Accelerating Energy renovation solution for Zero Energy buildings and Neighbourhoods

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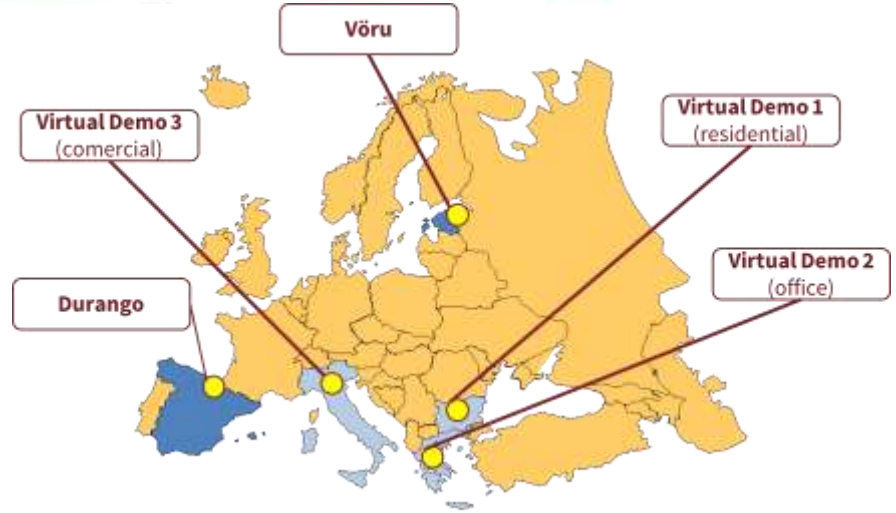
General overview

- Call: H2020-EEB-2017
- 48 months: October 2017 – August 2021
- 19 European partners
- 3 demonstration buildings + 3 virtual demonstration buildings

→ To achieve:

- 16% cost reduction of renovation
- 60% energy consumption reduction
- 65% renovation process time reduction



Context

- Currently only **1.2 % of the building stock** is replaced annually
- To accomplish the 2050 targets increase the rate to **2.9% necessary**
- Currently retrofitting processes are **expensive, complex and disturbing**, with many uncertainties and several inefficacies
- Information is not properly shared, multiple errors and duplicated efforts

RenoZEB strategy:

- technological attractive solutions (**multifunctional modular "plug and play" system**)
- a **well-designed renovation methodology**
- **cloud collaborative environment**
- **involvement** of all key stakeholders
- **property value** as main trigger for nZEB renovation Market

Objective

Unlock the nZEB renovation market leveraging the gain on property value through a new systemic approach to retrofitting that will include:

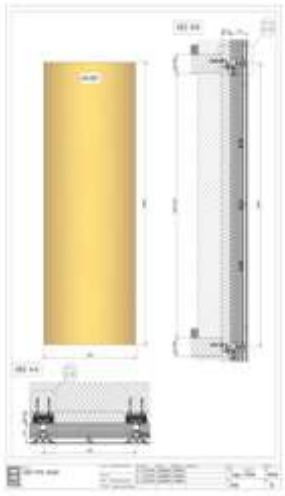
- innovative components
- processes
- decision making methodologies
- to guide all value-chain actors in the nZEB building renovation process

4 main pillars:

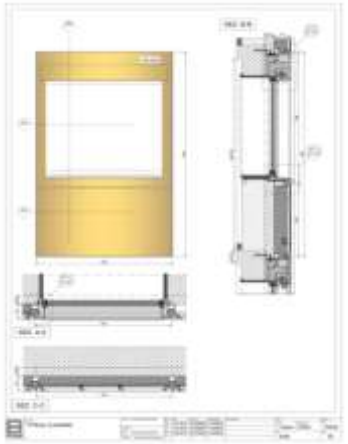
- **Reduce energy consumption**, increasing the share of RES in buildings
- **Cost & risk reduction** with low disruption during building renovation, to attract customers interest
- **Replicability and adaptability** through modularity in order to capture a large-scale renovation market
- **Property-value** as trigger

