

Seamless-PV drives the implementation of new integrated photovoltaic (IPV) solutions in different market sectors. The objective is to develop advanced manufacturing equipment, processes and digitalisation strategies focusing on glass-glass lamination as well as lightweight composite and polymer-based technologies.

Facing at real industrial environments and different market demands and opportunities, Seamless-PV sets up six pilot line levels and 11 different IPV demo cases across Europe, divided between integration in noise barriers, buildings, electric vehicles, and agriculture.

Agri-PV: A Promising Future for Europe

Agrivoltaics is seen as an extremely promising and transformative segment for Integrated Photovoltaics (IPV) in Europe. This is due to its unique ability to combine food and energy production on the same land area. It offers significant advantages to farmers, including crop and livestock protection from extreme weather events and the generation of additional income. The study from Becquerel Institute - “IPV market potential and comparative long-term impact scenarios” - sheds lights on this promising sector.



▲ A pilot Agri-PV site in Bolzano (Italy), Symbiosyst project

The methodology is divided into two main sections:

Technical Potential

Gross Technical Potential: This represents the entire Utilized Agricultural Area (UAA) in the EU (27 countries + Switzerland), estimated at over 155 million hectares in 2020 and assumed to remain constant until 2050.

Realistic Technical Potential: This is derived by excluding areas unsuitable for AgriPV installations, including:

- Protected agricultural zones or protected landscapes (approximately 26.1% of EU territory).
- High Nature Value (HNV) farmlands, which are important for biodiversity and traditional farming systems.
- Prohibitive land due to excessive slopes or frequent flooding (approximately 6% of the territory).

Economic Technical Potential: This further filters out areas with low photovoltaic yield (horizontal global irradiation below 876 kWh/kWp/year, affecting parts of Ireland, Sweden, and Finland) and crops unsuitable for AgriPV (e.g., energy crops, due to physical or inherent incompatibility). After these exclusions, the economic technical potential amounts to **76.6 million hectares**.

Specific Market Potential

The Total Addressable Market (TAM) for AgriPV is considered equivalent to the economic technical potential. The innovation diffusion model (S-curve) is applied to describe the pattern and speed of innovation adoption in the market.

Three scenarios were defined to reflect the impact of policies and regulations on agrivoltaics:

- Loose regulation scenario: Does not prioritize degraded land or specific crop selection.
- Medium regulation scenario: Includes prioritization for degraded land (not LMI classes 0 and 1).
- Strict regulation scenario: Requires both prioritization for degraded land and specific crop selection.

Power density (MWp/ha) varies by scenario, influencing installed capacity.

Results are presented for three main crop categories: arable land, permanent crops, and permanent grasslands.



▲ Aerial view of the same pilot site

Key Results on Cumulative SAM Capacity

By 2030: AgriPV could reach a cumulative capacity between 62 GWp (strict scenario) and 252 GWp (loose scenario).

By 2050: The cumulative potential expands significantly, ranging from 1,424 GWp (strict scenario) to 3,289 GWp (loose scenario).

Annual Market: to achieve 1 TWp by 2050, an annual market of over 50 GWp/year would be necessary starting from 2035.

Distribution by Crop Type: although arable land accounts for a significant portion of the surface area, permanent grasslands represent the majority of the capacity-based potential. This is because AgriPV systems on permanent grasslands can be denser, while those on arable land and permanent crops are more spaced out to ensure light for crops.

Role in Climate Goals and Sustainability

AgriPV holds unprecedented potential to advance the EU's climate, energy, and agricultural objectives. It could contribute to covering up to 42% of the EU's 600 GW solar target by 2030 under REPowerEU. It demonstrates a 75% reduction in CO₂ emissions compared to grid electricity. Its greatest advantage is optimizing land use, directly addressing land-use conflicts and ensuring the continuity of agricultural activity and food production.

Challenges and Importance of Regulation

Increasing competition for land use and concerns about "alibi farming" (where energy production overshadows agricultural activity) have led to growing opposition and a demand for clear regulatory frameworks. This underlines the importance of adequate rules able to mitigate land-use conflicts.

Regulatory uncertainty threatens AgriPV's potential. "Loose" policies risk enabling "alibi farming," while "strict" regulatory frameworks could impede the achievement of photovoltaic deployment targets. Inclusive policy support and increased market awareness are essential to fully unlock AgriPV's potential. Good practices and virtuous case studies are extremely important for demonstrating the viability of Agri-PV solutions across Europe. The pilot site that will be developed by AGRI-TERRA in the context of SEAMLESS-PV will be another step forward in this direction.



▲ Ground view of the same pilot site



LEARN MORE

If you want to learn more, check out all the **materials** and **results** available on seamlesspv.eu



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