Development of innovative lightweight and highly insulating energy efficient components and associated enabling materials for cost-effective retrofitting and new construction of curtain wall facades.

EENSULATE

EENSULATE project

Sustainable Places 2020

30 October 2020

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RINA Consulting S.p.A.

This project has received funding from European Union's Horizon H2020 research and innovation programme under grant agreement No. 723868.

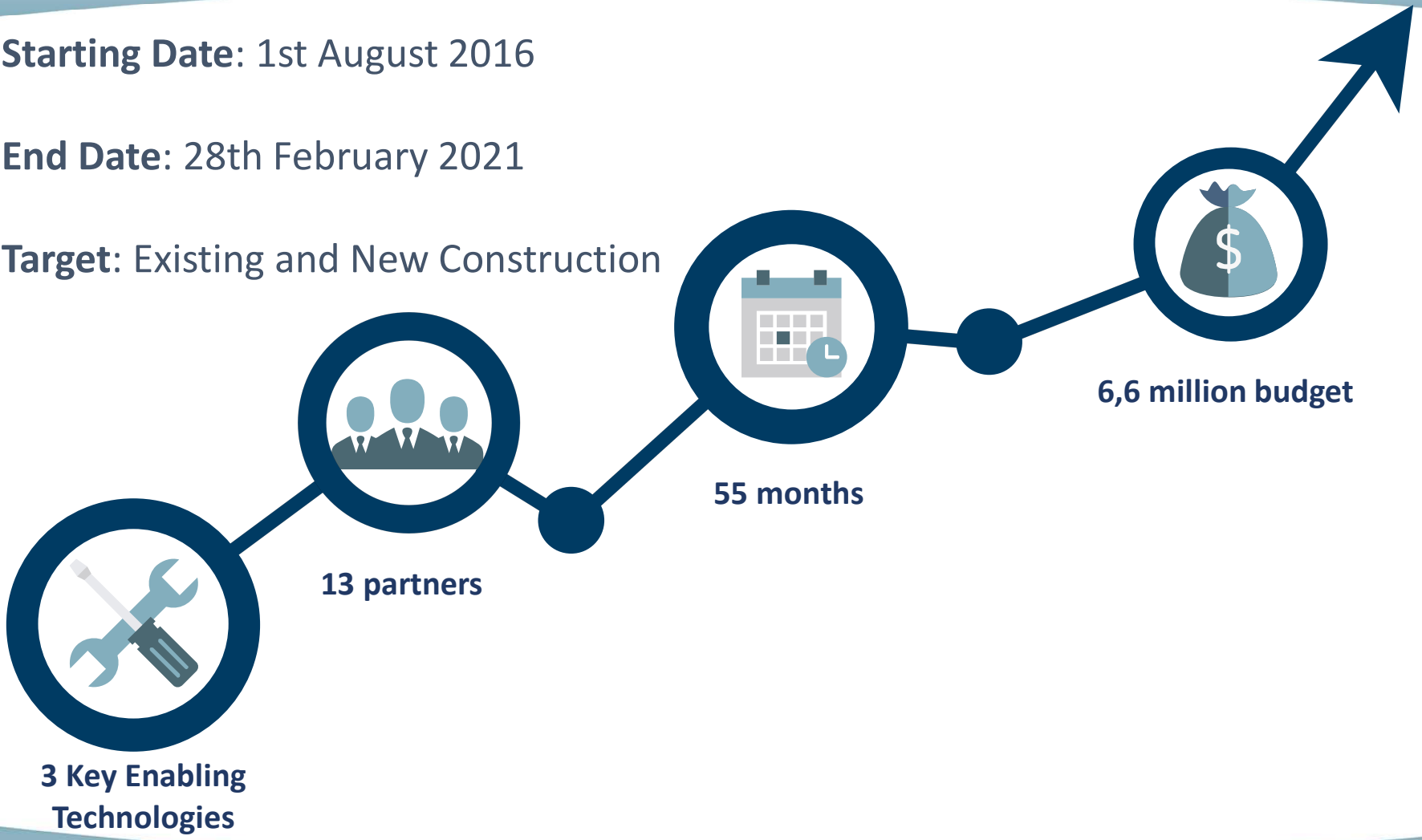
Horizon 2020
European Union Funding
for Research & Innovation

