AEGIR DEMO-LED REPLICATION WORKSHOP SERIES

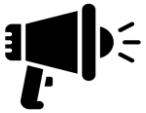
AEGIR Demo-led Replication Workshop (DWS1&2)

Bard Rama, Senior Expert, Sustainable Energy Systems, ICLEI Europe

16 April 2026

Funded by the European Union

Housekeeping rules



Please note that this session is being recorded.

Please keep your microphone muted and camera off during the presentation.

If you have questions, feel free to post them in the chat or use the Q&A button.

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AEGIR Demo-led Replication Workshop (DWS1&2)

Time	Session Title
14:00 – 14:05	Introduction to AEGIR Demo-led Replication Workshop series and DWS1&2 Bard Rama, ICLEI Europe
14:05 – 14:15	**Spanish Demo: School Retrofit** Víctor Martínez del Rey, Malgrat de Mar
14:15 – 14:25	**French Demo: Elderly housing retrofit** Faneva Herinirina, SIEL
14:25 – 14:40	**Technical Focus: BIM-based modelling and integrated digital workflows** Sergio Velasquez Correa, IDP
14:40 - 14:55	Q&A session
14:55 – 15:00	Key Takeaways

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About AEGIR project

Title:

DigitAl and physical incrEmental renovation packaGes/systems enhancing envIronmental and energetic behaviour and use of Resources. WebPage: https://aegirproject.eu/

GA Nº: 101079961

29 Partners: 29; 9 Countries

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AEGIR Project main approach

- Modular, industrialised renovation system — reducing costs and time
- Integrates renewable energy components and smart energy management → nearly Zero Energy Buildings (nZEB)
- Four renovation packages — adaptable to different building types and climates across Europe
- Full digital ecosystem: from design to operation
- Bio-based and recycled materials — circular economy, lower embodied carbon
- User-centric: affordable, improved indoor comfort, end-user engagement

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Technologies from AEGIR Project

Construction

- Scalable prefabricated envelope packages
- Bio-composite and timber profile systems
- Bio-based thermal and recycled acoustic insulation
- Integrated ventilation ducts
- Smart windows

Energy

- Flexible PV and PVT panel
- Second-life batteries

Digital

- Common Data Environment (CDE)
- Façade Cloud Configurator
- PointPix — on-site reality capture
- Ag2DT — automated digital twin generation
- Augmented reality for execution validation
- AI and energy metamodels for building operation & maintenance

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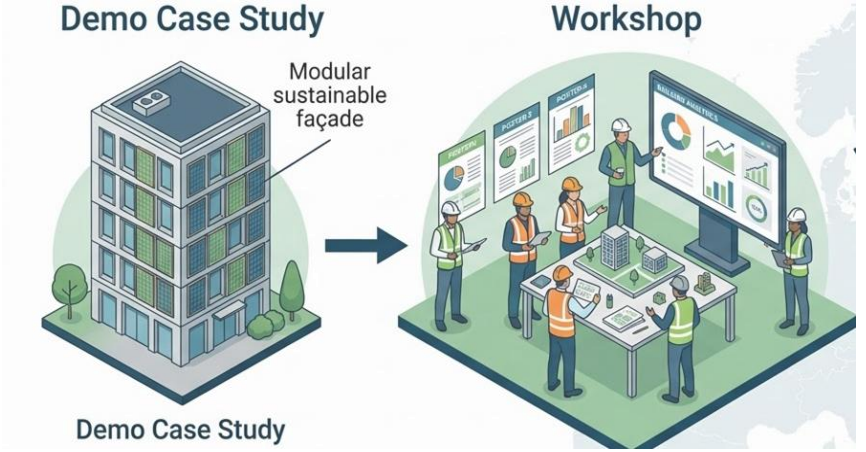
The AEGIR DWS Series

What are Demo-led Replication Workshop series?

- A workshop series designed to transfer knowledge and share practical insights from real-life demo sites with stakeholders (architects, engineers, policymakers, and building owners).

- Bridge the gap between technical demonstration and market-wide replication



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The AEGIR DWS Series

What they are built on:

- Demo evidence:

technical solutions | regulatory and permitting context | construction sequencing | replicable components

- Common renovation process:

assessment → design → procurement → construction → commissioning

What they deliver:

- Structured replication pathways for each demo context
- Inputs to Green Public Procurement guidance, financing models, and policy recommendations

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AEGIR DWS series

Objectives:

- **SHARE practical insights from real-world demonstration sites.**
- **EXPLORE technical feasibility and modular design strategies.**
- **DISCUSS strategies to overcome financial and regulatory barriers.**
- **ADAPT solutions for diverse climates and building typologies.**
- **FOSTER transdisciplinary collaboration for scaling up.**

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Incremental Renovation Package

AEGIR: DEMO MALGRAT DE MAR

April 16, 2026

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Marià Cubí school

376 students, from 3 to 12 years old

Average rate per classroom, 20 students

5,29 % of students with special educational needs.

Students from 24 different nationalities.

33 teachers

INSTALLATION OF 267 M² OF PV PANNELS IN THE FAÇADE

INSTALLATION OF 248 M² OF PV PANNELS AT THE ROOF

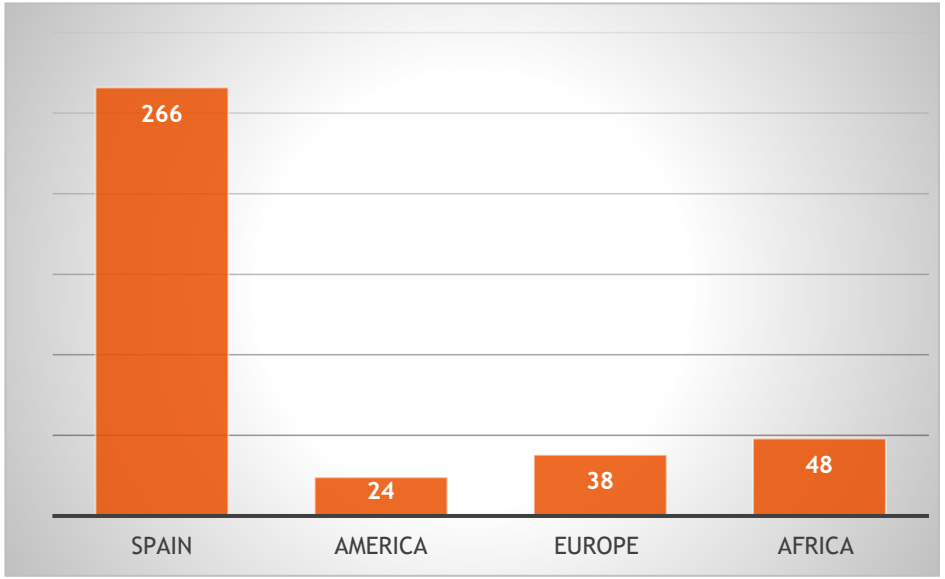
INSTALLATION OF 66 M² OF FLEXIBLE PV PANNELS AT SPECIFIC PARTS OF THE FAÇADE

INSTALLATION OF 124 M² OF PVT PANNELS TO SUPPORT THE HEAT PUMPS FOR HEATING AND COOLING

NEW VENTILATION SYSTEM

64 UNITS OF NEW WINDOWS WITH A NEW SYSTEM TO VENTILATE ACCORDING TO THE CO2 LEVELS

DIGITAL TWIN OF THE BUILDING



TO ENGAGE THE COMUNITY SINCE THE EARLY STAGES OF THE PROJECT

TO FIND OUT THE BEST SOLUTION FOR THE IRREGULAR SURFACES OF THE FAÇADE

NON DISTURBING WORKS WHEN THE SCHOOL IS OPEN

TO INTEGRATE THE SOLUTION WITH THE LOCAL ENERGY COMUNITY IN PROGRESS

TO INTEGRATE THE NEW BIOMASS BOILER RECENTLY INSTALLED, 210Kw

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POTENTIAL RISKS

TENDERING PROCESS OF THE INSTALLATION:

- Technical definition of the solution
- Prescriptions rules
- Lack of experience in such an innovative solutions within the local installer companies

SCHEDULE FOR THE IMPLEMENTATION OF THE SOLUTION:

- Disruptive works must be done during holiday season (summer, Christmast, Easter)
- It‘s of crucial importance to match the tendering process, the delivery of the materials and the holiday season just in case of disruptive works.

