



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 Sources 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

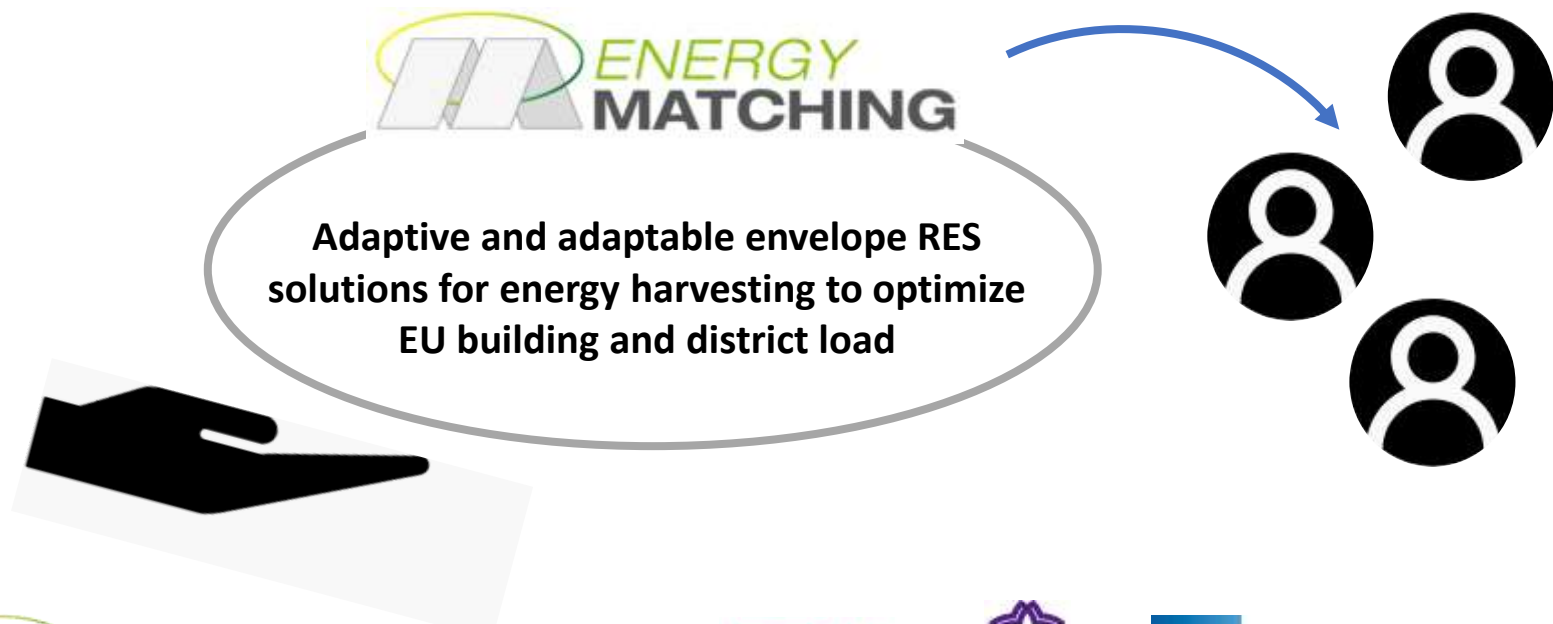
1. EnergyMatching Tool (i.e. optimization tool for PV in buildings)
2. EnergyMatching Platform
3. Versatile click&go substructure for different cladding systems
4. Solar windows package
5. Modular appealing BIPV envelope solutions
6. Renewable harvesting package to heat and ventilate
7. Building and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