Solutions

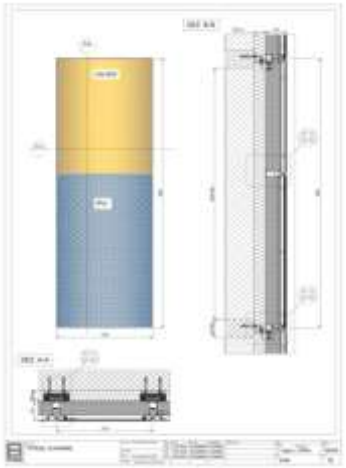
- **Prefabricated window module** and roller shutter
- **Multifunctional insulation** boards
- Ventilation units with heat recovery
- Building Integrated Photovoltaics (**BIPV**) and batteries
- Building Integrated Solar Thermal Systems (**BIST**)
- **Intelligent façade** controller (integrated sensors and façade controller)
- "**Click-in**" fixing mechanisms



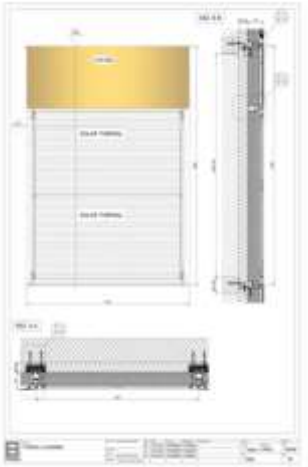
OPAQUE UNIT



WINDOW UNIT



PV UNIT

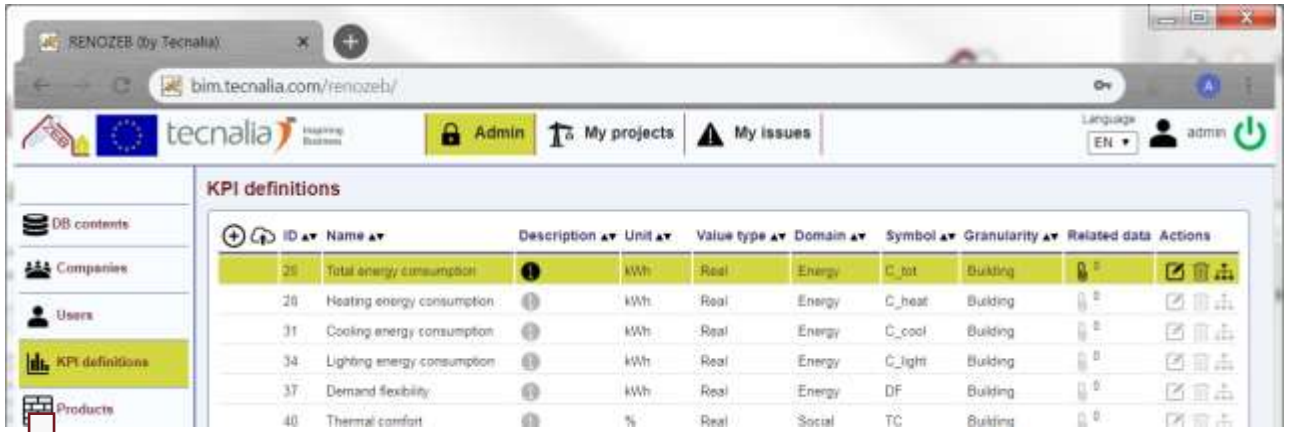


SOLAR THERMAL COLLECTOR UNIT

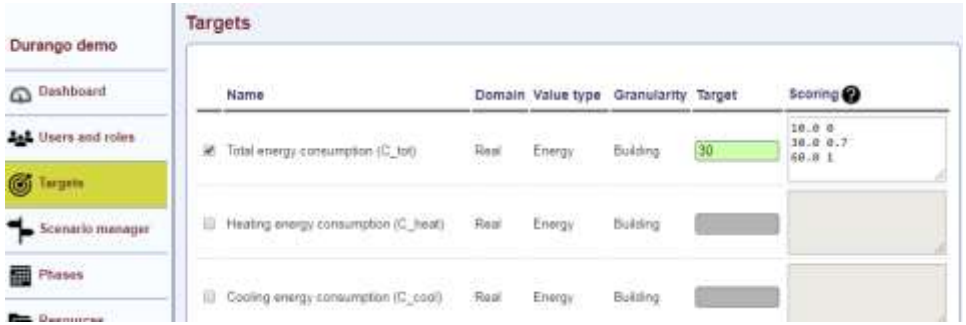
RenoZEB facade - Prototype

Solution: nD Collaborative Environment

Ongoing work: KPI management

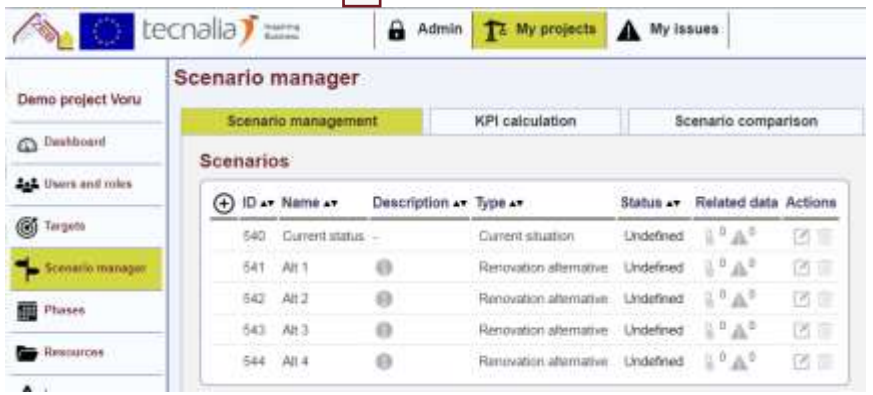


