

AEGIR DEMO-LED REPLICATION WORKSHOP SERIES

AEGIR Demo-led Replication Workshop (DWS3&4):

- Pilot sites from Denmark and Romania
- Technical deep-dive

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



30 April 2026

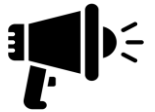


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If you have questions, feel free to post them in the chat.

AEGR Demo-led Replication Workshop (DWS3&4)



Time	Session Title
11:00 - 11:05	Introduction to AEGIR Demo-led Replication Workshop series and DWS3&4 Bard Rama, ICLEI Europe
11:05 - 11:15	Danish Demo: residential building Lies Vanhoutteghem, DTI
11:15 - 11:25	Romanian Demo: single-family home Alexandra Ban, Termoline
11:25 - 11:40	Technical Focus: Olaf Knospe, Westaflex
11:40 - 11:55	Q&A session
11:55 - 12:00	Key Takeaways

About AEGIR project



Title:

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

GA N°: 101079961

29 Partners: 29; 9 Countries

MATERIALS	COMPONENTS	SYSTEMS	DIGITAL	DESIGN	CONSTRUCTION	DEMOS	ASSOCIATIONS / DISSEMINATION	RTOS

AEGIR Project main approach

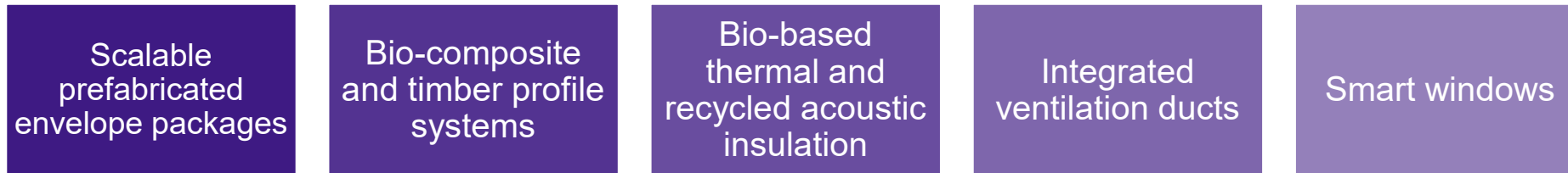


- Modular, industrialised renovation system – reducing costs and time
- Integrates renewable energy components and smart energy management → nearly Zero Energy Buildings (nZEB)
- Four renovation packages – adaptable to different building types and climates across Europe
- Full digital ecosystem: from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

Technologies from AEGIR Project



Construction



Energy



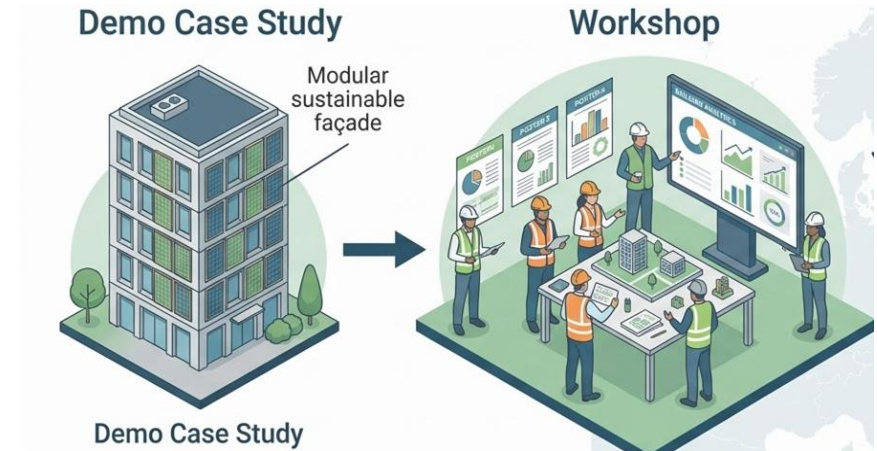
Digital



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



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

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.



AEGiR



Incremental
Renovation
Package

Danish demo site: From Gadehavegård to BiW demonstrator, Taastrup, Denmark

30 APRIL 2026

LIES VANHOUTTEGHEM, DANISH TECHNOLOGICAL INSTITUTE (DTI)

LIVA@TEKNOLOGISK.DK



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Original case: Gadehavegård, Block 15, Høje Taastrup, DK

- 19 blocks - 986 dwellings - built 1973-1977
- In 1999/2000, the roofs were changed to a new construction
- Block 15: 4 floors, each 684m² (2.736m²)
- Roof 320m² - Façade 1.100m² - 78 windows
- Façade with concrete sandwich elements (entrance and gables: 70-100 mm insulation) + light timber framed garden facade
- District heating
- Exhaust-only ventilation

Goal: improve energy efficiency, indoor air quality and comfort



AEGIR concept applied to Gadehavegård

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

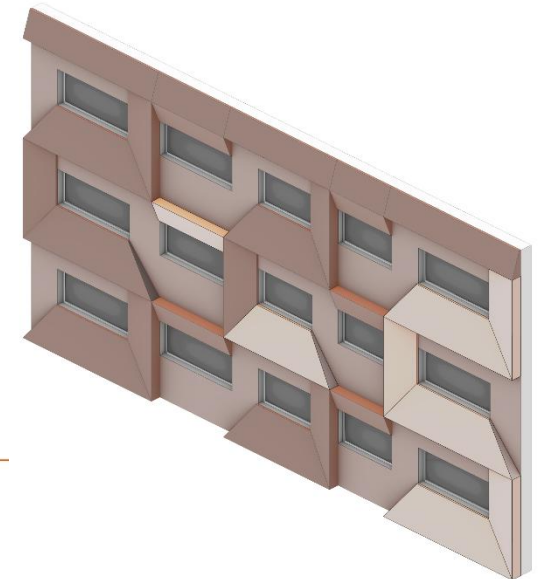
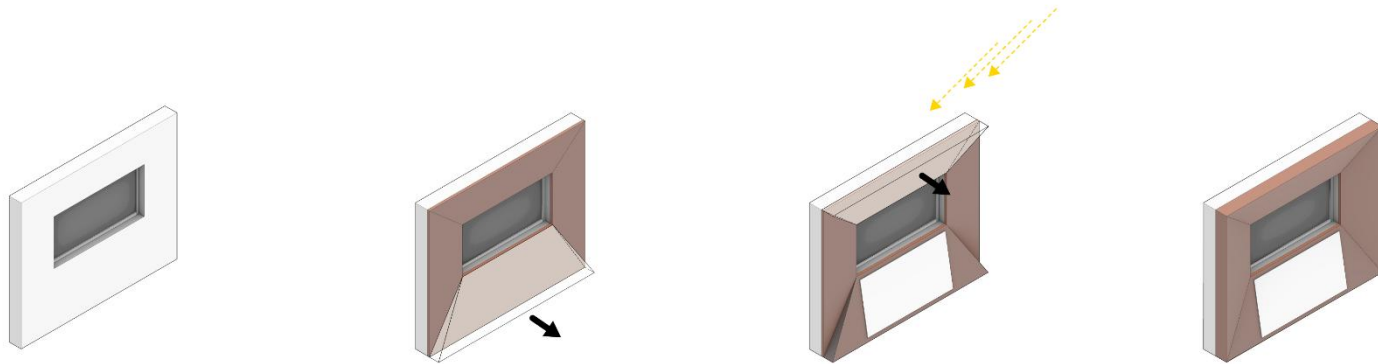
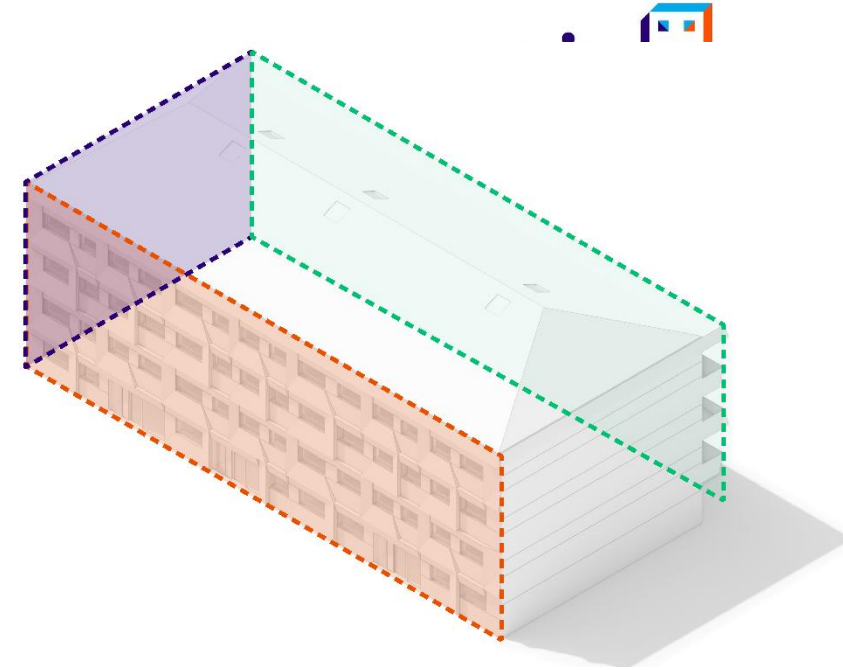
P009 PVT module