EnergyMatching Platform

EnergyMatching Platform

Objective

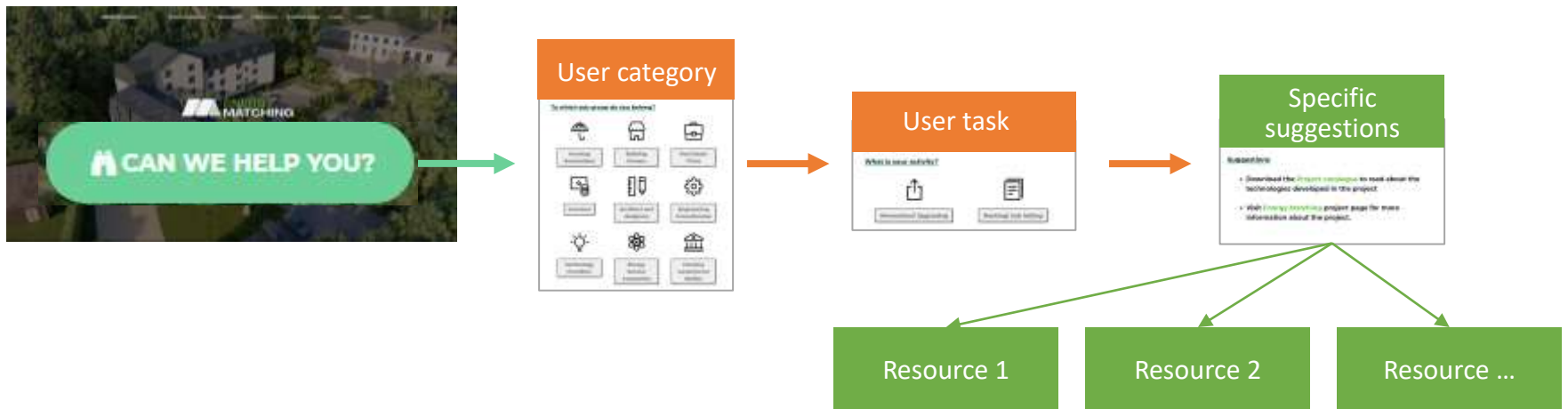
Offering EM resources to support external stakeholders in integrating RES in their built environment



