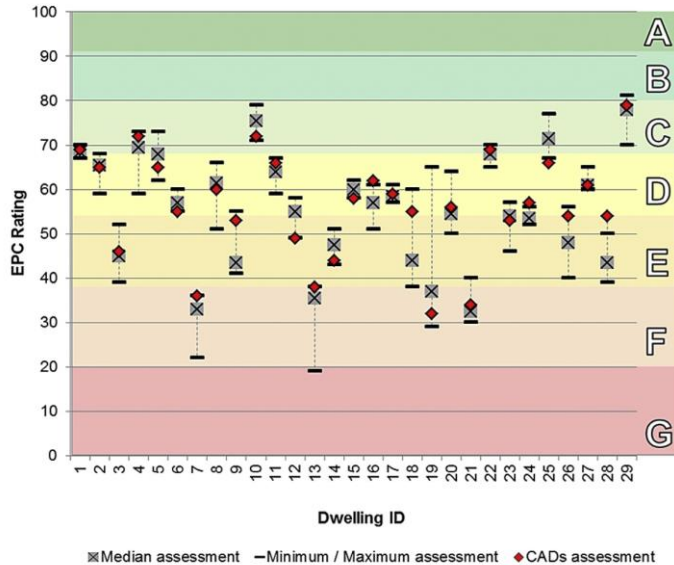
Source: crossCert Deliverable D2.5

# Consistency at a national level needs to be improved

Consistency (or robustness) at the national level is the likelihood of two certifiers obtaining the same result for the same building

## UK study

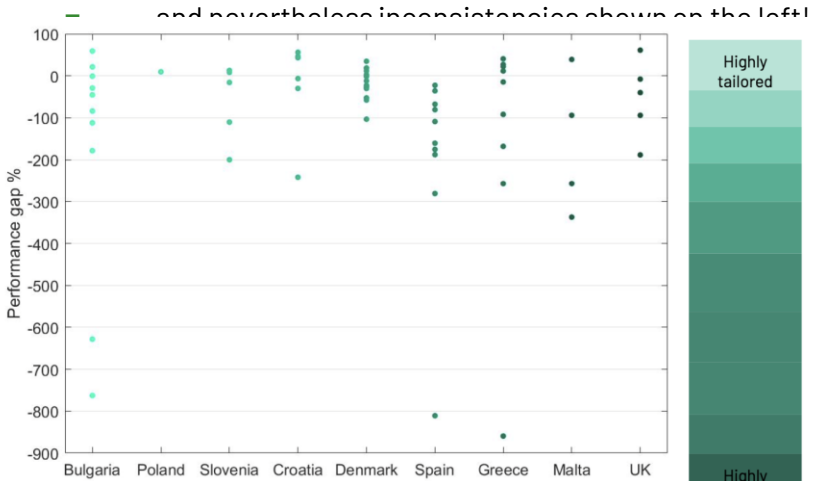
- 29 homes, 5 EPC evaluations of each home
- A reference EPC (diamond in the graph)
- Note wide dispersion of results!!!



Details: David Jenkins, Sophie Simpson, Andrew Peacock, investigating the consistency and quality of EPC ratings and assessments, Energy, Volume 138, 2017

## crossCert

- “Degree of standardisation” of the EPC methodology vs performance gap
- UK methodology is among the most standardized one, hence smaller leeway for certifiers...



Source: crossCert Deliverable D3.5

Increasing amount of certifier discretionary input

## Software

- Official | commercial accredited | commercial not accredited
- Sometimes semi-manual calculation

## Calculation methodology

- Inclusion of lighting
- HVAC systems
- U-values (inputted or from database)
- Zoning
- Ventilation rates
- Building usage schedule/User behaviour

## EPC recommendations

- Ad-lib by certifier | closed list
- Quantified savings vs estimated savings

## EPC document

- Level of detail very wide ranging
- Low level of detail makes verification hard

## Certifier background and training

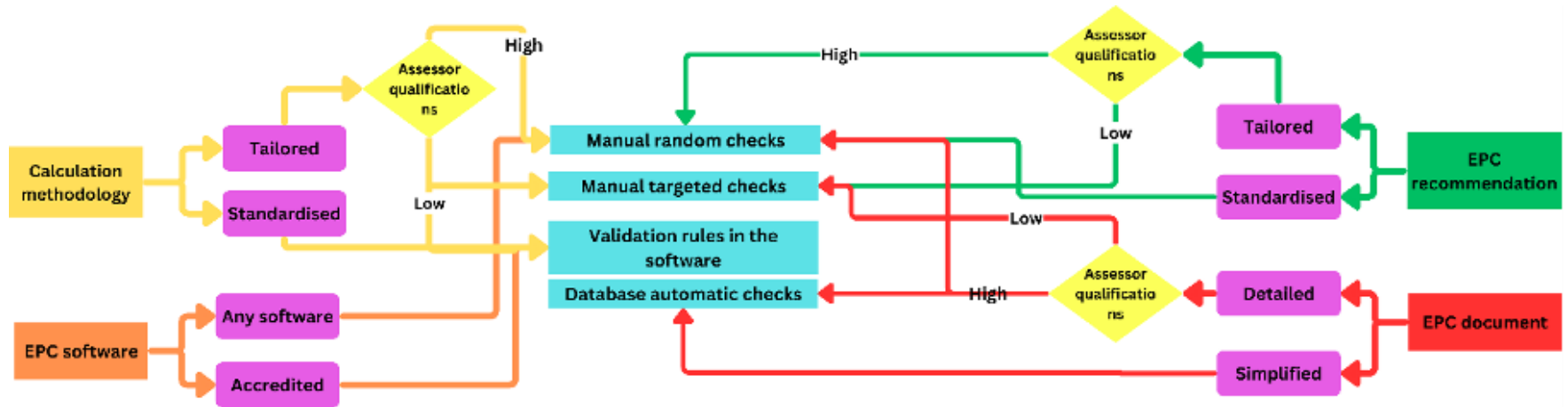
- Wide range of minimum education levels
- Regular training seldom required
- Training sometimes for software, not for physics

The image shows three pages of EPC calculation sheets. Each page has a header with 'Gens Central', 'D3.6', 'Ene', and 'Certificació/Emissió'. The sheets are titled: 1. CALIFICACIÓ ENERGÈTICA DEL SECTOR EN EDIFICIS, 2. CALIFICACIÓ ENERGÈTICA DEL SECTOR EN EDIFICIS EN CONJUNTS D'ENERGIA PRIMAria NO RENOVABLE, and 3. CALIFICACIÓ ENERGÈTICA DE LA DEMANDA ENERGÈTICA DE CALORIFICACIÓ I REFRIGERACIÓ. Each sheet contains a 'RECOMANACIÓ' section with a color-coded bar (green to red) and a table of 'RECOMANACIÓ PARÀMETRES' with columns for 'CALIFICACIÓ' and 'ACTS'. The tables include parameters like 'Emissió energètica', 'Consum energètic', 'Emissió de CO2', and 'Consum de CO2'.

Will this change following EPBD recast?

# Certification and consistency: Quality Assurance harmonisation framework

- This complex, diverse landscape complicates the harmonisation of Quality Assurance



From crossCert Deliverable D3.6, coordinated by HWU

# Thank you!

**Building Rating Instruments  
Brussels 21-22 May 2024**



# EUB SuperHub in a nutshell

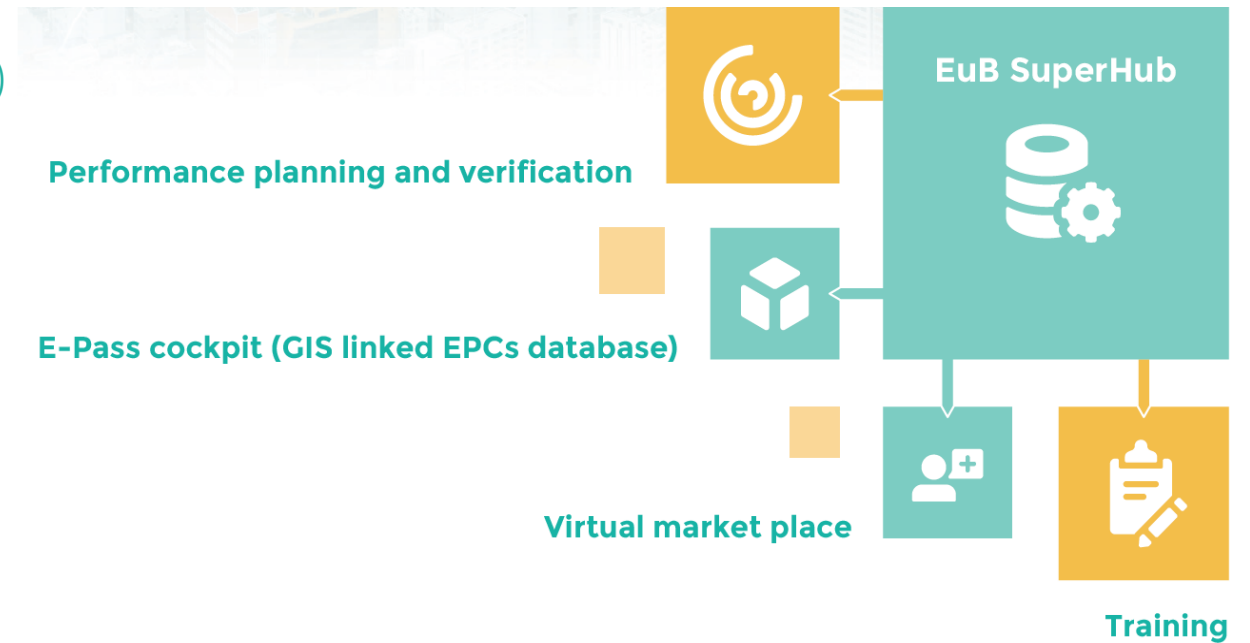


Selected, filtered KPIs and qualified staff – building **Key Performance Indicators** according to EU norms (EN ISO) developed the **EUB SuperHub CEN Workshop Agreement** to assess and certify buildings by skilled professionals (exploiting the TRAIN4SUSTAIN project CWA 17939-2022).

Meeting with EPBD 2024 provisions for applications that go beyond building **energy performance** with a **life-cycle approach** (GWP), quality of life for occupants (**IAQ**), climate and **future proof indicators** (SRI, resilience).

Store and manage geo-referenced EPCs on a platform that further supply building information with a support of a **Digital Building Logbook**, boosted with the project specific KPIs and the EUB Passport, as annex in a One-Stop Shop.

A set of 21 KPIs need upskilled assessors and trained to use the necessary - online – tools as well, that to be also tested on **100+ case study buildings across 7 EU Member States on different European climates**.