P010 Second life battery

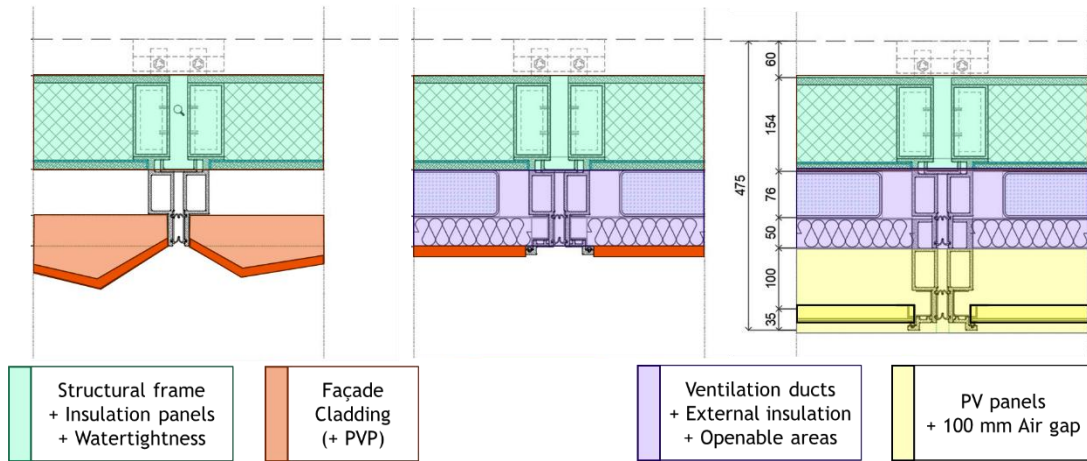


Design vision

- **Customized Panel Orientation:** Designed with Denmark's specific sunlight conditions in mind, panels are angled for maximum solar energy harvesting, integrating PV panels in the perfect orientation.
- **Intelligent Shading:** The angling contributes to strategic shading, reducing the need for cooling while maintaining natural light.

