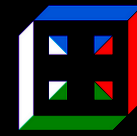




AEGIR



20TH | **ADVANCED**
BUILDING SKINS

uns United
Network
Studio

• **RESEARCH & INNOVATION PROJECT**

September 2025
Smart renovation solution for retrofitting

Aegir solution

AEGIR DESIGN TEAM



Reinier Simons
Senior Architect



Iris Koni
Designer



Tom Minderhoud
Associate Project Director






Aegir solution

WORK DESCRIPTION

The building envelope combines a package of solutions including:

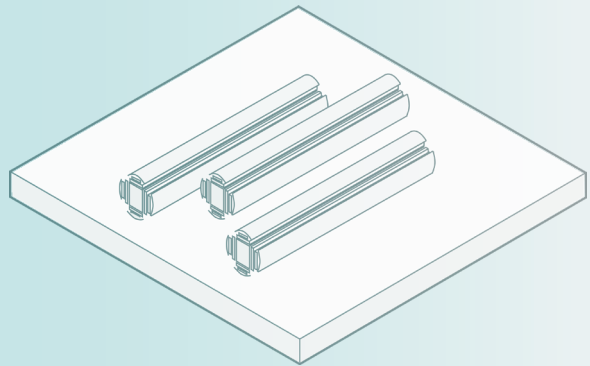
1. **Improved ventilation:** air ducts connected to a central heat-pump and smart windows
2. **Insulation:** biobased thermal insulation and acoustic insulation
3. **Bio-composite / bio-resources profile systems and cladding**
4. **Renewable energy generation:** flexible PV system and PVT panels
5. **Electric storage technologies:** second life batteries



-  Biocomposite / wood based profiles
-  Traditional photovoltaic elements
-  Modular facade
-  Traditional cladding
-  Bio-sourced / recyclable fabric insulation

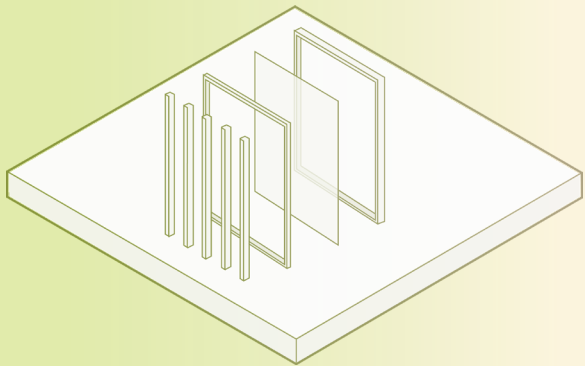
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AEGIR STRATEGY



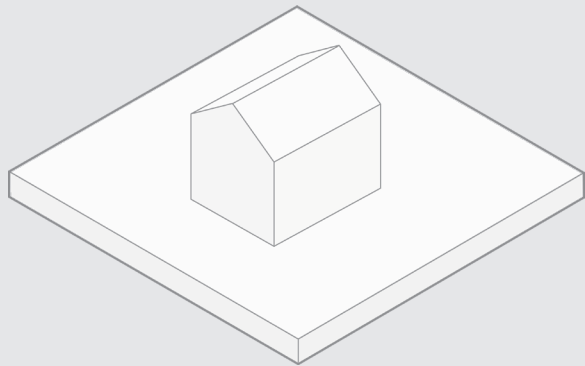
01

The AEGIR solution consists of nine distinct components, developed collaboratively by the consortium partners.



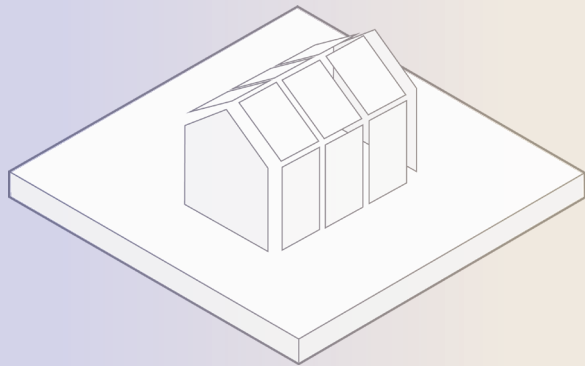
02

These components are integrated into a sustainable and standardized curtain wall system module.



03

To evaluate the adaptability and versatility of these facade systems, four distinct demo sites across the EU have been selected.



04

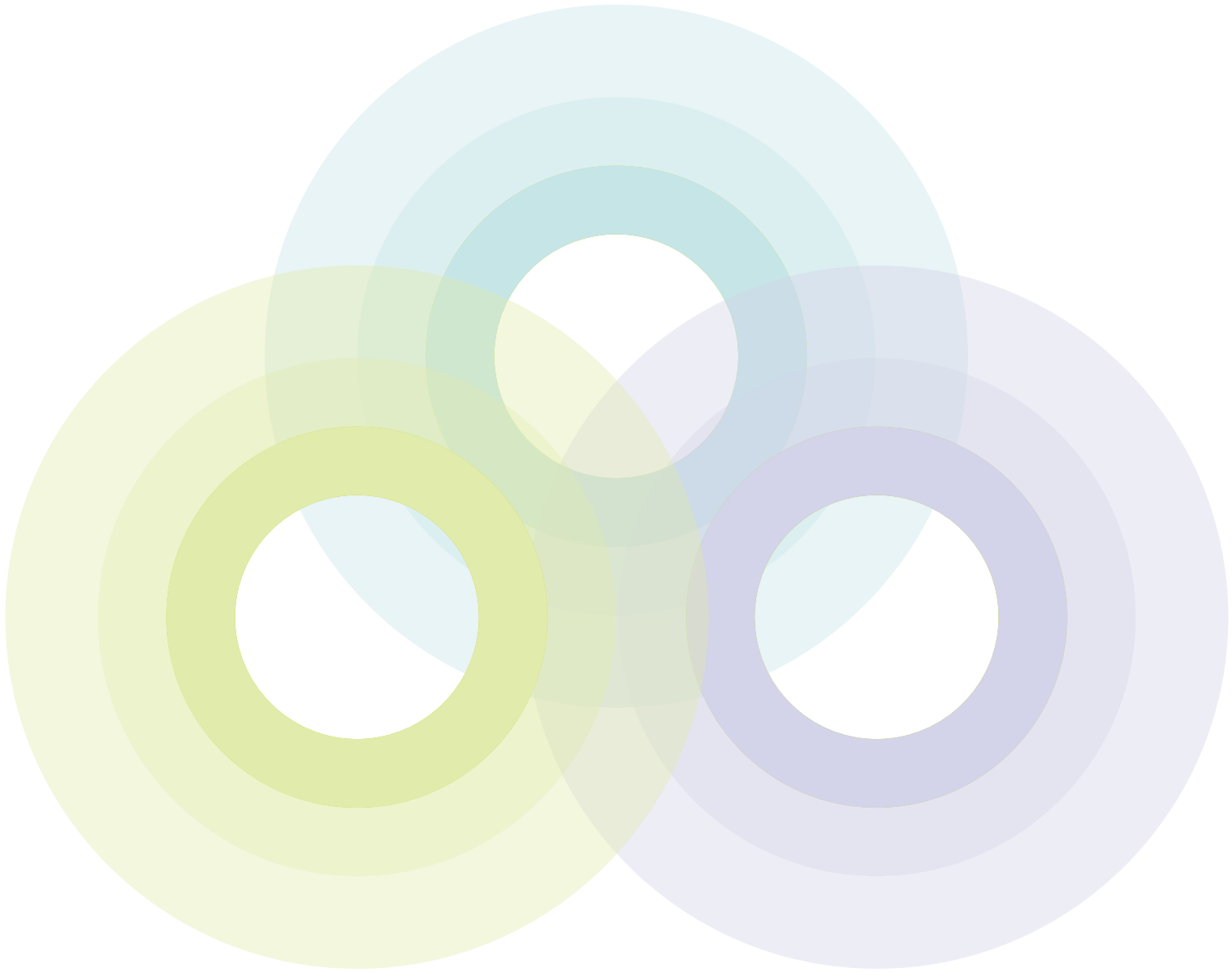
Each module is tailored to meet the specific requirements of the demo site, enabling a complete facade retrofit while minimizing disruption to the building's occupants.



- **BY STARTING WITH ENGINEERING INSIGHTS AND SENSOR DATA, WE REVERSED THE TRADITIONAL PROCESS – CREATING A SMARTER, MORE ADAPTIVE BUILDING.**

Aegir solution

AEGIR KEY FEATURES



01

ADAPTABLE SYSTEM

Provide flexibility and compatibility with components, allowing customization for different contexts.

02

PLUG & PLAY SYSTEM

Simplify installation by making components easily connectable, reducing assembly time, minimizing errors.