COMMISSIONING OF THE INSTALLATION

- Technical experts on site
- Schedule in order to have enough time to get data to validate the results
- Future maintenance

LACK OF ENGAGEMENT OF THE COMMUNITY

LOW PERFORMANCE OF THE SOLUTIONS INSTALLED

POTENTIAL BUILDING DAMAGES DURING WORKS PROGRESS

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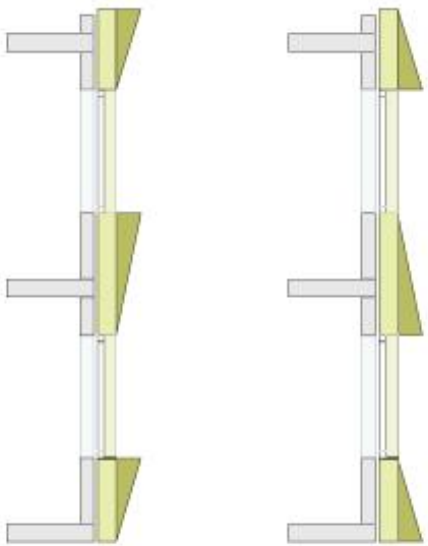
SPANISH DEMO CONCEPT

The sun study analysis conducted on the four proposed design inclinations of the functional façade informed the decision to proceed with the orientation that most effectively minimizes the shading factor better shading performance, as less solar heat is transmitted indoors.



	Orientation 1 - Down Tilt	Orientation 2 - Up Tilt
S	0.86	0.55
E	0.84	0.57
N	0.73	0.50
W	0.85	0.55

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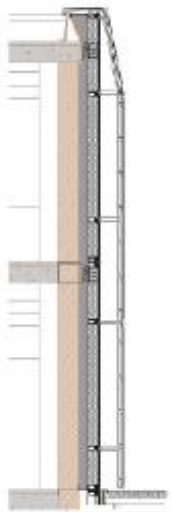
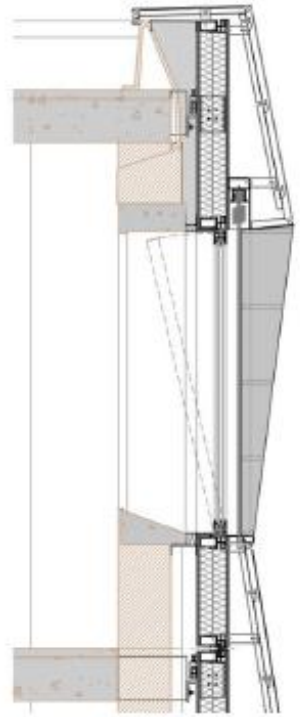
Aegir solution

SPANISH DEMO DETAIL

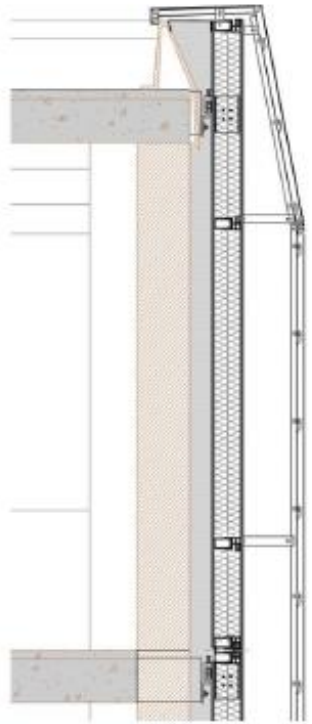


Cross section 1

Cross section 2



01. Typical window section



02. Typical corner section

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SPANISH DEMO MATERIALS

The material proposal is informed by the local climate conditions, incorporating two main materials:

Primary Material: A weather-resistant, durable HPL cladding in white, chosen to endure prolonged sun exposure while maintaining its integrity and appearance.

Secondary Material: A more delicate, reclaimed material, strategically positioned in shaded and protected areas. For this, reclaimed eucalyptus wood, sourced from regional sea mussel piers, was selected for its sustainability and local significance.

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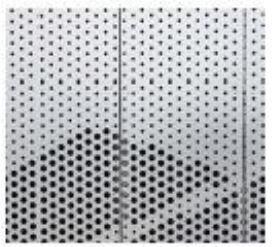
Aegir solution