Define KPIs



Select KPIs & define targets

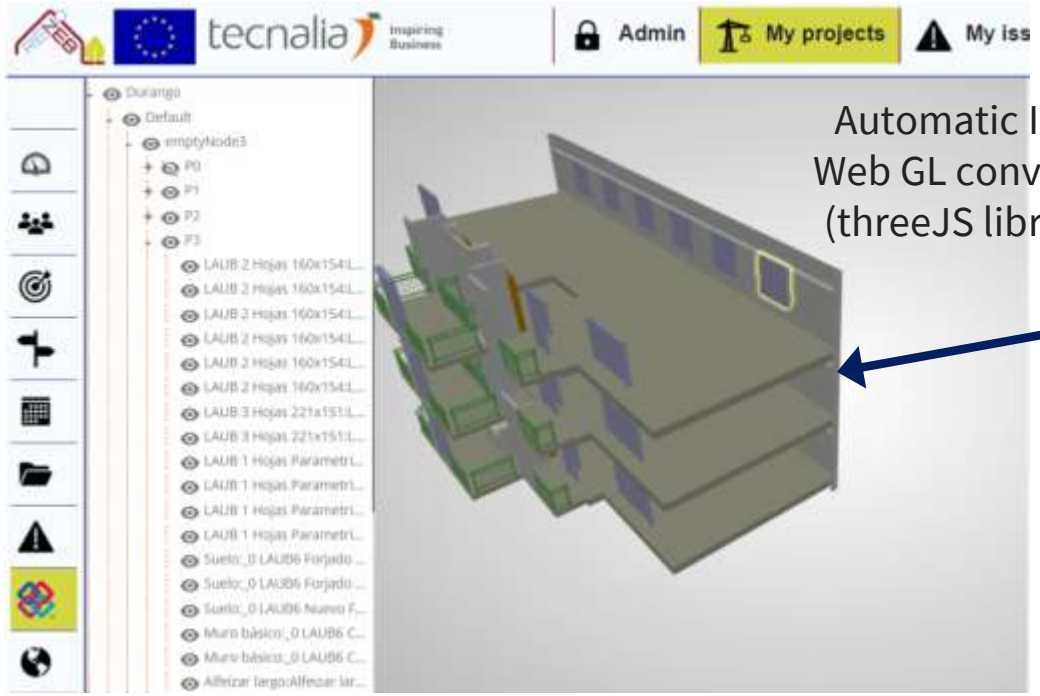
Define scenarios



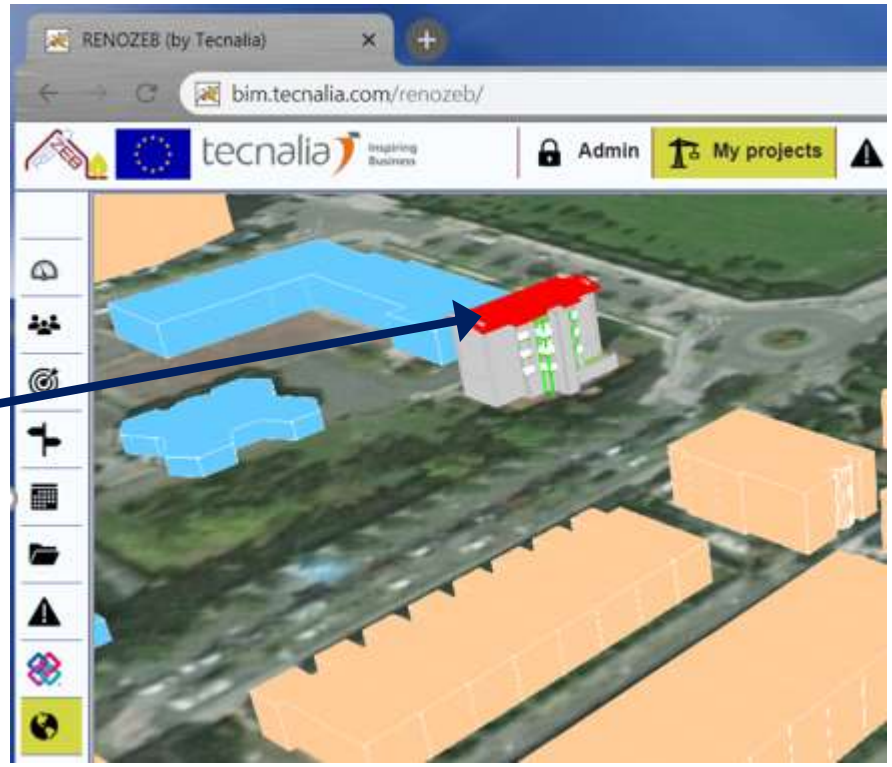
Evaluate scenarios

Solution: nD Collaborative Environment

Ongoing work: IFC viewers



Automatic IFC to Web GL conversion (threeJS libraries)



Automatic IFC to KML conversion & web viewing (cesium libraries)

