

Adaptable and adaptive RES envelope solutions to maximize energy harvesting and optimize EU building and district load matching

The Project

EU energy market is transforming and shifting from centralised, fossil-fuel based national systems towards a **decentralised, renewable, interconnected and variable system**. In view of this situation, Energy Matching's objectives are:



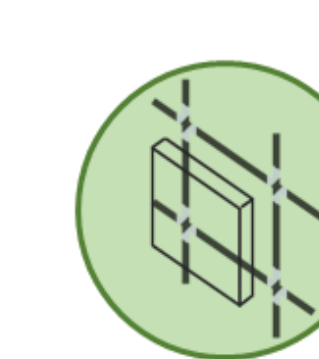




- I. **Definition of adaptive envelope solutions to maximize exploitation of solar energy** at building level focused on the renovation of EU residential buildings.
- II. **Integration of the energy harvesting solutions into the building and district energy concept**, developing load match aggregation strategies, energy harvesting management systems and optimization tools.
- III. **Geocluster solutions and replicate their potential** by developing tools and strategies to ensure applicability and optimal use of solutions in different geographical areas.

-  **H2020 PROJECT**
-  **CONSORTIUM: 17 PARTNERS**
-  **PROJECT COORDINATOR: EURAC**
-  **7 EUROPEAN COUNTRIES INVOLVED**
-  **DURATION: 54 MONTHS**
-  **01/10/2017 – 31/03/2022**