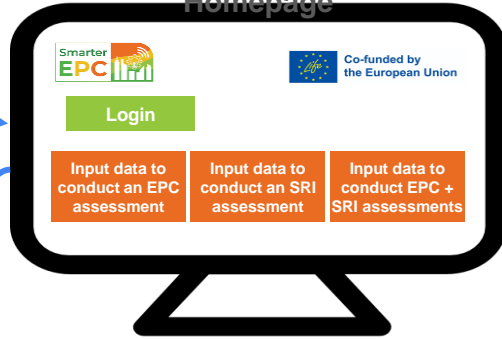


User

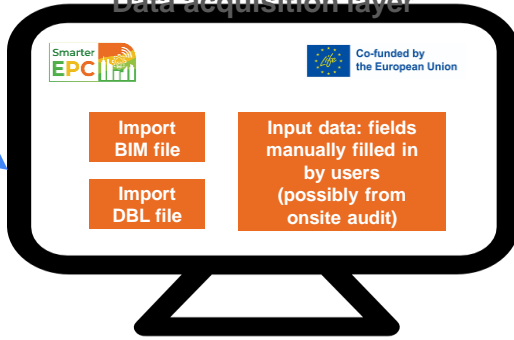


## SmarterEPC\_hub

### Homepage



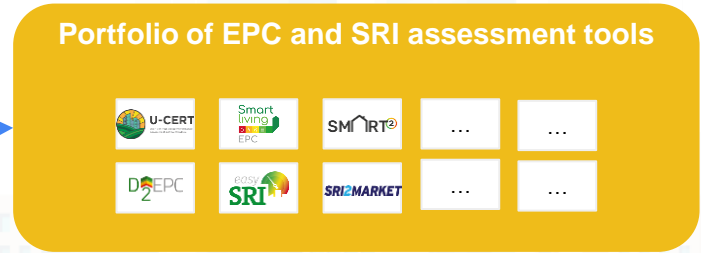
### Data acquisition layer



## SmarterEPC single EPC and SRI onsite audit procedure



## Portfolio of EPC and SRI assessment tools



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# Back-up slides



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# SmarterEPC – Procedure and tool for single EPC & SRI onsite audit

**Mission = support EU and national policies** towards the adoption of innovative EPC and SRI schemes.

**Development of a joint EPC and SRI audit process**, with the aim to act as the forerunner of a **standardized procedure**

**Development of common training programs**, the material will facilitate the adoption by assessors of this single audit procedure. Tested for +200 buildings in Cyprus, Finland, France, Germany, Greece, Italy, Netherlands, Romania, Spain, Sweden...



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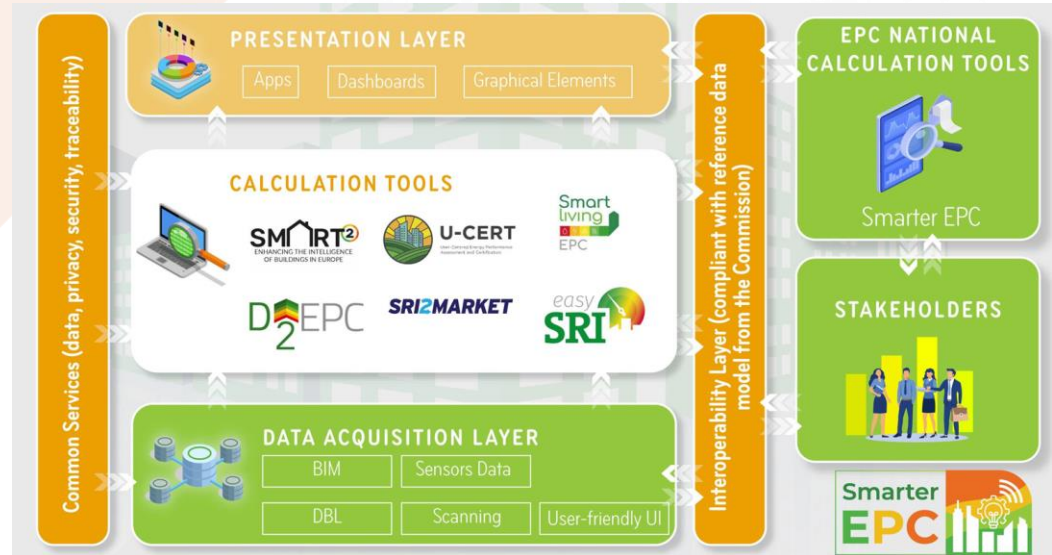
# SmarterEPC – Procedure and tool for single EPC & SRI onsite audit

The SmarterEPC project aims to **pave the way for the implementation of the SRI in synergy with EPCs.**

SmarterEPC is developing a digital interface allowing **smart data collection** for the calculation of EPC, SRI and joint assessment when possible.

The SmarterEPC hub will **connect this input data interface with existing tools calculating EPC and SRI scores.**

To prepare for the exploitation phase of the project, SmarterEPC partners will **explore the possibility of connecting the forward-looking hub with existing commercial EPC tools.**



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# Integrated EPB Assessments. A pathway for effective EPBD implementation.

Buildings clustering meeting  
21st-22th May, Brussels



Co-funded by  
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GENERALITAT  
VALENCIANA

Vicepresidència Segona i  
Conselleria de Serveis Socials,  
Igualtat i Vivenda

Leticia Ortega



IVE  
Instituto Valenciano  
de la Edificación

# Integrated EPB Assessments. A pathway for effective EPBD implementation.



[iEPB](#) will help improve the synchrony between multiple **building performance assessments** - notably between EPCs, the SRI and BRP - by developing a **Common data model for EPB Assessments**

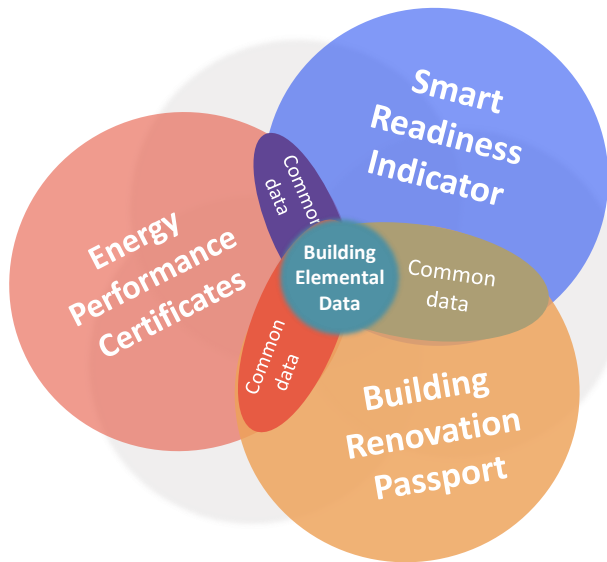
**Duration:** 10/2023 – 9/2026

**Overall Budget:** 1.982.967.88 €

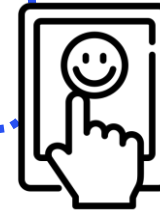
**Coordination** IVE (Spain) + **12** partners

**4** different EU countries: NL, AT, ES, IT

**3** demonstration ecosystems: NL, AT, ES



Improving data accessibility and user friendliness of EPCs



Demonstrating the applicability and effectiveness of the project results in operational environments

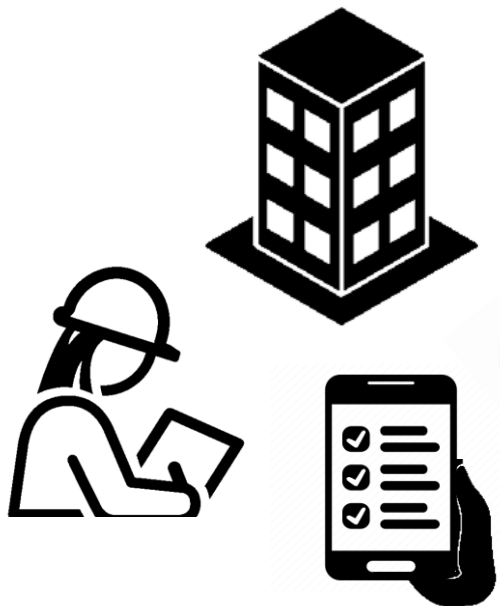


Easing collection, aggregation, and analysis of data for building's performance assessments

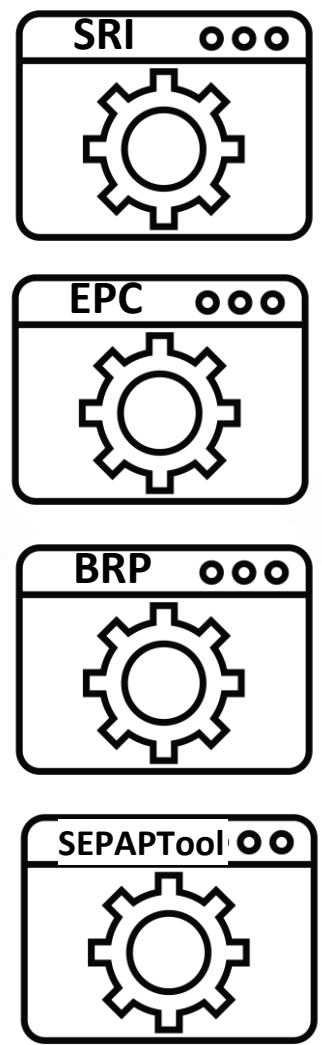
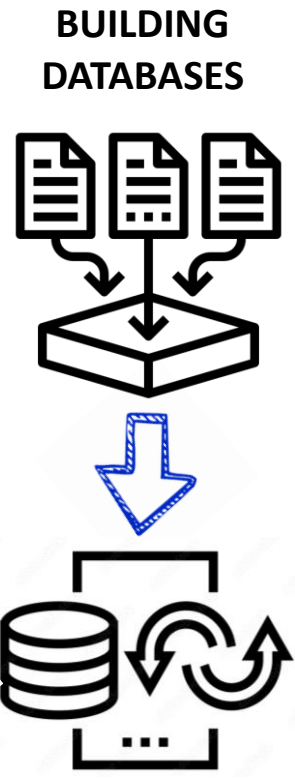


Supporting EPB Assessments and Certification schemes to be more EU-compliant, consistent, and accurate

iEPB web app  
PROFESSIONALS



iEPB common  
data model



SRI Calculator



CALIBRATION OF EPC  
WITH REAL DATA

SEPAPTool 2.0



API Data integration  
national databases



iEPB web app  
END USERS



# Thank you!



<https://iepb-project.eu/>



[iepb\\_coordinator@five.es](mailto:iepb_coordinator@five.es)



[@iEPB\\_eu](https://twitter.com/iEPB_eu)



[https://www.linkedin.com/  
company/iepb-eu-project/](https://www.linkedin.com/company/iepb-eu-project/)



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the European Union



# SRI platform WG2: LIFE projects cluster

## Synthesis & overview

Sylvain Robert

LIFE Energy + LIFE Climate Unit

CINEA

*Cross-programme buildings clustering meeting  
22 May 2024*



# LIFE CET projects supporting the SRI



**SRI2MARKET**



**iEPB**



**tunES**

- LIFE Clean Energy Transition
- LIFE-2021-CET-SMARTREADY & LIFE-2022-CET-BUILDPERFORM
- 7 projects
- Approx. 14 MEUR EU funding
- 2022 - 2026

# LIFE CET SRI projects – main activities

## SRI policy support

- Policy dialogue
- Recommendations, guidance

## SRI calculation framework

- Assessment / evaluation on real buildings
- Feedback and recommendations

## Capacity building / market uptake

- Helpdesks & training
- Demonstration & testing

## Digital tools

- Web interface
- Cloud-based platform
- SRI scores calculation

## Smart capabilities

- AI-based generation of recommendations
- Self-assessment of smart readiness (real data)



# Clustering the LIFE CET SRI projects



SRI uptake in targeted countries & liaison with authorities



Design & development of SRI tools



Improvement of the smart-ready service catalogue



Common communication and dissemination actions



# LIFE SRI projects cluster – examples of action

- Direct support to MS test phases (10+ MS, e.g. ES, CY, HR)
- Common, open API-based framework
- CEN Workshop on standardised on-site SRI building audits
- BUILD UP platform joint webinar, MIPIM 2024, EUSEW 2024...