EENSULATE PROJECT

Starting Date: 1st August 2016

End Date: 28th February 2021

Target: Existing and New Construction



PARTNERS

EENSULATE

Project Coordinator:

RINA

Project Partners:

UCL

saes group

Innovative facade solutions
BG Tec Sp. z o.o.
Innowacyjne rozwiązania fasadowe

EVONIK INDUSTRIES

FOCCHI SINCE 1914

UNS UNSTUDIO
AMSTERDAM • SHANGHAI • HONG KONG

SELENA GLOBAL EXPERIENCE

Dzierżoniów miasto z inicjatywą

Ulster University

FENIX.TNT tvořivost nad technologií

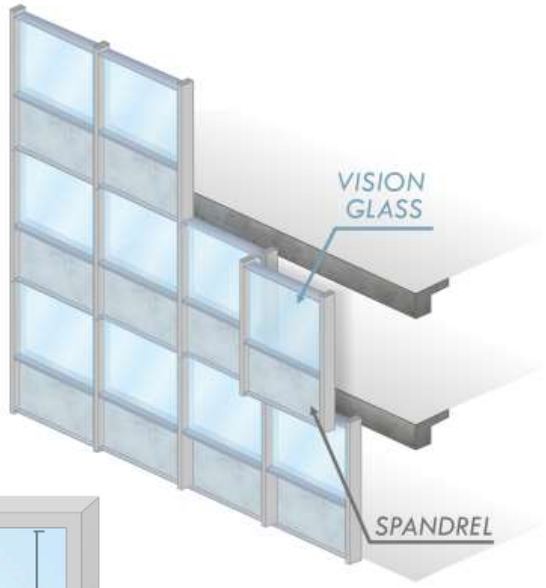
AGC GLASS UNLIMITED

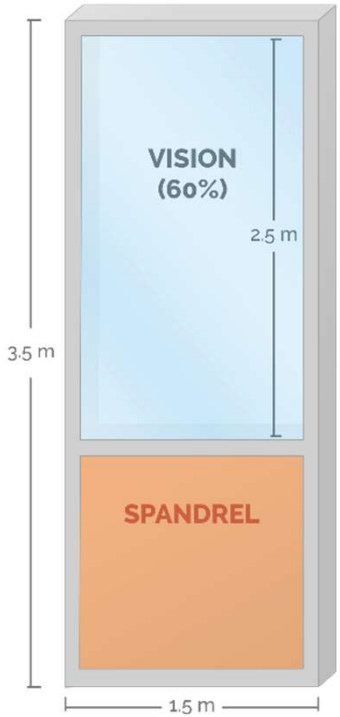
UNIVERSITÀ POLITECNICA DELLE MARCHE

EENSULATE Project CHALLENGE

- Thousands of buildings in Europe have been constructed in the recent decades using the **curtain walls** system and many of these buildings are now **thirty to fifty years old or even more**.
- **Curtain wall** technology has recently moved from **office buildings** to glazed **residential towers** within the urban context, where noise pollution is a significant and growing concern.
- Windows and glass facades are estimated to be responsible for up to **60% of energy losses through the envelope**.
- **Replacement** and **retrofitting** of **curtain walls** would allow a significant enhancement in **thermal performance** which results variously in condensation, unwanted heat transfer, and general **discomfort to occupants**.

Main Breakthrough





EENSULATE curtain wall modules where the thermal and acoustic insulation are provided by the novel EENSULATE glass based on VIG technology and EENSULATE foam (TCF) in the spandrel combined with SoA low-e coated glass, including thermo-chromic coated glass with additional self-cleaning and antifogging functionalities