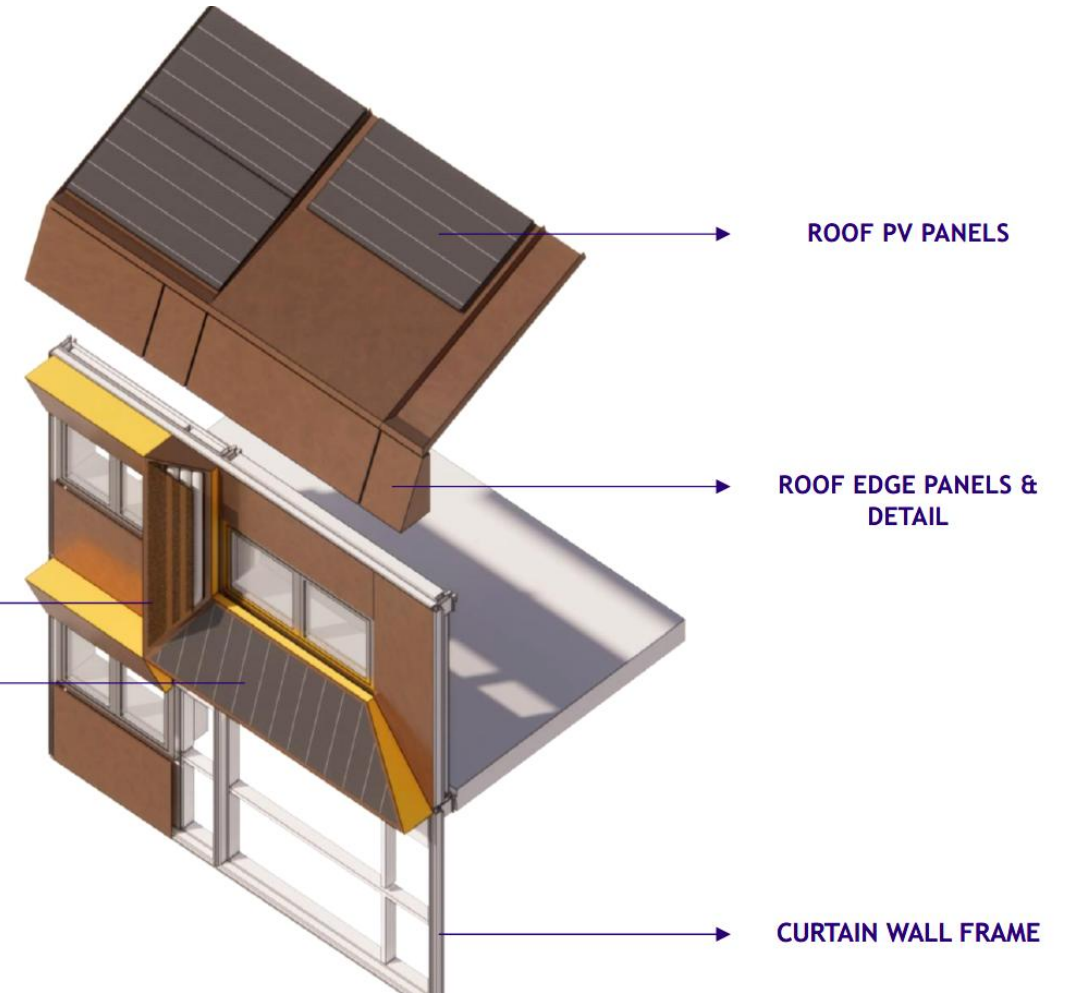


Design vision - technical solutions

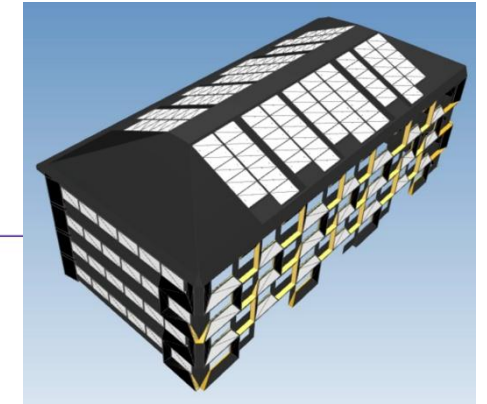
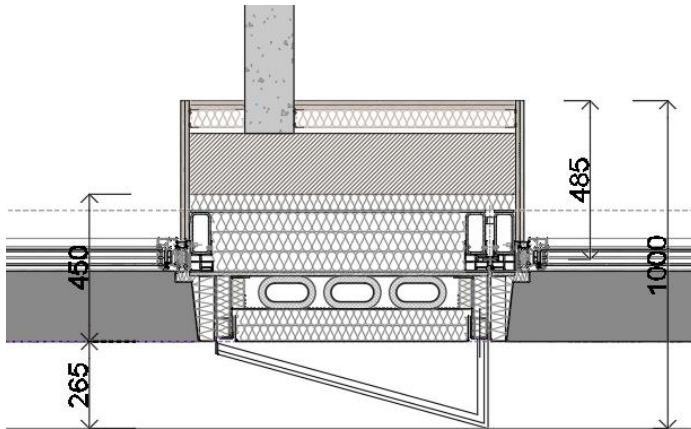


OPERABLE MESH PANEL TO ACCESS
VENTILATION UNITS

CUSTOMIZABLE FAÇADE PV
UNITS



Design vision - technical solutions



FULL BLACK PANEL 430 Wp:
131 PANELS (272,48 m²)
CRYSTALLINE SILICON
PHOTOVOLTAIC GLASS:
21 PANELS (71,73m²)

YEARLY TOTAL PV ENERGY
PRODUCTION 48.075 KWH



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Key challenges in Gadehavegård

Despite benefits, the building committee voted **NO** to the AEGIR refurbishment of Block 15.

Economy

Fear of unforeseen costs during integration with the parallel general renovation

Architecture

Thicker façades reducing daylight in apartments



Operation

Uncertainty about long-term operation and maintenance of new technologies

GENERAL CHALLENGES IN DENMARK

- **Social housing governance:** tenant democracy and The National Building Fund shape every decision
- **Restrictive legislation:**
 - Building permits
 - Restrictive local plans,
 - The Building Damage Fund (insurance) → conservatism towards novel solutions

→ **THE TECHNICAL SOLUTION WAS READY. THE BARRIERS WERE NOT TECHNICAL.**

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New demo site

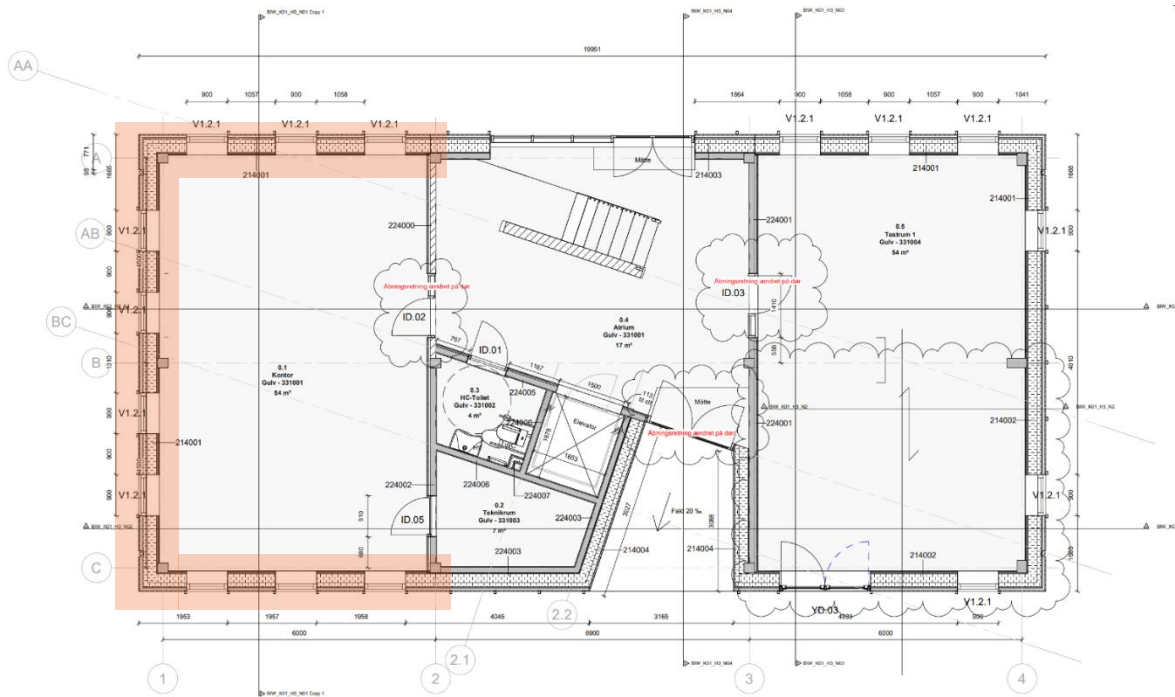


BiW demonstrator building at DTI in Taastrup (near Copenhagen)

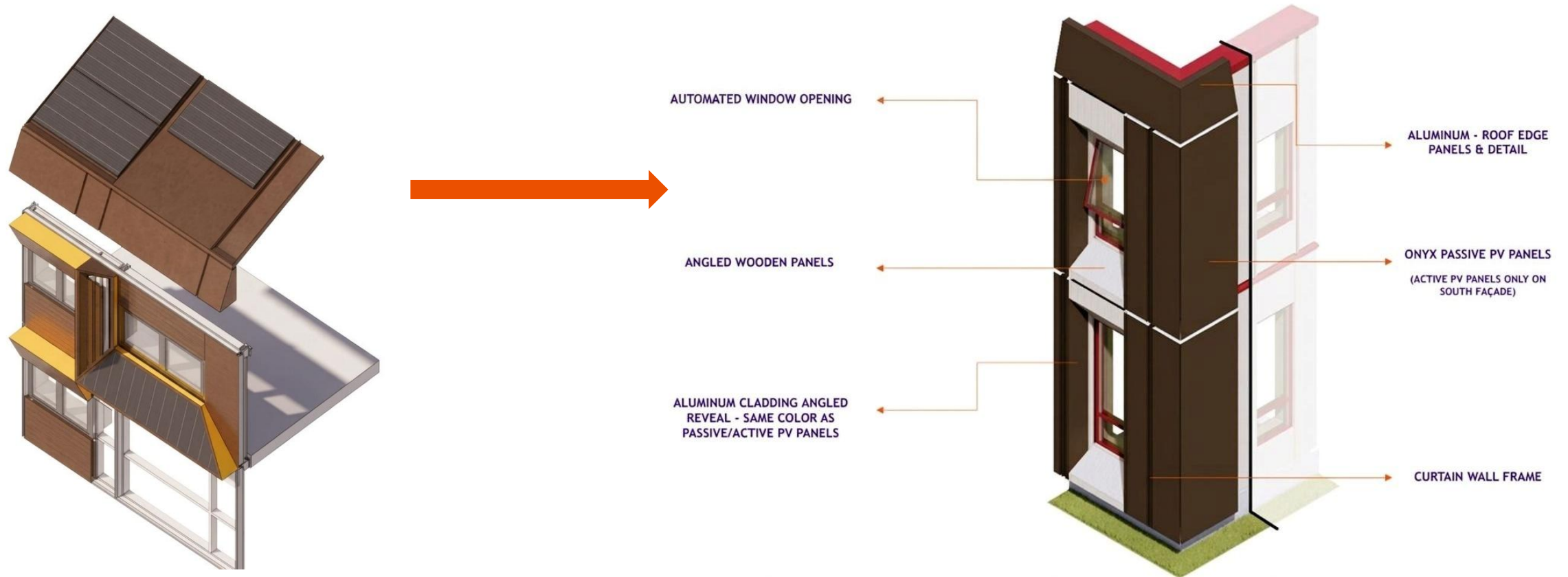
- Living laboratory
- 2 stories, 340 m2
- Original showcase of the 'Build-in-Wood' building system
- Ideal for test and documentation of innovative envelope solutions