## LIFE CET SRI Cluster Report

Presented by



See the 2023 report [online](#)



# Thank you



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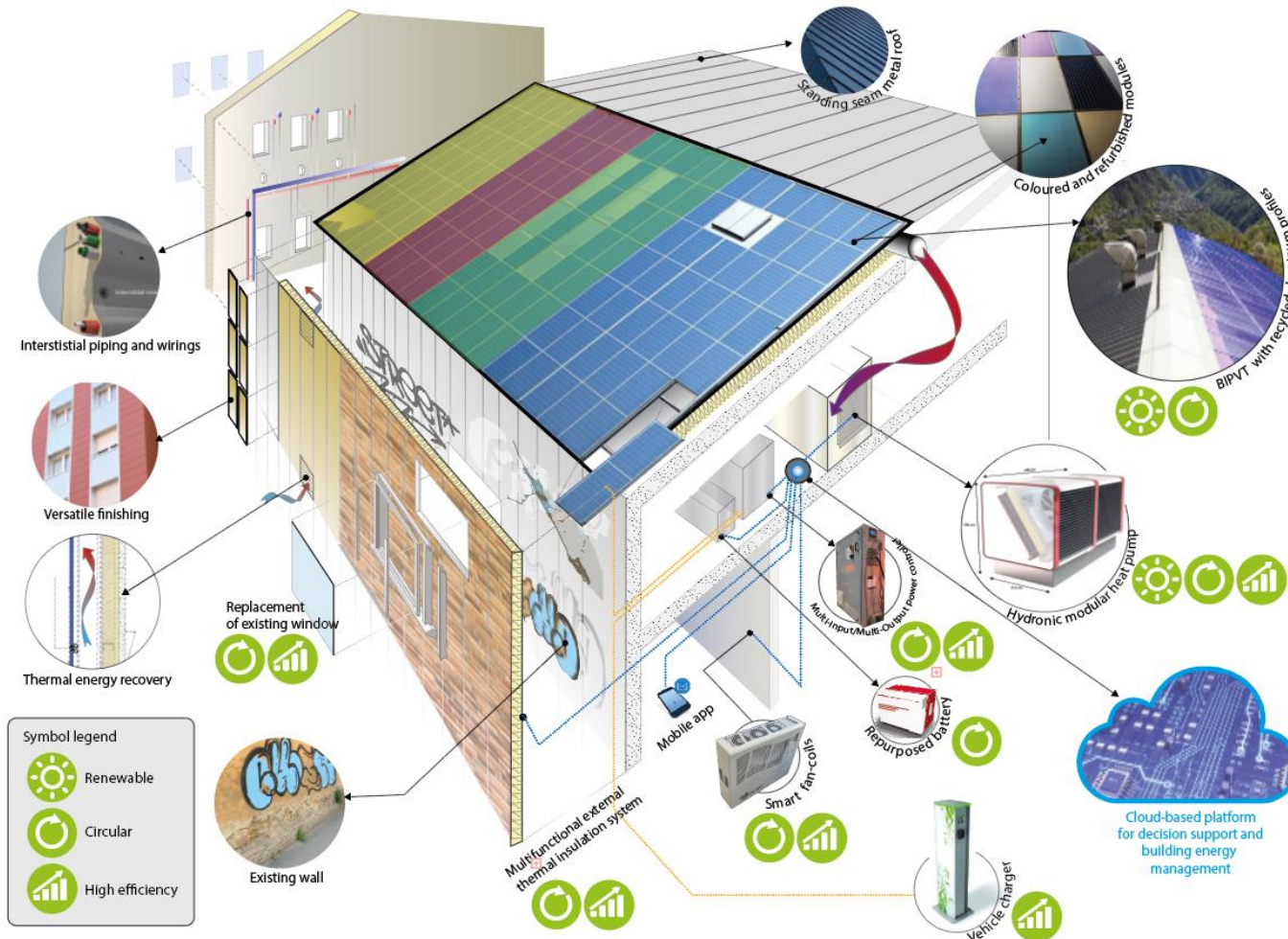
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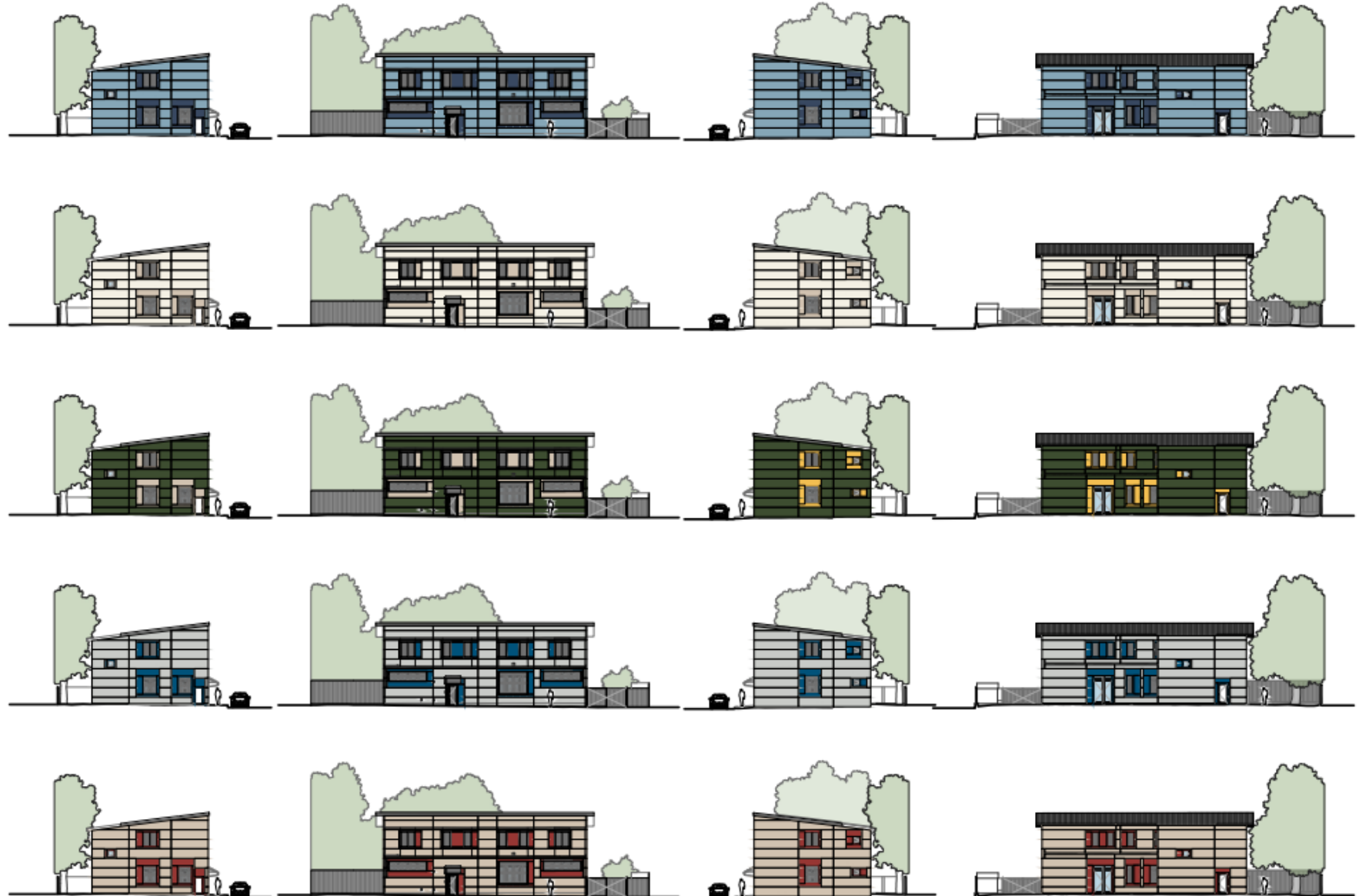
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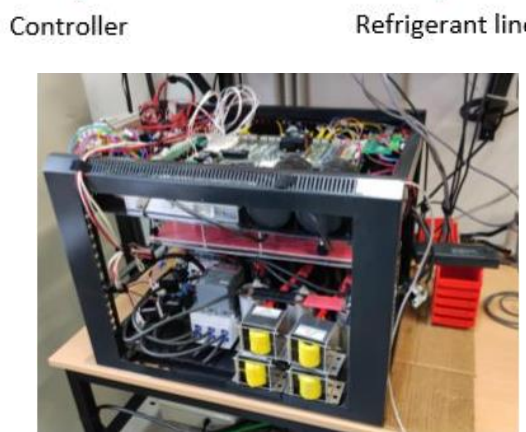


# Achievements, challenges and barriers

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MIMO prototypes



Battery pack



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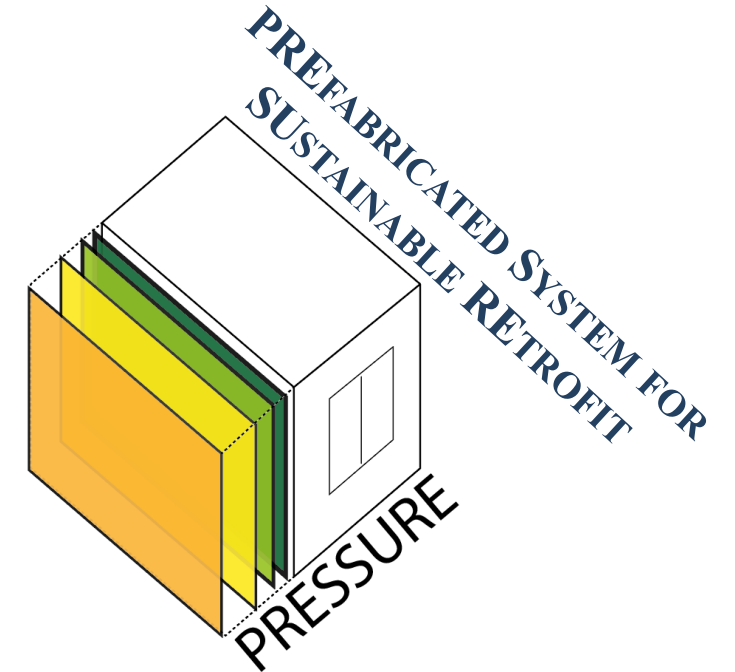
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**Title:** DigitAl and physical incrEmental renovation packaGes/systems enhancing envlronmental and energetic behaviour and use of Resources.

**WebPage:** <https://aegirproject.eu/>

GA N°: 101079961 Start: 01/10/2022; End: 30/09/2026

## Main Objective:

Develop modular, renewable, and industrialized building packages for energy renovation

MATERIALS	COMPONENTS	SYSTEMS	DIGITAL	DESIGN	CONSTRUCTION	DEMOS	ASSOCIATIONS / DISSEMINATION	RTOS

# Technologies from AEGIR Project

## Construction Components

1. Scalable prefabricated renovation packages approach
2. Bio-composite profile system for prefabricated modules of envelope
3. Timber profile system for prefabricated modules of envelope
4. Bio-based thermal insulation system
5. Acoustic insulation system based on recycled fabric materials
6. Ventilation ducts integration in envelope solutions for retrofitting
7. Smart Windows

## Energetic components

8. Flexible PV system
9. PVT panels
10. Second life batteries

## Digital eco-system

11. Common Data Environment (CDE)- digital framework.
12. Digital services for a cost-effective renovation design
13. Façade modules configuration service. Façade Cloud Configurator
14. On-site building data capture system. PointPix Reality capture
15. Automated generation of Digital Twin. Ag2DT
16. Augmented reality for execution validation
17. Energy metamodels and artificial intelligence for building O&M