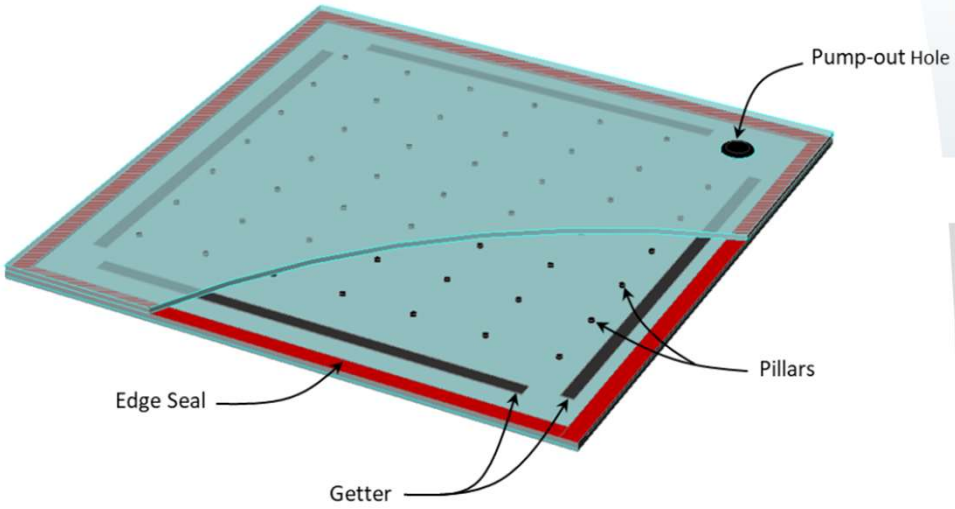
EENSULATE Module allows to achieve thermal and mechanical performances according to technical and standard requirements as well as market drivers

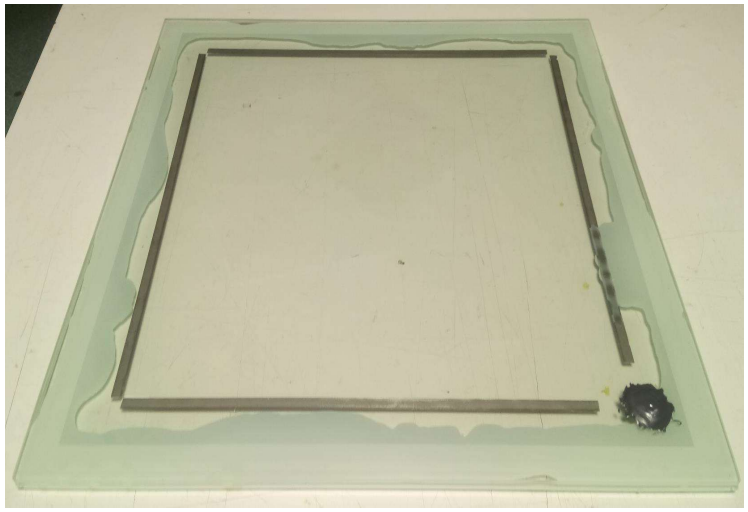
Main Technologies

- Lightweight and thin double pane Vacuum Insulated Glass (VIG) with innovative sealant and getter technologies for transparent part of the façade module and windows applications

- Highly insulating foams based on mono component (OCF) and bi-component (TCF) elements

VIG





Centre and overall U-value:
0.36 and 0.44 $Wm^{-2}K^{-1}$, respectively

- Vacuum Insulated Glass (VIG) realized by BGTEC with a tailored manufacturing process implementing the innovative sealant and getter strips to ensure the target performances
- Small Scale VIG prototypes (500x500mm)
- Large scale VIG prototypes (1000x1000mm)
- Real scale VIGs for pilots (2060X860mm, 1200x1160mm)

FOAM

- A highly insulating mono-component foam (OCF) for windows application and a two component foam (TCF) with high fire class for spandrel application developed by SELENA
- The innovative foams are nanocomposite polyurethane (PUR) / polyisocyanurate (PIR) foams with tailored cell morphology, size and structure in order to enhance the thermal properties through the precise control of the cells nucleation events which generate the foams

SEALANT

- Epoxy resin based sealant in strips for vacuum insulating glass
- Thermal curing allows low processing temperature (< 200°C)
- Possibility of having the mono-component sealant resin in syringe dispensable in a range of 60÷100°C
- Permeability - extremely high barrier performance for Ar, N2, O2
- Active filler for moisture absorption
- Storing in freezer, processing in air

GETTER

- Distributed getter realized with innovative Zr-based alloy ZAO®2 with extremely high N2 capacity (0.1cc·torr/cm2)
- Laminated double-side getter strips 200µm thick and 8mm large
- Easy handling and positioning in air
- Getter activation process by RF heating after vacuum pumping