<https://www.build-in-wood.eu/post/the-build-in-wood-demonstrator>

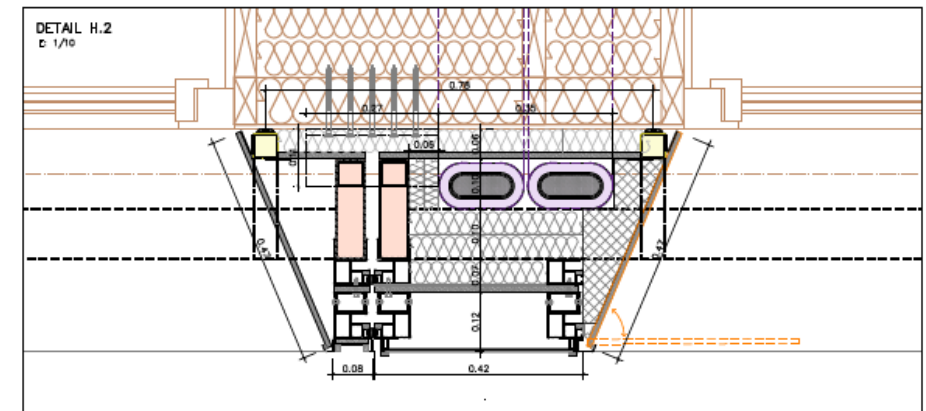
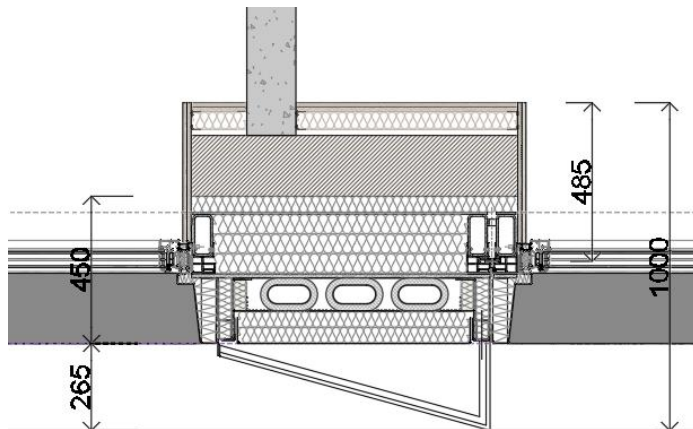
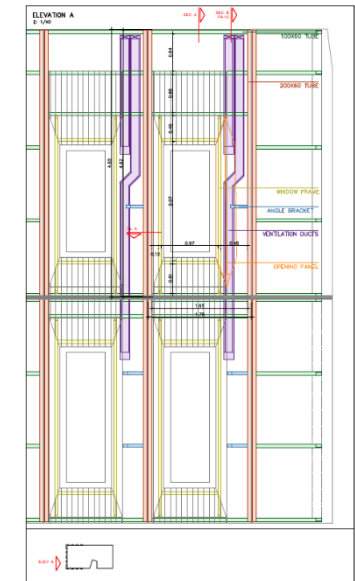
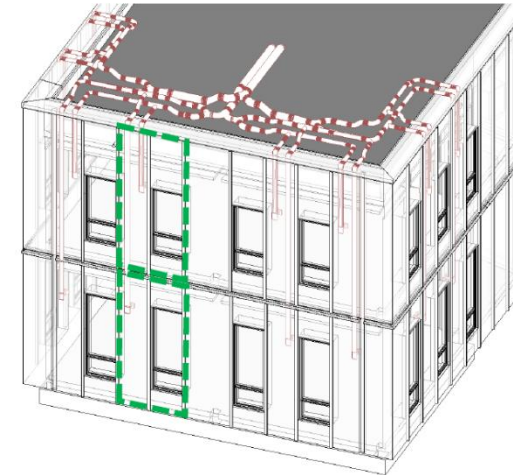
Partial facade renovation



Same ÆGIR concept, easily translated



AEĞİR



Thank you for your attention!



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Romanian Demo Site - Deep Renovation of a Single-Family House

30 May 2026

Alexandra Ban , TERMOLINE



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Building description before renovation

Building Type	Single-family home
Address	Gheorghe Doja nr. 51/C, Oradea
Year of Construction	1980
Building Floors	Basement, 2 floors, under- the-roof space
Roof Type	Pitched, with 2 pitches and an addition on one side
Building Materials	Concrete (structure), bricks (facades), aluminum windows
Heating System	Gas boiler and radiators
Ventilation	Manual
Building Surface	324m ²
Roof Surface	170m ²
Façade Area	200m ²



CONTEXT & OBJECTIVE



MAIN OBJECTIVE:

→ ACHIEVE NEAR ZERO ENERGY BUILDING (NZEB)

SPECIFIC GOALS:

- REDUCE HEATING & COOLING DEMAND
- IMPROVE INDOOR COMFORT (IEQ)
- INTEGRATE RENEWABLE ENERGY
- ENABLE FAST AND SCALABLE RENOVATION



DESIGN: BEFORE & AFTER

Solution tailored to real-life constraints, not ideal conditions.



BEFORE:

- Low insulation
- Thermal bridges
- No mechanical ventilation
- Inefficient façade