EnergyMatching Platform

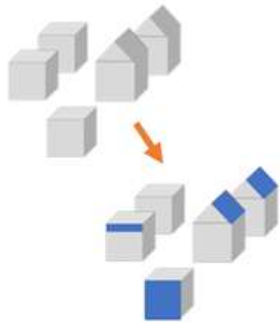
Strategy

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

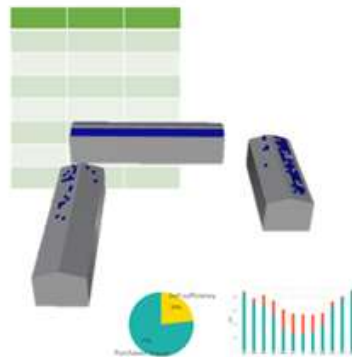


EnergyMatching Platform

Resources



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



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

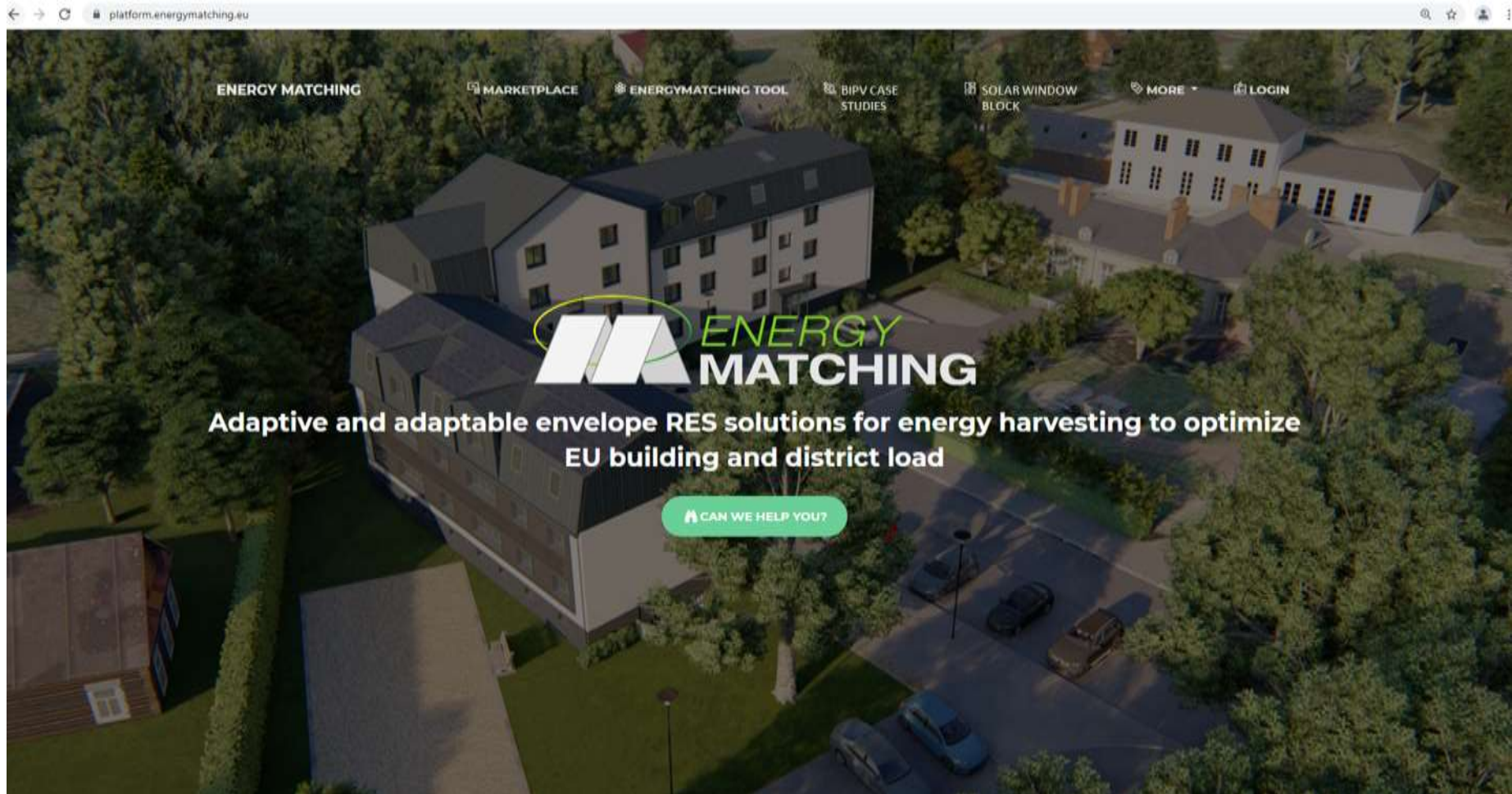


Repository of **Solar Window Block** configurations with performance data

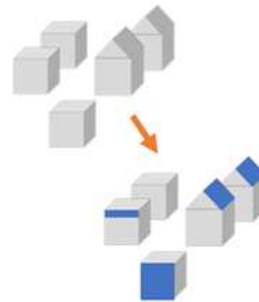


Marketplace showing **technologies for integrating RES** in buildings

EnergyMatching Platform



EnergyMatching Tool

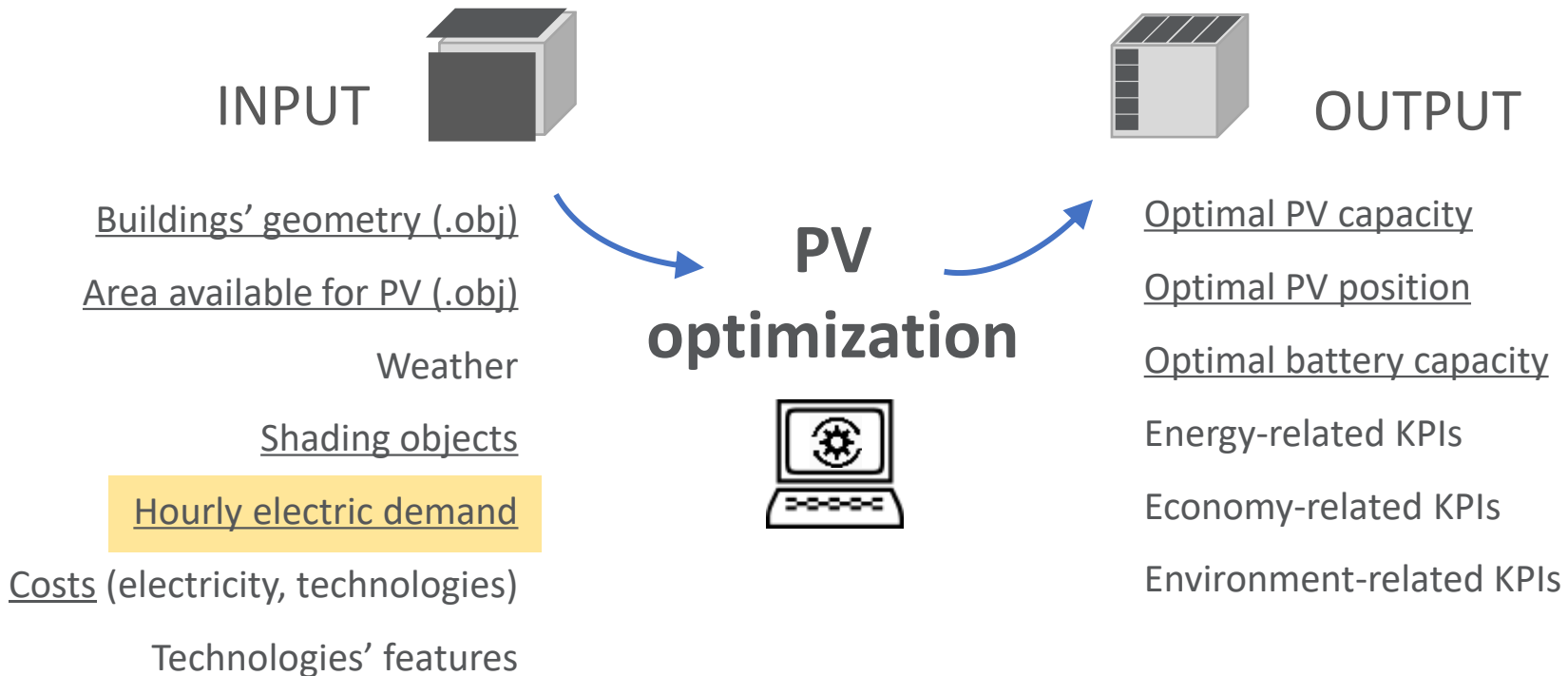