3 Demo Buildings

School

Building Type:
Tertiary Building

Location:
Dzierżoniow, Poland

Type of Intervention:
Façade System

Museum

Building Type: Old Building

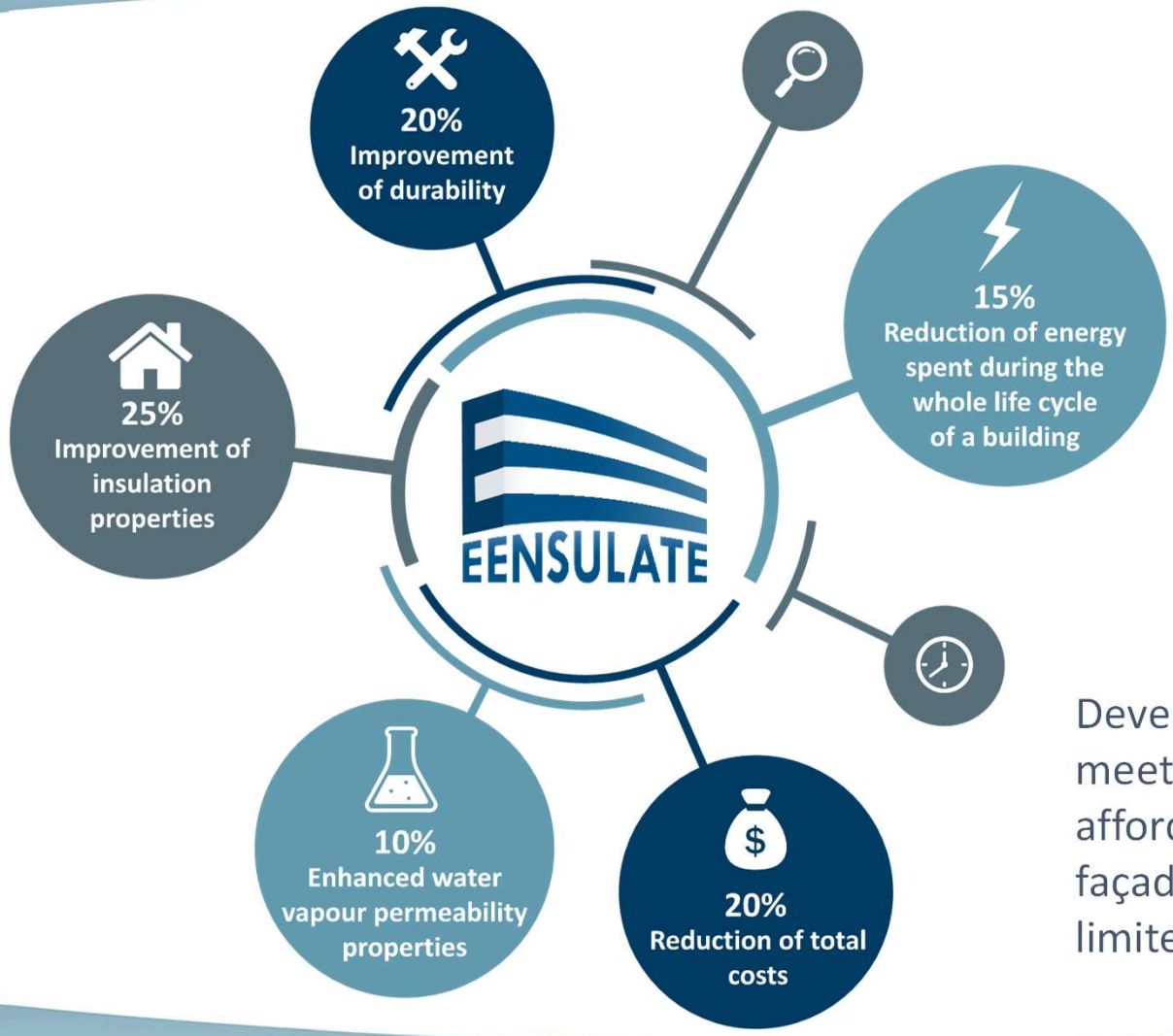
Location: Dzierżoniow, Poland

Type of intervention: Windows

Public Library

Building Type: Tertiary Building
Location: Pesaro (Italy)
Type of Intervention: Door Window