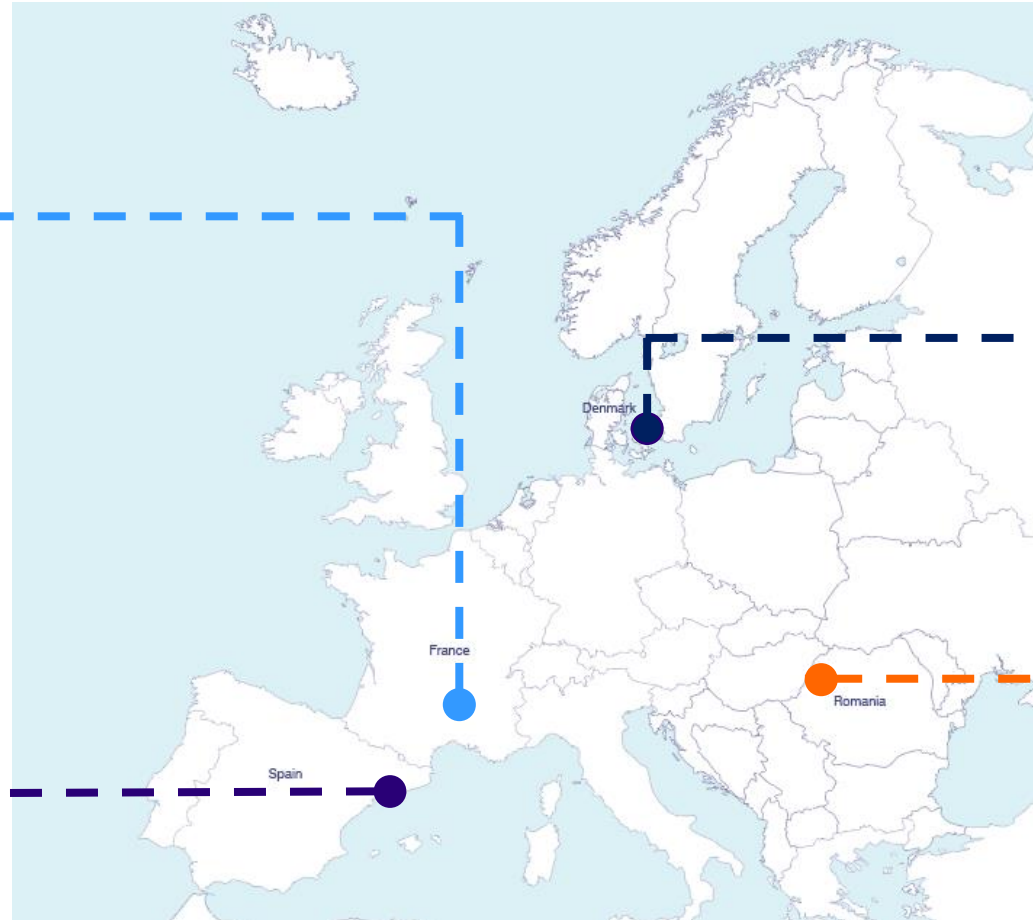
# Demonstrators/pilots



Mixed uses (Residential and Tertiary)  
- Bóen Sur Lignon (France)



Educational building - Malgrat de  
Mar - Barcelona (Spain)



Residential building - Høje-  
Taastrup (Denmark)



Single family building - Oredea  
(Romania)

# Demonstrator (Spain)





# Demonstrator (Spain)

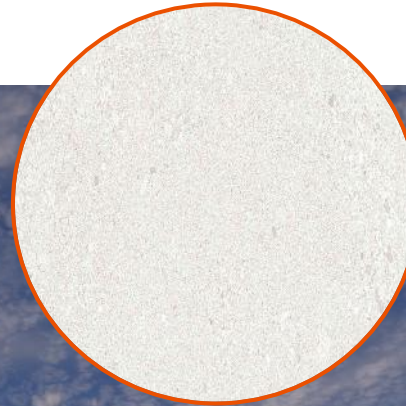
## Material explorations

1. Durability
2. Low Maintenance
3. Aesthetics
4. Thermal Performance
5. Fire Resistance

### CONSIDERATIONS

1. Cost
2. Installation
3. Weight

Ceramic Cladding  
White spotted mat



Reclaimed Wood  
tbd



# Demonstrator (Spain)

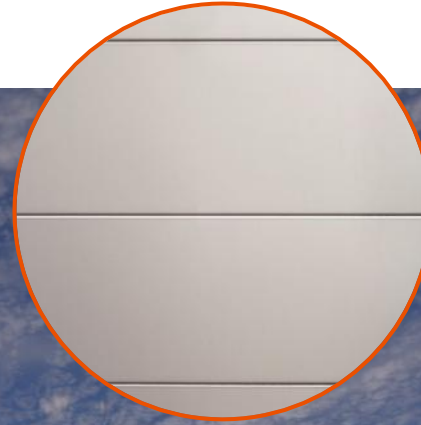
## Material explorations

1. Durability
2. Low Maintenance
3. Lightweight
4. Energy Efficiency
5. Recyclability

### CONSIDERATIONS

1. Cost
2. Thermal Conductivity
3. Noise

Aluminium Cladding  
White mat

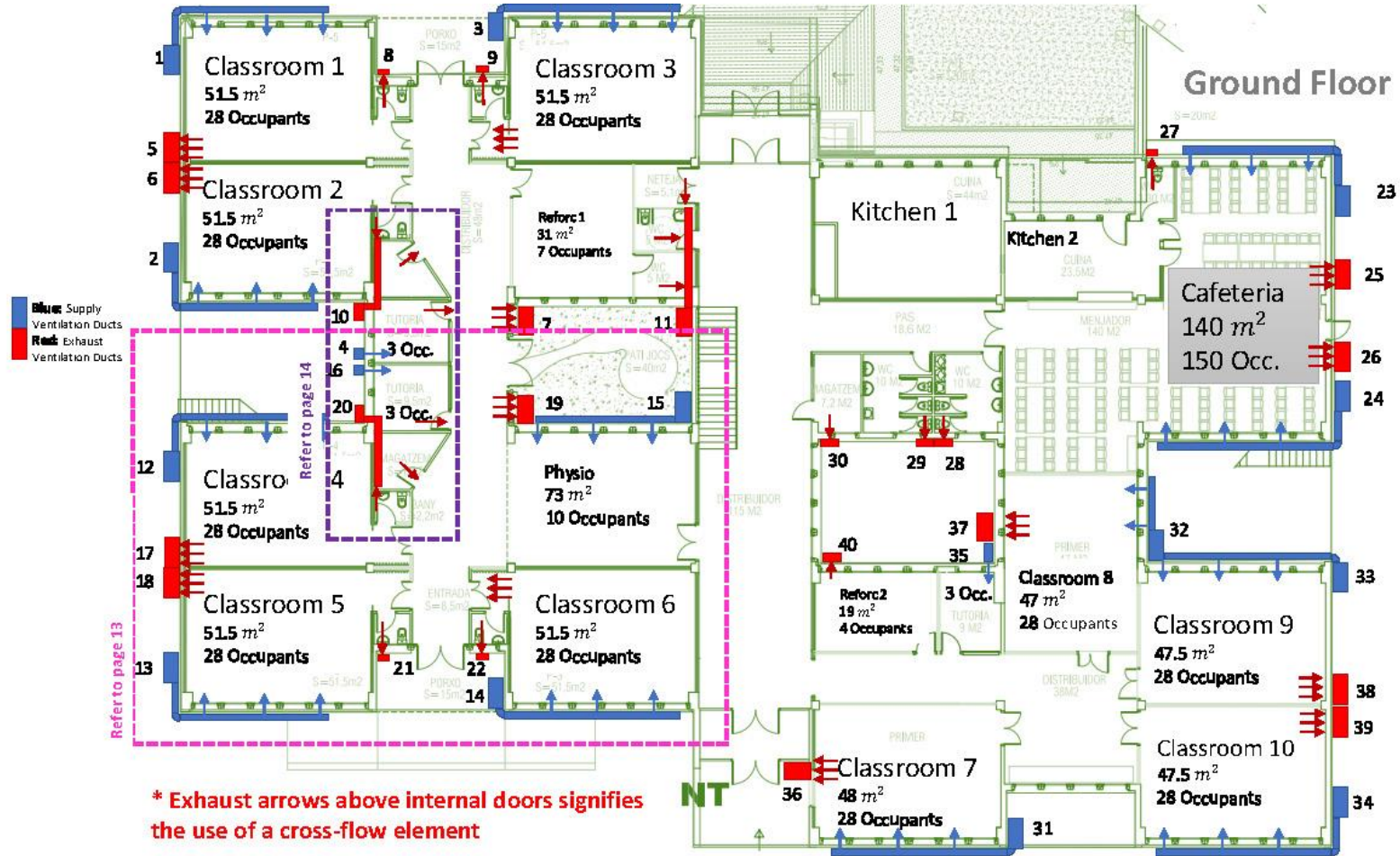


Reclaimed Wood  
tbd



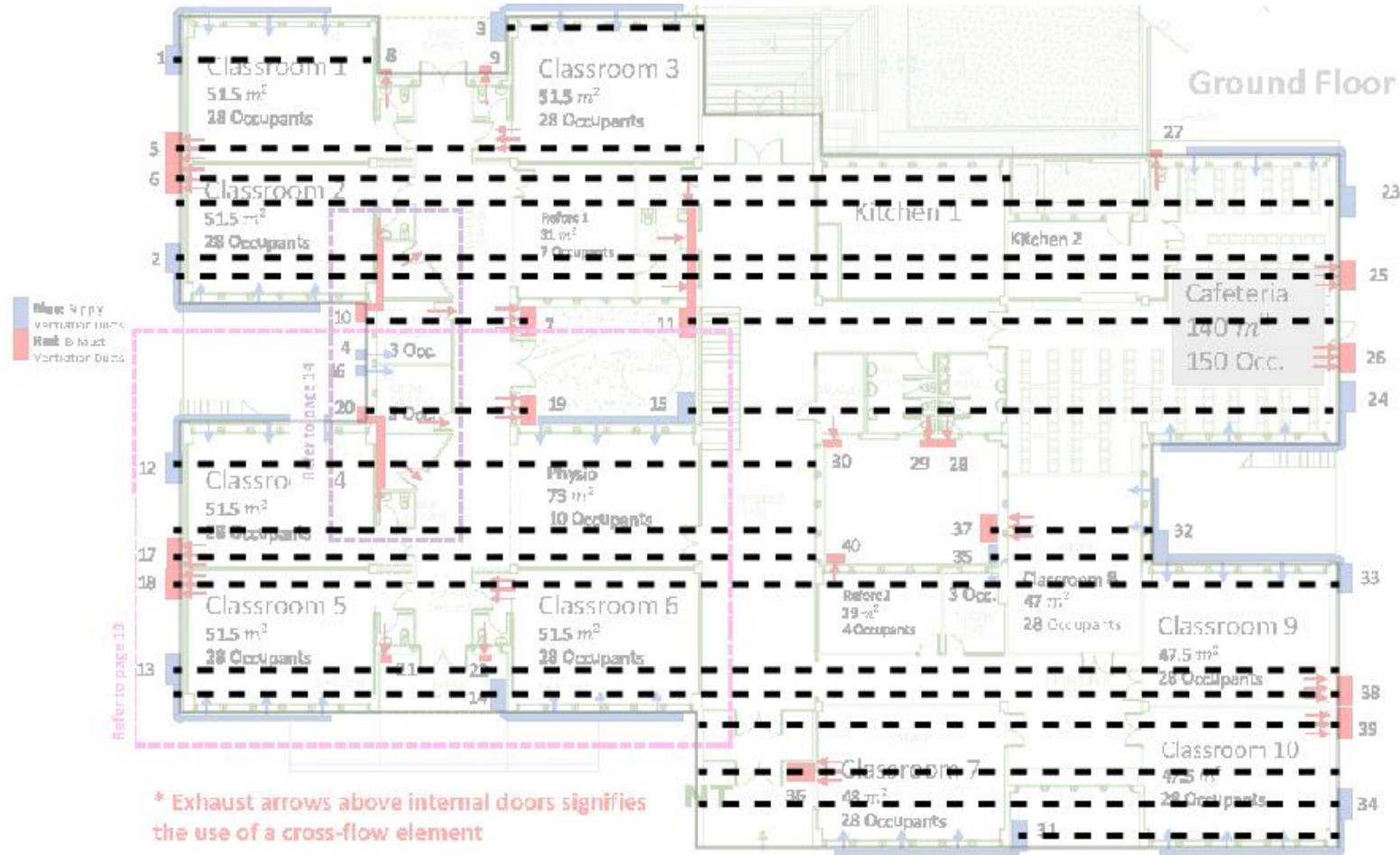
# Demonstrator (Spain)

