SUSTAINABLE PLACES 2021

ENERGY MATCHING

Online EnergyMatching Platform to support the RES harvesting in buildings and districts

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Sustainable Places 28/09/2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°768766.

Introduction on EnergyMatching project

EnergyMatching project

Timing

October 2017 to July 2022

Objective

Maximize the Renewable Energy Souces harvesting in the built environment by developing and demonstrating cost-effective active building skin solutions as part of an optimised building energy system

EnergyMatching project

Results

1. EnergyMatching Tool (i.e. optimization tool for PV in buildings)
2. EnergyMatching Platform
3. Versatile click&go substructure for different cladding systems
4. Solar windows package
5. Modular appealing BIPV envelope solutions
6. Renewable harvesting package to heat and ventilate
7. Building and district energy harvesting management system

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EnergyMatching Platform

ENERGY MATCHING

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R2M RESEARCH TO MARKET SOLUTION

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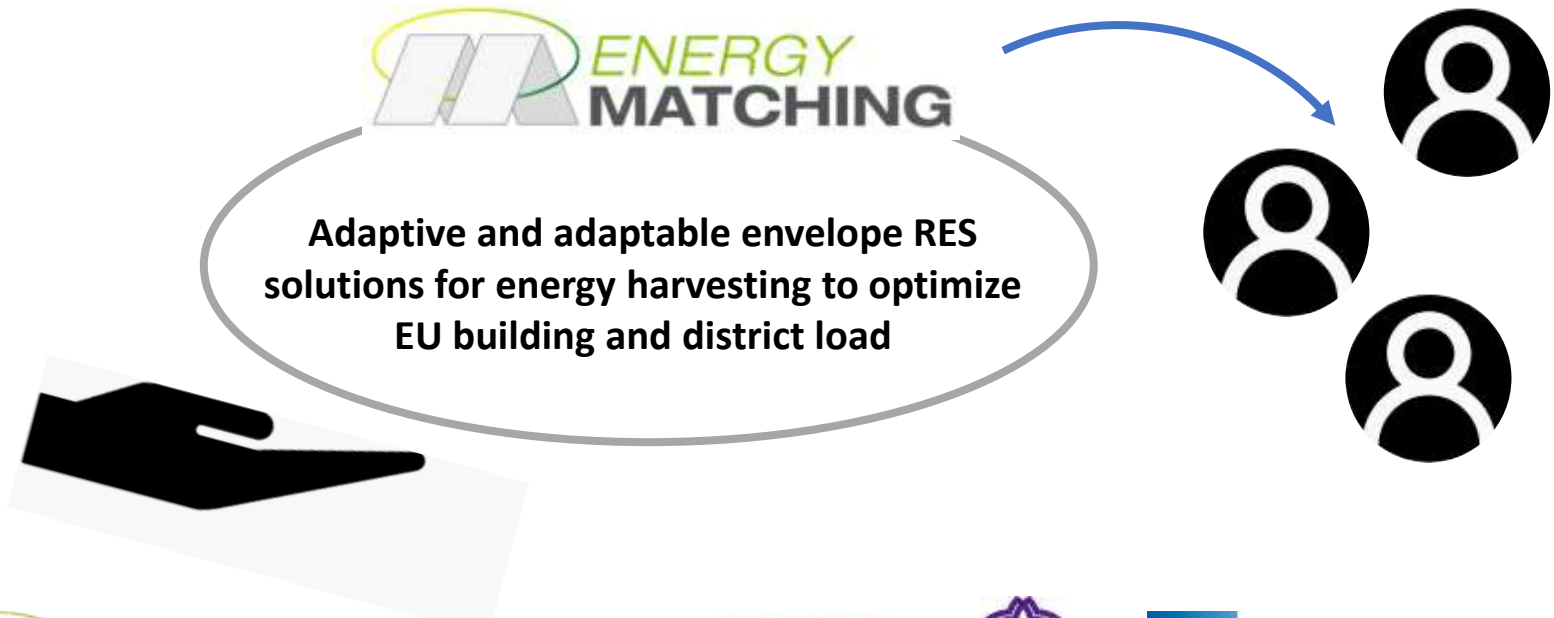
WIP RENEWABLE ENERGIES