EnergyMatching Tool

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

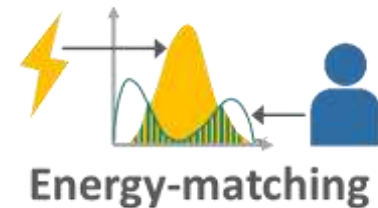
EnergyMatching Tool



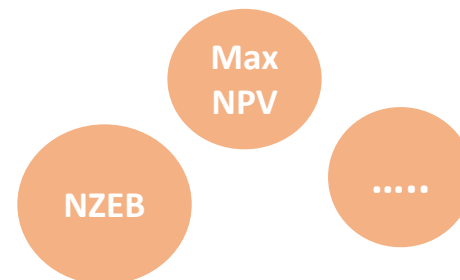
EnergyMatching Tool

Key aspects

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



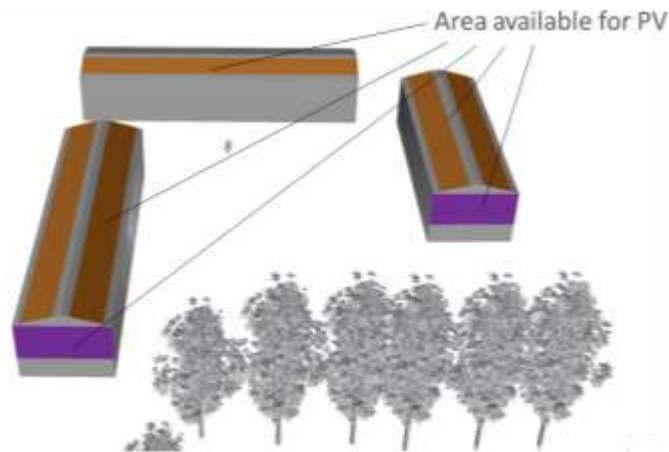
- It has different target functions: economy/energy/environment-related



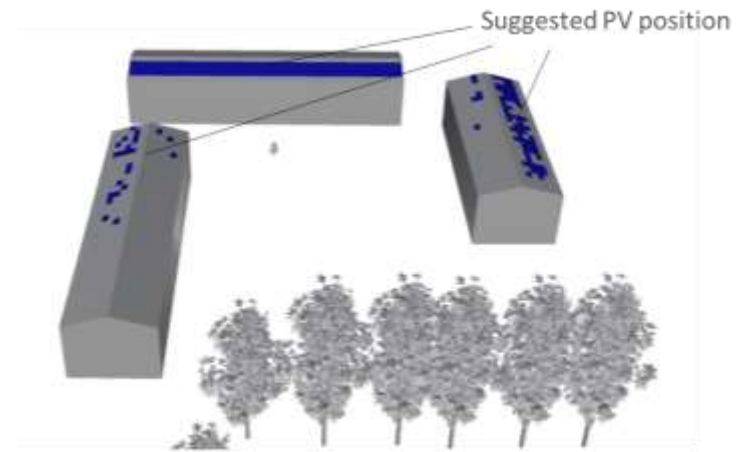
EnergyMatching Tool

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 %



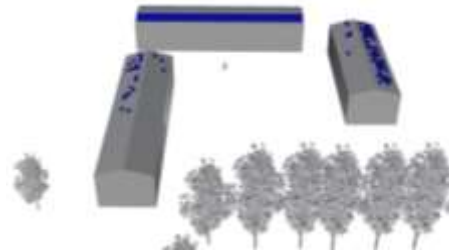
OUTPUT



EnergyMatching Tool



EnergyMatching Tool



EnergyMatching
Ludvika
PUBLIC

[VIEW 3D MODEL](#)

