



# THE ENERGMATCHING PRODUCT CATALOGUE

Detailing the products  
and solutions from the  
EnergyMatching Project

[www.energymatching.eu](http://www.energymatching.eu)

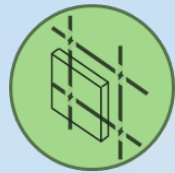
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# Product & Solutions OVERVIEW



**SOLAR WINDOW BLOCK** ... 3



**VERSATILE CLICK&GO  
SUBSTRUCTURE** ... 10



**BIPV CLICK&GO SYSTEM** ... 11



**RENEWABLE HARVESTING  
PACKAGE TO H&V** ... 13



**BUILDING & DISTRICT ENERGY  
HARVESTING SYSTEM** ... 17



**ENERGYMATCHING PLATFORM** ... 21



**ENERGYMATCHING TOOL** ... 25

# Solar Window Block

contributing partners:



# Solar Window Block

The Solar Window Block is an autonomous modular and flexible solution aimed at improving building energy efficiency and increasing indoor comfort, while also generating energy from a renewable source. The window block is a physical framework surrounding the window frame made of insulating materials, composite wood, metal supports and sealing bands. Its design can easily be varied depending on the window hole and the design needs, determining a very flexible solution. In addition, it can guarantee fast and correct installation, minimalization of thermal bridges, and is completely compatible with the rest of principle elements that form the window block: mechanical ventilation system, integrated shading system and integrated BIPV.



# Solar Window Block Concept

This prefabricated, autonomous and multifunctional window presents the following main features:

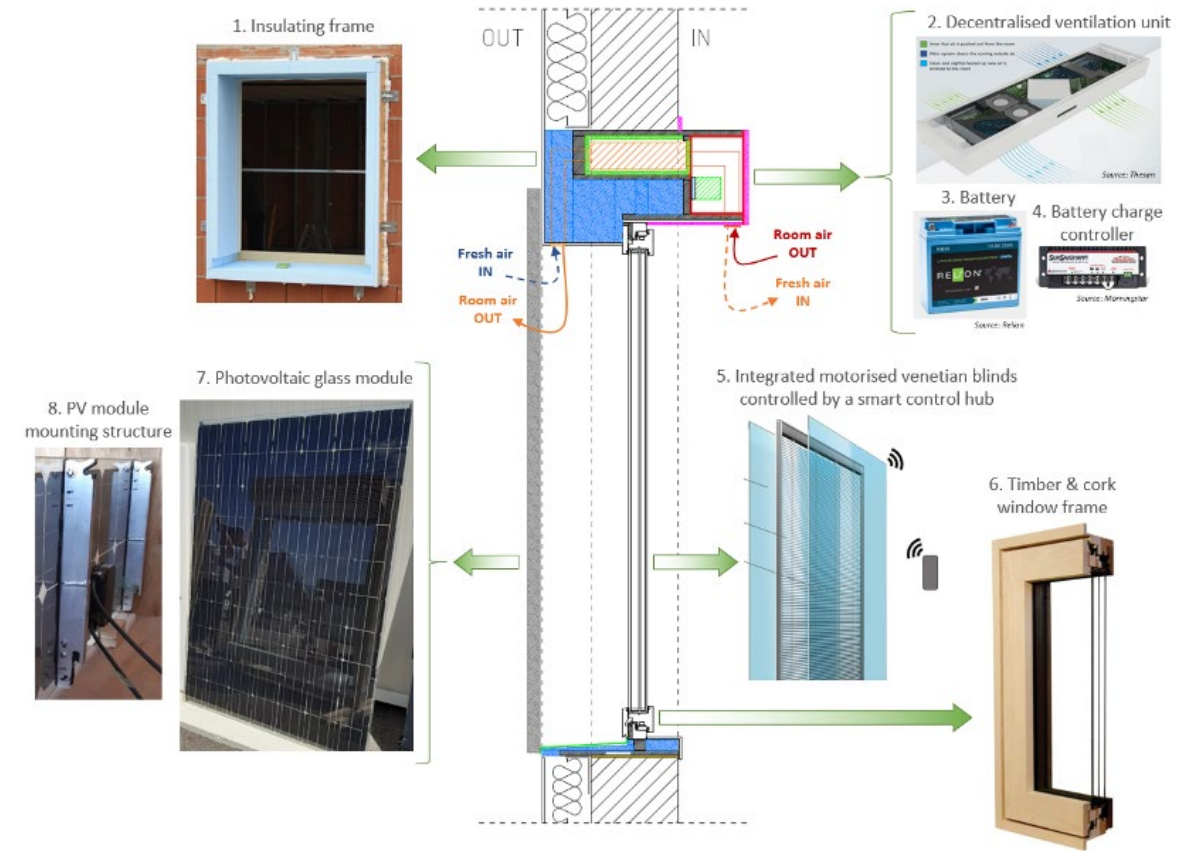
- Improvement of the building energy efficiency
- Improvement of internal comfort
- Easy and fast installation with lower disturbance to occupants
- Autonomous system with renewable energy source harvesting