03

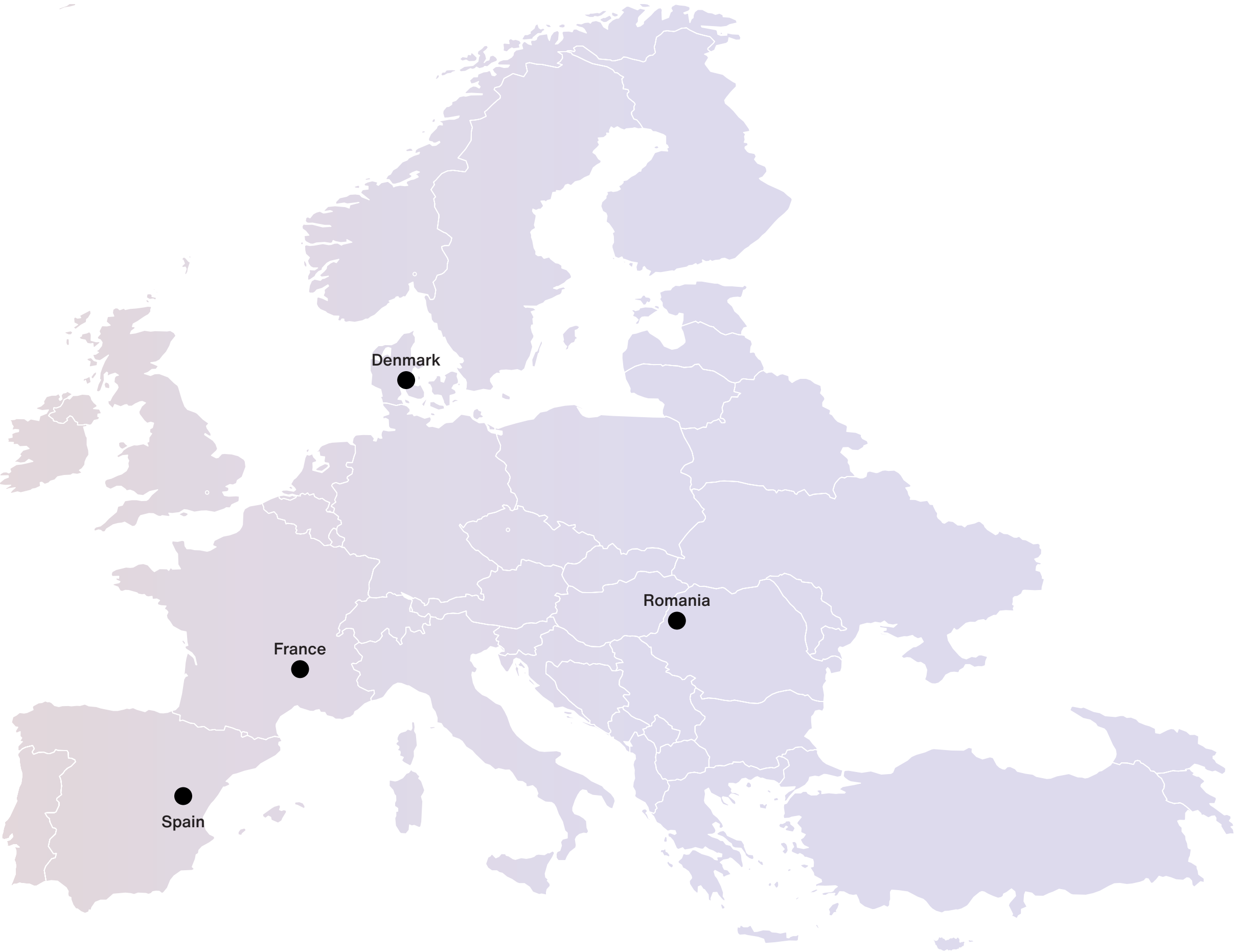
ENERGY EFFICIENT DESIGN

Integrates sustainability, energy efficiency, customized structures, innovative materials, and diverse energy solutions.