SPANISH DEMO MATERIALS

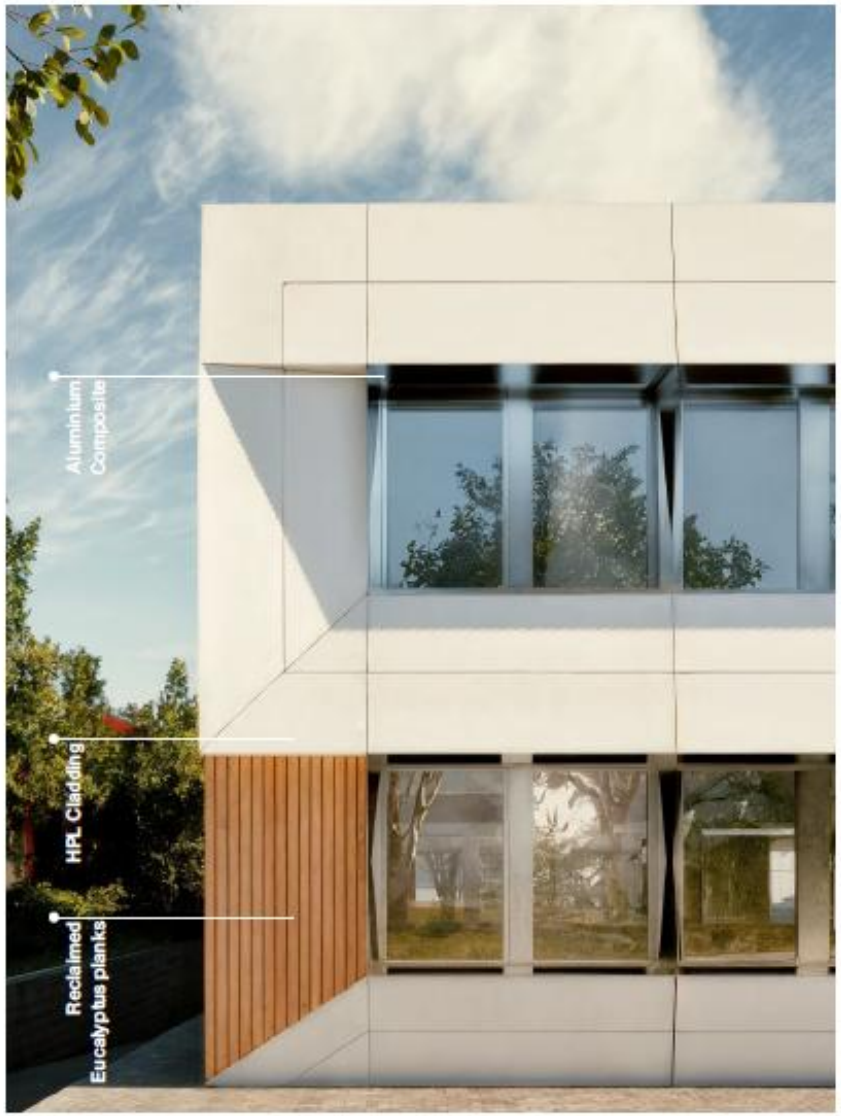
1. Reclaimed Eucalyptus

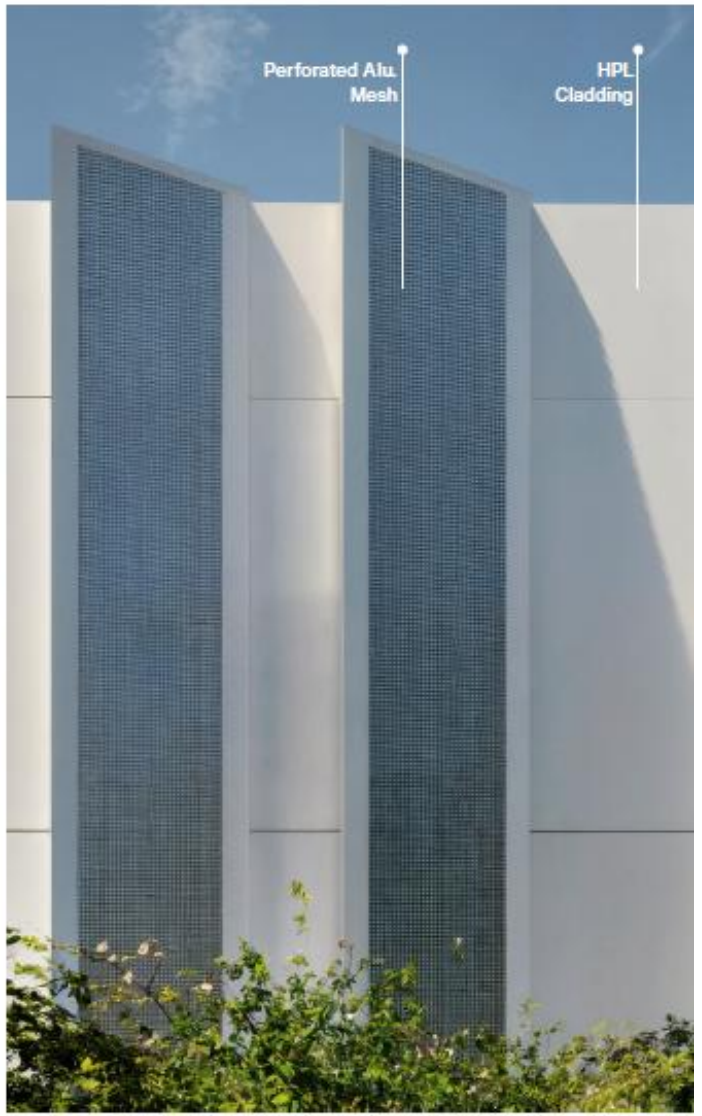
2. HPL Cladding (Trespa)

3. Aluminium Composite



4. Perforated Alu. Mesh





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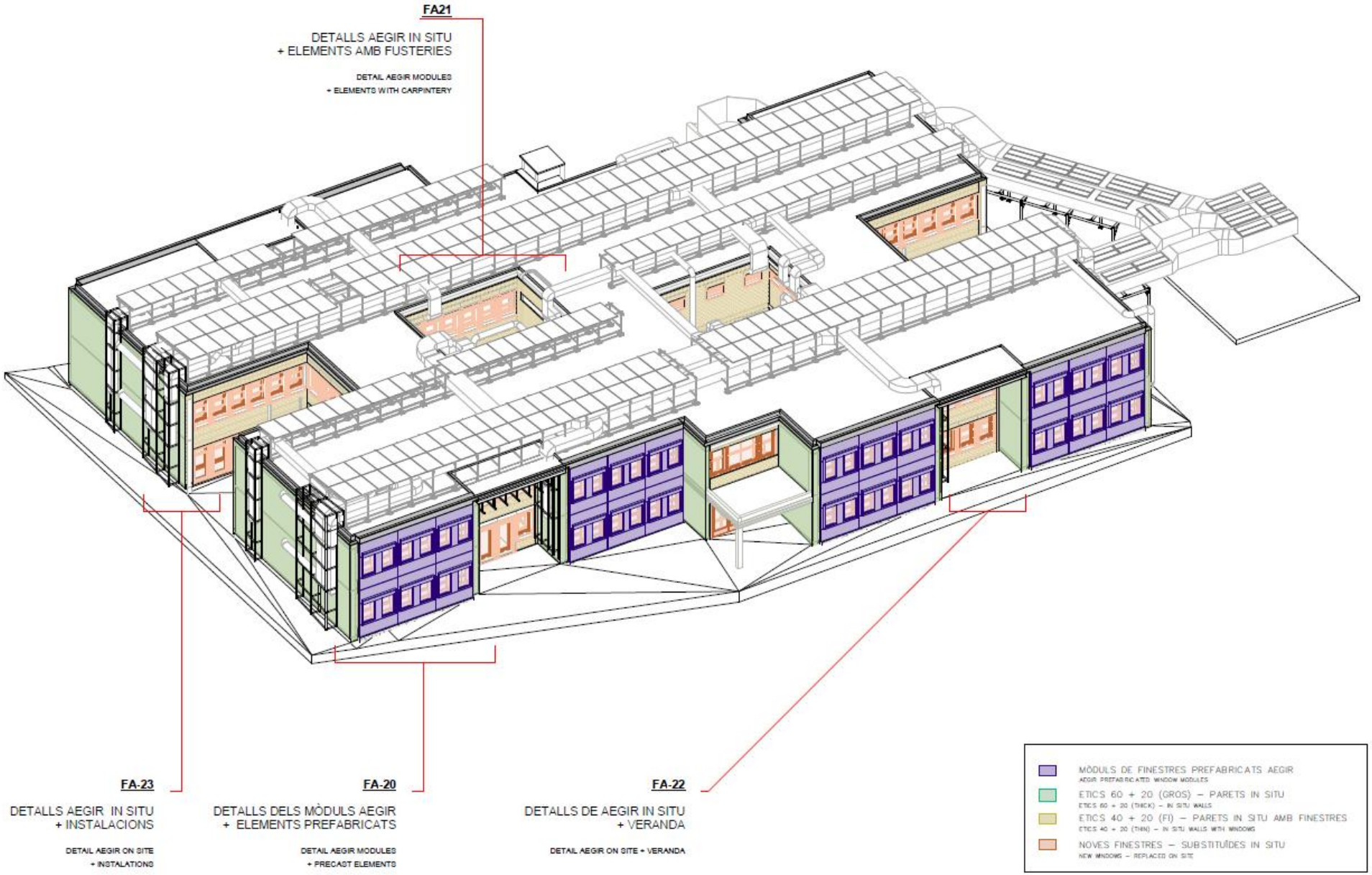

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¡Thank you for your attention!

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French demosite : Astree Residence Boën-sur-Lignon, France

16 April 2026, France

Herinirina FANEVAMAMPIANDRA, SIEL-TE

Pauline BONINO, Tenerrdis

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Astree Residence : Boën-sur-Lignon, France

Figure 1 : French demo site

- Year of construction: 1981
- Building Surface: 3,300 m2,
- Roof Surface: 820 m²
- Façade Area: 1,500 m²
- Structure: R+3 Building used fo (R+3)
- Types of building : A social residence for Autonomous Seniors
- *Heating System: Gas boiler and radiators*
- *Location : Boën-sur-Lignon, France*

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Aegir solution

FRENCH DEMO APPLICATION

P001	Industrialized envelope
P002	Envelope mesh
P003	Ventilation system
P004	Active windows
P005	Bio-based insulation
P006	Fabric insulation
P007	Standard PV module
P008	Flexible PV module
P009	PVT module
P010	Second life battery

OBJECTIVES :

- ❑ Develop modular, renewable, and industrialized building envelope solutions for energy renovation
- ❑ Test and deploy solutions developed by partners.
- ❑ Replicate results on a European scale
- ❑ Reduce costs and construction time for energy renovation projects

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Design

Figure 2 : French demo site design

Challenges :

- Minimize the impact of the on-site work for residents' comfort
- Solar Control integration: How to integrate solar control shading to allow easy maintenance without reducing daylight and facilitating ventilation pipe integration ?
- Ventilation system challenges: How to integrate the fresh air pipes and inlets into the prefab elements without reducing the insulation performance and keeping an effiecient ventilation ?
- French regulation : links to French energy-performance requirements and social-housing operator constraints

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General facades:

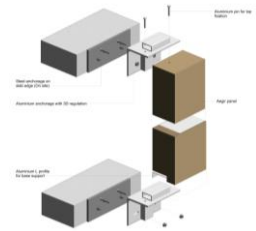
Figure 3 : French demo site design

TWO TYPES OF PANEL

RIBBED

FLAT

Windows panels



Panels anchorage

Aluminium pin for top fixation

- ❑ **The chosen solution is a modular prefabricated timber façade system that envelopes the existing building, combined with integrated renewable energy and building service upgrades**
- ❑ **Zero-displacement retrofit concept so elderly residents remain in place**
- ❑ **Sequencing of works to minimise disturbance (access, noise, dust)**

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Figure 4: French BIM model

The design is adaptable to the building's geometry and regulatory constraints, meaning the module sizes and placement take into account the building's dimensions, window positions, and French construction codes