EnergyMatching Platform

Objective

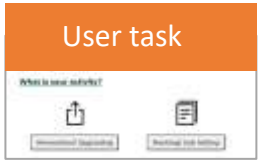
Offering EM resources to support external stakeholders in integrating RES in their built environment



EnergyMatching Platform

Strategy

Matchmaking tool supporting users in finding EM resources suitable for their own business (based on a previous stakeholders analysis)



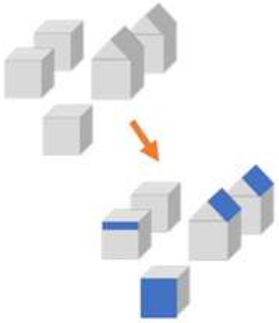
Resource 1

Resource 2

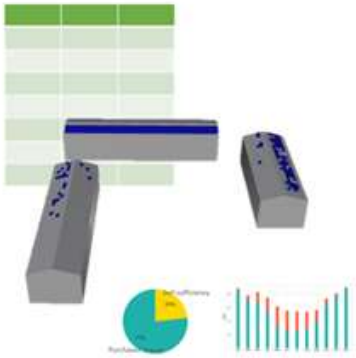
Resource …

EnergyMatching Platform

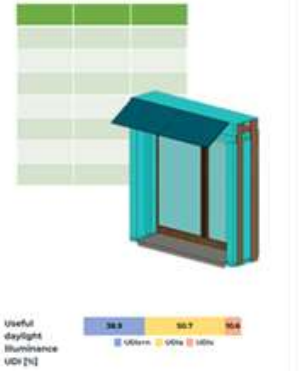
Resources



EnergyMatching Tool to optimize **BIPV early design** at building and district scale



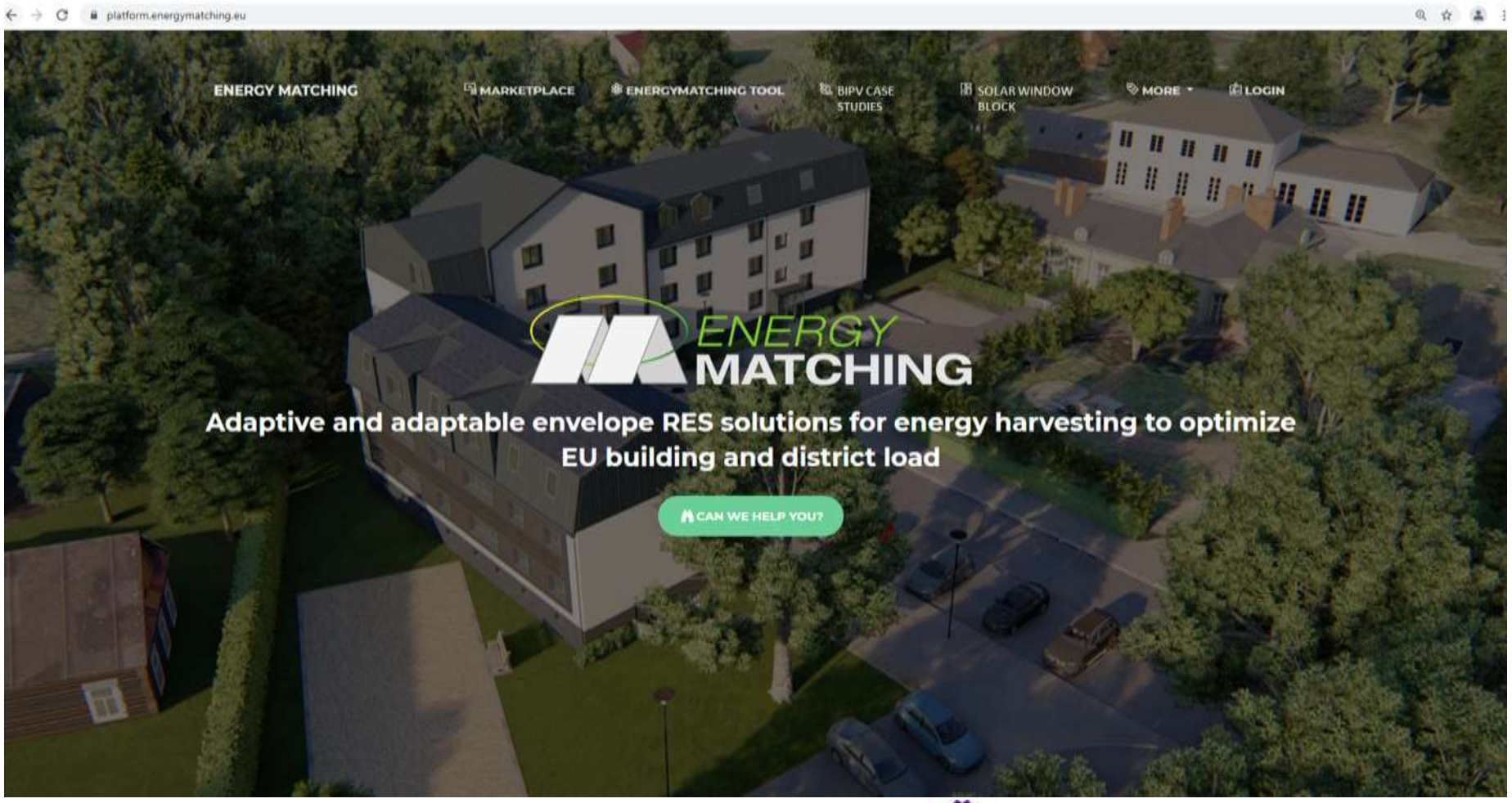
Repository of **BIPV case studies** with performance data