Aegir solution

AEGIR DEMO & COMPONENTS

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



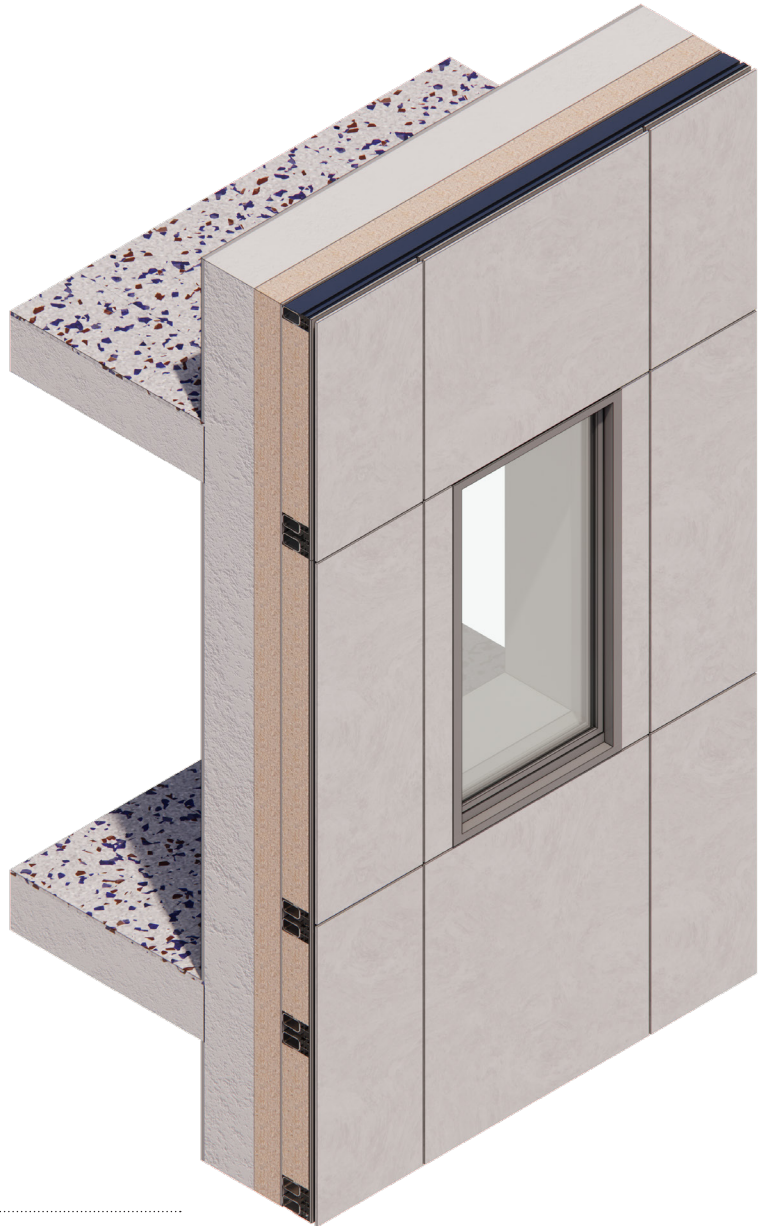
Aegir solution

CURTAIN WALL COMPONENTS

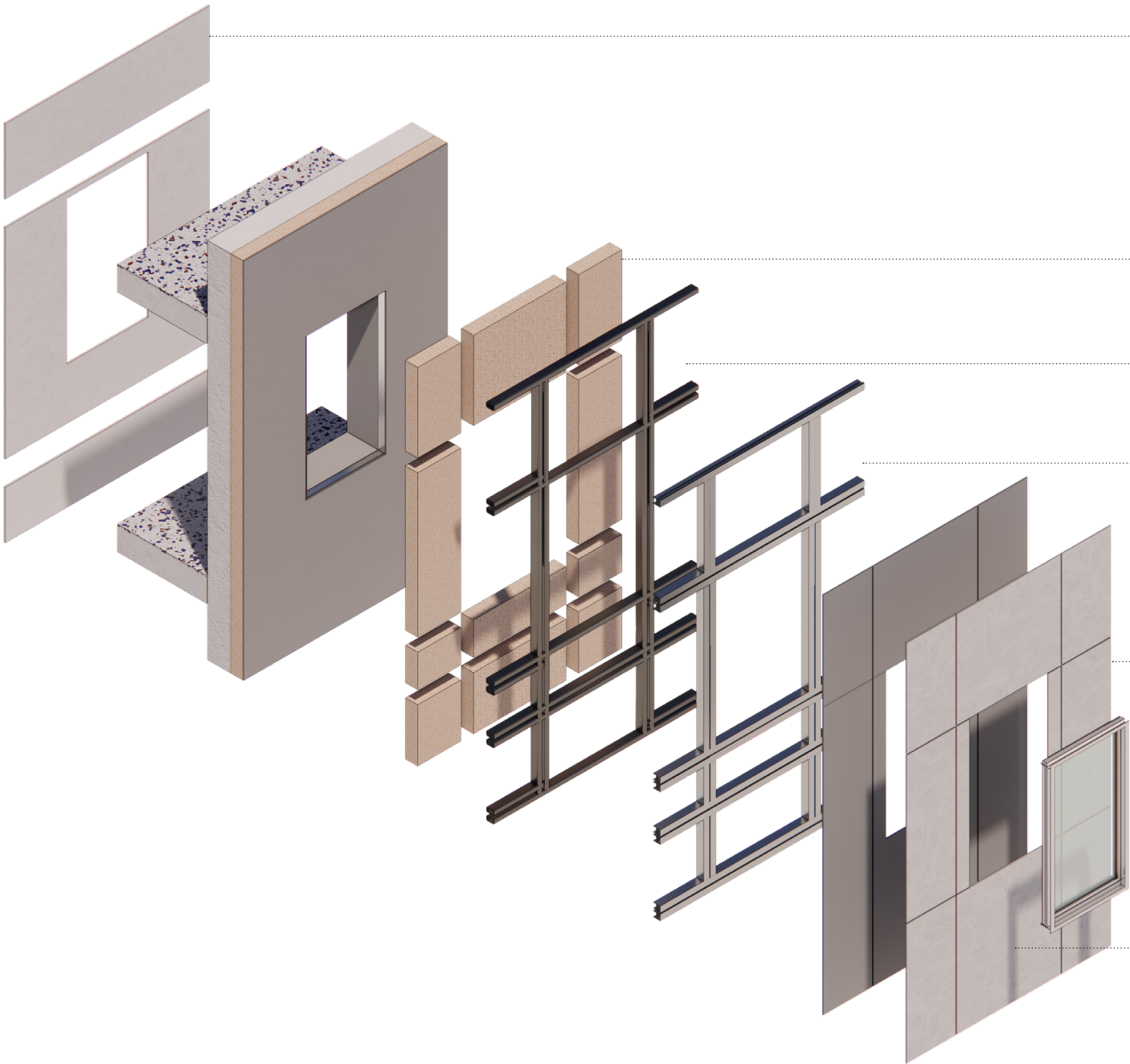
01

AEGIR STANDARD SOLUTION

AEGIR standard solution integrates multifunctional components in the facade modules, allowing for a potential customization in the facade.



● Facade module



● Interior wall finish

● Bio-based insulation

● Curtain wall structure

● Key frame profiles

● External cladding

● Technical panels

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AEGIR DEMO SITES



In **Spain**, there's a growing trend towards renovating and repurposing older school buildings for modern use.



In **France** renovation projects aim to revitalize outdated and underutilized buildings, while addressing the need for more energy-efficient spaces.



Denmark's social housing projects are initiatives designed to provide affordable and sustainable housing options for citizens.



Romania's private housing project is high-quality and unique housing solutions perfect for private comission.