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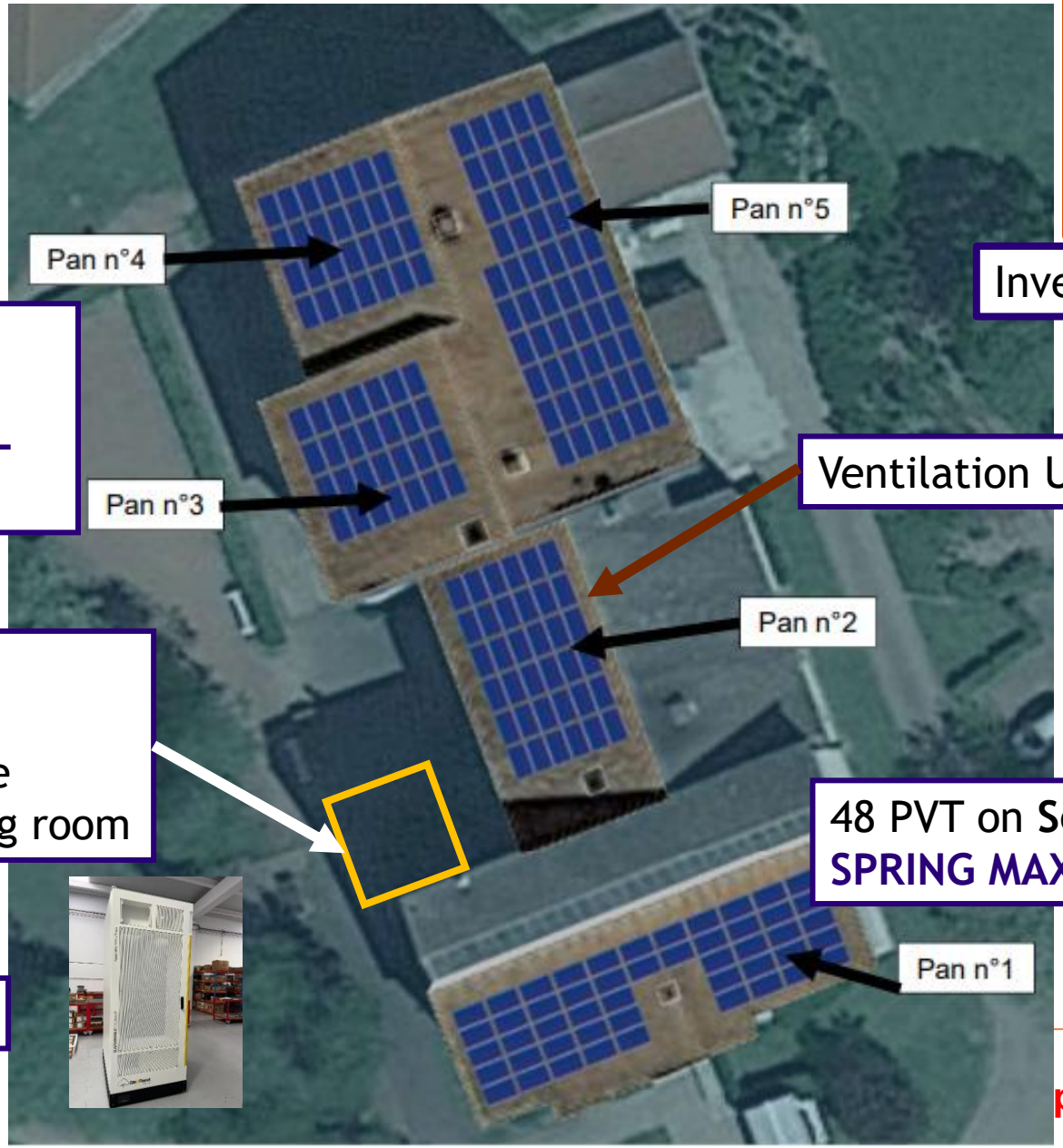
Renewable energy solution



148 standard
PV on Roof
FLASH 455 Glass-Glass TOPCon

W/W Heat Pump
New gas boiler
Water tank in the basement heating room

Battery BeePlanet factory

Inverters ?

Ventilation Unit in the attics

48 PVT on **South** Roof
SPRING MAX 455 Wc
Dualsun

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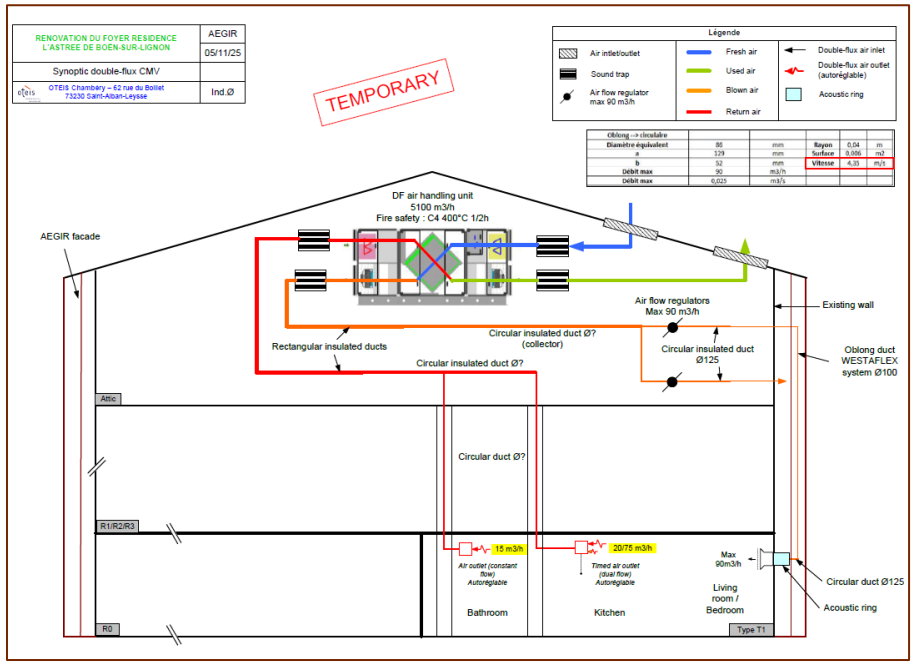
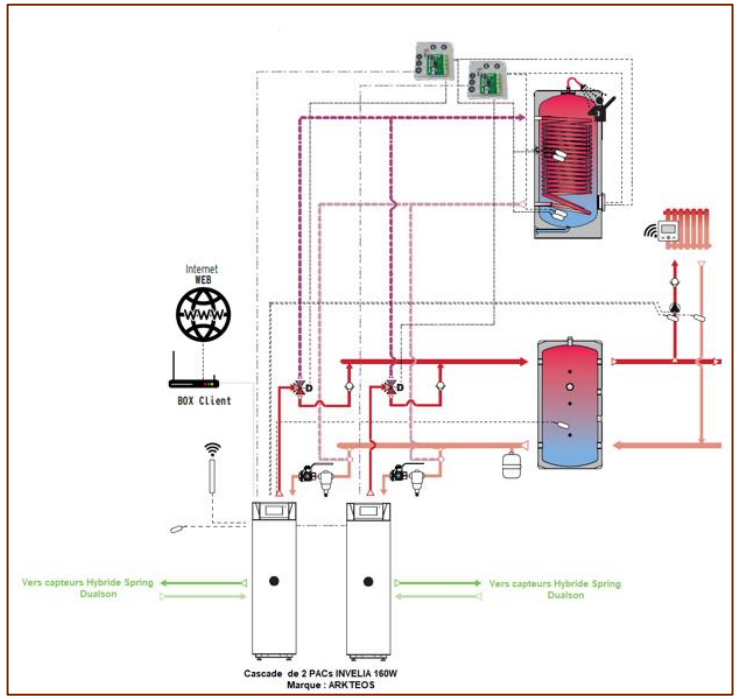
Heating and Ventilation





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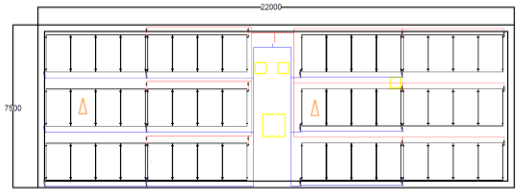
3 lines of 4×2 panels
(4 in serial × 2 branch in //)



2x24 PVT panels connected to w/w Heat Pump Arkteos

- Coupling PVT panels (water part) to Water/water Heat Pump as cold source.➔ **2x16kW HP, (1.5 PVT panel /kW --> 48 PVT)**
- Change gas boiler to new one (smaller one to fit other components in the heating room)

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Final renders of the French demo building