Repository of **Solar Window Block** configurations with performance data

Marketplace showing **technologies for integrating RES** in buildings

EnergyMatching Platform



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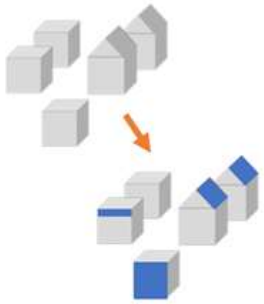
EnergyMatching Tool



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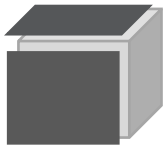
EnergyMatching Tool

Key aspects

- It aims to **support since the early design stage of BIPV**
- It performs an **optimization to suggest the best BIPV configuration, i.e. PV capacity, PV modules' position, electric storage capacity**, for the specific case
- It is suitable to evaluate **building to district scale: energy sharing**

EnergyMatching Tool

INPUT



Buildings' geometry (.obj)

Area available for PV (.obj)

Weather

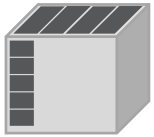
Shading objects

Hourly electric demand

Costs (electricity, technologies)

Technologies' features

PV optimization



OUTPUT

Optimal PV capacity

Optimal PV position

Optimal battery capacity

Energy-related KPIs

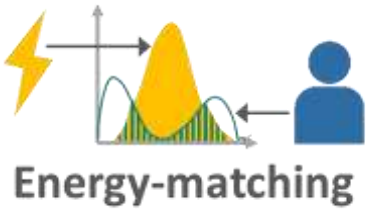
Economy-related KPIs

Environment-related KPIs

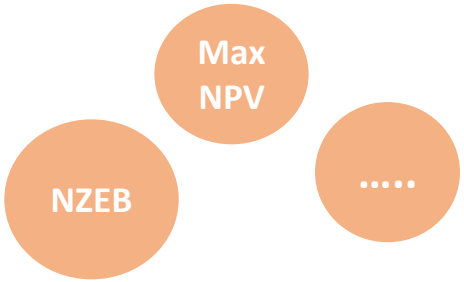
EnergyMatching Tool

Key aspects

- It evaluates the **hourly-matching** between PV production and building consumption