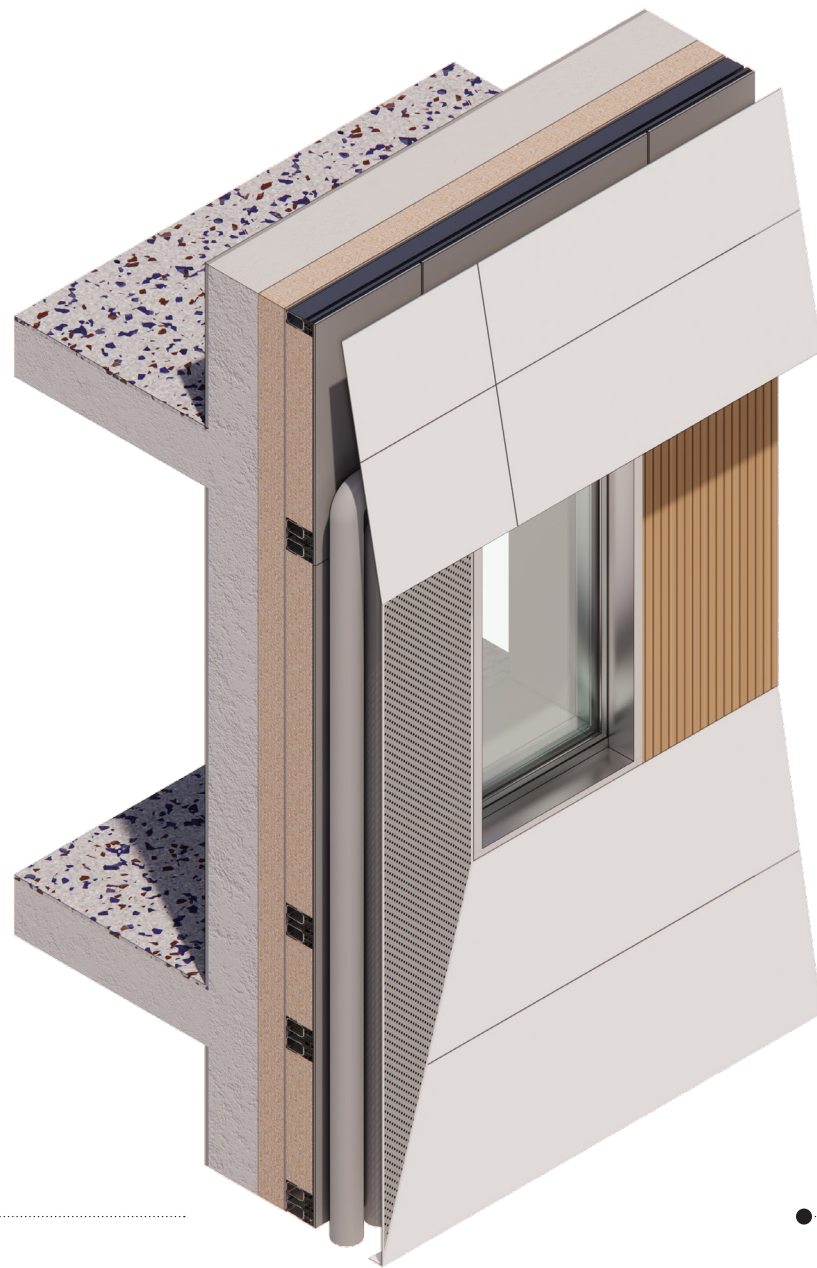
Aegir solution

AEGIR CONCEPT DESIGN

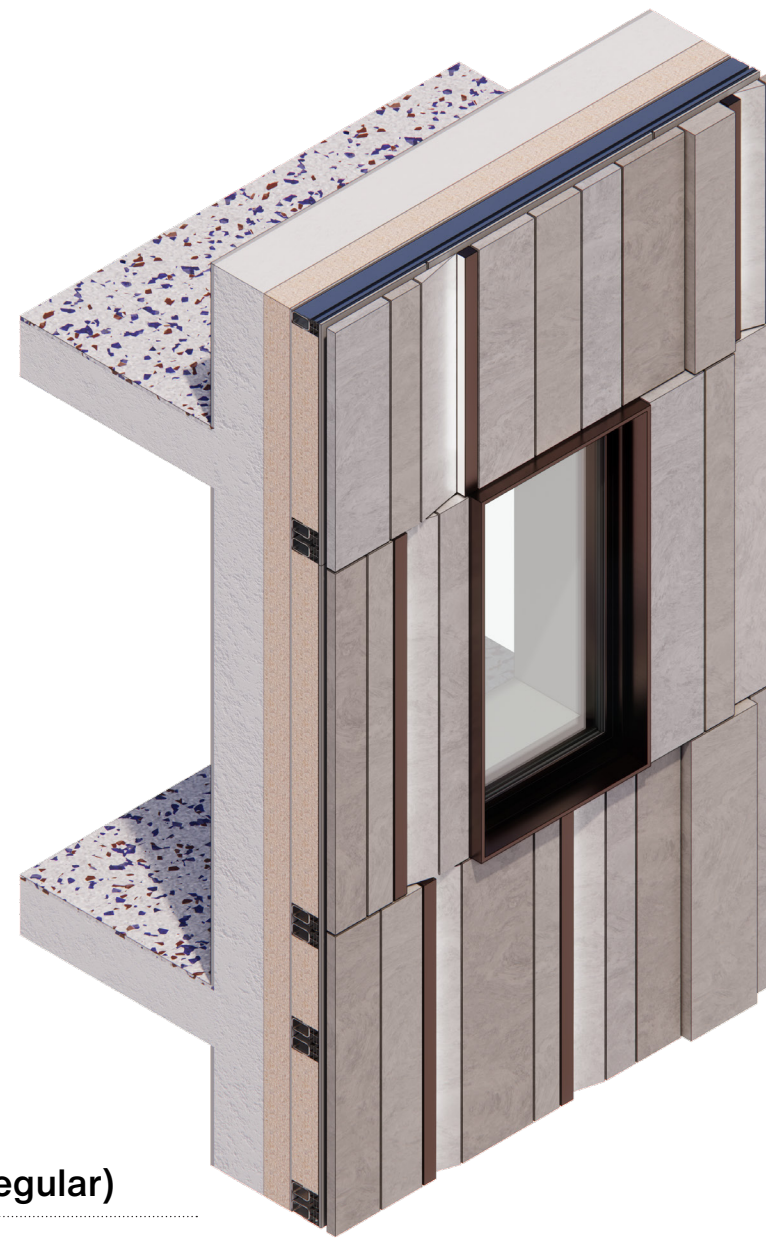
02

AEGIR CUSTOMIZABLE SOLUTION

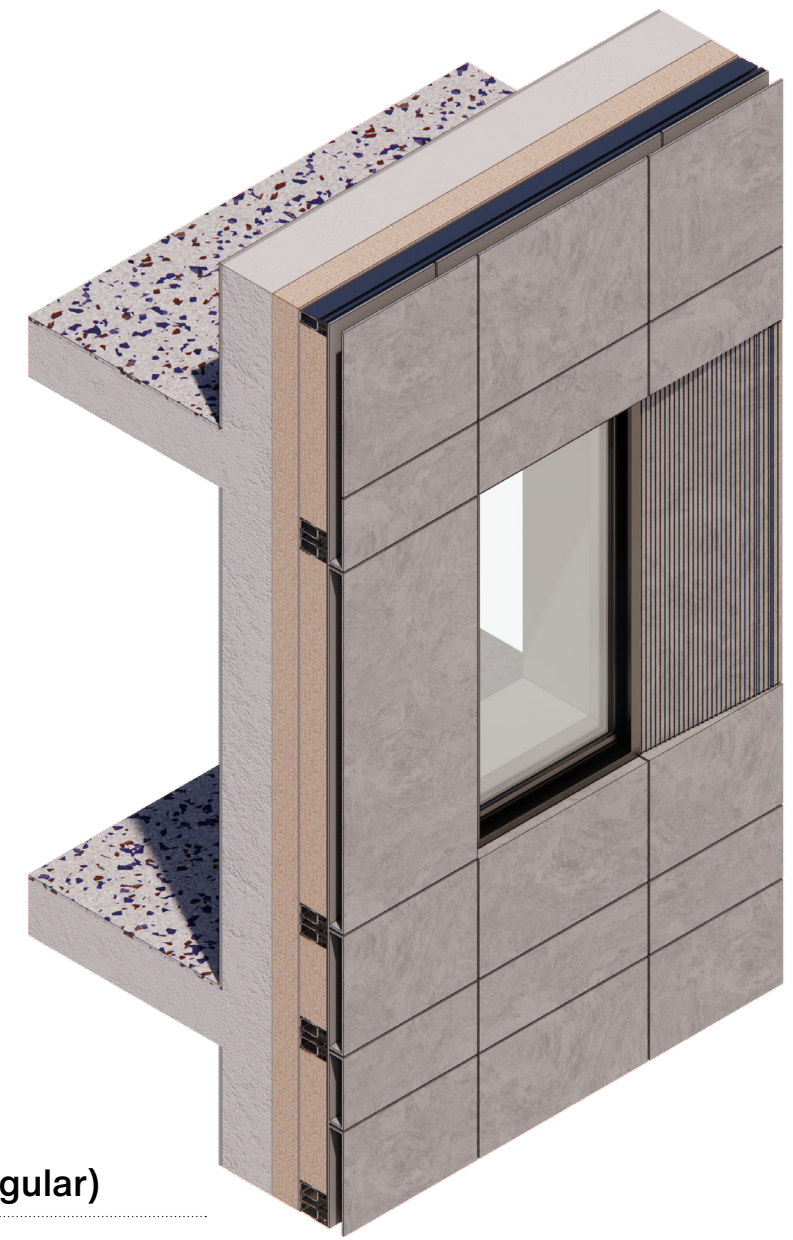
Provide flexibility and compatibility with components, allowing customization for different contexts.



● Angular design



● Flat design (irregular)



● Flat design (regular)



- **TRANSFORMING EDUCATIONAL SPACES: RETROFITTING OF A PRIMARY SCHOOL IN MALGRAT DE MAR**

Aegir solution

SPANISH 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



Aegir solution

SPANISH DEMO BUILDING

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Aegir solution

SPANISH DEMO CONCEPT



01

02

03

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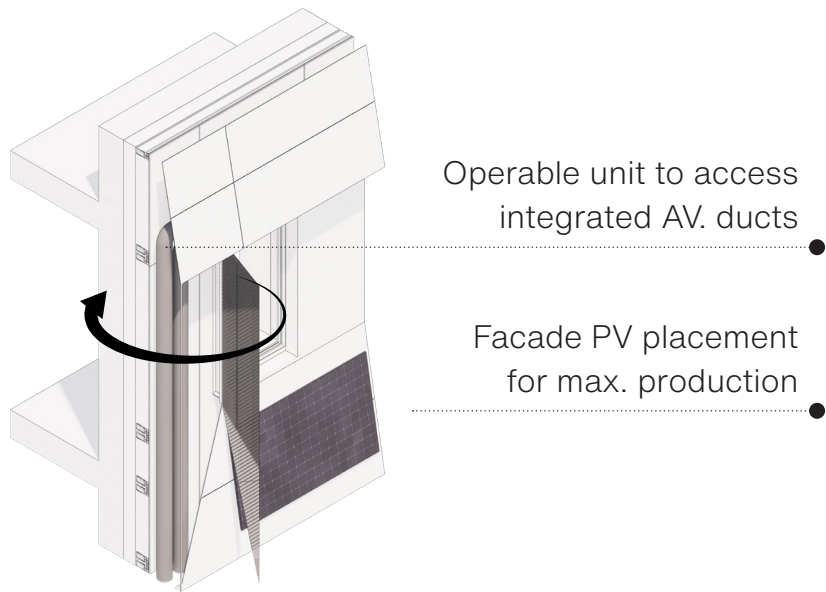
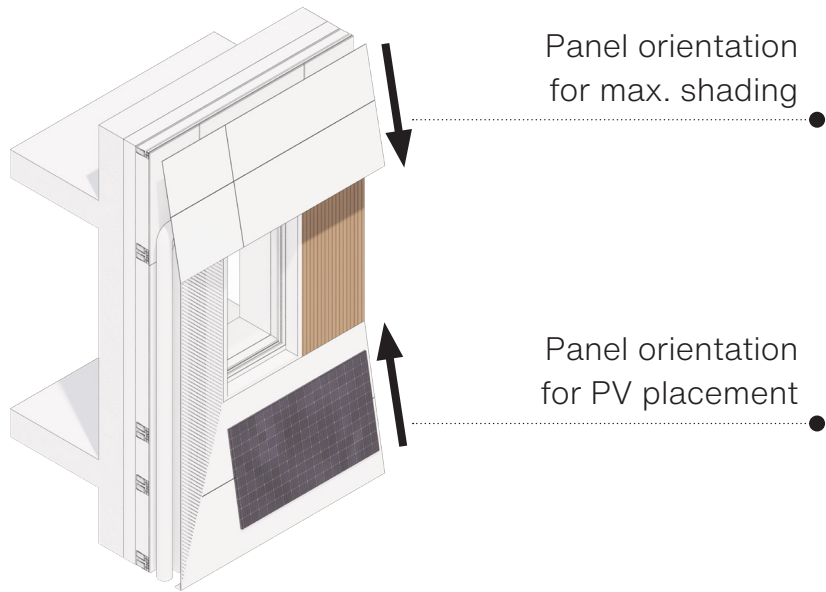
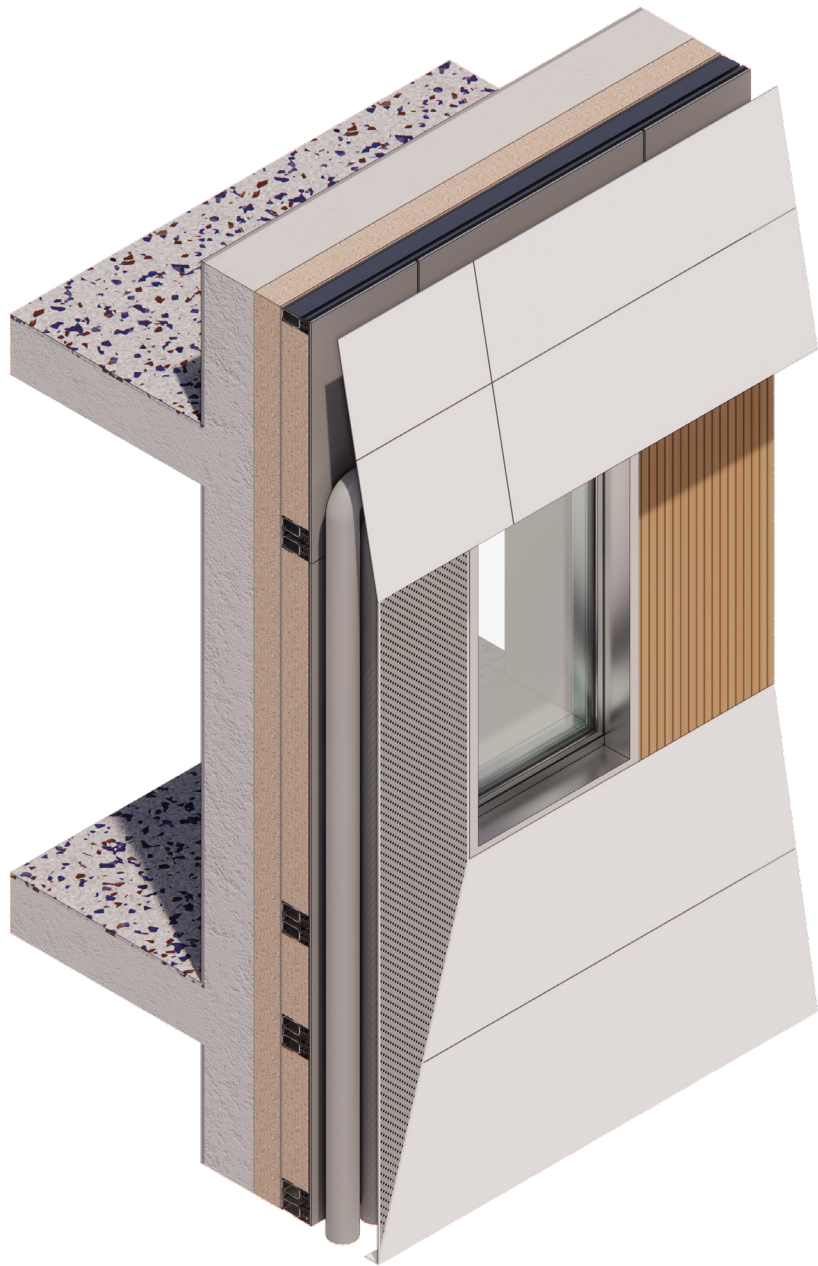
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AEGIR CONCEPT DESIGN