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Thank you for your attention

FANEVAMAMPIANDRA Herinirina : SIEL-TE

Bonino Pauline : Tenerrdis

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TECHNICAL DEEP DIVE WORSHOP

AEGIR Incremental Renovation Package

AEGIR Demo-led Replication Workshop Series (DWS) -DWS 1&2: France & Spain

April 16th, Remote

Sergio Velásquez Correa, IDP

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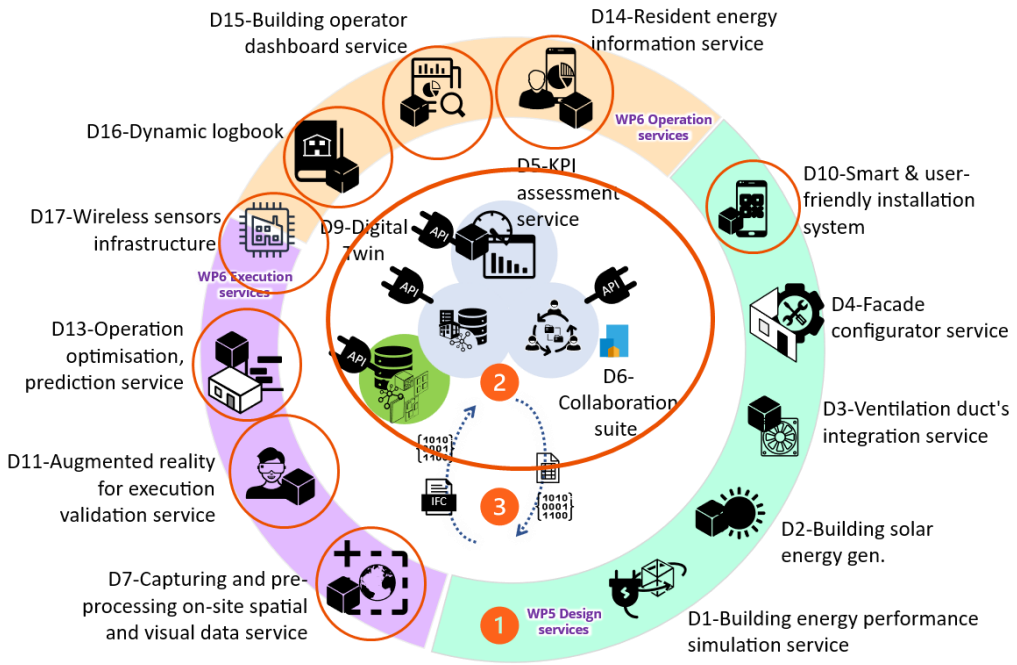
DIGITAL TOOLS AND SERVICES ECOSYSTEM

THE MAIN OBJECTIVE IS TO IMPLEMENT THE INFORMATION-BASED ECOSYSTEM OF SERVICES THAT ALLOW THE DIGITALIZATION OF THE PROJECT DURING EXECUTION AND OPERATION. IT IS BUILT ON EXISTING TOOLS PROVIDED BY THE PARTNERS AND FOCUSED ON AUTOMATING THE DATA FLOW BETWEEN THE DIFFERENT SERVICES MEANT TO FACILITATE FOLLOWING CONSTRUCTION OR INTERVENTION PROGRESS, AS WELL AS MONITORING AFTER COMMISSIONING.



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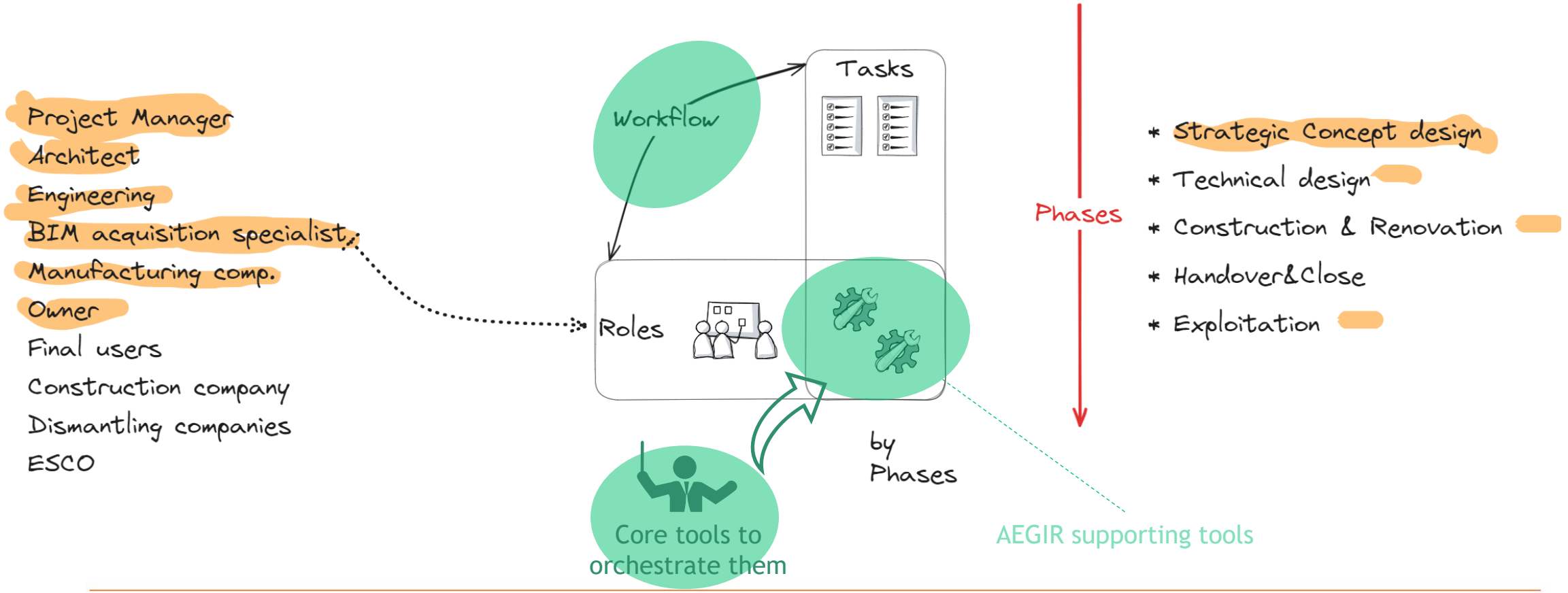
Information Workflows - From Design to Operation

The process : Tools orchestration to support AEGIR workflow



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DIGITAL PROCESSES

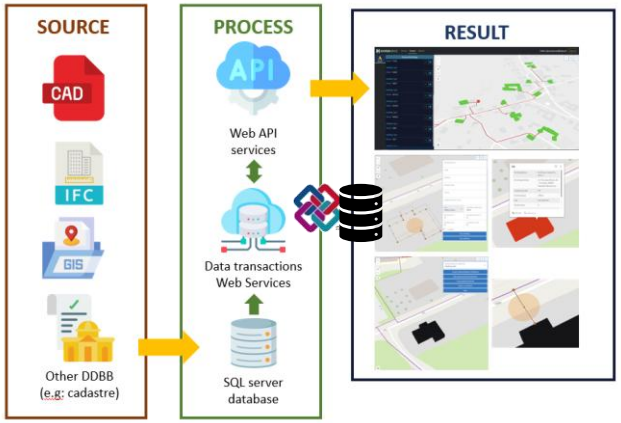
Demo Site definition from physical to digital