## Roof design including ventilation ducts



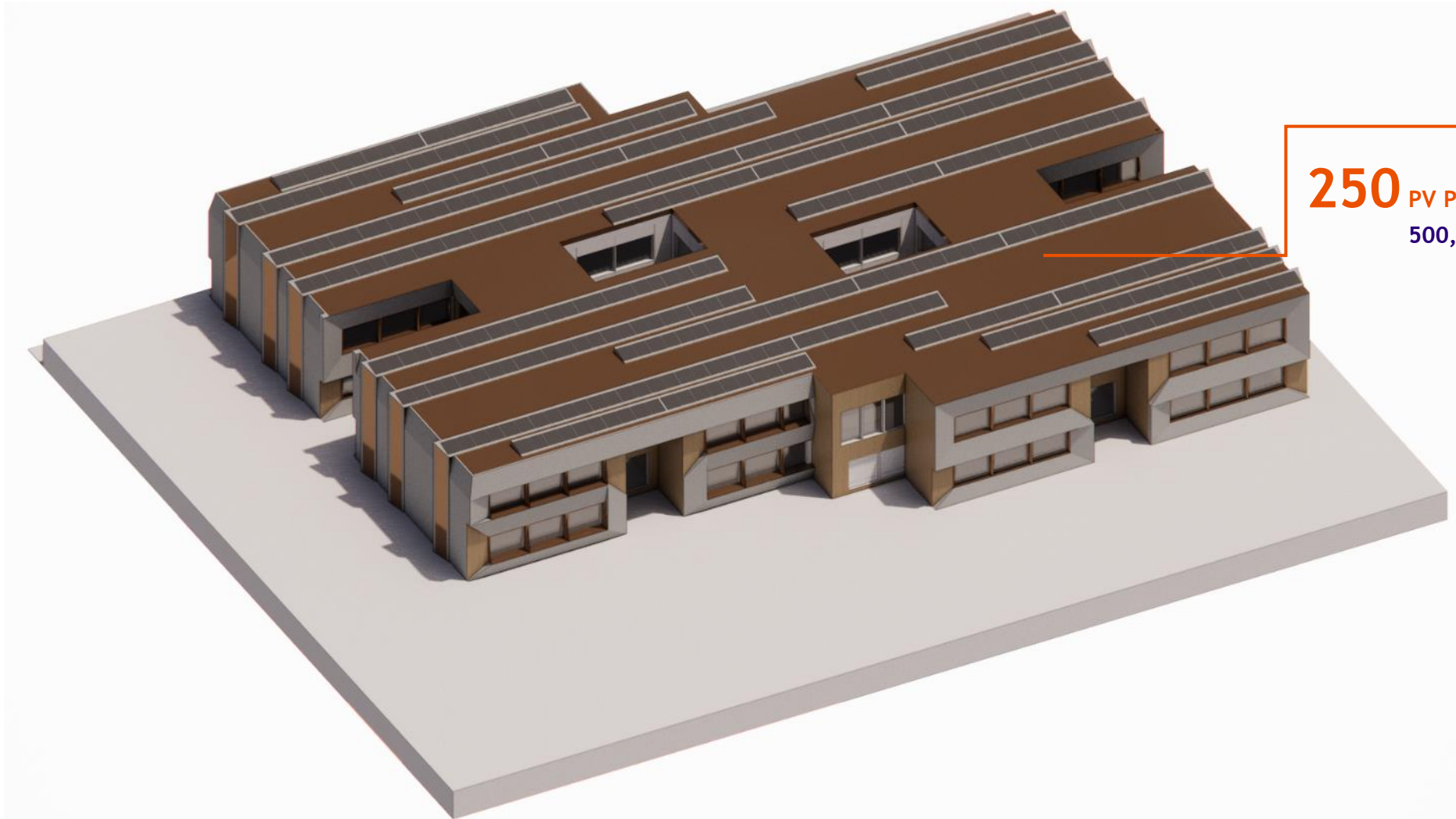
# Demonstrator (Spain)

## Roof design including ventilation system



# Demonstrator (Spain)

## New Roof design

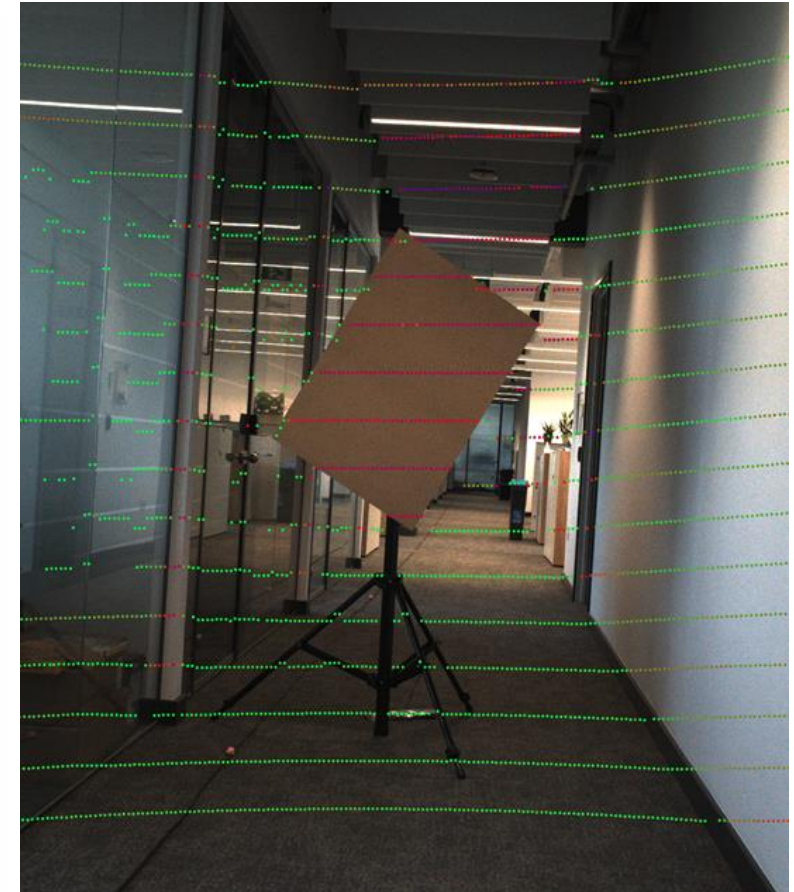


**250** PV PANELS  
500,76 m<sup>2</sup>

## Issues:

- Problems to obtain the data from the buildings with good accuracy and to be able to use this data without losing time on its treatment.

### Pointpix: Capturing And Pre-processing On-site Spatial And Visual Data



- Properties of eco innovative materials to comply with fire regulations (it is necessary in many cases to protect them with other materials with better properties).
- As active technologies in facades are relatively new and innovative, they outpace existing regulations, leading to challenges in compliance.
- Requirement to fulfil additional requirements in some countries in Europe (it is not possible to apply only European standards)
- Insurance and Liability: Incorporating active technologies impact the building's insurance policies. Insurers can require additional safeguards or inspections to cover potential risks associated with these technologies.
- Maintenance is a key point in relation to the use of eco-materials and active technologies.



# Thank you for your attention!

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## CINEA Buildings Clustering Meeting

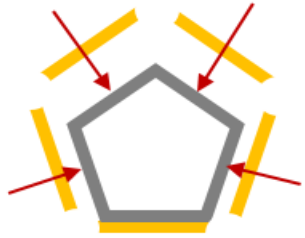


# What is outPHit?



The Idea? Deep Renovation Projects more reliable, faster and cheaper

- Start date: 01/09/2020 -> End date 31/08/2024
- Coordination: Passive House Institute
- Nr. of partners: 10 in 7 European countries
- Maximum Grant Amount: 2, 561,729.36€



- Prefab or semi prefab solutions
  - Streamlined conventional
  - On-stop-shop / whole package solutions to reduce coordination effort/costs
- No loss in high energy performance

# Main Objectives

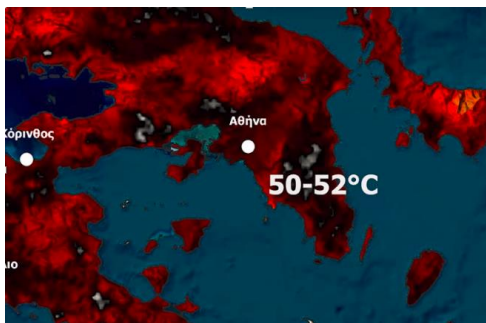
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- Support, quality assure and document real renovation projects
  - Demonstrate the successful implementation and provide scientific evidence by monitoring the results
  - Develop quality assurance approval and certification concepts to offer reliability of deep renovations
  - Develop decision making support tools and guidelines
  - Involve stakeholder groups to raise awareness
-

# Achievements and Success Story

Following a streamlined renovation approach, this single-family house located in Papagos, Athens now has a heating demand that is 15.2 times lower than its initial demand. The area where the house is situated has many buildings of the same type that need urgent energy renovation.

Previously, the owners paid just under €5,000 a year for heating. Now the oil heating is hardly used any more and the electricity bills have also dropped by 30%.



Before the EnerPHit retrofit, the house had temperature fluctuations of between 7° and 40° between summer and winter.

Reports from residents show: Even during a record-breaking Greek summer with outdoor temperatures of over 40°, the indoor temperature was constantly at a pleasant level

# Challenges and Barriers

## Case Study Projects



CS02\_Papagos / GR



CS09\_Lons le Saulnier / FR



CS23\_St. Johann in Tirol / AT



CS25\_Hamburg / DE



CS29\_Bonneuil s. Marne / FR



CS17\_Teruel / ES



CS12\_Ansoain / ES



OP06\_Tavros / GR



CS11\_Coulanges-s-Yonne / FR



OP30\_Goes Polder / NL



Bruno-Sander-Haus  
OP21\_Innsbruck / AT



CS03\_Cholargos / GR



CS27\_Frankfurt am Main / DE



CS37\_Darmstadt / DE



CS14\_Mendillorri / ES



OP28\_Hamburg / DE



CS22\_St. Johann in Tirol / AT



CS13\_Pamplona / ES



CS24\_St. Johann in Tirol / AT



CS36\_Erlangen / DE



CS04\_Marousi / GR



CS26\_Bünde / DE



OP20\_Madrid / ES



CS07\_Bagnères / FR



OP19\_Madrid / DE



OP39\_Köln / DE



CS34\_Frankfurt am Main / DE



CS35\_Erlangen / DE



OP08\_Colombes / FR



CS37\_Metz / FR



9  
Completed

4  
On site

5  
Delayed

9  
Cancelled

- Various difficulties with CS, ranging from cancellation to communication etc.

- Raw materials for both construction and technical parts could not be delivered

- Delayed due to COVID

→ Amendment made progress possible (monitoring, Dissemination etc.)

*Want to learn more?*

Get in contact

[luca.mueller@passiv.de](mailto:luca.mueller@passiv.de)

...or visit [outphit.eu](http://outphit.eu)



# Thank you for your attention!



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957175. The presented contents are the author's sole responsibility and do not necessarily reflect the views of the European Union. Neither the CINEA nor the European Commission are responsible for any use that may be made of the information contained therein.





**V2MARKET explores and develops  
the necessary market conditions  
to boost V2G and V2B**

# EVs and market participation

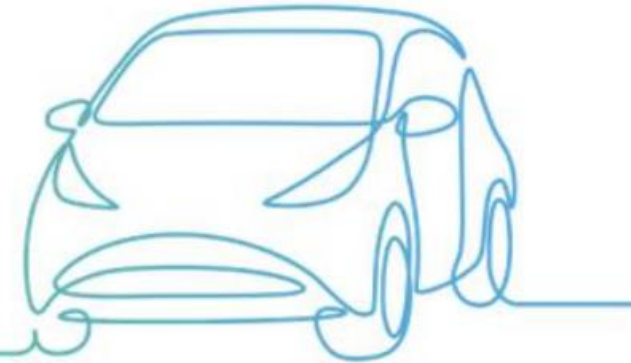


## UNIDIRECTIONAL LOADING ACCORDING TO PRICE SIGNALS

**Optimisation of charging times** by taking advantage of market price signals, charging at times of low electricity prices:



- Ex ante price analysis.
- Dynamic price analysis



## ELECTRIC VEHICLE POSSIBILITIES



## BI-DIRECTIONAL CHARGING V2H AND V2B

Vehicle recharging at times of low electricity prices, or excess self-production (self-consumption) and **use to power consumption in homes or buildings** at times of higher prices, reducing, where appropriate, tolls.