ANGULAR DESIGN CONCEPT

The angular design best expresses the potential of the functional module with enhancement in shading, facade PV integration and ventilation integration.



Possible application: Denmark



Possible application: Spain



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SPANISH DEMO COMPONENTS



Biobased insulation



Fiber cement cladding




Metal sytem frame



Reclaimed wood facade





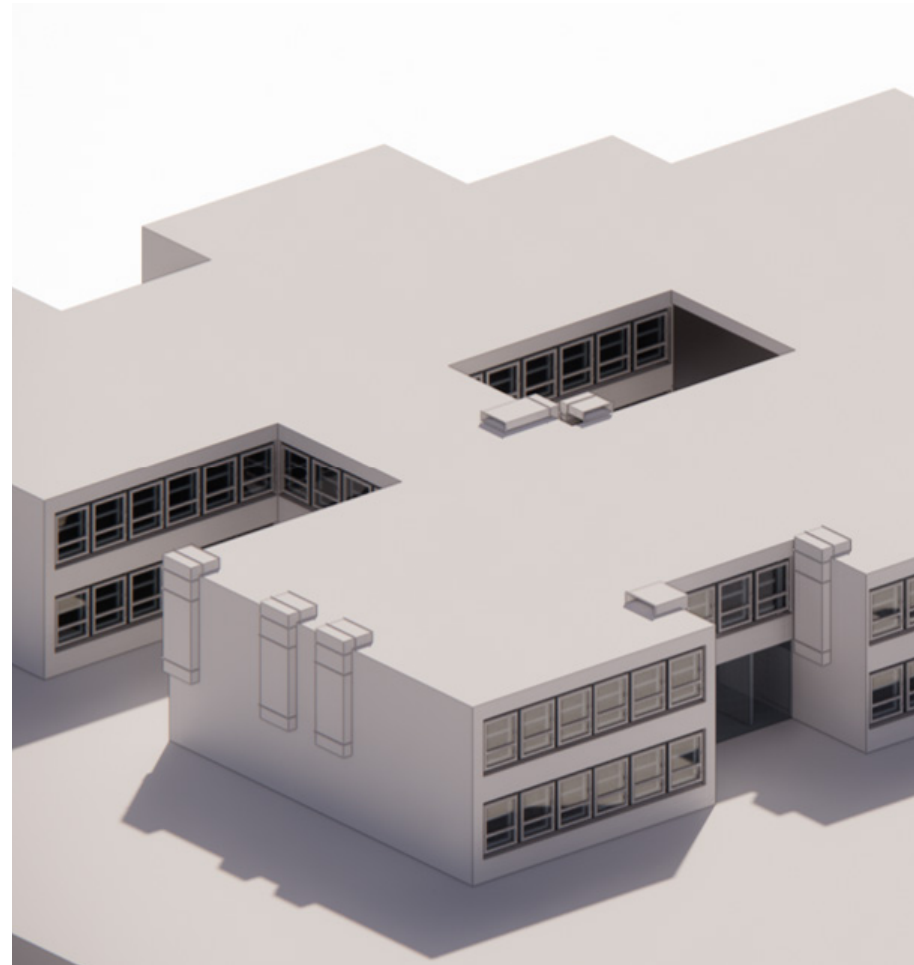
**THE REUSED
EUCALYPTUS WOOD
FROM MUSSEL FARMS
• TRANSFORMS LOCAL
INDUSTRY WASTE
INTO A SUSTAINABLE
CLADDING FOR THE
MALGRAT SCHOOL.**