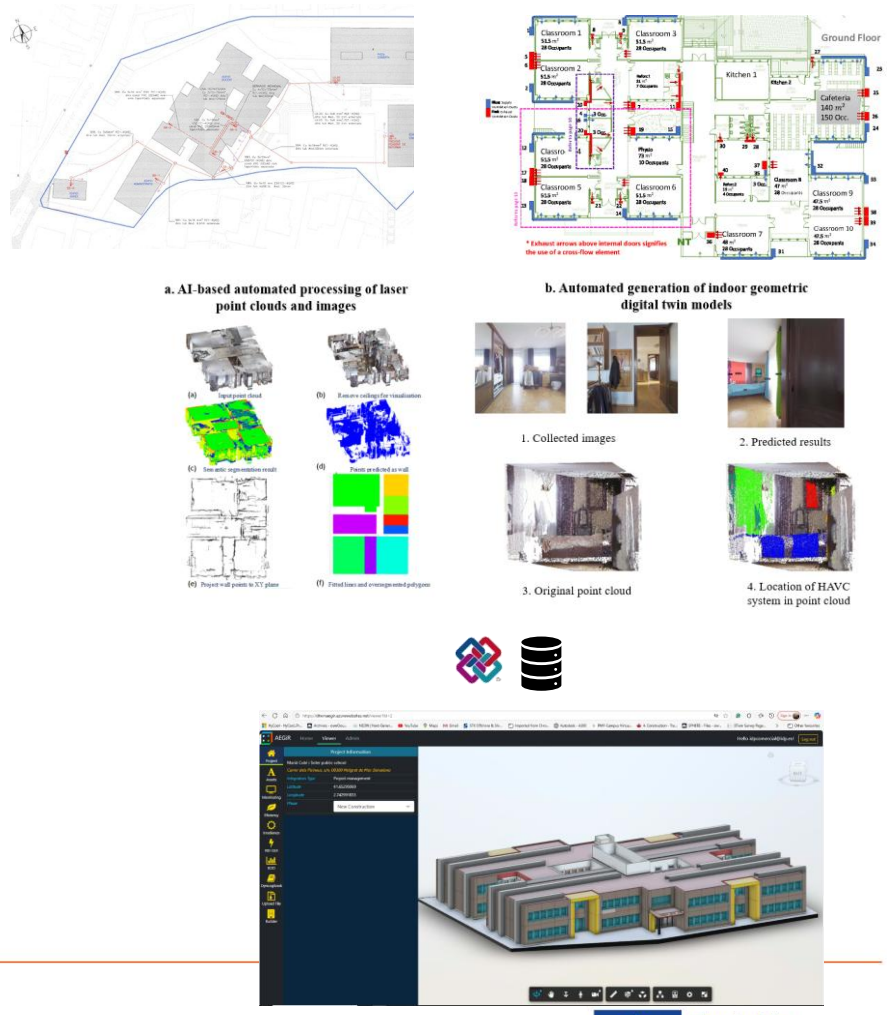
The Process

Data for BIM models has been obtained from points cloud or other sources have been provided.

The entire process requireed the provision of the following disciplines in digital formats compatible with BIM/ifc:

1. Architecture (geometry)
2. Façade and roof top components federated in architecture
3. Site information (geography)
4. MEP (mechanical, electrical and piping) installations
5. HVAC (heating ventilation and air conditioning)
6. Sensing for monitoring (BEMS, MODBUS, etc.)
7. Simulation data (thermal and energy performance) referenced to be integrated into de DTwin platform.
8. LCC and circularity





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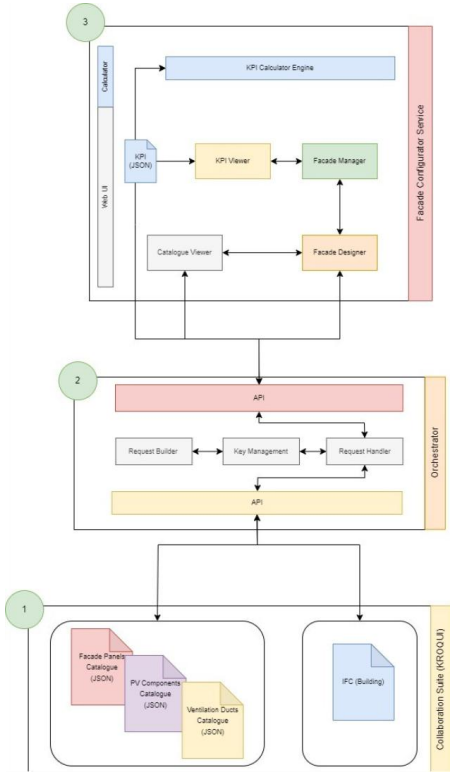
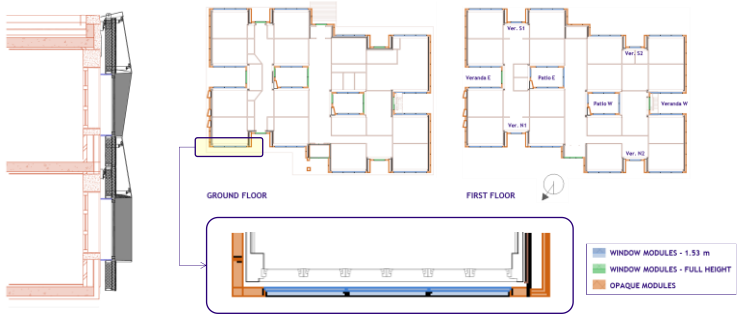
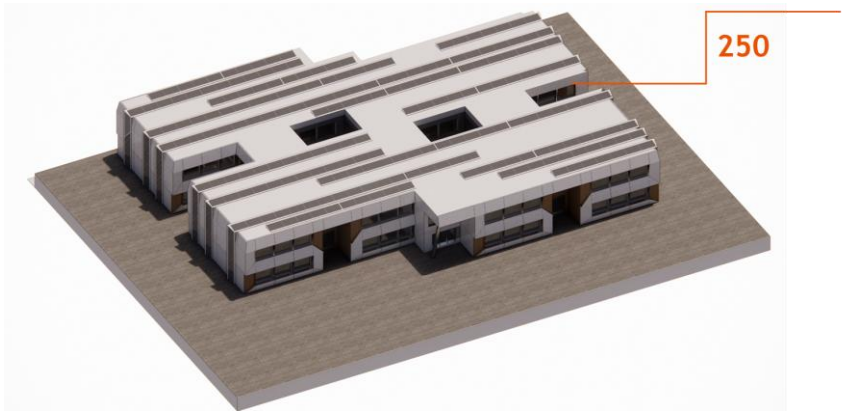
New Elements

FAÇADE







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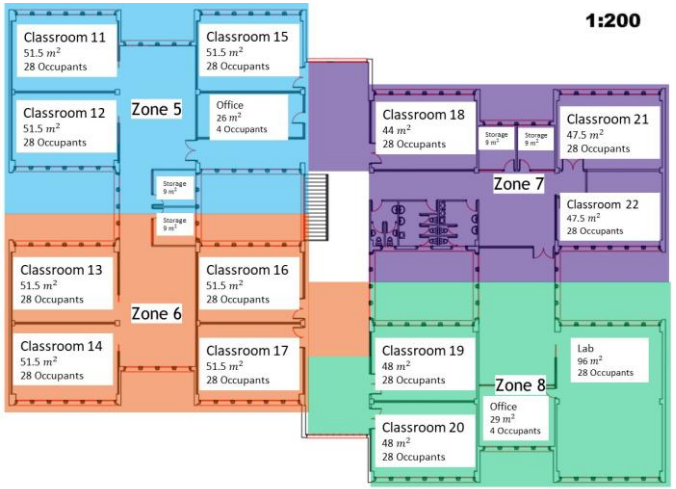
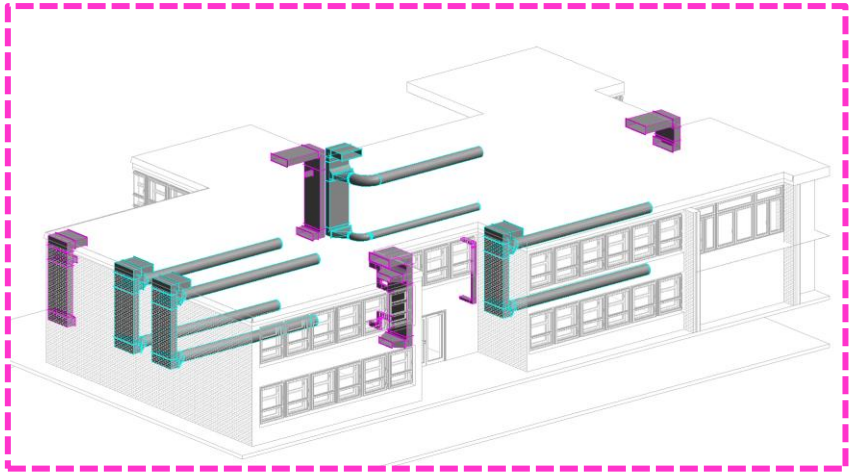
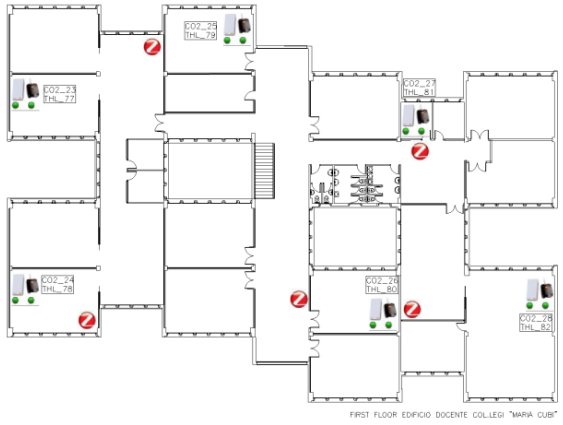
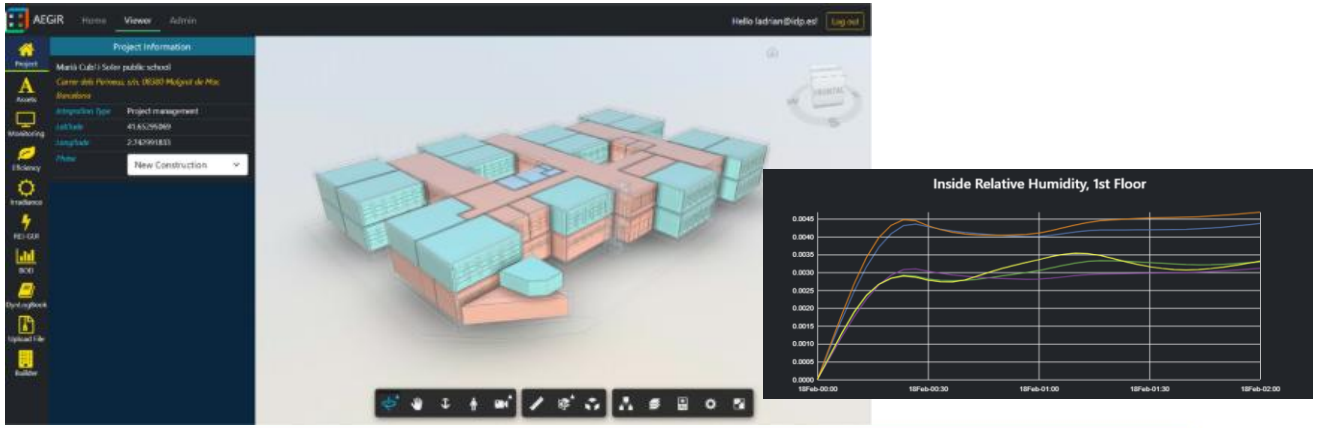
Ventilation and Monitoring