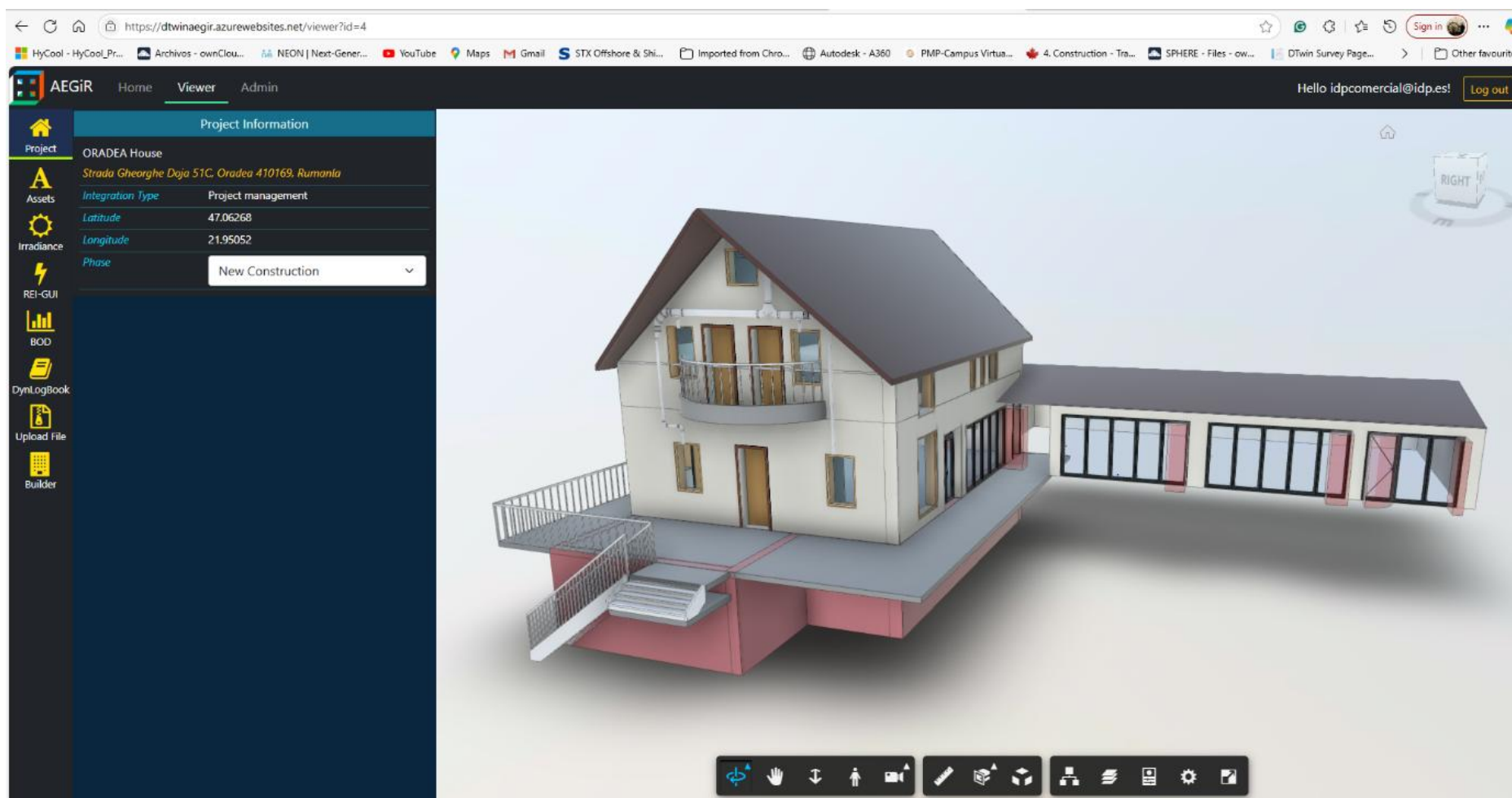
CHALLENGES:

- Irregular façade geometry
- Existing balconies & structure
- Limited access for installation
- Compliance with regulations



AFTER (Solution):

- Integrated modular façade
- Improved thermal envelope
- Ventilation + renewables



GENERAL FACADES

Industrialised façade = key enabler for deep renovation

PREFABRICATED VENTILATED FAÇADE

- FIBER CEMENT CLADDING PANELS
- ALUMINIUM SUBSTRUCTURE
- INTEGRATED INSULATION
- VENTILATED AIR CAVITY

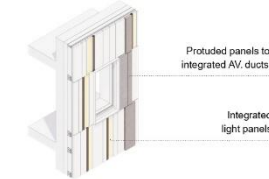
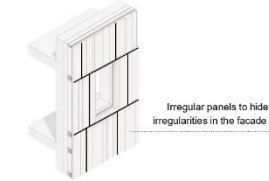
Aegir solution

ROMANIAN DEMO MATERIALS



FLAT DESIGN CONCEPT (IRREGULAR)

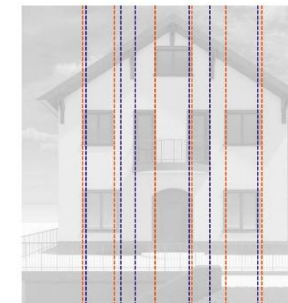
The flat design is ideal for retrofitting buildings where adding a carefully designed facade package is not feasible. The irregular flat pack is particularly well-suited for retrofitting projects that involve significant facade irregularities.



Possible application: Romania



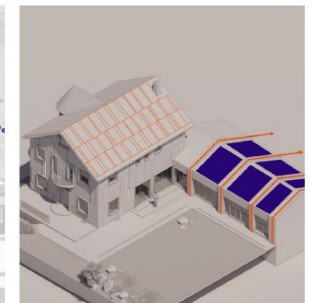
The primary design challenge of a privately-owned demonstration building lies in customizing the solution to accommodate irregular and unpredictable geometries, which often complicate the process of retrofitting facades.



01 The primary design driver is the building's openings, which are characterized by irregular geometries. The design strategy centers on developing a cohesive design language that effectively addresses and harmonizes these geometric irregularities, seamlessly integrating them into the overall aesthetic.



02 The design incorporates rigid constraints, emphasizing the horizontality of facade elements to create a cohesive connection between the various cladding components. To achieve this, we have deliberately highlighted the anchorage line of the curtain wall system, making it the sole visibly continuous element in the facade design.



03 For the roof design, we extended the same irregular design language to seamlessly envelop both the pool house and the main building. We incorporated complementary geometric ribs to harmoniously integrate the PV / PVT panels, ensuring they appear as an integral part of the overall design.



FA-01 | AEGIR Modules - Elevations I

DATE: 27/01/2024 PROJECT: ROMANIAN DEMO



FA-02 | AEGIR Modules - Elevations II

DATE: 27/01/2024 PROJECT: ROMANIAN DEMO

Resume of values for thermal transmittance values of the Aegir solution

Element	U value only AEGIR	U value complete Facade
Opaque panel area	0.212 W / (m ² ·K)	0.113 W / (m ² ·K)
Opaque module joint	1.56 W / (m ² ·K)	0.28 W / (m ² ·K)
Window module joint	2.12 W / (m ² ·K)	2.01 W / (m ² ·K)
Window - Opaque module joint	2.72 W / (m ² ·K)	2.89 W / (m ² ·K)

RENEWABLE ENERGY SOLUTION

INTEGRATED RENEWABLE STRATEGY

- GEOTHERMAL ENERGY (GSHP)
- PV & PVT PANELS
- BATTERY STORAGE

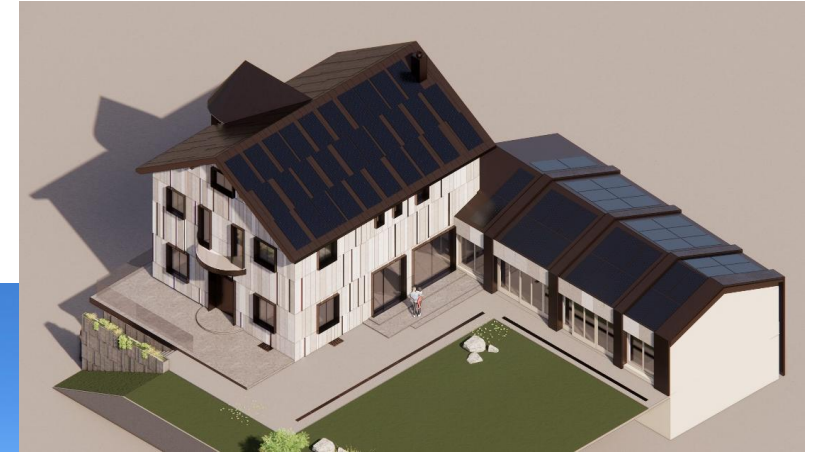
CONCEPT

- RENEWABLE ENERGY EMBEDDED IN BUILDING DESIGN
- OPTIMIZED ENERGY SELF-CONSUMPTION

OUTCOME

- REDUCED FOSSIL FUEL DEPENDENCY
- LOWER OPERATIONAL ENERGY DEMAND

Not just adding
renewables —
integrating them into
the building system



HEATING / COOLING & VENTILATION

High efficiency system using renewable geothermal energy

GEOTHERMAL HEAT PUMP SYSTEM - 30 KW GSHP (OPEN-LOOP, ~100 M DEPTH)