# Solar Window Block Components

The EnergyMatching Solar Window Block is made up of several components when combined create an holistic and easily integratable solution. On the right, you can find a scheme pointing out its various components of the Solar Window Block and below the corresponding component descriptions.

1. Insulating frame made of XPS and timber reinforcing elements by Eurofinestra
2. Ventilation Machine with heat recovery (Thesan Aircase ES)
3. Battery
4. PV and battery charge controller: Maximum Power Point Tracker (MPPT)
5. Integrated, motorised and controlled shading blinds by Pellini
6. Timber and cork window ("Versatile") by Eurofinestra
7. PV glass-glass module by Onyx
8. PV module mounting structure ("Click&Go") by Tulipps



# Versatile Click&Go Substructure

contributing partners:



# Versatile Click&Go Substructure



A novel way for fast and easy installation of BIPV modules with the Click&Go solution: The PV panels can be installed by a single person and it can be used in every wind zone up to a height of 200 metres.

In EnergyMatching, several Click&Go prototypes have been tested at four demo-sites. The PV panel technology was developed by ONYX, with the installation system developed by TULiPPS.

The main features of the Click&Go solution are:

- Easy installation
- Metal substructure that allows for various PV integrations, sizes, module types and further integration forms.
- Takes into account heat and cold metal contraction
- Successfully tested and integrated at various demo-sites

The Click&Go BIPV facade is prefabricated with solar panels and delivered as a complete package. This allows for unprecedentedly short installation times with minimal risk of errors. An important functionality of the system is that each individual panel can be easily removed. This is essential for low maintenance costs. Another unique feature is that solar panels and traditional façade materials can be combined in a single mounting system.

The plug & play nature of the Click&Go system is part of its advanced design, which also enables easy replacement and removal. PV installers can now easily install BIPV installations.



# Versatile Click&Go Substructure

The Click&Go mounting rail system is designed to install PV laminates easily and aesthetically on a facade or a roof. Fitting pieces are available to fill in the layout of PV modules around windows and at the sides near the roof and the edges of the facade. It is the construction interface between the PV laminates and the construction wall/roof.

The Click&Go mounting system consists of following parts:

- The rear frame (including Click&Go connectors) that is glued to the rear side of the PV laminate. The connectors (at the four corners) can easily be snapped on the axles that are fixed to the mounting rails.
- The substructure of the mounting rail system that is fixed onto the construction wall or construction roof.



# BIPV Click&Go System

contributing partners:



# BIPV Click&Go System

The BIPV Click-&Go System is a combined EnergyMatching solution utilizing TULiPPS Click-&Go Substructure integrating BIPV glass-glass and/or composite modules by Onyx and Tecnalía.

- Composite modules on the roof are mounted overlapping each other (overlapping pitched roof system)
- Glass/glass modules on the roof are mounted flat (flat mounted pitched roof system)
- Parapet modules are mounted flat as facade mounting system (facade mounting system)
- Solar Window Block modules mounted with the same facade Click-&-Go system

At the Italian Demo-Site two different BIPV modules are used, the Onyx lightweight glass-glass BIPV module and the Tecnalía composite roof BIPV module (picture on the right).



## BIPV Click&Go System

The Lightweight composite BIPV is a monolithic, lightweight, colored composite BIPV module based on fiber reinforced composite materials and crystalline silicon. The composite technology in combination with the Click-&-Go substructure provides one of the lightest self-supporting BIPV technology in the market, with a weight as low as 5 [kg/m<sup>2</sup>] for 3 [mm] thickness without requiring of additional substrates providing the demanded mechanical resistance.