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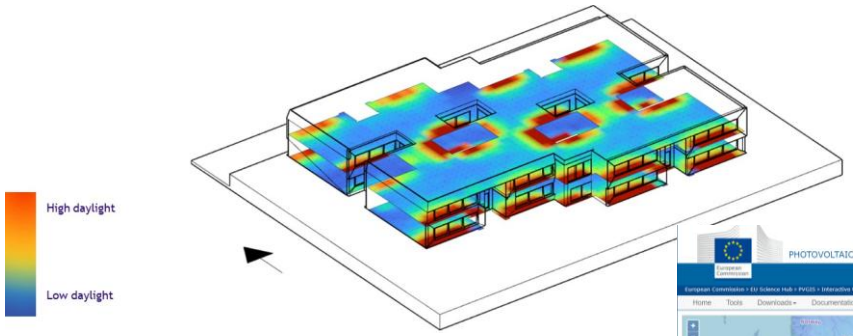
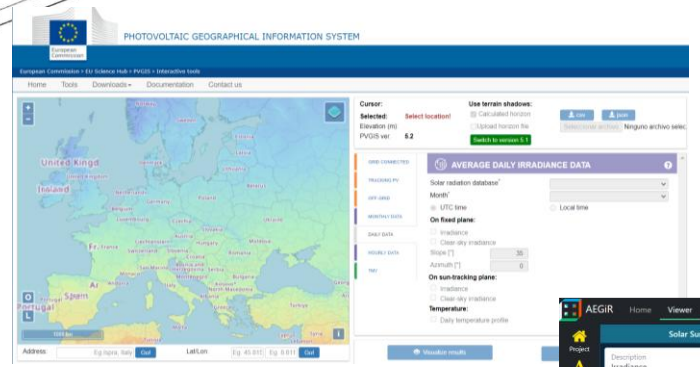
Irradiance





Data collection

Main data source: European Commission models
(PHOTOVOLTAIC GEOGRAPHICAL INFORMATION SYSTEM)

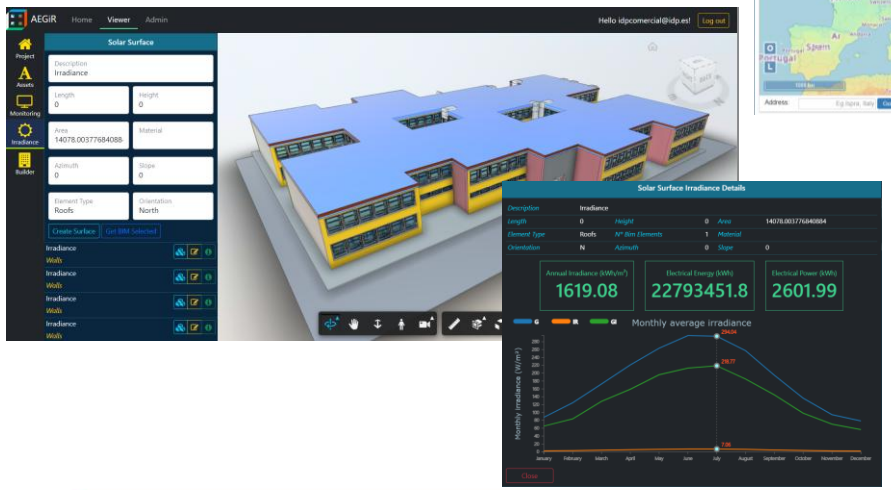
Inputs:

- Location: Address or Longitude/Latitude.
- Slope (°): Inclination. This is the angle of the PV modules from the horizontal plane.
- Azimut (°): Orientation. This is the angle of the PV modules relative to the direction due South.

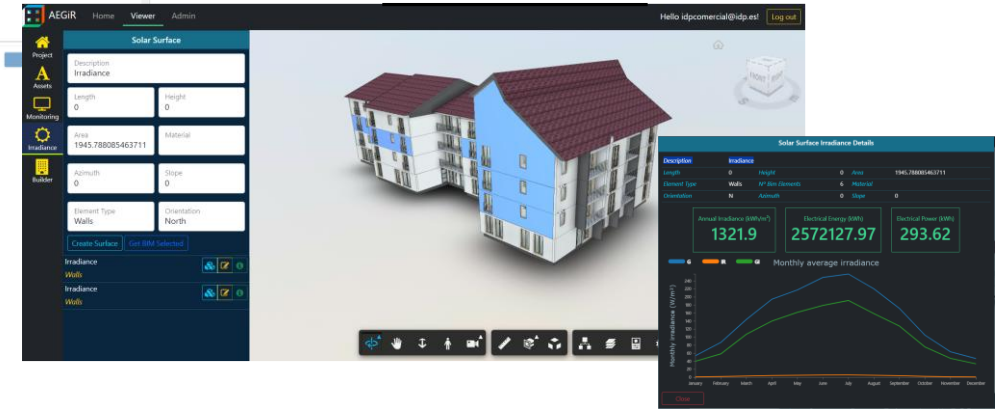
Outputs:

- G (W/m2): Global irradiance on a fixed plane.