- It has **different target functions:** economy/energy/environment-related

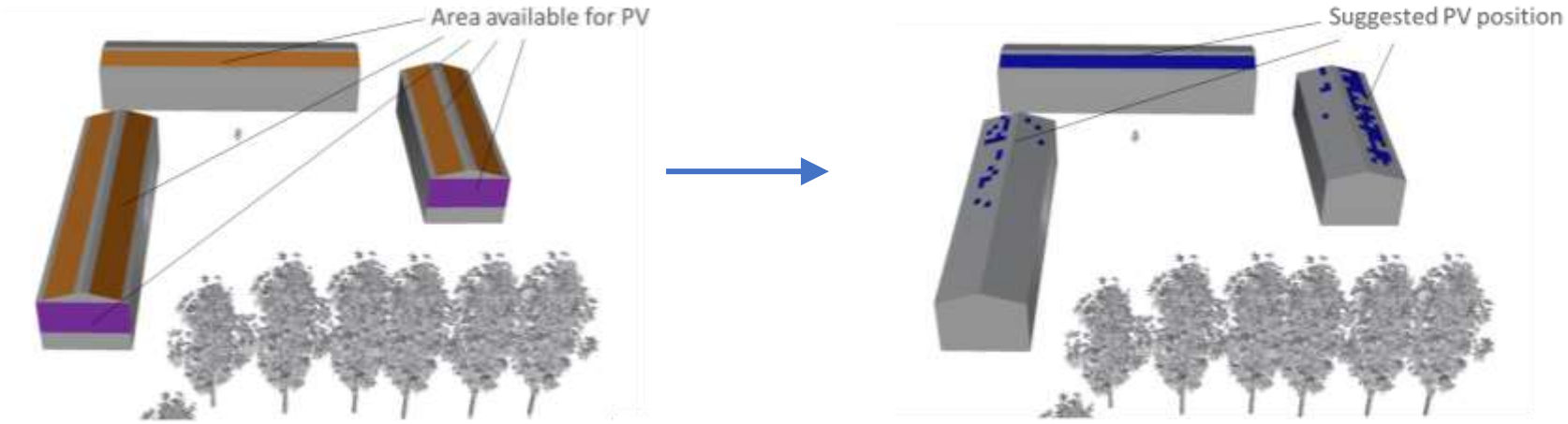


EnergyMatching Tool

Application

INPUT

OUTPUT



EnergyMatching Tool

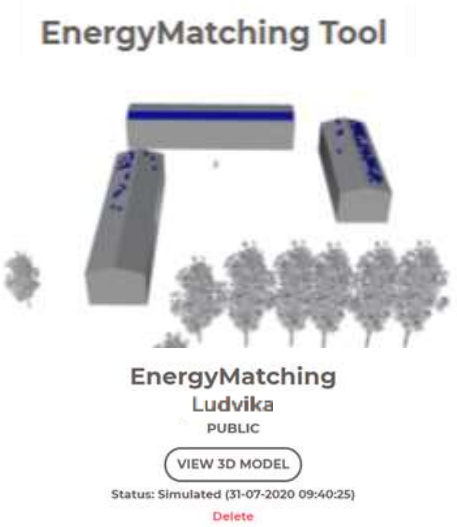
Application

INPUT

PV module efficiency: 14 % on roof, 13 % on facade
Price of electricity bought from the grid: 0.16 €/kWh
Price of electricity sold to the grid: 0.05 €/kWh
Cost of PV system: 1420 €/kWp
Cost of battery: 500 €/kWh
Linear annual growth electric demand: 0 – 2 %
Linear annual growth of price of electricity for the consumer: 0 – 3 %
Linear annual growth of price of electricity for the provider: -1 – 0 %
Annual discount rate: 0 – 2 %
Annual cost of maintenance: 25 - 40 €/kWp
Linear annual efficiency losses: 0.5 – 1 %

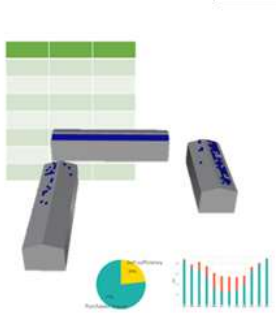
OUTPUT

EnergyMatching Tool



Summary.pdf
Suggested PV.obj
....
....