Main Impacts



Development of a product that meets the market demand for affordable and prefabricated façade retrofitting system with limited weight and thickness

CONTACT INFO

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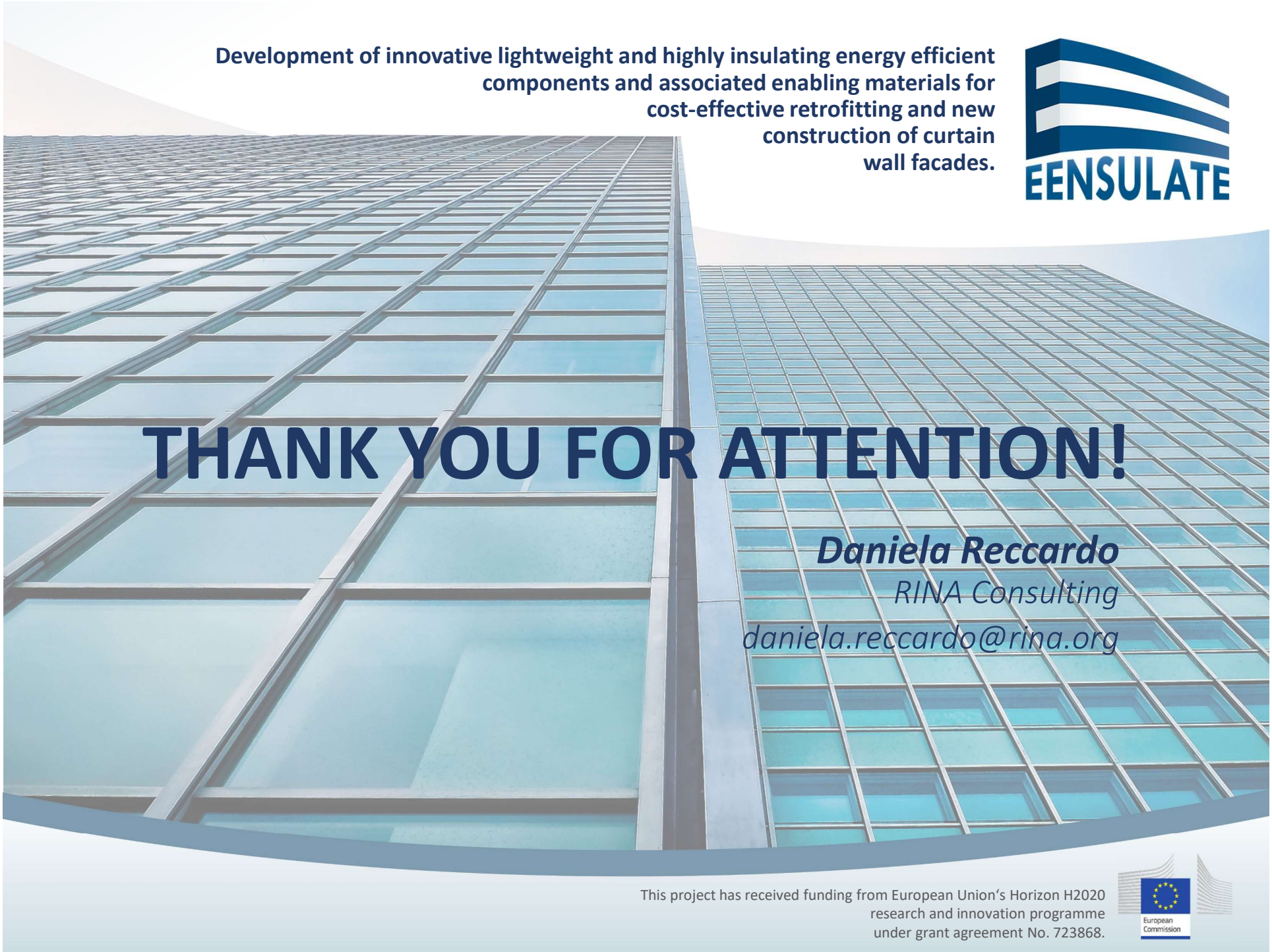

THANK YOU FOR ATTENTION!

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European Commission