# Renewable Harvesting Package to H&V

contributing partners:



ferroamp



# Renewable Harvesting for Heat & Ventilation

Whether it's a cool winter day or a hot afternoon in the summer sun, we need a balanced indoor climate that allows us to have a comfortable living day regardless of the weather. The EnergyMatching renewable harvesting for heat & ventilation innovations provide our demonstration site buildings with cooling, heating, ventilation and hot water, creating a perfect indoor climate with minimal impact on nature.



# Renewable Harvesting for Heat & Ventilation INNOVATIVE TECHNOLOGY

The innovative heatpump technology combines different technical solutions working in synergy to provide heat and ventilation through an algorithm providing the most cost-effective use of energy. The heatpump heat source is pre-heated with the SolarWall technology. A DC network is used as electrical source for the heat pump. The connection to the FerroAmp energyhub optimizes the energy distribution. The heat pump controller communicates with the district energy harvesting system.



# Renewable Harvesting for Heat & Ventilation

## SOLARWALL HEATPUMP INTEGRATION

The SolarWall technology is a solar air heating system that uses the power of the sun to heat your building's ventilation air. It minimizes energy consumption, heating costs and carbon emissions throughout the heating season. It directly addresses one of the largest sources of building energy consumption: Indoor space and ventilation heating. SolarWall heating also allows buildings to increase their ventilation air without increasing their energy costs or carbon emissions.





ferroamp

# Building and District Energy Harvesting System

contributing partners:

**ferroamp**



# Building and District Energy Harvesting System

The EnergyHub converter, the heart of the EnergyHub system, is a unique invention. It has built-in features comparable to those of a router in a local data network. Instead of data, it regulates energy flows and gives you control over how energy flows between the DC grid and your local grid, which is connected to the national grid.

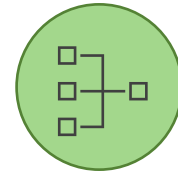
EnergyHub makes it possible to connect solar cells and batteries in a local DC grid, and controls energy between the different parts of it, regulating when energy is to be converted to and from AC. It acts as a bridge between these two grids and controls, balances and optimises flows automatically according to your needs.



# Building and District Energy Harvesting System

## ENERGYHUBS

The EnergyHub adapts capacity as required, even if your system needs to be adapted over time with more solar electricity, more batteries or one of the new functions we develop. An EnergyHub system makes you future-proof. The system connects all solar cells and batteries in a DC grid and adapt the conversion capacity to meet your needs with one or more EnergyHub modules. This allows you to adapt the system to suit a house, an apartment block, agricultural premises, commercial properties or industrial premises. EnergyHub replaces the traditional inverter for solar electricity and also replaces the battery converter. It is thanks to this unique two-way function that solar cells and batteries can operate all year round. The EnergyHub converter is both the brain and the executor at the same time.