Repository of BIPV case studies



BIPV case studies

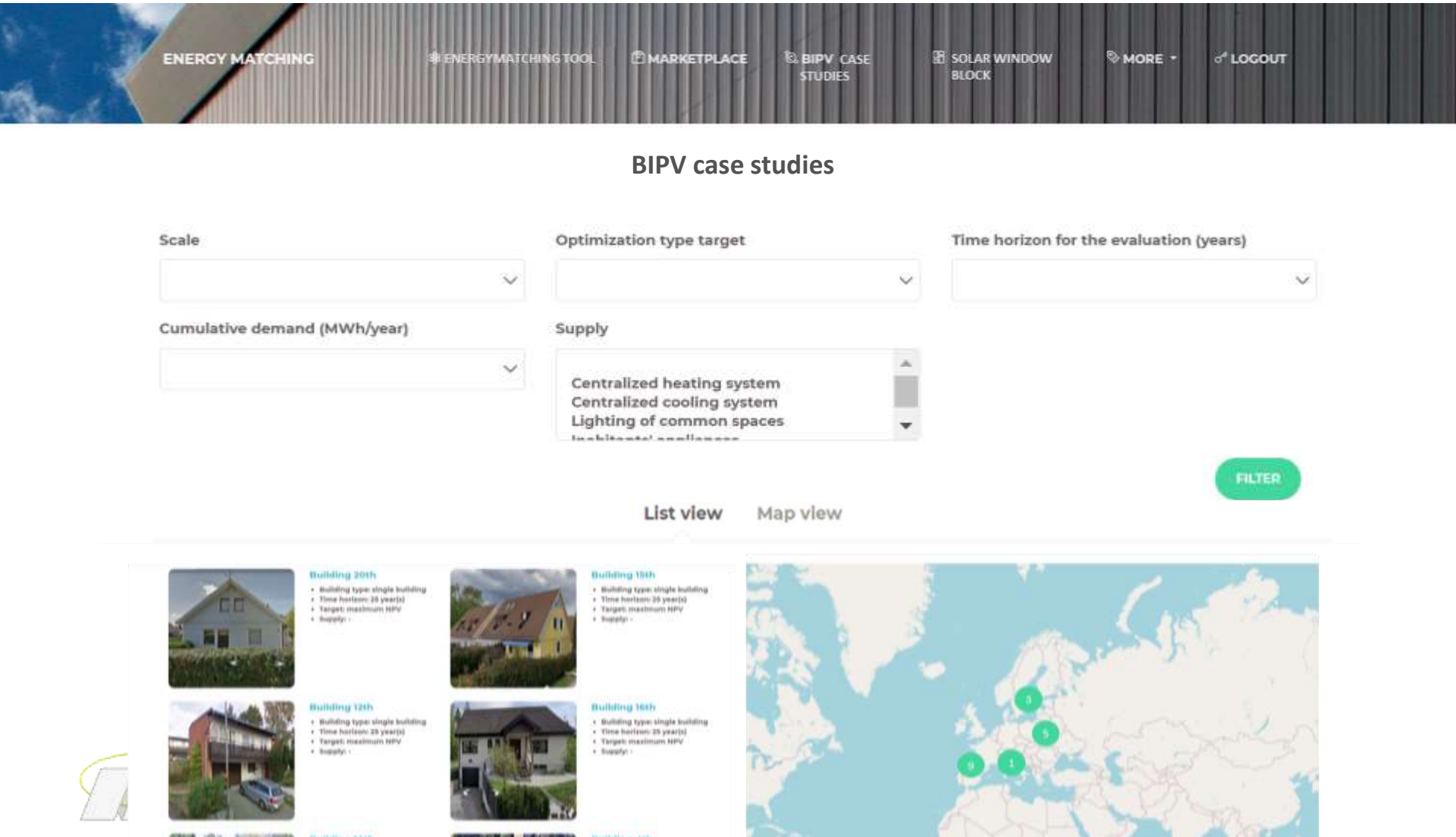
Key aspects

- The case studies are **results of EnergyMatching Tool applications**, published by users

- **Filter selection**: building scale, optimization objective, time horizon for the evaluation, cumulative annual energy demand, kind of supply