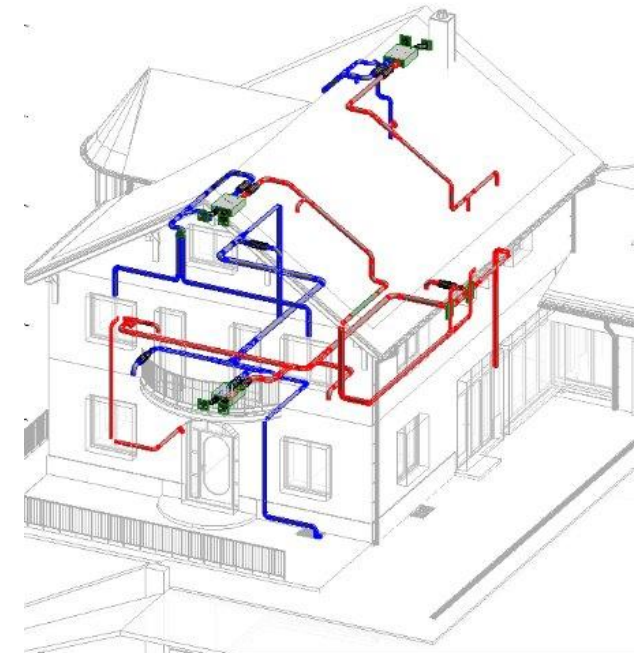
OPERATION (RADIANT CEILINGS)