### One system

Combines solar energy, storage and charging



### Phase balancing

Always the lowest main fuse



### Metering

High-resolution metering for dynamic system control



### Future-proof

Future-proof and scalable



### Two-way converter

Bridge between AC and DC grids



### Monitoring

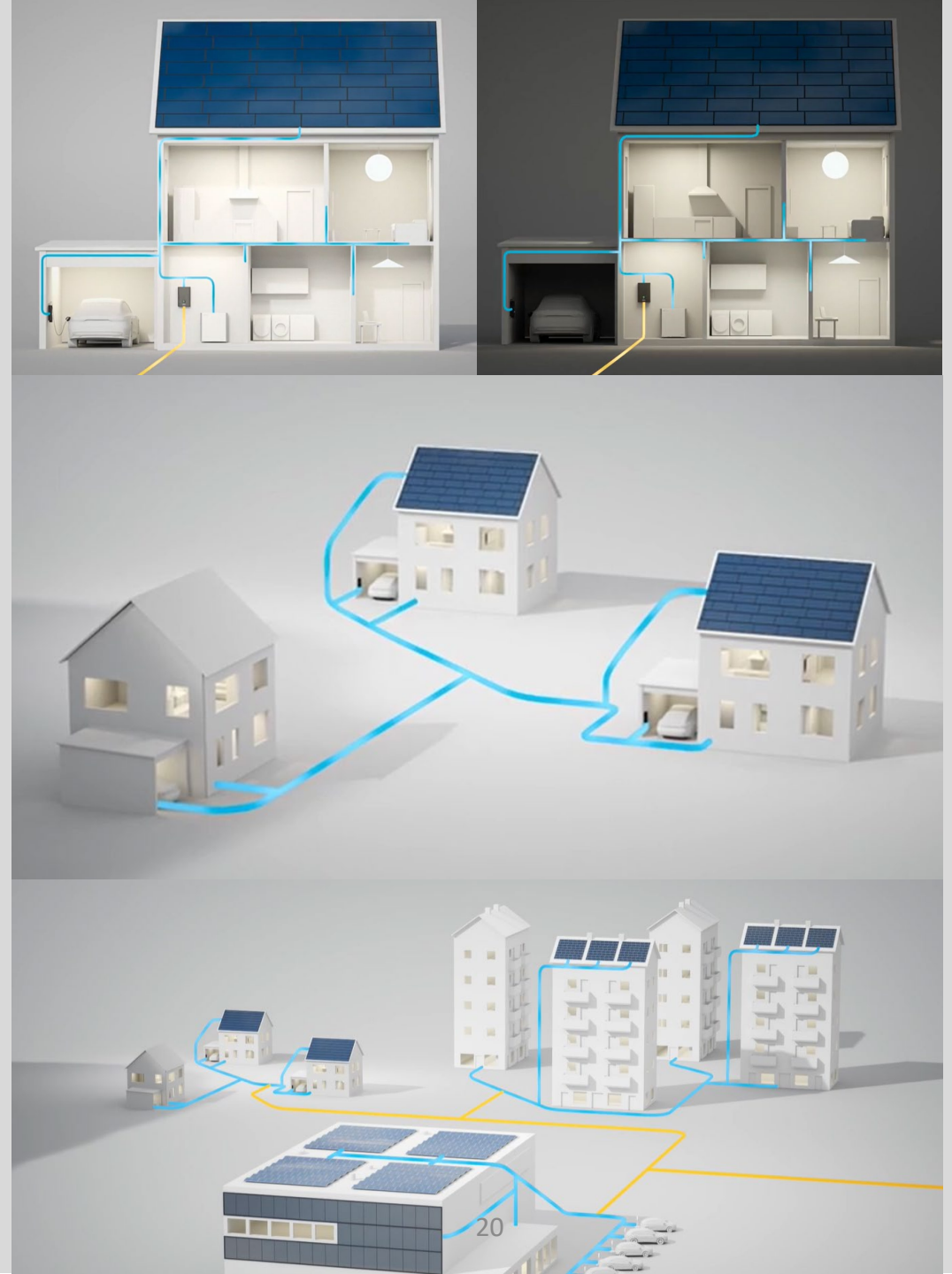
Cloud-based data analysis and visualisation

# Building and District Energy Harvesting System

## ADVANCED ENERGYFLOW CONTROL ALGORITHMS

ACE – Adaptive Current Equalisation, enables more efficient utilisation of a property’s grid connection. EnergyHub transfers energy between phase transmission lines to increase the space between the capacity of the main fuse and loads in the building. This extra capacity can either be used to reduce the size of your main fuse or to increase the electrical load, for example, by installing more efficient and faster chargers for electric vehicles.

PowerShare makes it possible to share energy and power resources between several properties via a local DC grid. Sharing the “best sunroofs” allows you to increase your own use of energy produced, distribute the benefits of an energy storage solution between several buildings and gain control over power consumption in the connected buildings.



# The EnergyMatching Platform

contributing partners:

**eurac**  
research

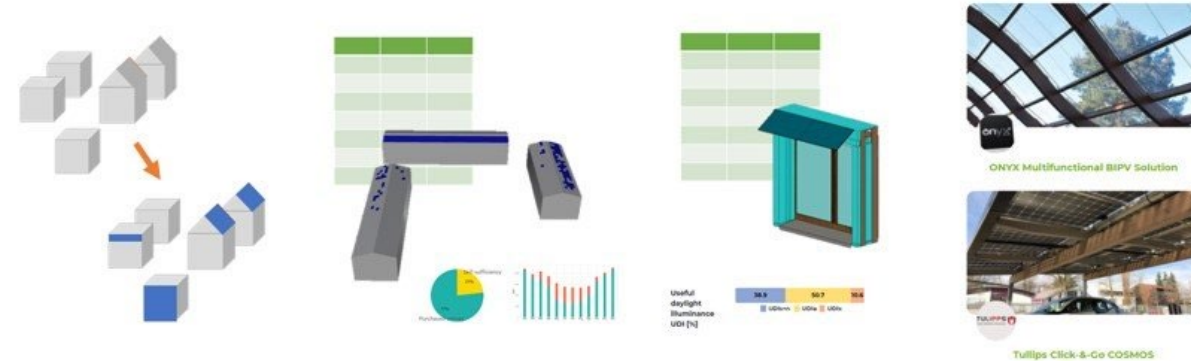
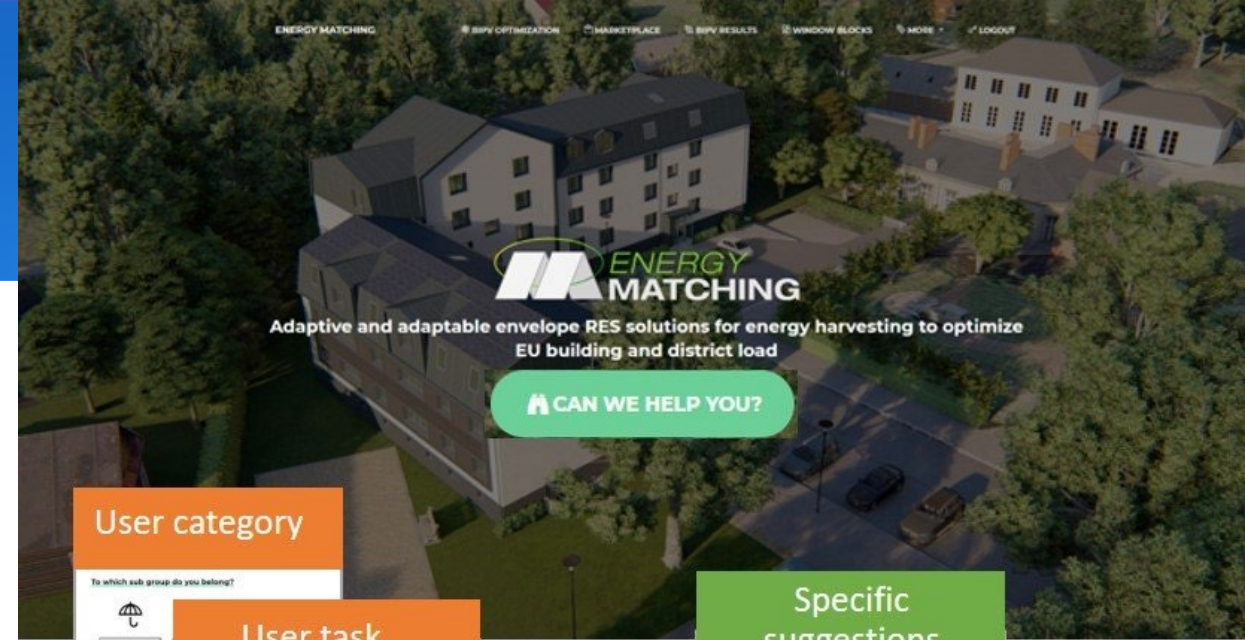
**R2M**  
RESEARCH TO MARKET  
SOLUTION



**WIP** RENEWABLE  
ENERGIES

# EnergyMatching Platform

The online EnergyMatching Platform aims to support designers and other professionals in maximizing the RES harvesting in their built environment. Through the integration of a matchmaking tool, it guides users to meet their own interests and potential exploiting resources developed within the project. The EnergyMatching Platform suggests optimal configurations of BIPV systems and provides inspiring examples of active building skin solutions (BIPV and Solar Window Block). The Platform also links users to the EnergyMatching technology providers, establishing an important connection with the industry sector.