## BI-DIRECTIONAL CHARGING VEHICLE TO GRID (V2G)

**Recharging** the vehicle at times of **low electricity prices** and **selling the** energy stored in the vehicle on the market at times of **higher prices**.

## OPPORTUNITIES

- Renewable energy resources integration into the electricity market
- Solution for grid congestion
- Saving investments related to grid expansion
- Increase of self-consumption
- New business/service opportunities



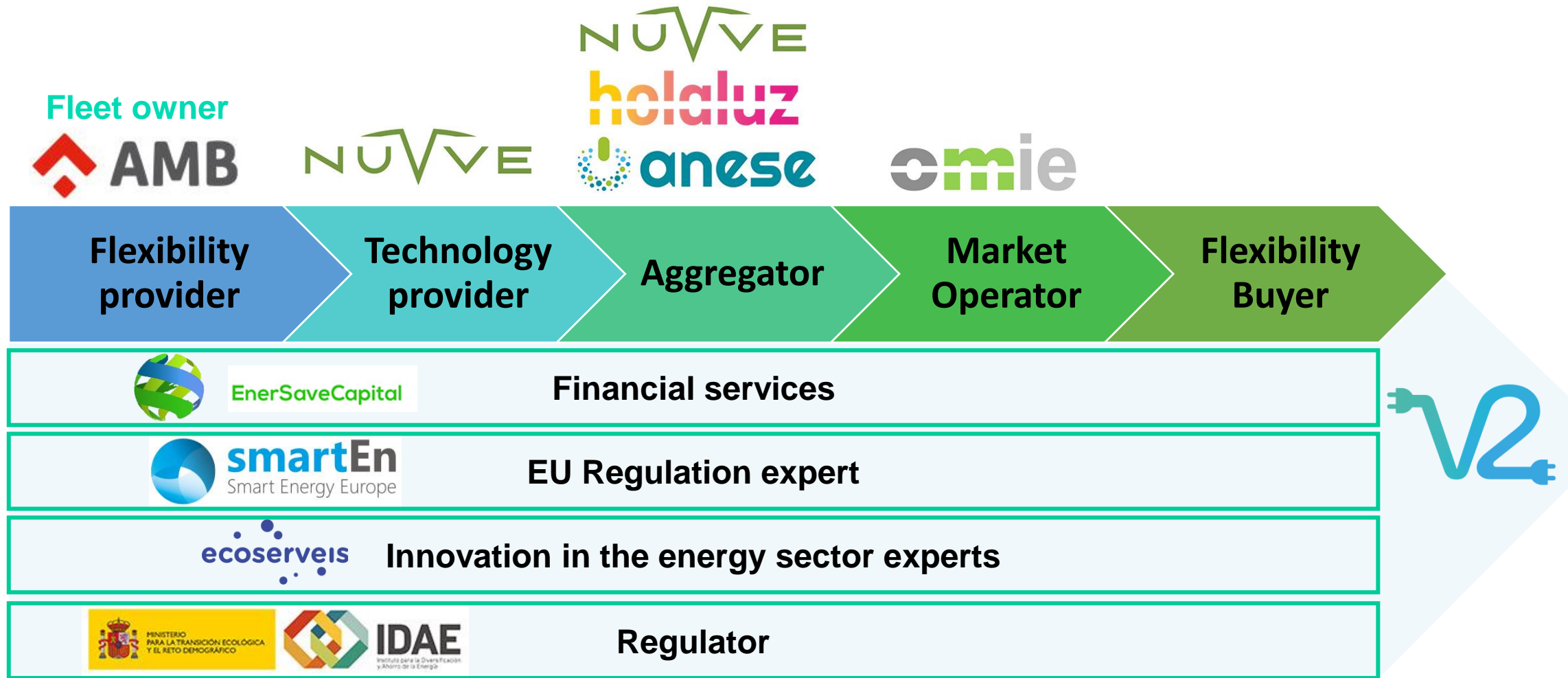
## BARRIERS

- Lack of regulation at member states level
- Standardization of communication protocols for chargers, connectors and EVs.
- E-roaming: interoperable charging infrastructure
- Lack of mass deployment of chargers and EVs

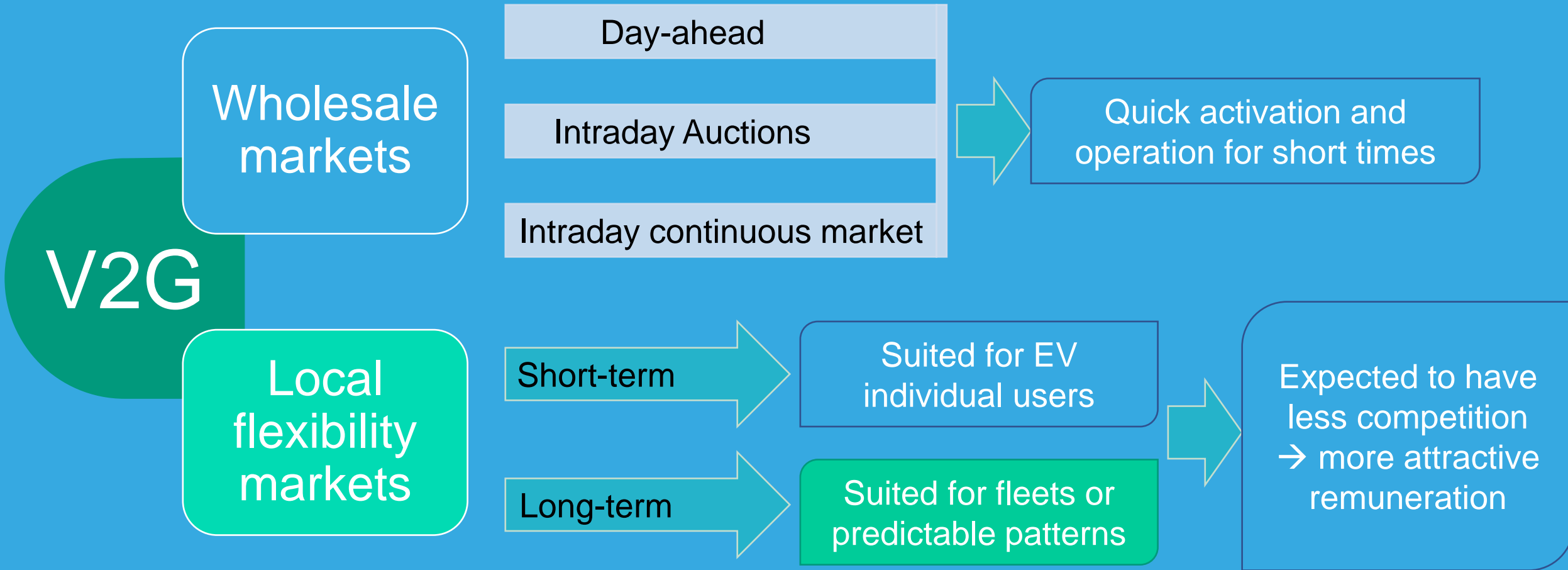
## ENABLERS

- Regulation put in place
- Aggregators as key players in flexibility markets with diversified portfolio
- Business opportunities for ESCOs, retail electricity suppliers and energy communities
- DSOs to adopt a new role in the integration of V2G in the system.

# The partnership



# Exploitation pathways in electricity markets



# Total Cost of Ownership in 6 different scenarios

Total cost of car ownership per month	Standard		V2G capable
	VW Golf VI	Nissan Leaf 40kw	Nissan Leaf 40kw
Base case (Stable battery price /Stable energy price)	€ 482,04	€ 554,50	€ 498,30
Low battery price/ Low energy costs	€ 482,04	€ 541,25	€ 485,05
Low battery price / High energy cost	€ 482,04	€ 549,89	€ 493,68
High battery. price / Highy energy cost	€ 482,04	€ 561,44	€ 505,24
Base case battery price / Low energy cost	€ 482,04	€ 552,80	€ 496,60
Low battery price/ Base case energy cost	€ 482,04	€ 542,95	€ 486,75
Base case battery price / High electricity cost	€ 482,04	€ 561,44	€ 505,24

# SERVITIZATION



Approx  
**25%**  
LOWER PURCHASING  
PRICE OF THE CAR



**PAY ONLY  
WHAT  
YOU DRIVE**



**BIDIRECTIONAL  
CHARGER  
INCLUDED**



**BATTERY  
REPLACING  
WHEN NEEDED**



# Servitisation schemes to close the affordability gap

EV OWNER	AGGREGATOR
<ul style="list-style-type: none"><li>• Low upfront costs and/or capital expenditure</li><li>• Transforms a capital expense into an operational expense (off-balance)</li><li>• Predictability of costs</li><li>• “Carefree” package</li><li>• Reduced CO<sub>2</sub> footprint</li><li>• Always have access to the newest battery model</li></ul>	<ul style="list-style-type: none"><li>• Keeps risk but also profits</li><li>• Systematisation / full exploitation of the battery cycle up to 4 cycles:<ol style="list-style-type: none"><li>1. Car life</li><li>2. Secondary storage (daily)</li><li>3. Emergency storage (sporadically)</li><li>4. Raw material value</li></ol></li><li>• Consolidates / Complements other services (e.g. for ESCOS, retail energy suppliers, energy communities)</li></ul>



# V2G Integration in EPC

**Servitisation**



- May relief “only” the battery/charger costs (-)
- Available for any end user (+)

**EPC**



- Totality of the investment (+)
- Not available for individual end users (-)

  
**MARKET**

**CONTRACTUAL  
ARRANGEMENTS**

**EPC +  
servitisation**



**DE-RISKING THE OVERALL EE INVESTMENT**

ICV – EV replacement energy efficiency  
(less viable marketwise)