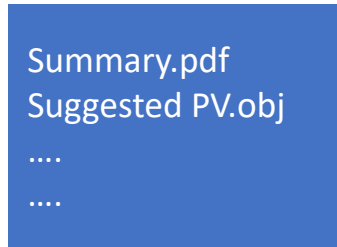
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Inputs

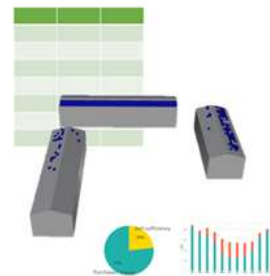
Outputs

Files



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

ENERGY MATCHING

ENERGYMATCHING TOOL

MARKETPLACE

BIPV CASE
STUDIES

SOLAR WINDOW
BLOCK

MORE

LOGOUT

BIPV case studies

Scale

Optimization type target

Time horizon for the evaluation (years)

Cumulative demand (MWh/year)

Supply

Centralized heating system
Centralized cooling system
Lighting of common spaces
Inhabitant preferences

FILTER

List view

Map view



Building 20th

- Building type: single building
- Time horizon: 25 year(s)
- Target: maximum NPV
- Supply: -



Building 15th

- Building type: single building
- Time horizon: 25 year(s)
- Target: maximum NPV
- Supply: -



Building 12th

- Building type: single building
- Time horizon: 25 year(s)
- Target: maximum NPV
- Supply: -



Building 16th

- Building type: single building
- Time horizon: 25 year(s)
- Target: maximum NPV
- Supply: -



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

ENERGY MATCHING

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MARKETPLACE

BIPV CASE
STUDIES

SOLAR WINDOW
BLOCK

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Solar Window Block

Climate

Italy

Orientation

South

Room Type

Bedroom single

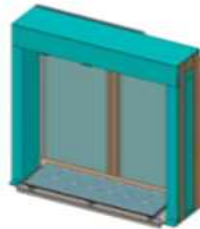
Glazing

Double

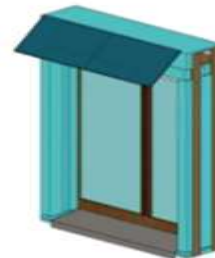
Battery

240Wh

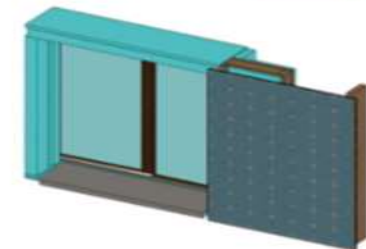
SEARCH



BIPV sill



BIPV overhang



BIPV vertical

Basic Data

THERMAL PERFORMANCE

Value = 0.01 | Baseline = 0.26

Value = 0.00 | Baseline = 0.26

Value = 0.01 | Baseline = 0.26

Marketplace



ONYX Multifunctional BIPV Solution



Tulip Click-s-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

ENERGY MATCHING

ENERGYMATCHING TOOL

MARKETPLACE

BIPV CASE STUDIES

SOLAR WINDOW BLOCK

MORE

LOGOUT



onyx

ONYX Multifunctional BIPV Solution

Onyx Solar



DC nanogrid and EnergyHub

FerroAmp




ONYX Multifunctional BIPV Solution

Compact Design - Onyx Solar

www.onyx.com

ONYX is a technology driven company founded in Avila (Spain) that develops cutting-edge smart building solutions for Building Integrated Photovoltaic's (BIPV) to be used as building materials in facades, windows, roofs and skylights. These solutions consist in the replacement of conventional materials such as glass or ceramics for a material with photovoltaic properties, allowing not only sustainable aesthetic value but also customized for each project, producing clean and free energy from the sun. ONYX Multifunctional BIPV Solutions allow the entry of natural light, provide thermal and sound insulation, they filter out harmful radiation, produce clean and free energy thanks to solar power and feature an innovative, customized design which can be integrated into any type of building without limitations of color, pattern, transparency degree, thickness and size. All these solutions allow to the architect and the client to have a variety of designs for their projects depending on the needs required.