- HEATING: 35°C
- COOLING: 17-18°C

PERFORMANCE COP > 5 EER > 6 GROUND TEMPERATURE: ~13.8°C

VENTILATION

- MECHANICAL VENTILATION WITH HEAT RECOVERY
- INTEGRATED IN FAÇADE SYSTEM



Technical deep-dive

30 of May 2026

Dr.-Ing. Olaf Knospe, Westaflexwerk



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Danish Demo Site

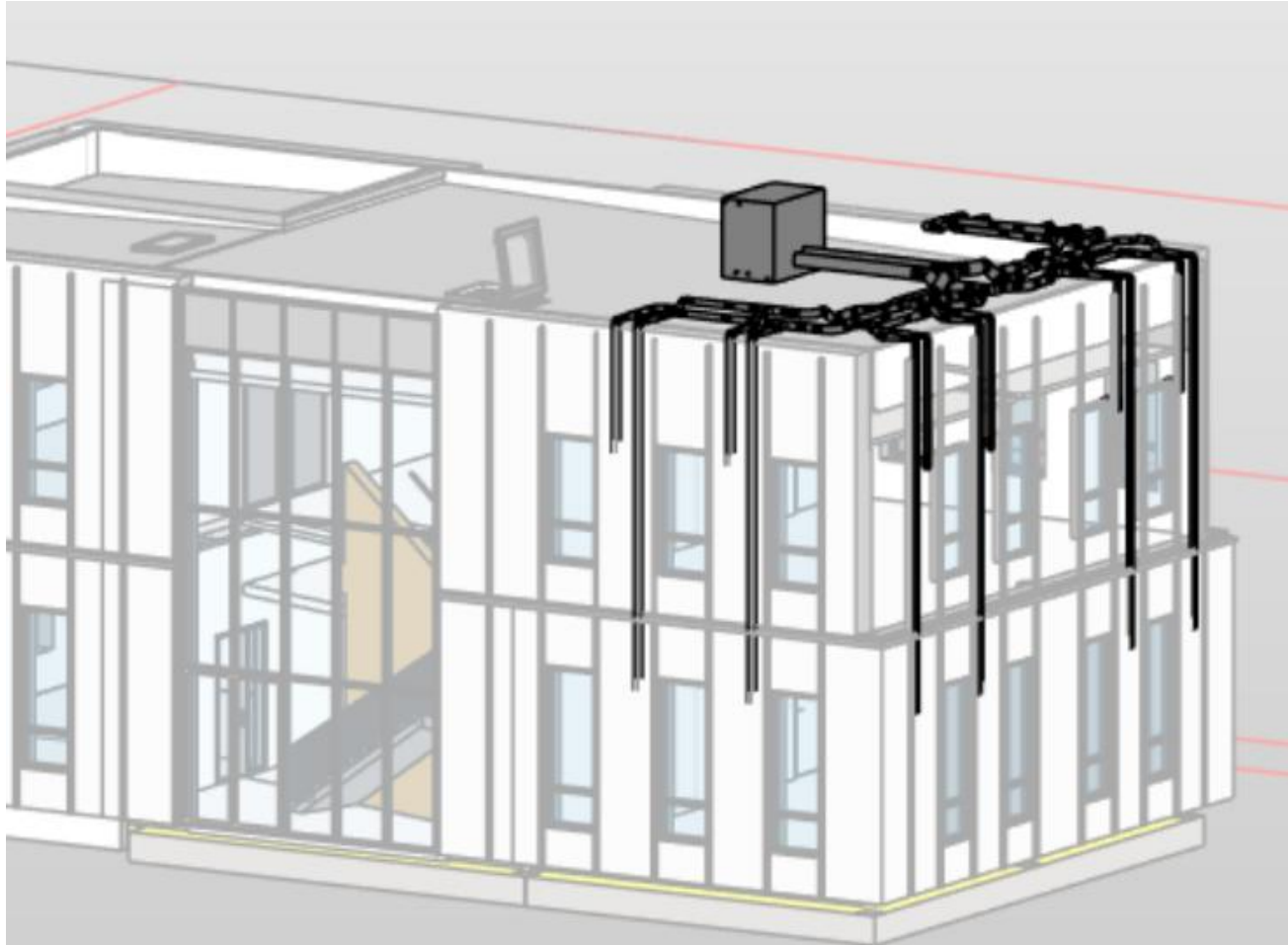


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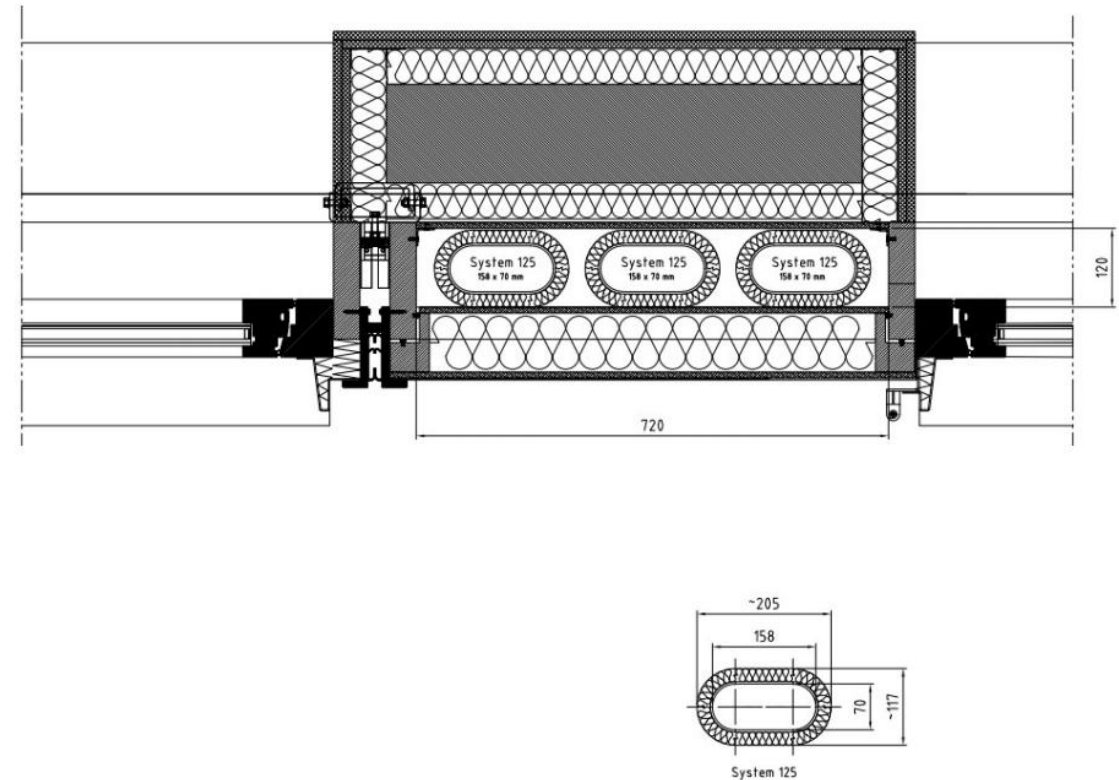
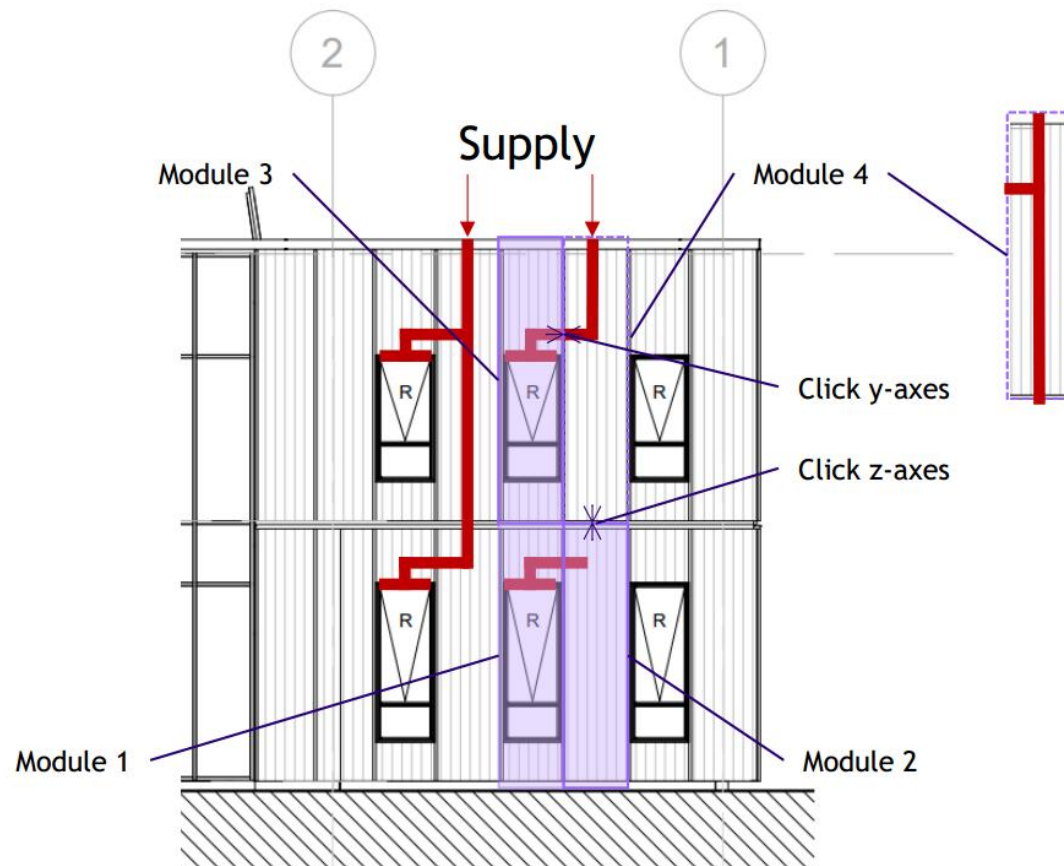
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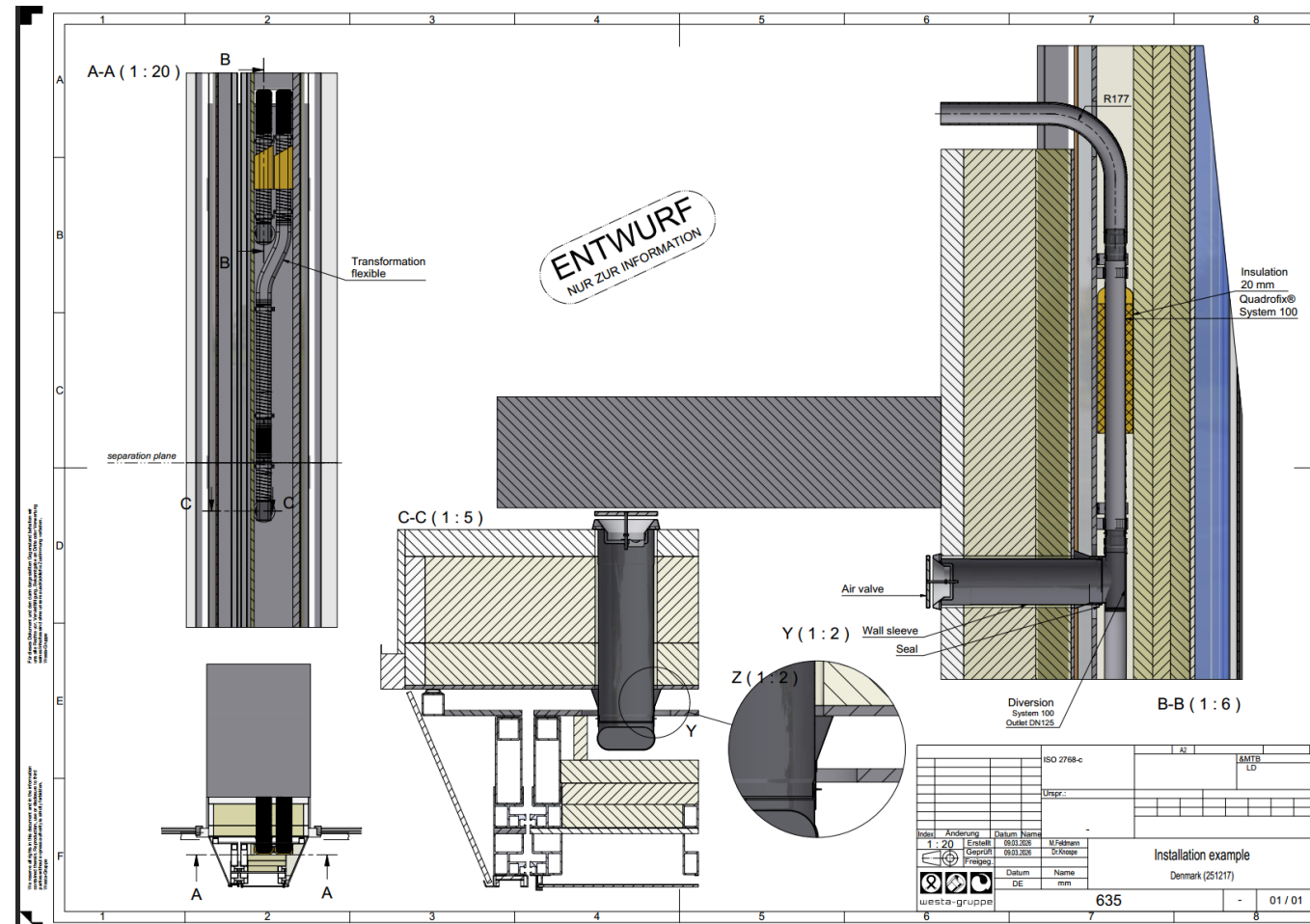
VENTILATION