- **Performance indicators**: same as EnergyMatching Tool

BIPV case studies



Repository of Solar Window Block configurations

Solar Window Block

Key aspects

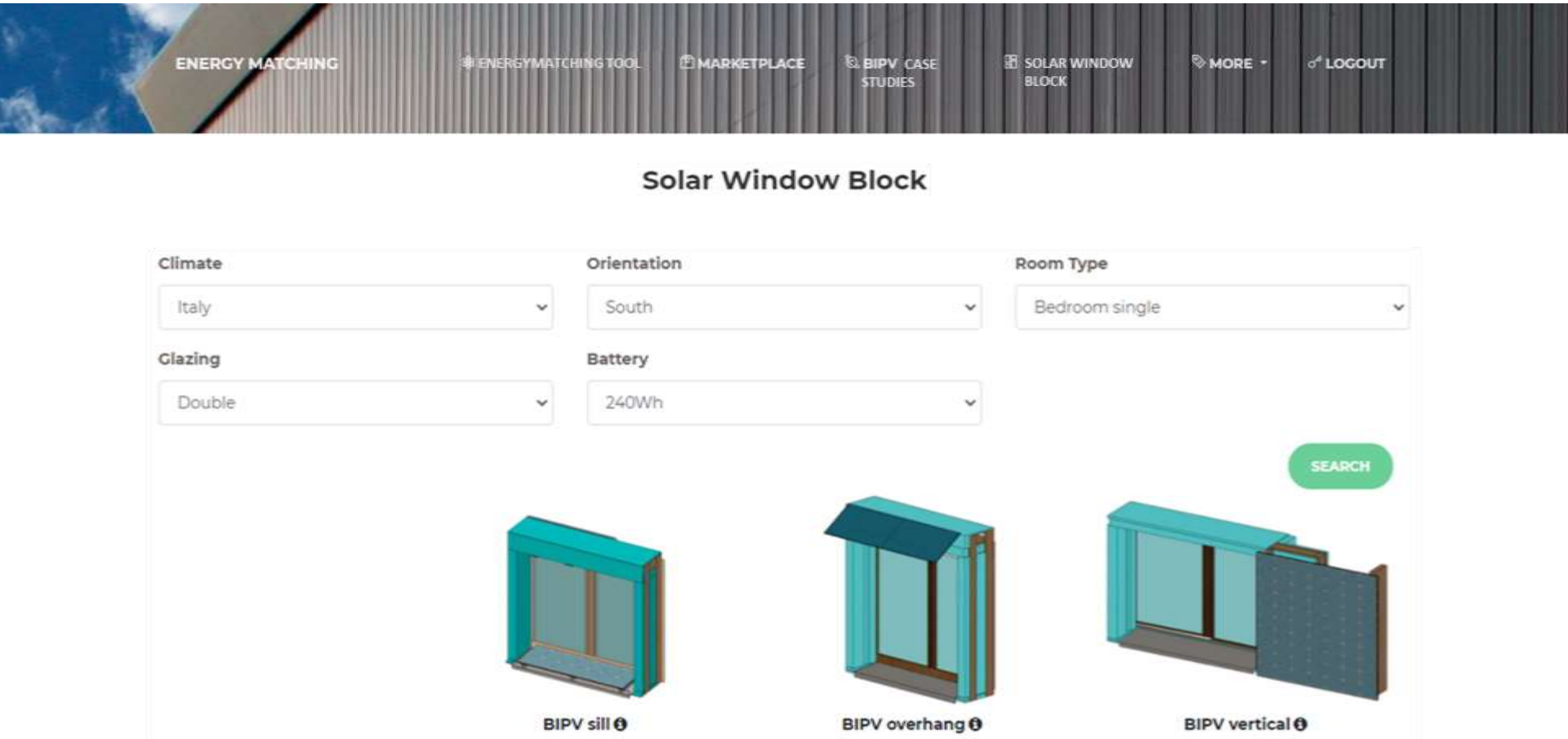
- Solar Window Block is an **autonomous prefabricated multifunctional window system** that integrates an insulating frame, a highly efficient window, a PV module, a shading system and a decentralized ventilation machine.

- The configurations are **results of simulations done within EnergyMatching project**

- **Filter selection**: climate, orientation, room type, glazing, battery

- **Performance indicators**: thermal performance, energy-matching between production and consumption, daylighting.