Spanish Demo-site



French Demo-site



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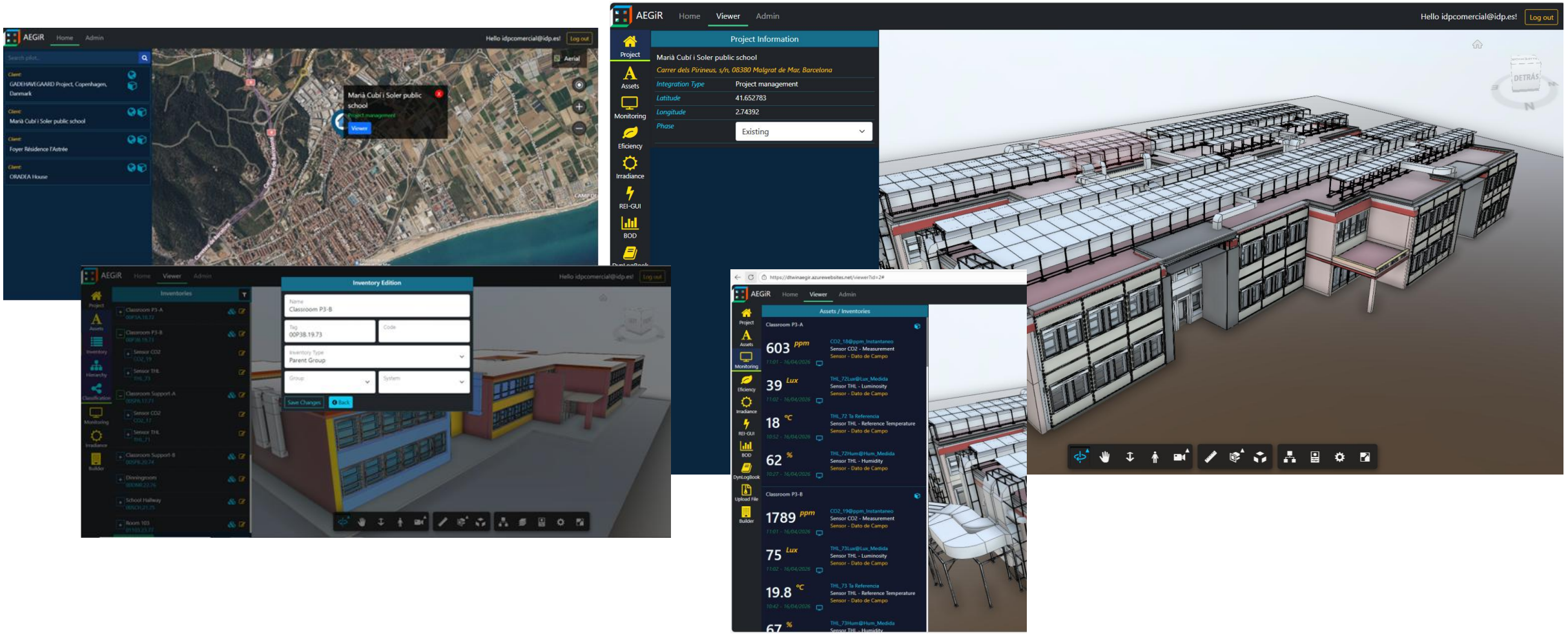
RESULTS AND OUTCOMES

Digital Twin Platform and the AEGIR Digital Services/Components

SPANISH DEMO SITE



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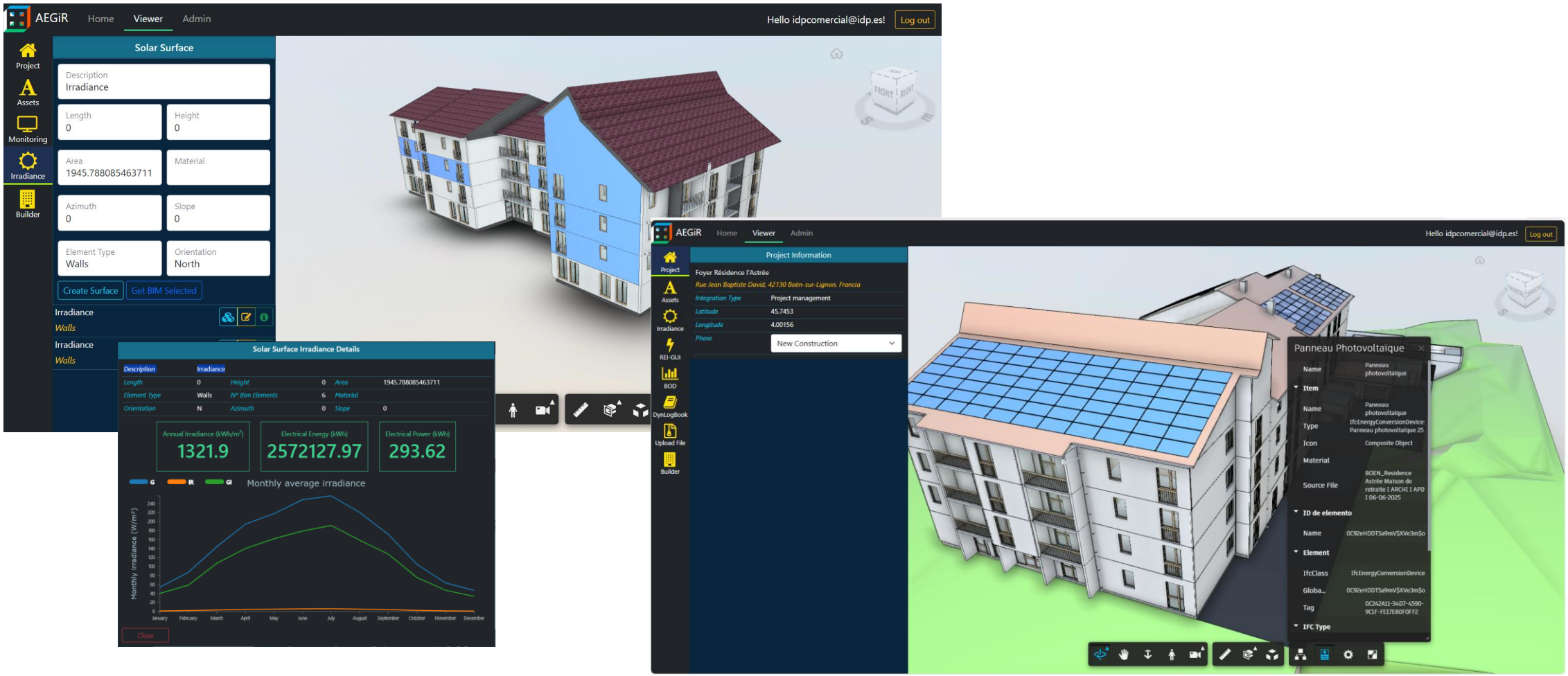
FRENCH DEMO SITE



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Thank you for your attention

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AEGIR Demo-led Replication Workshop (DWS1&2)

Time	Session Title
14:00 – 14:05	Introduction to AEGIR Demo-led Replication Workshop series and DWS1&2 Bard Rama, ICLEI Europe
14:05 – 14:15	**Spanish Demo: School Retrofit** Víctor Martínez del Rey, Malgrat de Mar
14:15 – 14:25	**French Demo: Elderly housing retrofit** Herinirina FANEVAMAMPIANDRA, SIEL
14:25 – 14:40	**Technical Focus: BIM-based modelling and integrated digital workflows** Sergio Velasquez Correa, IDP
14:40 - 14:55	Q&A session
14:55 – 15:00	Key Takeaways

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AEGIR DWS: Key Takeaways

- Two different buildings - an occupied school in Mediterranean Catalonia and an elderly care residence in France, tackled with the similar industrialised, modular AEGIR approach
- Integrated, industrialized façade system (combining modular, sustainable materials with plug & play PV/PVT and HVAC integration) is technically feasible across diverse climates and building types.
- BIM and digital workflows are not optional extras — they are what makes the approach coordinated, verifiable, and transferable to new contexts (IDP)
- Zero-displacement and zero-disruption renovation is technically feasible, both demos prove it for occupied buildings with vulnerable or young occupants
- Translating operational data and occupant feedback from the demo sites (France, Spain) into actionable insights for future large-scale projects, validating the role of Digital Twin and smart sensor technology.
- The path to replication requires sustained partnerships between technology developers, building owners, policymakers, and architects to align technological solutions with regulatory frameworks and local needs.

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Next Steps and How to Stay Connected

- If you are interested in a study visit to one of the demo sites, please get in touch with us
- If your city or organisation is exploring a similar renovation project, the intervention documents are the starting point — feel free to contact the relevant demo partner

Coming up in the AEGIR Demo-led Replication Workshop series:

- DWS3&4 will cover the Danish and Romanian demonstration sites — **29 or 30 Apr (tbc)** Stay Tuned!
- Capacity building materials (procurement guidance, holistic assessment toolkit) will be published and shared with all participants
- Stay connected:

Follow AEGIR on LinkedIn and visit our website (aegirproject.eu) for project updates and upcoming events.

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Thank you for your attention

Bard Rama, ICLEI European Secretariat

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