# EnergyMatching Platform

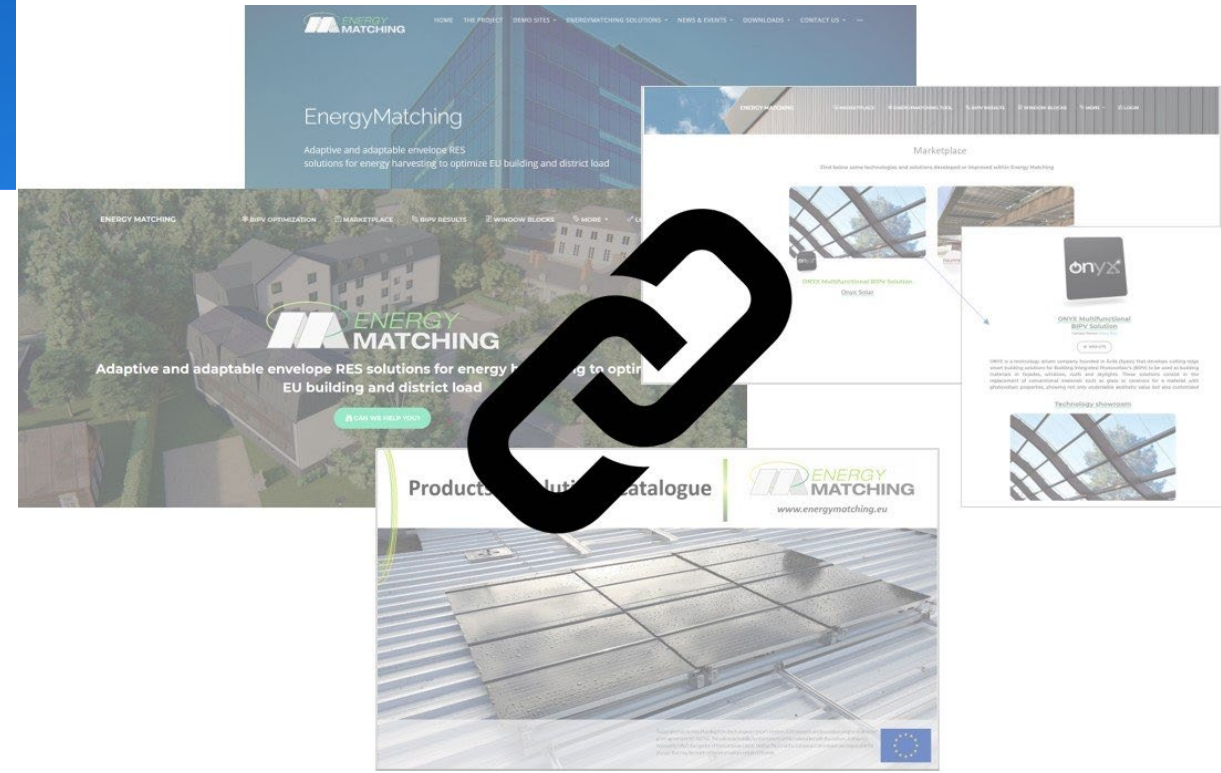
## EM-TOOL, BIPV CASE STUDIES, MARKETPLACE, AND MORE

### EnergyMatching Tool

On the Platform, the EnergyMatching Tool is available for users that are interested in optimizing their own BIPV system design. With relevant Key Performance Indicators provided, the building's performance is analyzed. The tool was developed and tested within the EnergyMatching project for the preliminary design of BIPV systems installed in demo buildings. It can be run the users after registering.

### Public repository

The public repository provides inspiring examples of optimized BIPV installations and Solar Window Block configurations. A list of KPIs (energy, economy, environment, comfort-related) allows users to have an interesting insight into the solutions' performance. On the top of the pages, a filter selection helps users browsing into the two sections (BIPV and Solar Window Block).