Solar Window Block



Marketplace

ONYX Multifunctional BIPV Solution

Tullips Click-&-Go COSMOS

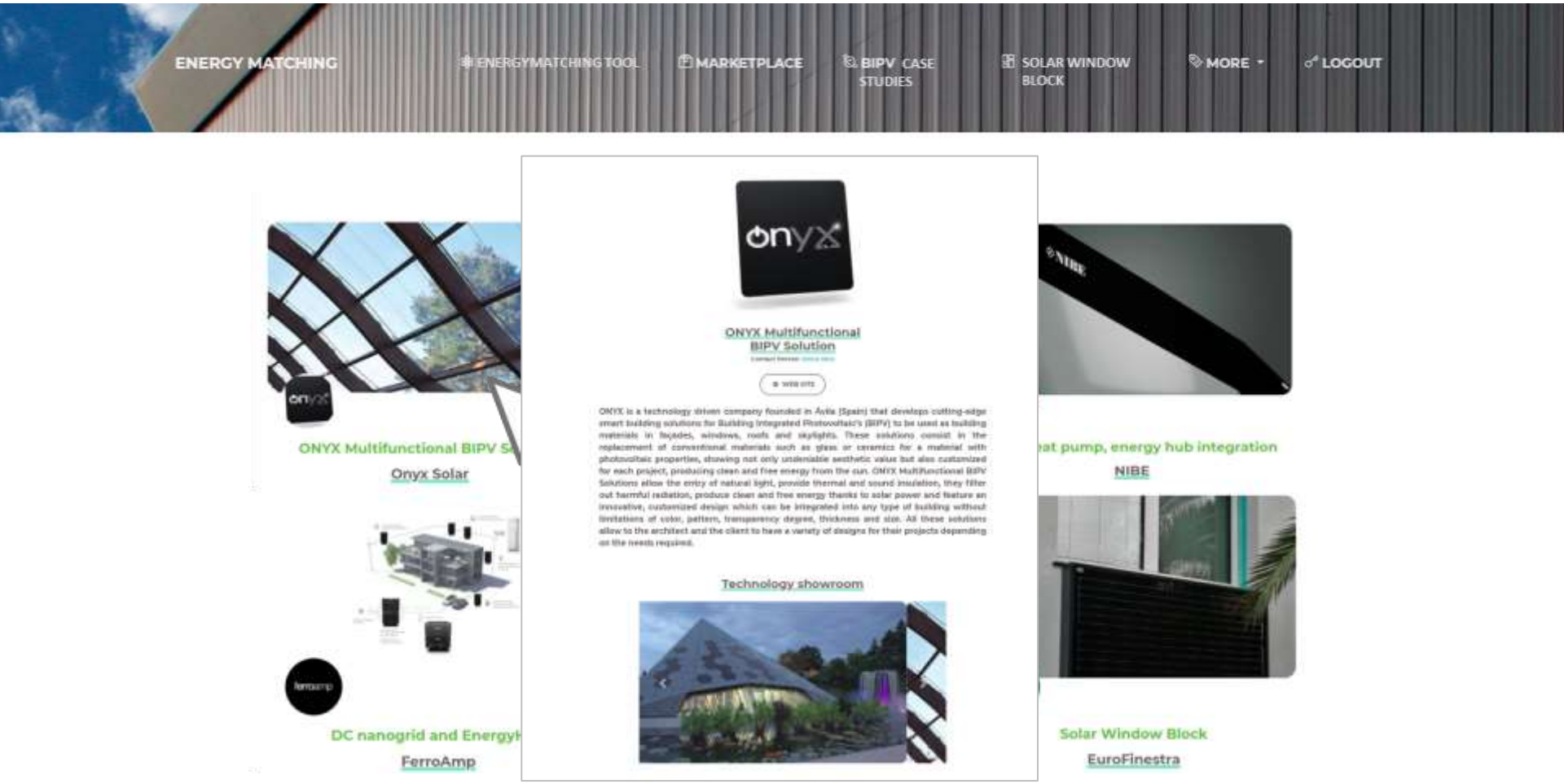
Marketplace

Key aspects

- It offers an **insight on the technologies** developed within the EnergyMatching project, **useful for the integration of Renewable Energy Sources** in buildings and districts

- It includes a brief **explanation, photos** of the products and **contacts to reach the technology providers**, so that users are directly connected to the industry