# Nuno Mateus – Project Coordinator

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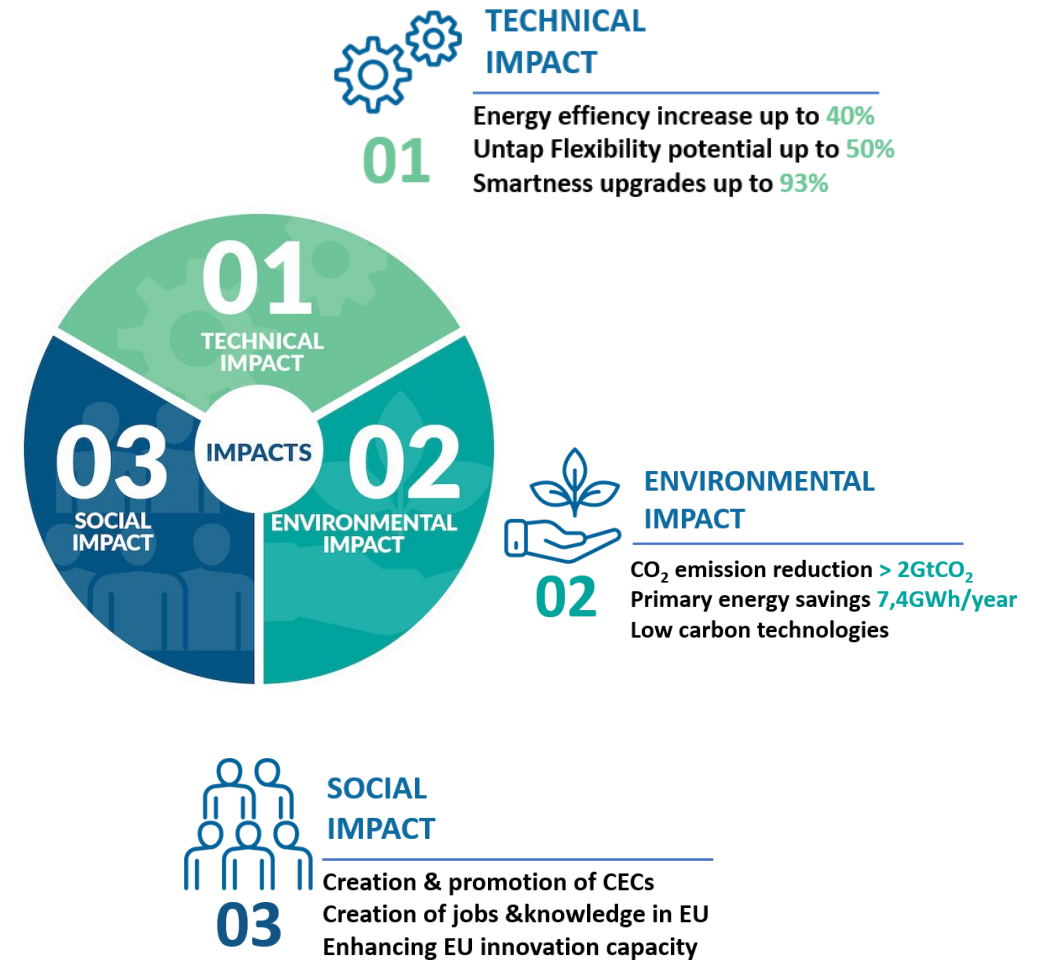
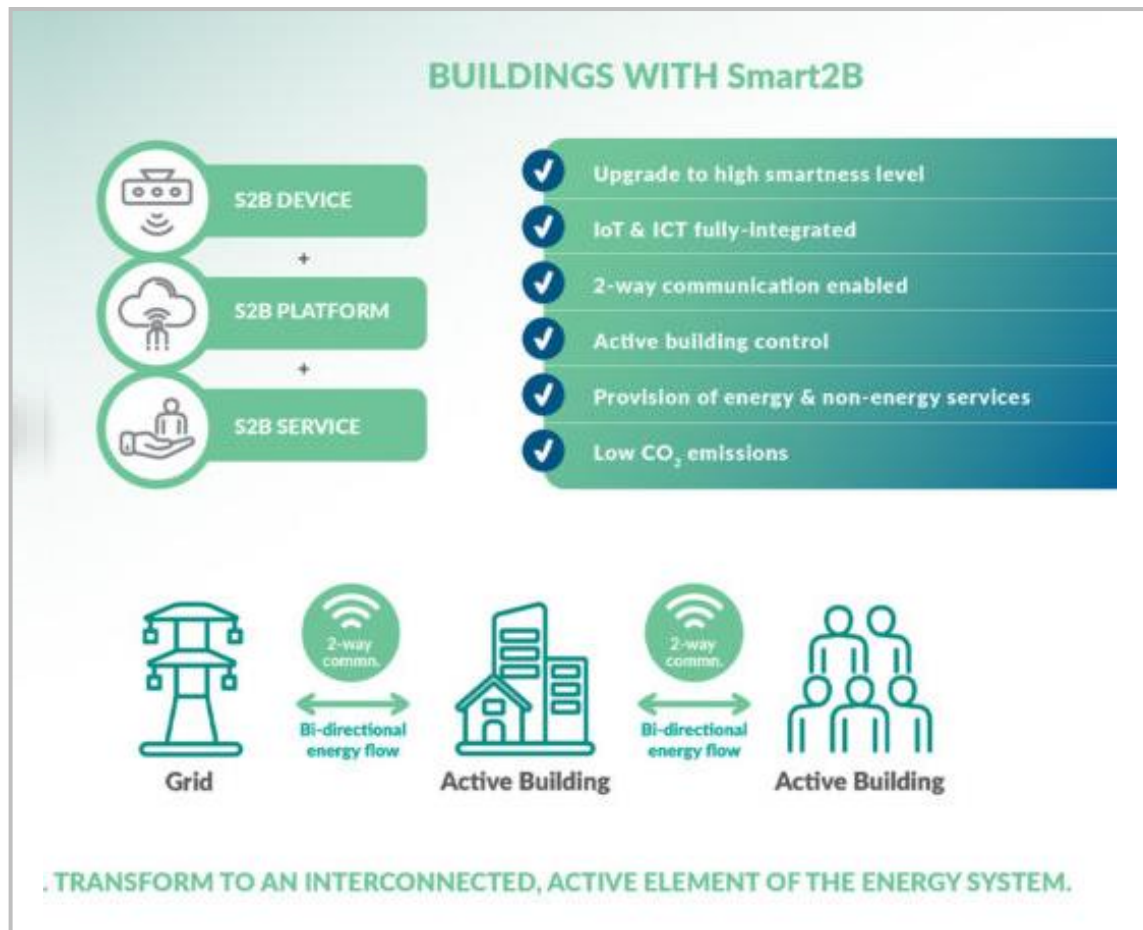
## CINEA buildings clustering meeting



This project has received funding from the European Union's Horizon 2020 research and innovation program under Grant agreement no. 101023666.

21-22 May 2024

# Smart2B Concept & Impacts





# Smart2B Ecosystem - KERs

## Upgrade the smartness of existing buildings

SERVICES SPACE



Flexibility



Smart Performance Assessment & Advisor



Energy efficiency



Indoor Comfort

PLATFORM & USER INTERACTION SPACE



Grid operator



Active Building



Occupants

DEVICES SPACE



Legacy Equipment



Smart appliances



Storage

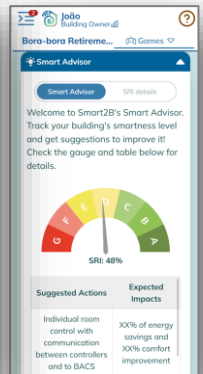
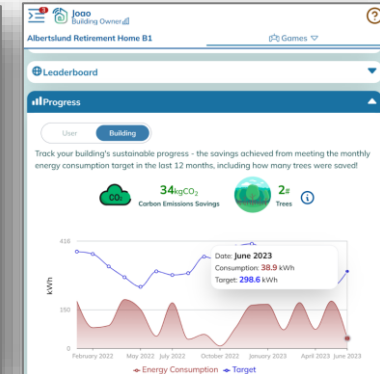
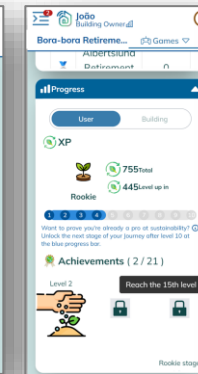
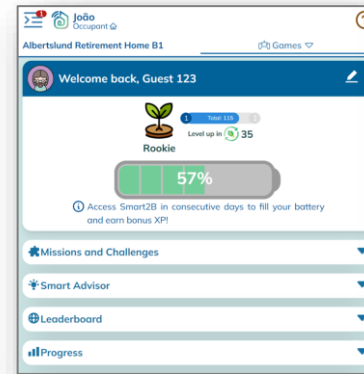


Electric vehicles

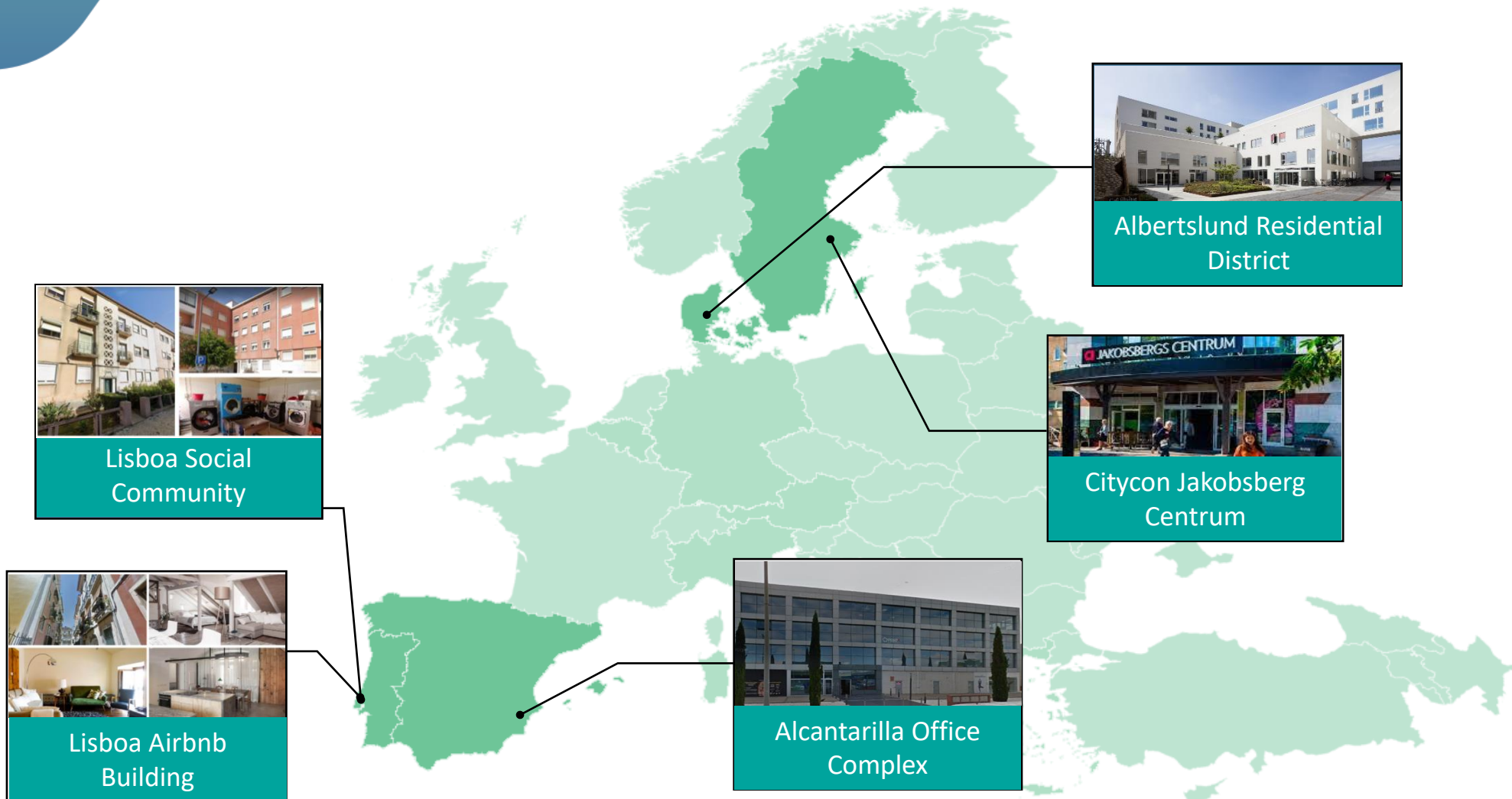


Distributed RES

USER INTERFACE (APP)



