



Turning solar energy into community power

Digitalizing Community-Integrated PV Systems for
Smart, Inclusive and Grid-Ready Energy
Communities

The challenge

From Passive PV to **Active Community Assets**

Photovoltaic systems across the Mediterranean remain underutilised, disconnected from grids, communities, and markets. PVSmile transforms these passive installations into flexible, community-level assets that are fully integrated into energy grids using cutting-edge digital technologies.

PVSmile delivers data-driven, value-added energy services to network operators, aggregators, ESCOs, PV manufacturers, developers, and O&M providers, while empowering citizens and energy communities.

Three pillars



**Community
Empowerment**



**Smart
Integration**



**Sustainable
Impact**

What PVSmile delivers



GenAI-based Digital Twin

Hierarchical coordination of energy communities with the grid for real-time optimisation and scenario planning.



Blockchain Marketplace

Energy Data Space-compliant DLT marketplace for P2P asset trading and PV-community orchestration.



Smart Grid Readiness Index

Assessment framework with MCDA tools to build consensus among diverse energy community stakeholders.



Smart Hierarchical Control

Multi-level strategies for PV converters, inverters, and substations with advanced sensors and AI.



PV Lifecycle Management

Data-driven tools for optimal planning, construction, operation, and end-of-life management.



Secure PV Data Space

Cybersecurity, semantic interoperability, and IEEE 2030.5-compliant standardised data exchange.

The challenge

9 Countries Across the Mediterranean

PVSmile operates with 28 partners through a three-tier model: Front Runners host full-scale pilots, EU Early Adopters replicate and adapt, and Non-EU Early Adopters extend impact beyond Europe.

Pilot Italy

Developing digital tools for energy communities, testing smart control and data-driven services to strengthen grid resilience and energy efficiency.

Pilot Spain

Testing digital tools for energy communities, testing smart control and data-driven services to strengthen grid resilience and energy efficiency.

Pilot Portugal

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Pilot Morocco

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Pilot Germany

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Pilot Slovenia

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Pilot Türkiye

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Pilot Greece

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Pilot Tunisia

Testing digital tools for energy communities, testing smart control and data-driven services to strengthen grid resilience and energy efficiency.

On the ground

01 Real-World PV-Community Pilots

Testing digital tools, smart control, and marketplace services with real energy communities and DSOs.

02 Leadership Programme

Capacity building and knowledge transfer to enable wide replication across the Mediterranean.

03 Policy Recommendations

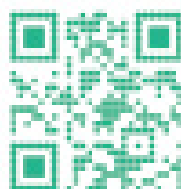
Evidence-based guidance for regulators on community PV, grid flexibility, and data governance.

04 Circular Economy Models

Business models for PV reuse, traceability, and inclusive incentives mechanisms.



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 PVSmile Project

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Meet the partners



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Disclaimers



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