Marketplace



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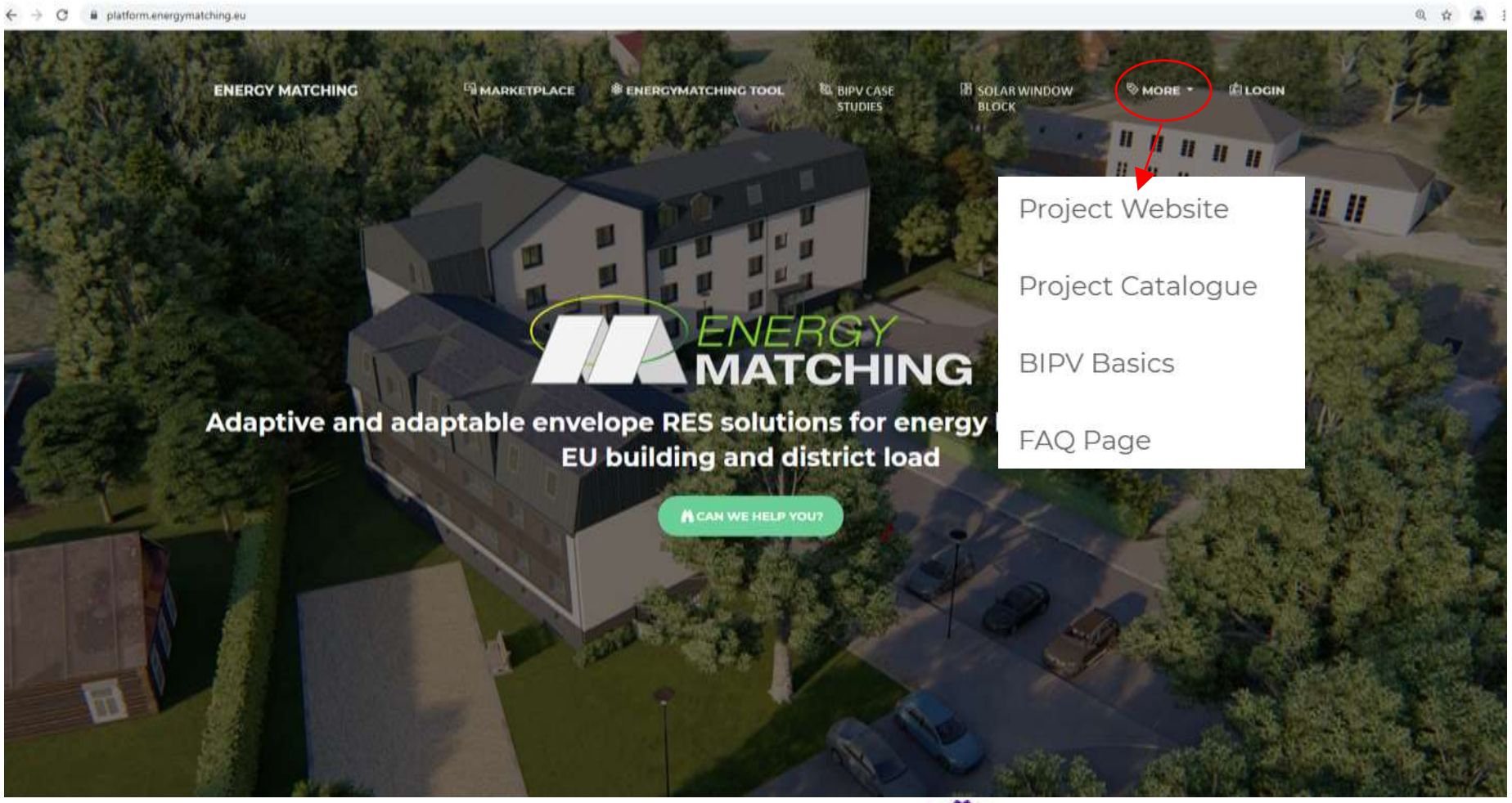

Conclusion

- The EnergyMatching Platform provides resources at **support of different stakeholders** who want to integrate Renewable Energy Sources in their built environment or just to know more about the topic
- It offers a set of **performance indicators** (energy-economic and environment related) allowing users to evaluate **several BIPV and Solar Window Block applications**
- It boosts the **network** among stakeholders and connects to the industry
- The EnergyMatching Tool is a useful instrument to apply since the **early design stages of buildings and districts, providing preliminary suggestions** for the later detail phases
- It considers the **energy sharing** but is not ready to evaluate Renewable Energy Communities scenarios

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Browse the EM Platform

and

try the EM Tool

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Thank you!

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