VENTILATION



VENTILATION



AEGiR



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Romanian Demo Site - Deep Renovation of a Single-Family House



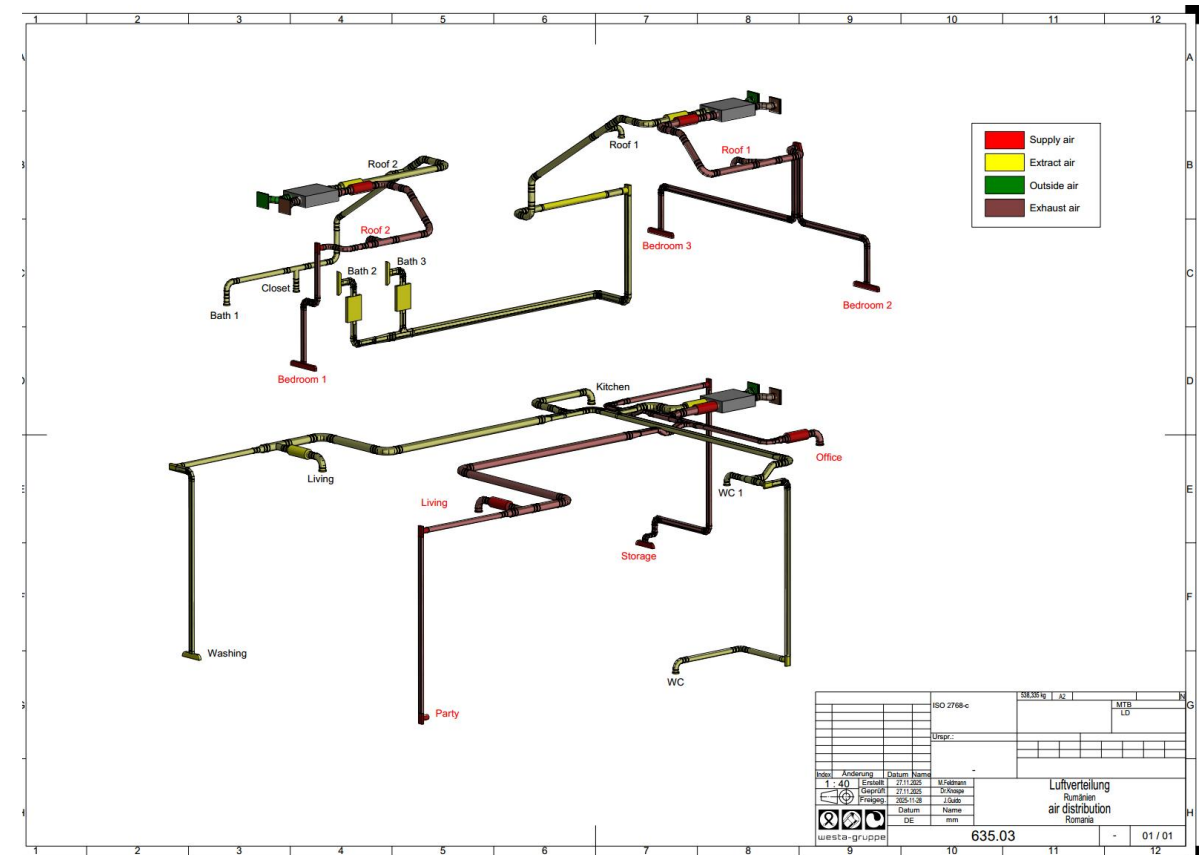
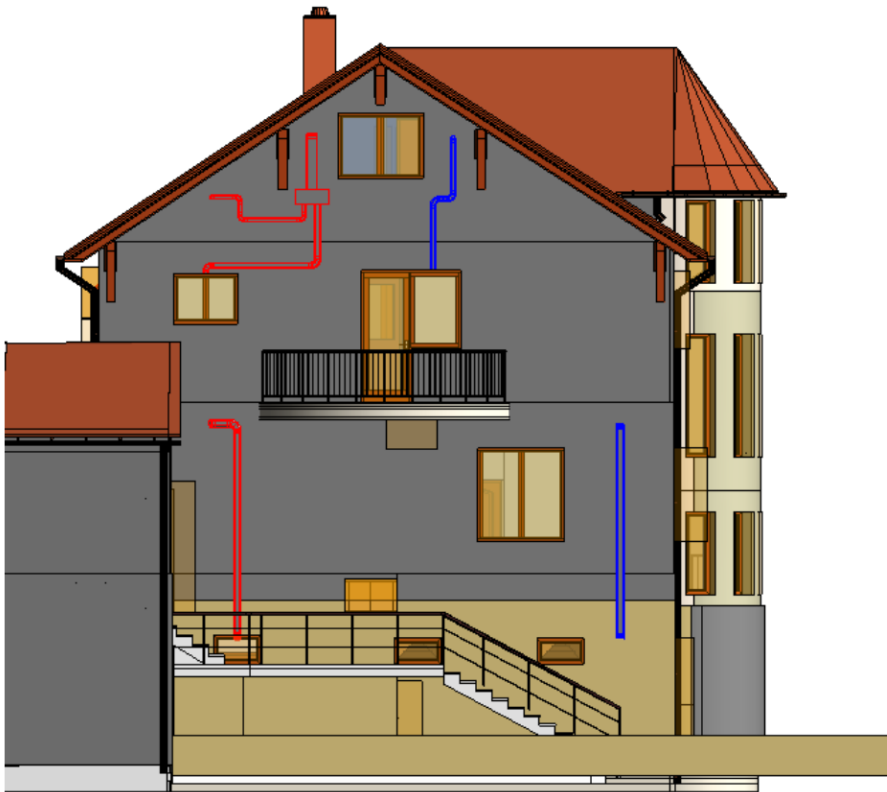
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HEATING / COOLING & VENTILATION

Ventilation System



AEGIR DWS: Key Takeaways



- While the technical solutions are mature, the Danish BiW case highlights that navigating governance, financing, and stakeholder alignment is the primary requirement for successful replication.
- The Romanian demo proves that scalable deep renovation is feasible when systems (facades, ventilation, and renewables) are integrated to adapt to real building geometries rather than ideal cases.
- As shown by the Westaflex approach, embedding air management directly into the facade is essential for balancing energy performance with comfort while enabling rapid, space-efficient deployment.

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 - the final series of the AEGIR Demo-led Replication Workshop:

- The DWS5&6 and DWS7&8 will be held once all the renovation works are done, and cover all four demonstration sites. Around September timeframe, but will announce the exact dates. So, 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.

Thank you for your attention

Bard Rama, ICLEI European Secretariat

bard.rama@iclei.org

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