**Marketplace**  
Available technologies  
and products



**EnergyMatching  
Tool**  
Tool available to optimize  
your BIPV system



**BIPV Results**  
Public results of BIPV  
optimizations



**Solar Window  
Block Results**  
Public results of Solar  
Window Block  
simulations

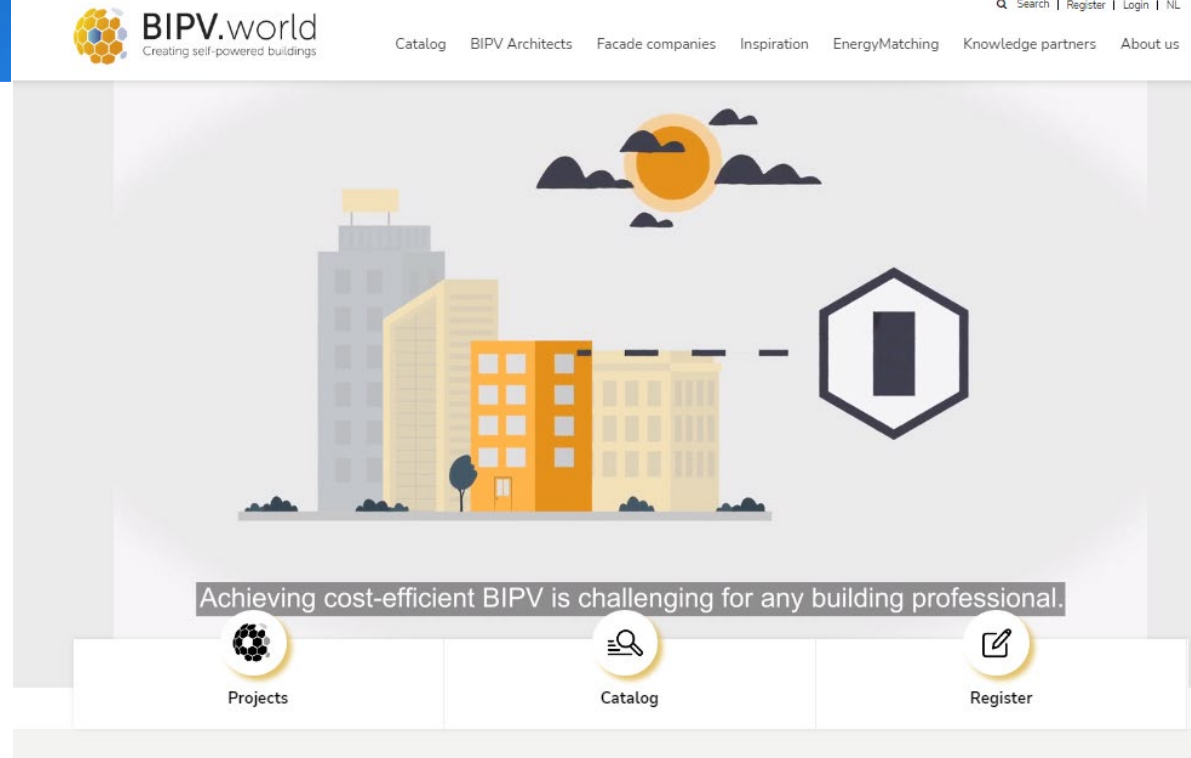
# EnergyMatching Platform

## BIPV.WORLD

BIPV.world is the inspiration, design and collaboration platform for architects, designer, facade builders, and construction professionals.

This digital platform enables every designer to create aesthetic, practical, and robust facade designs with integrated solar panels according to the latest BIM standards. Another outcome is quickly available information about costs, earnings and return on investment (ROI) as a function of design choices.

The BIPV.world platform helps architects, designers, facade builders, and construction professionals excel and distinguish themselves from their competitors by offering the best BIPV solutions in industry, combined with interesting business cases that can be used to help convince prospective customers.



**BIPV.world**  
Creating self-powered buildings



# The EnergyMatching Tool

contributing partners:

**eurac**  
research

# EnergyMatching Tool

The tool is based on the “energy-matching” between building consumption and photovoltaic production, evaluating the quantity of electric energy that is directly self-consumed. The energy-matching is optimized by an algorithm which suggests the photovoltaic configuration most suitable according to the selected objective (economy, energy or environment-targeted). Over than the building consumption, the tool considers a set of other inputs: geometry of the buildings, surfaces available for photovoltaic installation, weather conditions, shading effect of close and far objects, technologies’ features (e.g. costs, dimensions, efficiency, degradation), cost of electricity bought and sold to the grid.