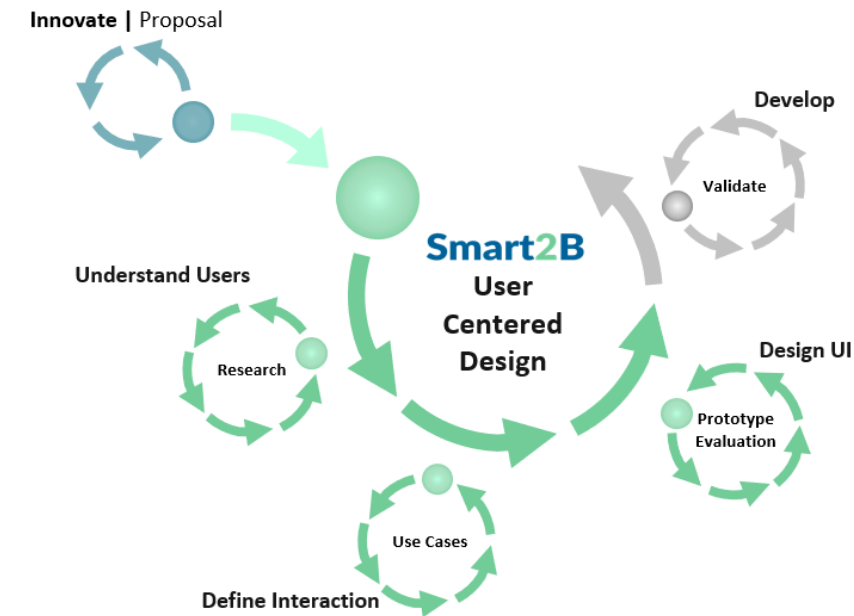
# Smart2B Pilots



# Lessons Learnt & Good practices



1. Building energy systems are **not IOT enabled or “open”**
2. Hard to convince building owners to allow us to monitor and control their equipment's: **distrust in cloud solutions**
3. **Incompatible expectations**: Buildings owners vs Project Consortium vs EC
4. **User-in-the-Loop service** reveals big potential to reduce the intrusiveness
5. **User centered design** as a valuable “tool”
6. Exploitation Plans: **MVP and extra pilots** to demonstrate economic & technical feasibility





# Smart2B

Smartness to existing Buildings

# THANK YOU FOR YOUR TIME

[www.smart2b-project.eu](http://www.smart2b-project.eu)



This project has received funding from the European Union's Horizon 2020 research and innovation program under Grant agreement no. 101023666.







# EBENTO

Energy efficiency Building Enhancement  
through performance guarantee Tools



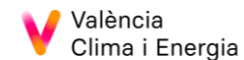
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OF TECHNOLOGY



Carbon  
Co-op





## CONTENT

- EBENTO at a glance
- EBENTO main objectives
- Developments for the OSS
- Market status for EnPC and OSS
- New EnPC for EBENTO OSS
- Pilots overview



# EBENTO AT A GLANCE

## Consortium

- 11 Partners (7 countries)
- 4 Pilots
- Total Budget 5,6 M€
- Duration 36 Months



### Research entities

JR, UL, IECCP, IRI



### Legal and EPC expert

JR, UL, IECCP



### Technology providers

ETRA, HYPERTECH, CCOOP



### End users

VCE, CEMOSA, TalTech, MYT, CCOOP





# PROJECT OBJECTIVES



Development of a **one-stop-shop** platform for all actors involved in the building and renovation sector



Focuses on **citizens** as key players in the energy transition



Increase the **involvement of public institutions and energy communities** by helping them to identify potential buildings for improvement.



Explore the **best financing for users** by studying the type of support available.



Include **new savings in EnPC** coming from user comfort, energy efficiency and demand response mechanisms creating new business models



# DEVELOPMENTS FOR THE OSS

## TOOLS

One Stop Shop



One-stop shop tool for the management of energy efficiency contracts, simulation and monitoring of buildings, with the aim of improving the dialogue between the actors involved in the renovation of buildings and the citizen.



Building performance contract module

- Working as a logbook where energy efficiency certificates and financial information for the different contracts will also be stored.
- **Decision support system:** generation of "standard" contracts.
- **Contract management** and control: EnPC life cycle and validating metrics.



Monitoring Module

- **Monitoring** the state of the houses (energy, comfort...)
- List of KPIs that allow the evaluation of energy contracts
- Metrics of housing **behaviour for consumers.**



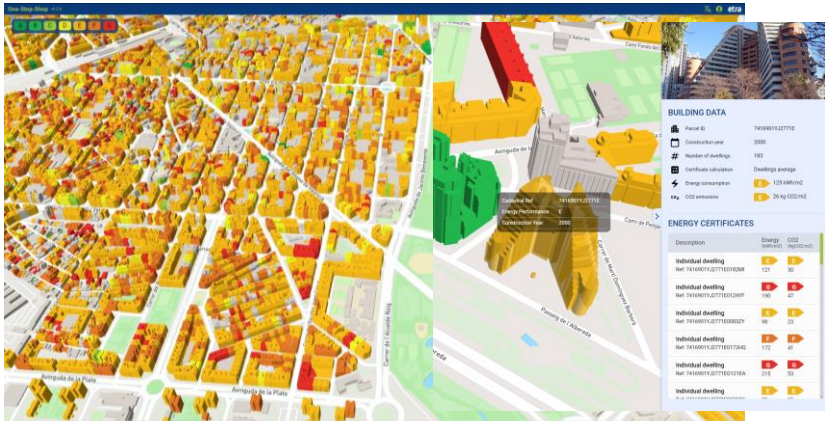
Simulation Module

- **Physical simulation:** Calculations based on BIM and specific energy simulation programs.
- **Economic simulation:** Profitability calculation coming by the physical simulation and actuations and simulation of the best performance contract to increase the benefits for the end user.

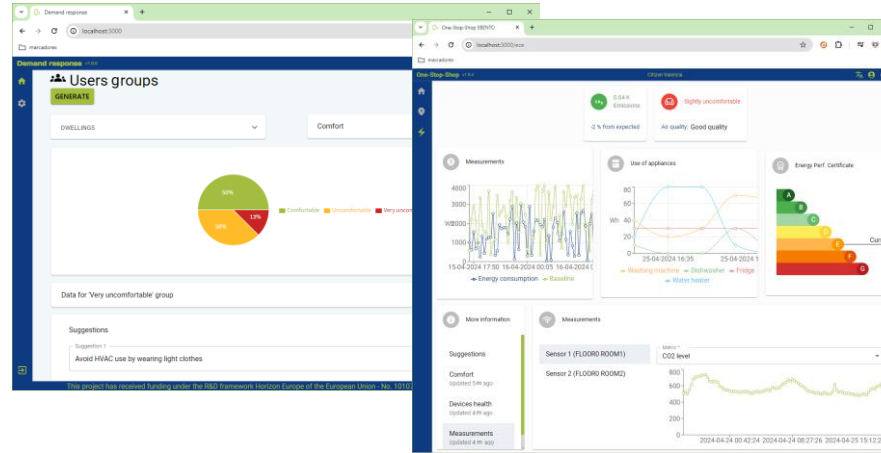


# ELEMENTS ON THE OSS

Dynamic Map: EPC for buildings in cities



Monitoring (energy, comfort, CO2..) and user clustering

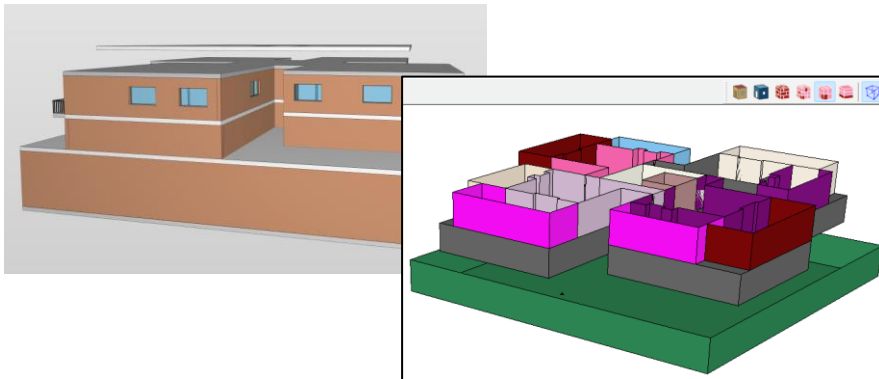


Common space for citizens and companies

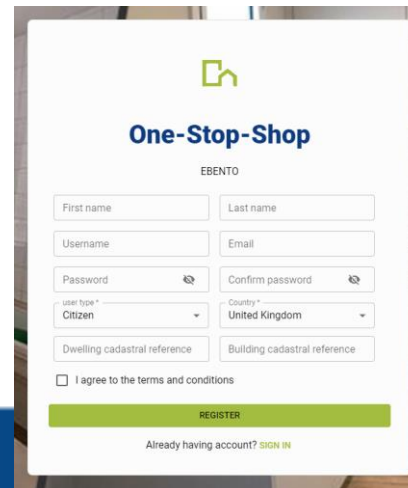
Match between users and companies



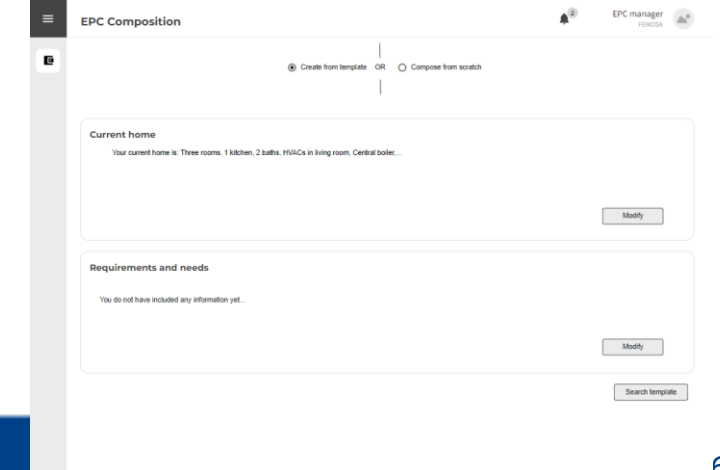
Energy and comfort simulation based on BIM in Energy+



Unique platform with different roles



EnPC management, control and definition



## Market status, barriers, drivers

### Current market status

- Initial market development has taken place in most European countries
- Current market development static or slowly growing
- Energy supply contracting more established as payback time is much lower

### Barriers

- Lack of client trust and understanding
- Complex contracts and financing schemes
- Long payback periods and therefore long contract durations

### Drivers

- Increase of energy cost
- Availability of competent facilitators or support services
- Standardization, model contracts and handbooks to overcome complexity barriers



# NEW EnPC FOR EBENTO OSS

## EnPC model

### Technical & financial aspects (relevant for the digital platform)

#### 1. Design and installation of energy efficiency and RES measures

Renovation works specification

Contract and installation schedule

#### 2. Performance Guarantee

Annual Guaranteed Energy Savings and Consumption

NEW: Demand Responsiveness and Flexibility

NEW: Guaranteed Quality and Comfort

#### 3. Project implementation

#### 4. Monitoring and energy savings calculation

#### 5. Financial compensation

#### 6. Notification and management of significant changes and delays

### Legal & contractual aspects (outside OSS)

EnPC template  
fit-for-EBENTO  
OSS

- Define basic skeleton for all type of EnPCs
- Cover the most important elements
- Adding new parameter: COMFORT and DEMAND RESPONSE
- Focus on residential buildings

EBENTO OSS platform will suggest suitable solutions and useful tips for various elements of the contract, and it could also facilitate the management of the contract.

The legal decisions and the actual contract will be signed outside of the platform's environment.





# PILOTS OVERVIEW

## Pilots

Different renovation and monitoring stages to enhance energy efficiency and comfort of users

- VALENCIA (Spain): Isolated two twin towers, **136 neighbours: 17 stories floors**, 4 dwellings per floor, one in each orientation. In which **24 houses** are fully monitored.
- TALLIN (Estonia): **Two buildings**, one focus on planning and 1<sup>st</sup> steps **preparation** for renovation and the second one focused on **actuactions and commissioning** process.
- ATHENS (Greece): **20 resident buildings** with different consumption patterns.
- MANCHESTER (UK): Based on Levenshulme Area Based Retrofit Scheme (LABS) to reaches households **vulnerable to fuel poverty** and explores **new finance options for retrofit**

Valencia



Tallin



Greece



Manchester



# THANKS

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