Technology showroom




NIBE

Heat pump, energy hub integration

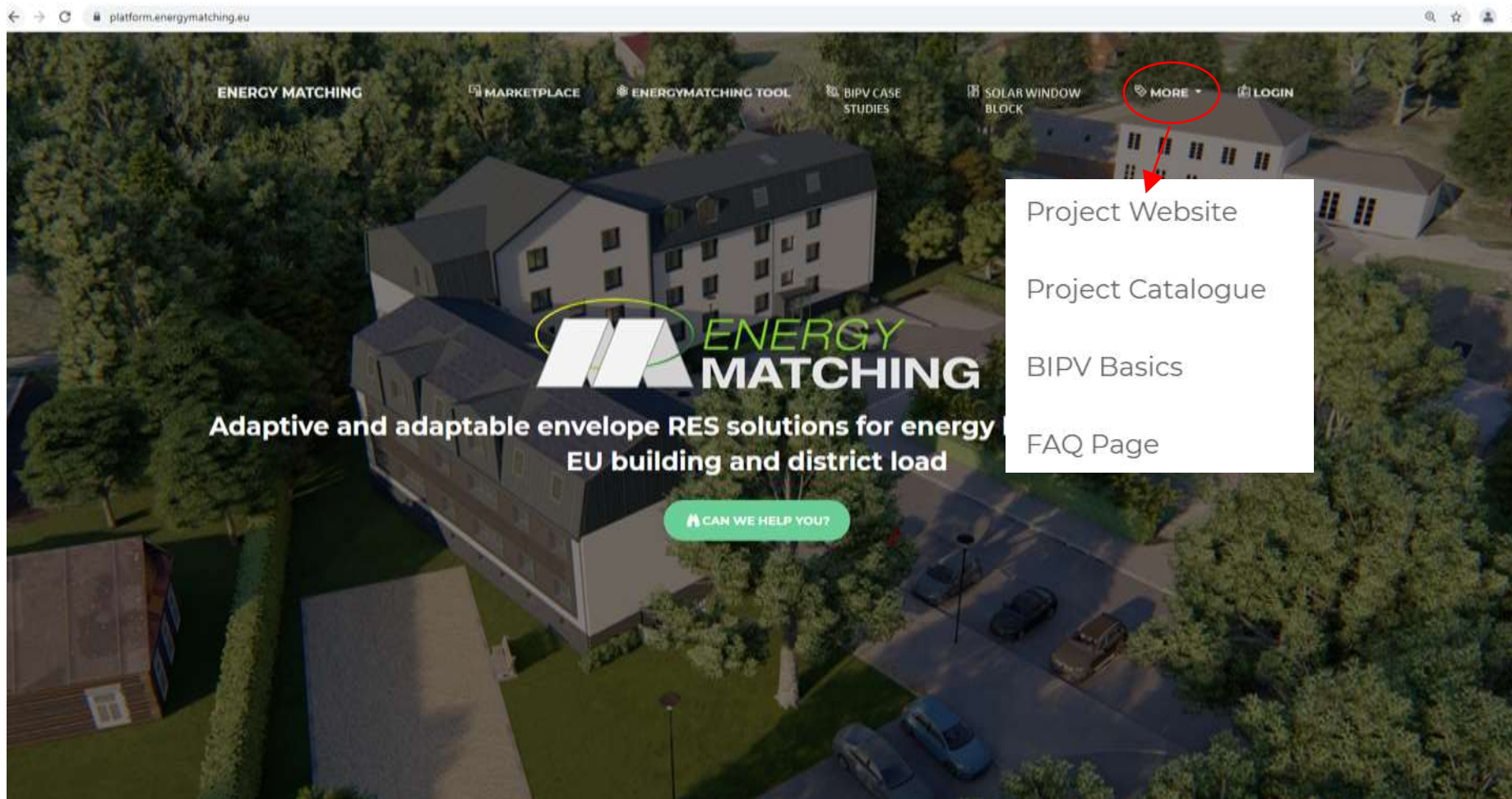
NIBE



Solar Window Block

EuroFinestra

EnergyMatching Platform



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

Browse the [EM Platform](#)
and
try the EM Tool





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Thank you!

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