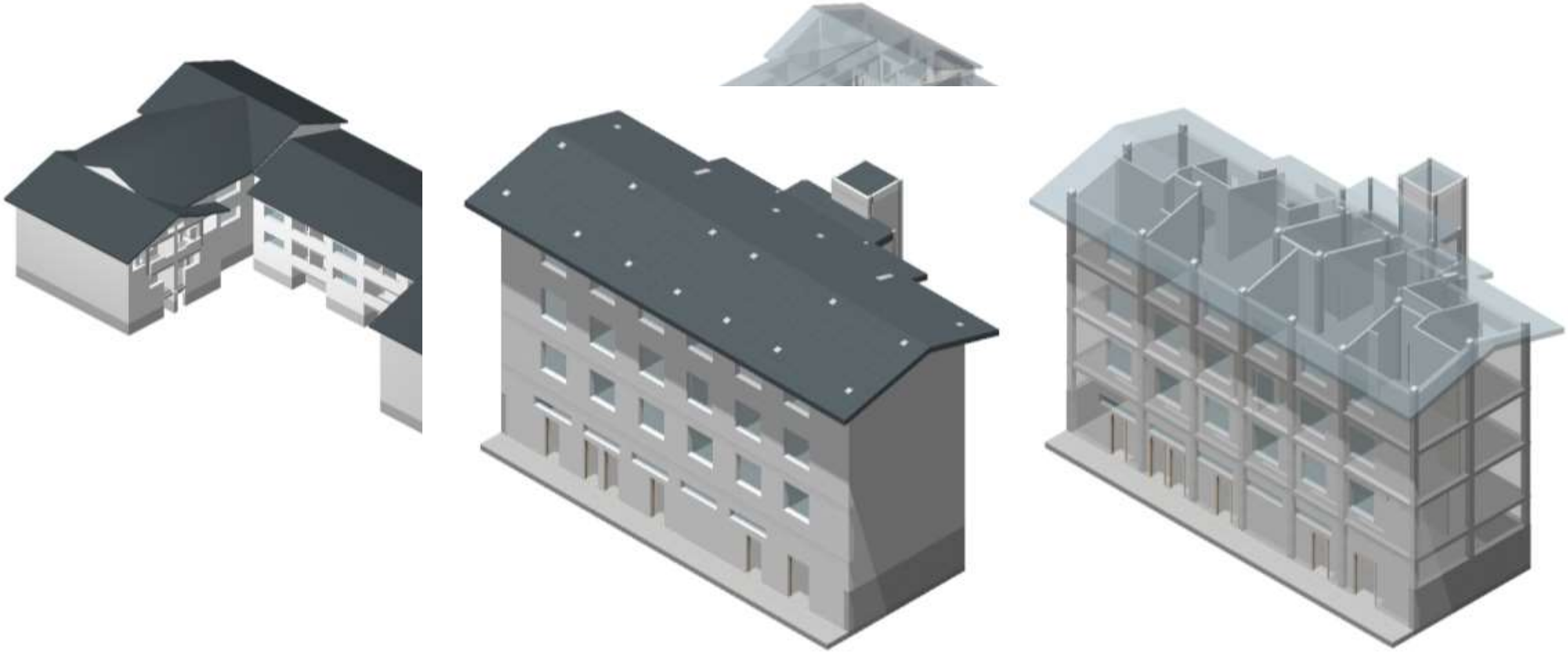
Detailed mode

Building view (with internal navigation)

Georreferenced view

(GIS context)

Solution: BIM Model Generation Tool



Solution: Smart logistic and construction management tool

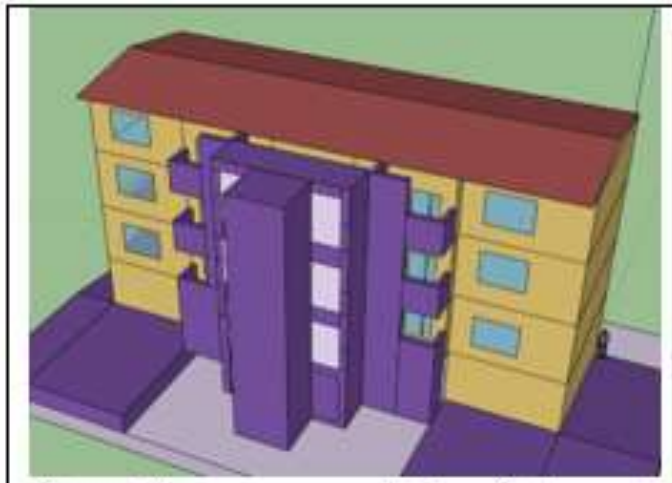
- READ IFC ENTITIES
- CREATE A QR CODE FOR THAT ENTITY
- ADD INFORMATION TO THE QR CODE
  - DATES
  - PDF, YOUTUBE
- GANNT CHART WITH ALL THE ELEMENTS