PLACE

ENERGYMATCHING TOOL

BIPV CASE STUDIES

SOLAR WINDOW BL

## Sign in

**Username**

**Password**

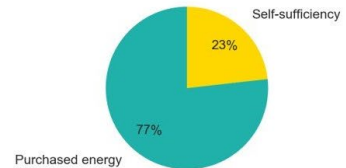
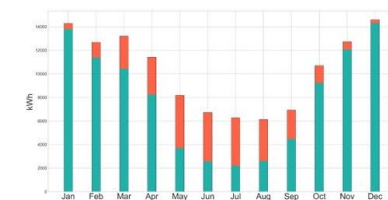
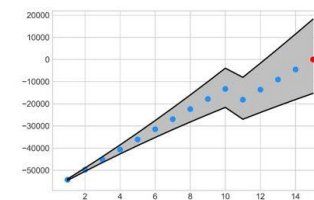
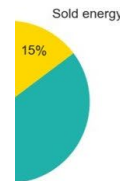
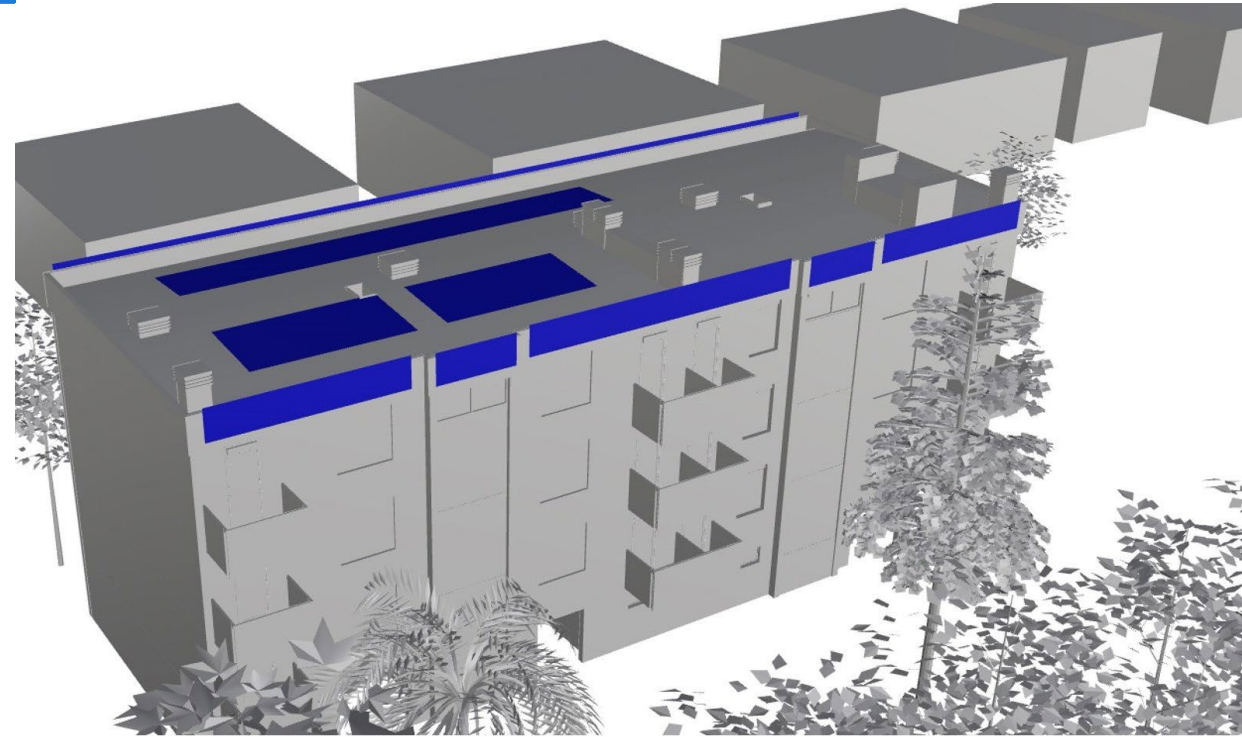
LOGIN

**Note: If you don't have credentials, you can contact [Eurac](#) or [R2M](#) to request the access.**

# EnergyMatching Tool

## APPLICATION ON REAL-LIFE STUDIES

The EnergyMatching Tool was applied to the project demo buildings (Italian, French, Swedish, Dutch), providing a preliminary design of the photovoltaic systems. It suggested the optimal configurations and gave a precious insight in the systems' expected performance. A set of Key Performance Indicators are provided (e.g. energy self-consumed, coverage of energy demand, payback time, Net Present Value, Levelized Cost of Electricity, CO2 emissions).



# Contact INFORMATION

## Project Coordinators:

David Moser     [david.moser@eurac.edu](mailto:david.moser@eurac.edu)

Laura Maturi     [laura.maturi@eurac.edu](mailto:laura.maturi@eurac.edu)

Sara Giona     [sara.giona@eurac.edu](mailto:sara.giona@eurac.edu)

Eurac Research, Institute for Renewable Energy

Via A. Volta 13/A

39100 Bolzano, Italy

**eurac**  
research

# Disclaimer

## EnergyMatching project

Building-integrated photovoltaic technologies and systems for large-scale market deployment.

**EnergyMatching** is a European funded project that recognizes the vast potential of Building-integrated photovoltaics and provides robust BIPV technology solutions that comply with the key demands from the market. Essentially, related to the flexibility in design and aesthetics considerations, lack of tools integrating PV and building performance, demonstration of long-term reliability of the technology, compliance with legal regulations, smart interaction with the grid and cost effectiveness.



Acknowledgements.

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