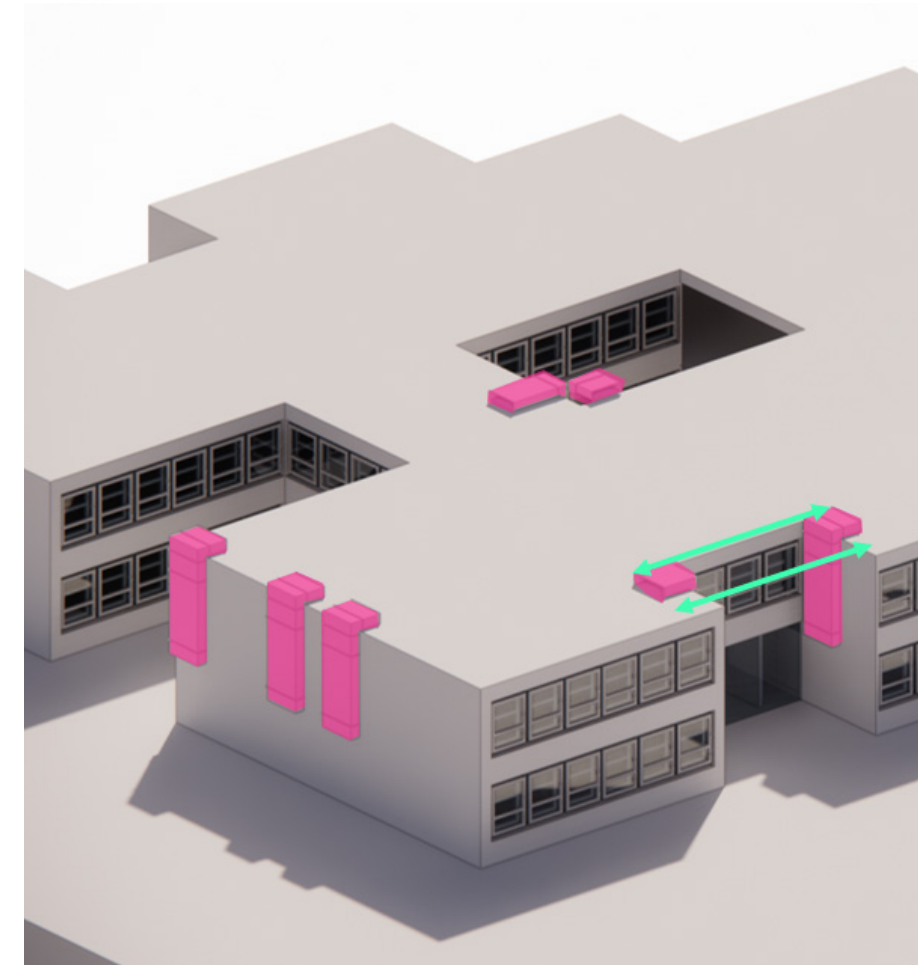
Aegir solution

SPANISH DEMO CONCEPT

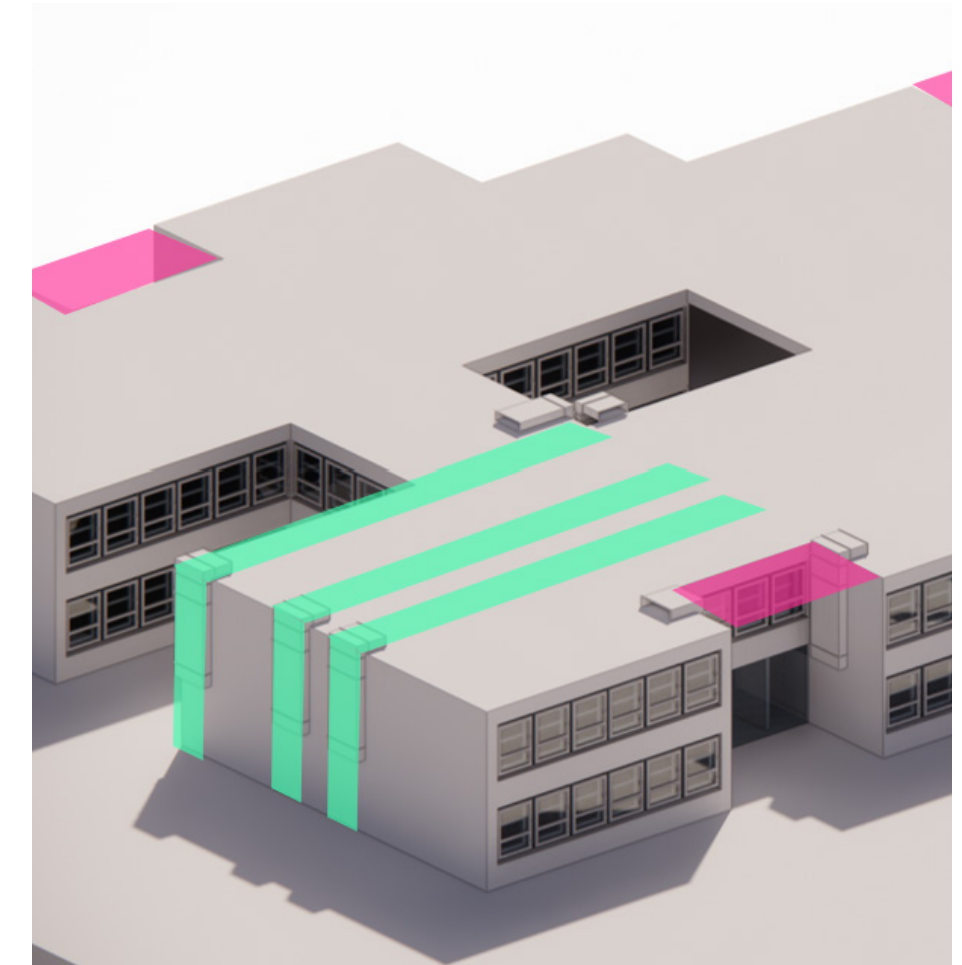
We consider local needs, like ventilation in large school classrooms, and prioritize accommodating prominent ventilation ducts. Celebrating these ducts, we design around them, ensuring they become prominent features of our architectural vision.



01 To meet the ventilation requirements of a school, large ventilation ducts were necessary to ensure proper air circulation and maintain a healthy indoor environment.



02 The ventilation ducts were strategically positioned along the side of the building, adjacent to each classroom. Due to their substantial size, integrating them internally within the curtain wall panels was not feasible. Additionally, whenever possible, the ducts were designed to be interconnected and efficient.



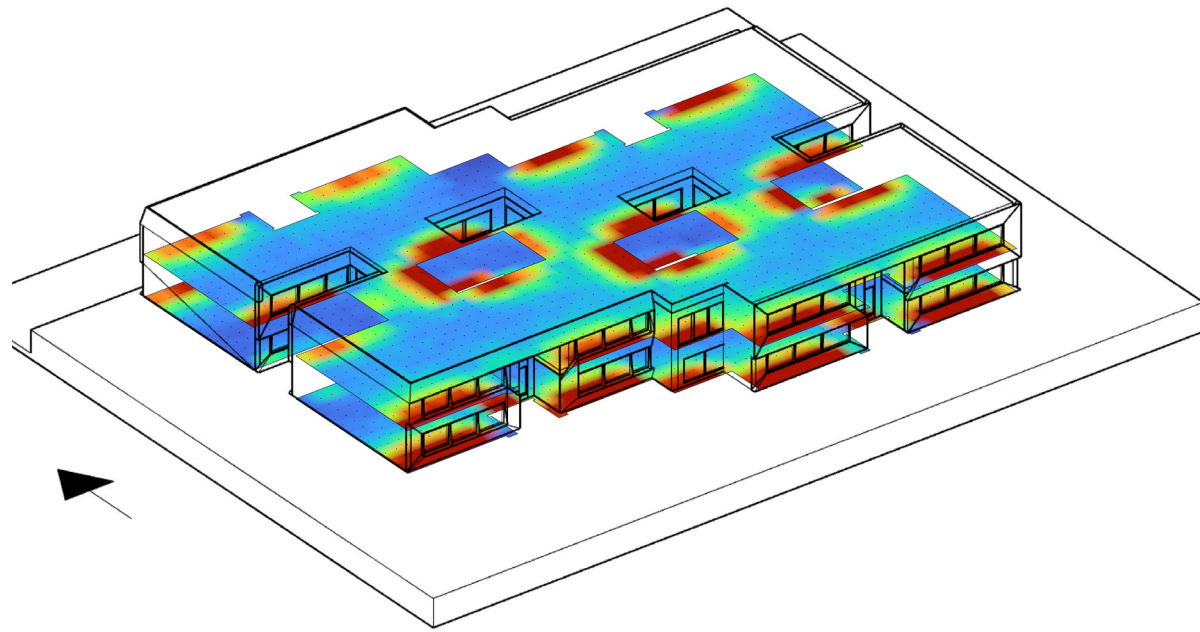
03 Our design strategy involved integrating the ventilation ducts into specially designed panel elements that seamlessly transition from the building's walls to its roof. These panels ultimately serve as supports for the solar panels on the roof, combining ventilation and renewable energy solutions in a harmonious way.



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SPANISH DEMO CONCEPT

Following a preliminary sun analysis, it became clear that while the majority of the building receives adequate natural light, the areas near the window openings on both the north and south sides are overexposed to sunlight. This overexposure will need to be carefully addressed in the design to ensure a balanced and comfortable indoor environment.