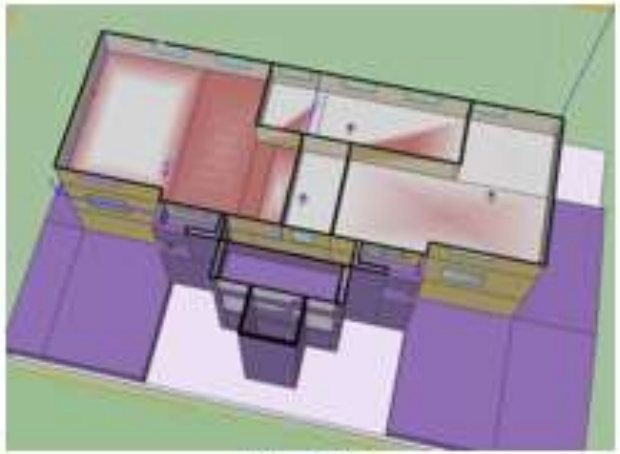
RenoZEB Pilot - Durango

1960’ building

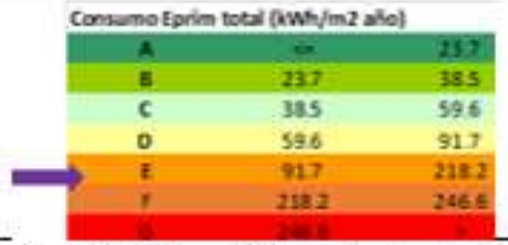
Pre-intervention (left column) and Post-Intervention (right column) infographics

RenoZEB smart modular customizable facade





Overall energy model and thermal zones created in F2

	PRE kWh/m2	POST kWh/m2 (scen. 3)***
Space heating energy demand	110	14.5
DHW demand	9*-19	9-19**
SH+SH energy use	166.3 -180	33-47 (80% reduction
		

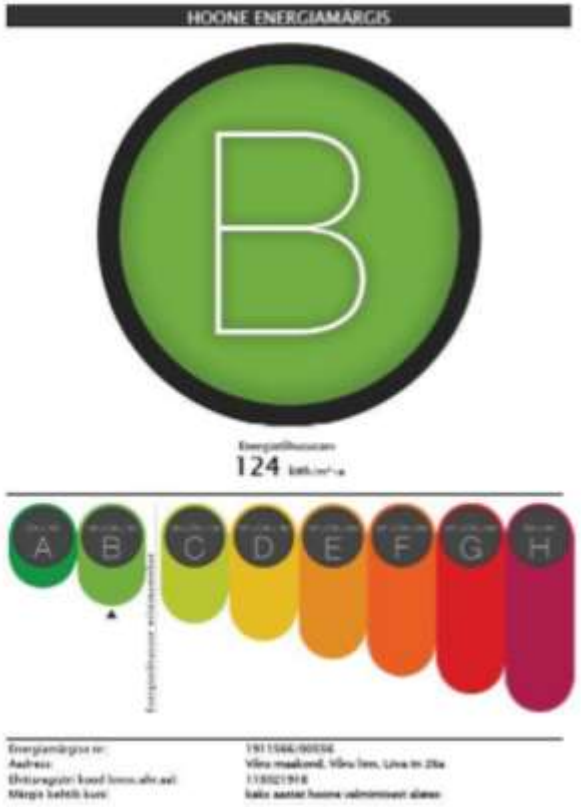
RenoZEB Pilot - Voru

1992 building

RenoZEB smart modular customizable facade

	Before (existing) kWh/m2	After kWh/m2
Space heating energy demand	110	70
DHW demand	33,3	33,3
Heat for ventilation	0	26
Heat adjustment	Not present	Controlled Temp. range 18-23 °C
Indoor climate	no	II indoor climate class
Ventilation	Freeflow, not mechanical	Mechanical (by II indoor climate class)
Solar enegy generation	0	30 kW PV station ca 50% of yearly demand will be covered
Energy class and label	"E" 231 kWh/m2 a	"B" 124 kWh/m2 a 53% reduction

Energy model before and after intervention



Thank you for your attention

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