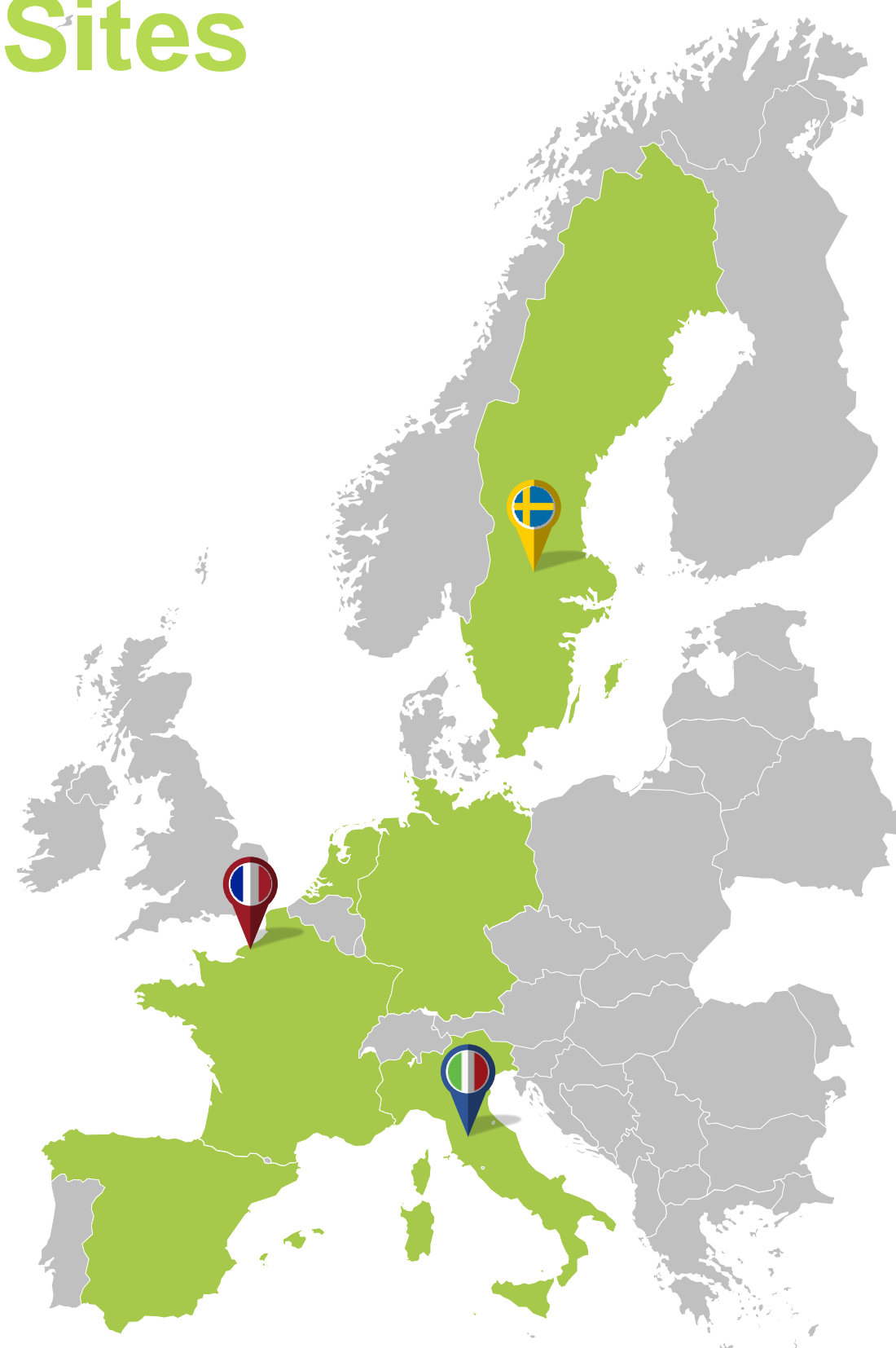
Results

EnergyMatching will optimally combine and demonstrate a complete **portfolio of robust solutions** to efficiently capture the on-site available renewable sources through adaptive active building skin technologies and to effectively use the locally produced energy within the building and district concept.

<p>R1</p>  <p>Energy harvesting business enhancer platform</p>	<p>Set of simulations on EU building/district archetypes populating a repository that will be a source of inspiration for possible replication</p>	<p>R2</p>  <p>EnergyMatching optimization tool</p>	<p>Software enabling the best matching between the building load profiles and the local RES-based energy production, allowing for the selection and sizing of the EM solutions</p>	<p>R3</p>  <p>click&go substructure</p>	<p>System approach for flexible interfacing between plate materials (both active, such as PV, and passive) and a building. It is adaptable to a wide variety of envelope typologies</p>
<p>R4</p>  <p>Solar windows package</p>	<p>The Window Monoblock consists of a prefabricated window with an adaptive automatic shading, a ventilation unit and integrated PV modules (as overhang, sill or shutter)</p>	<p>R5</p>  <p>Modular appealing BIPV</p>	<p>Glass-glass modules have been developed based on c-Si and a-Si technologies. The project is also working on the development of opaque lightweight composite BIPV modules</p>	<p>R6</p>  <p>Renewable harvesting package to heat & ventilate</p>	<p>Pre-heated air from the energy harvesting elements on the building (such as the SolarWall) will be used as low temperature heat sources for variable speed heat pumps</p>
				<p>R7</p>  <p>Energy management system</p>	<p>The electricity hub(s) will be responsible for the management of the electricity supply and storage, controlling the interaction with the external parts (grid, PV supply, loads) as well as the hubs in the other buildings</p>



Demonstration Sites



	1. Résidence Emile Hauduc France (1969)	2. Comune di Campi Besenizio Italy (1984)	3. Ludvika Sweden (1973)
Lot size	1643 m ²	2.800 m ²	4.488 m ²
Façade area	2.146 m ²	1.100 m ²	2146 m ²
Roof area	528 m ²	360m ²	1750 m ²
Estimated Energy Consumption	265 kWh/m ² /year	145~175 kWh/m ² /year	170 kWh/m ² /year

Expected impact

- ✓ **Reduced cost** (by more than 20%) of manufacturing, installation and operation of energy harvesting technologies
- ✓ Demonstrated **replicability** that will result in the acceleration of the integration of RES
- ✓ Cost-effective solutions supported by advanced **economic and business models for investors** including payback period below 10 years
- ✓ **Maximisation of RES generation**, demand coverage and optimal integration of RES with the energy grids
- ✓ **Market penetration** of effective, modular, robust and easy to integrate energy harvesting solutions
- ✓ **Revitalization** of the EU construction / energy harvesting sectors and **reduction of GHG Emissions**
- ✓ **Improved IEQ** with optimal control and natural sources exploitation



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