GROUND FLOOR

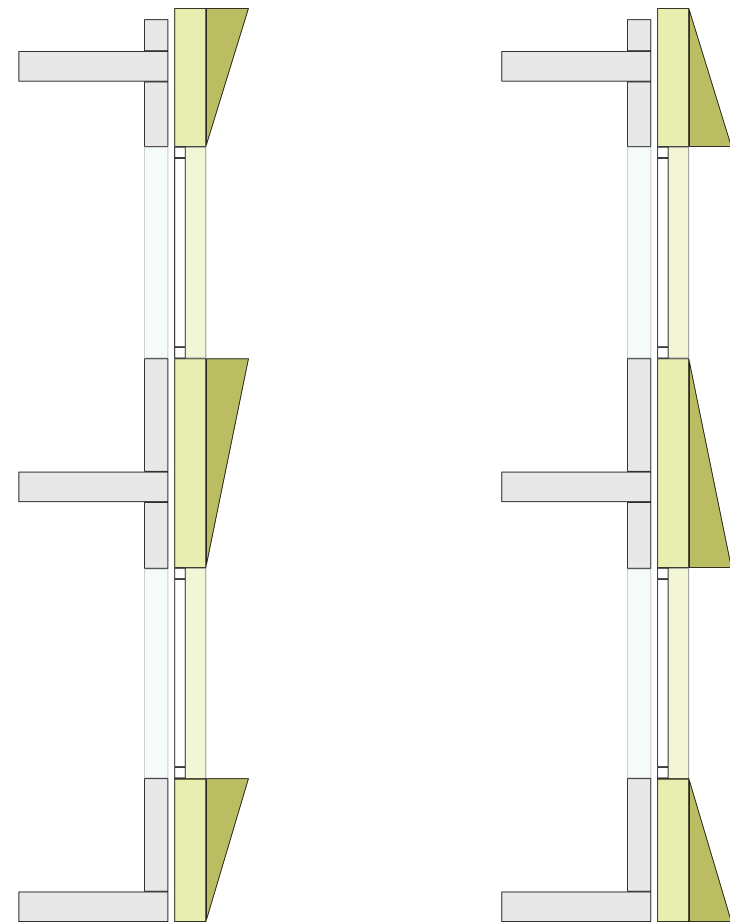


FIRST FLOOR

Aegir solution

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

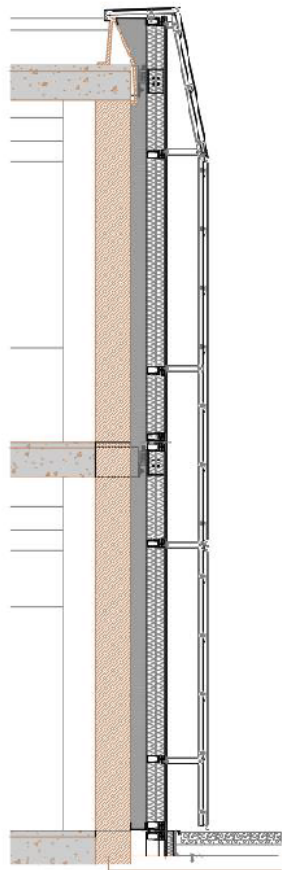




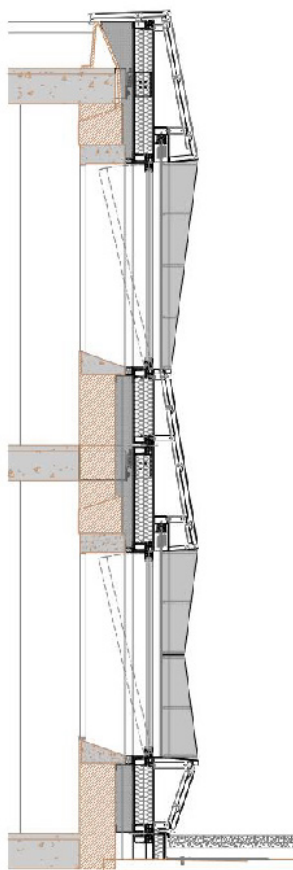


Aegir solution

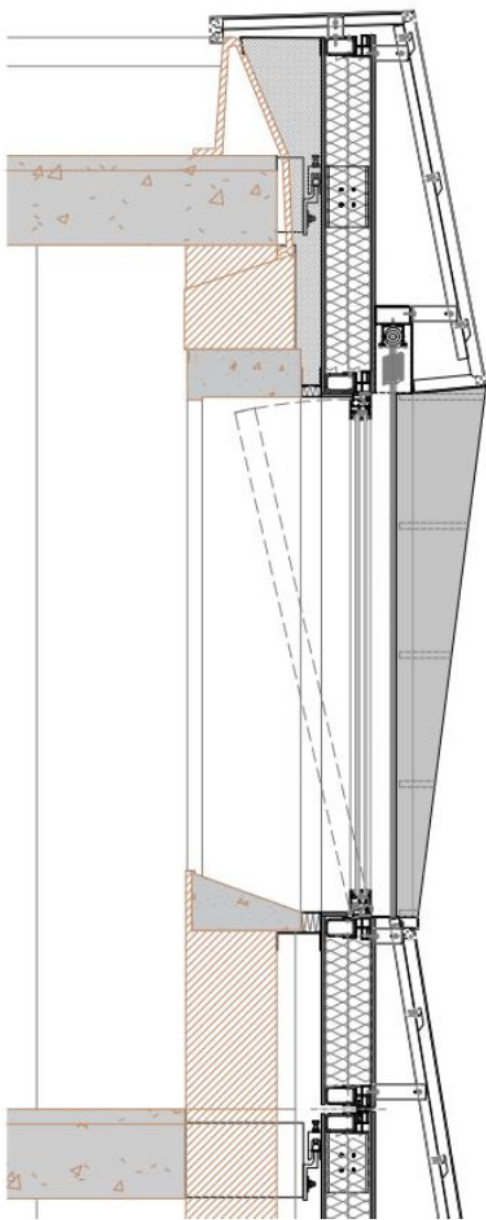
SPANISH DEMO DETAIL



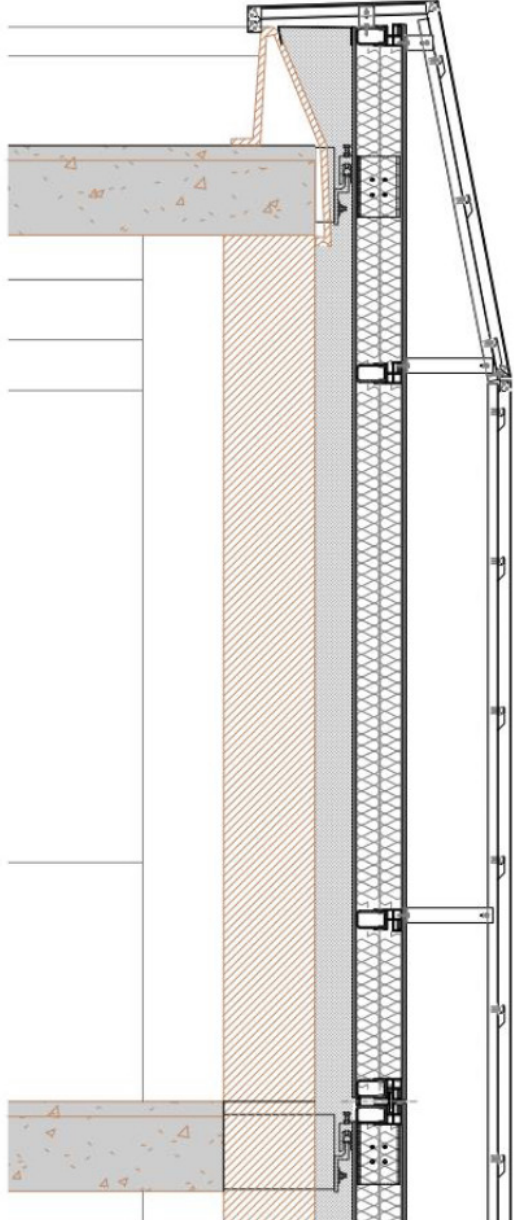
Cross section 1



Cross section 2



01. Typical window section

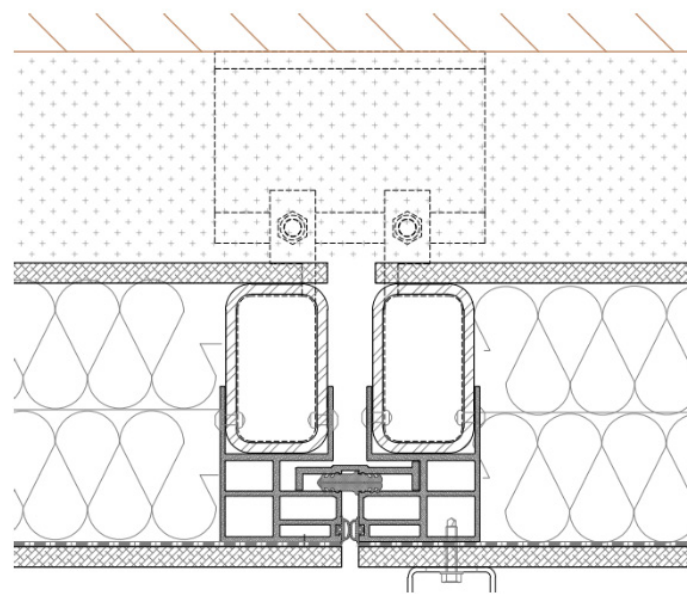


02. Typical corner section

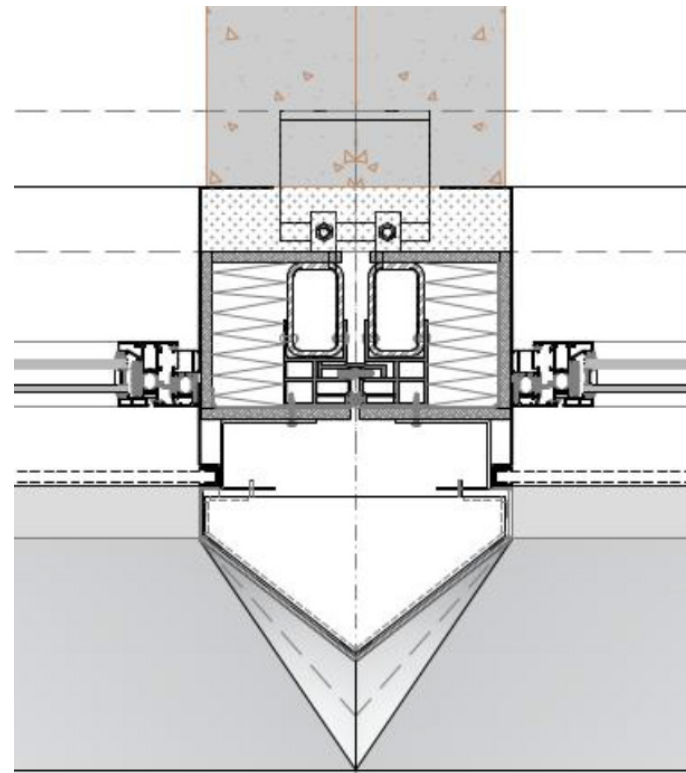
Aegir solution

SPANISH DEMO DETAIL

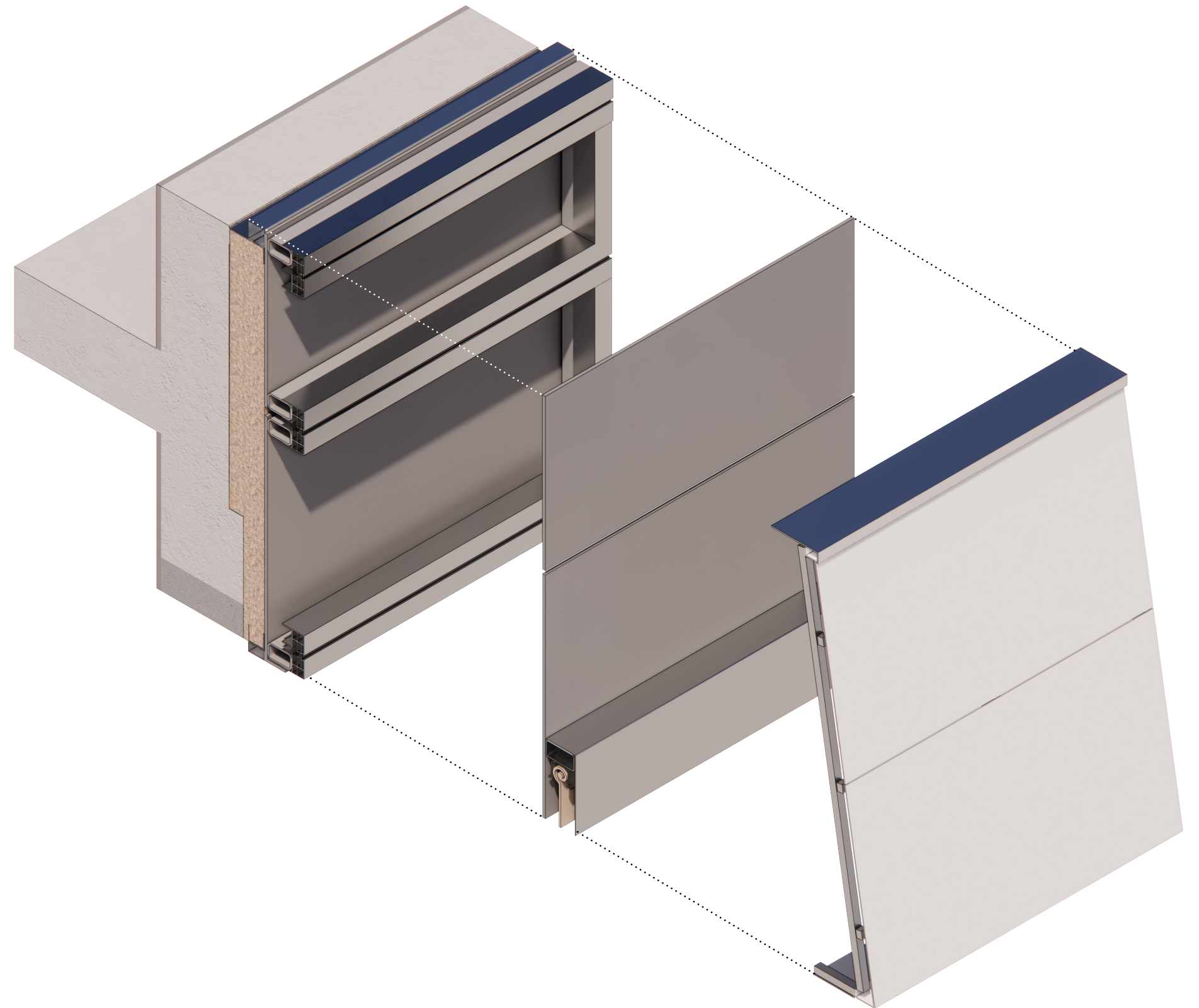
The sun study analysis conducted on the four proposed design inclinations of the functional façade informed the decision to proceed with the orientation that most effectively minimizes the shading factor better shading performance, as less solar heat is transmitted indoors.



01. Typical curtain wall detail



02. Typical window profile detail





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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 material 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.

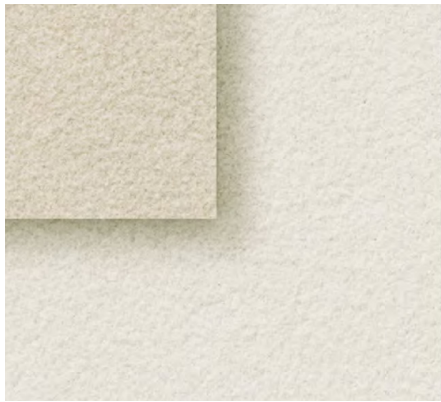


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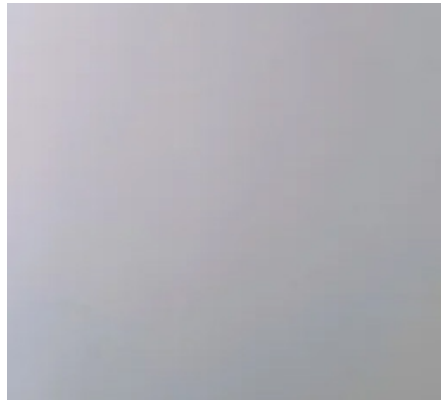
SPANISH DEMO MATERIALS



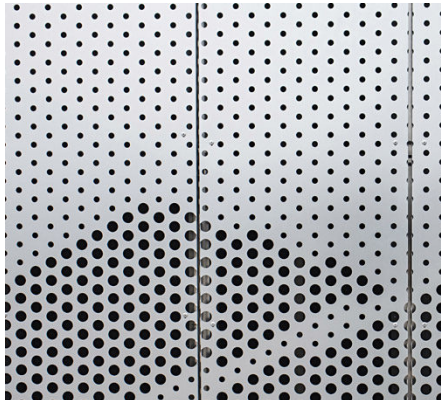
1. Reclaimed Eucalyptus



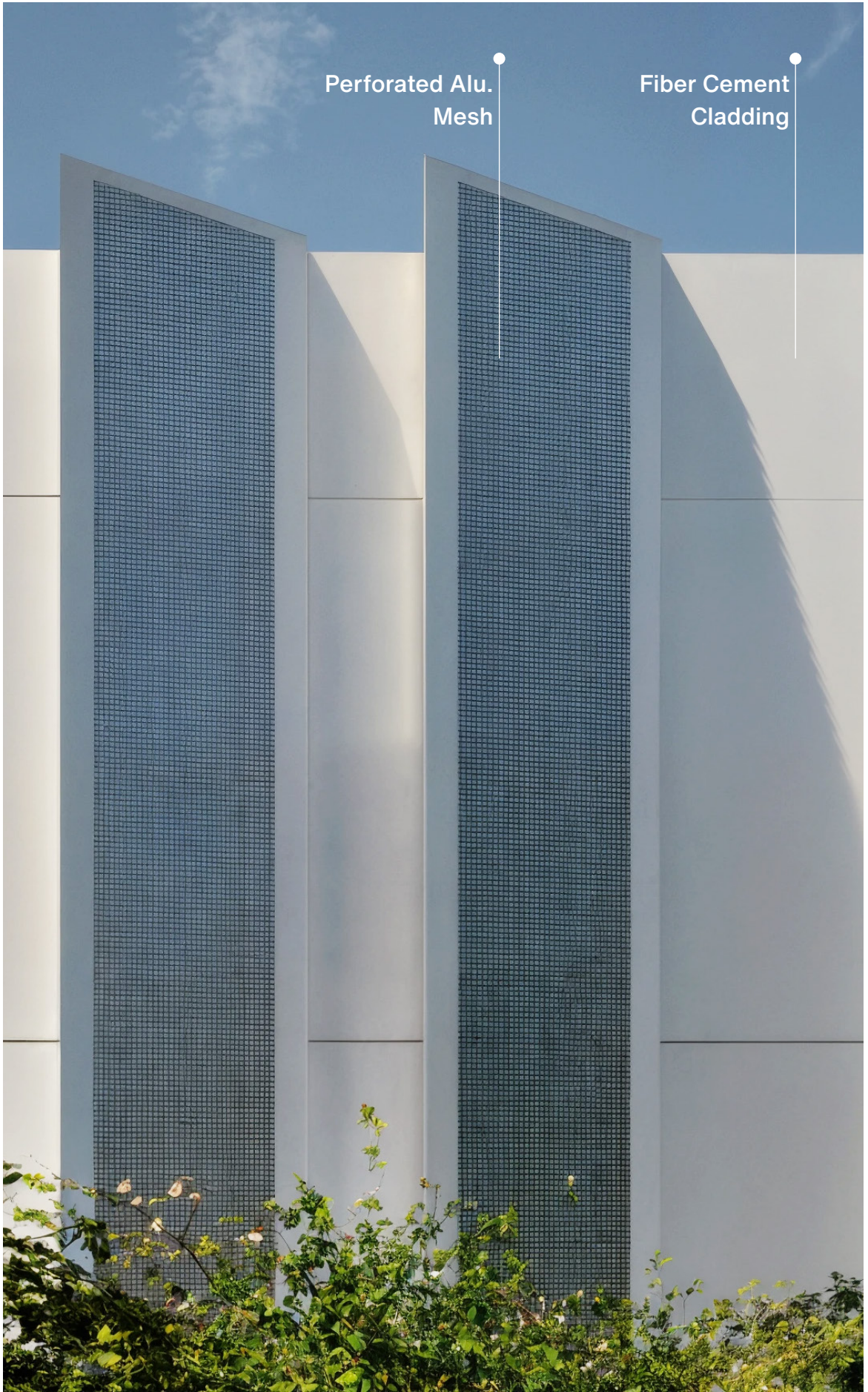
2. Fiber Cement Clad.



3. Aluminium Composite



4. Perforated Alu. Mesh



Thank you!

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