



Bringing forward Integrated Photovoltaics solutions:

12 months of progress in the Seamless-PV project

About the project

Seamless-PV is a Horizon Europe project having the objective of developing new advanced manufacturing equipment, processes, and digitalization strategies focussing on glass-glass lamination as well as lightweight composite and polymer-based technologies related to the Photovoltaic sector. Seamless-PV will set up six pilot lines with 11 different demonstration sites of integrated PV solutions. These will be in the field of Photovoltaic Noise barriers (PVNB), Building integrated PV (BIPV), Agriculture (AGRI-PV) and Vehicle integrated PV (VIPV).

1. Manufacturing Equipment

During the first year of project's activities, partners working on the development of new manufacturing equipment, led by Mondragon Assembly, have successfully defined the 6 machines to be used in the production of new IPV products.

Following the definition phase, work on the 6 new machines has begun, following the successive steps indicated below:

1. Draft design
2. Design in detail
3. Purchase phase
4. Assembly
5. Set-up
6. Validation



The first prototype realized by Monragon Assembly

Mondragon Assembly has successfully validated the prototype of the prelamination machine whose final user will be CEA.

In the next 6 months, partners will define 2 new machines for the VIPV applications. As for the other 4 machines (Tabber stringers of different kind, pre-lamination machine and Bussing machine), at least one will reach the validation phase.



2. Pilot lines and demo cases

The realization of the machines described above will be instrumental for the realization of the 11 demo cases. These demonstrations will include the installation, monitoring and evaluation of different key aspects. During the last 12 months, several new manufacturing pilot lines have been defined and agreed between the equipment manufacturer (Mondragon Assembly) and each of the interested partners, who will later host the new equipment at their facilities.



A BIPV installation in Florence (IT)



A PVNB installation in the Netherlands

Besides, the design of the IPV products has been transferred to the design of their implementation in real demos. In this sense, for instance, most of the developed BIPV products have been transferred to a basic design of their integration in final buildings. In addition, the authorization and permissions have been also analyzed in most demo cases, both for the build and grid connection of the IPV products.

For the next months these activities are expected to continue by the manufacturing of the required equipment of the pilot lines, better definition of the integration designs and better definition of the monitoring parameters, sensors and data management.

The demo cases will include:

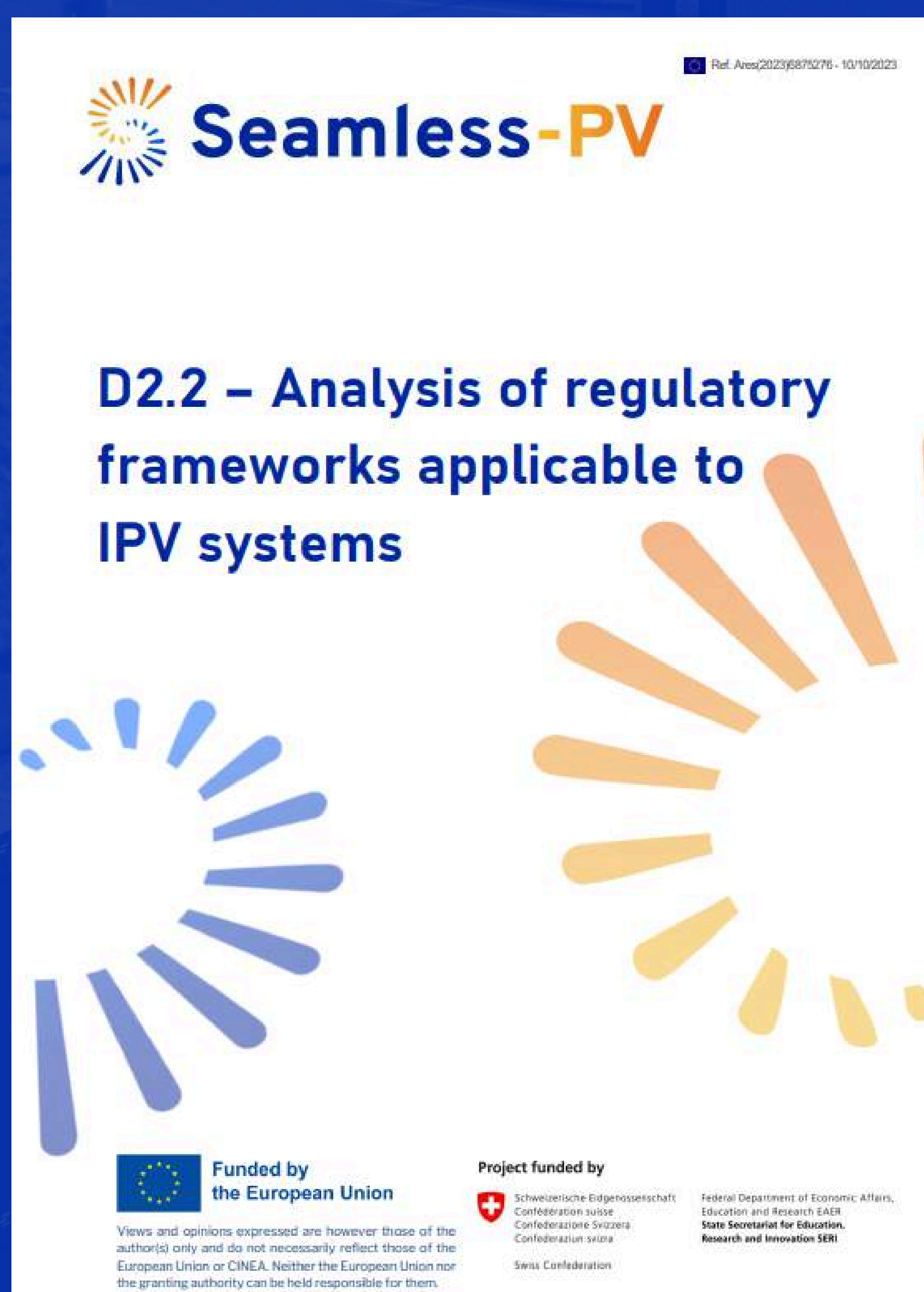
- Residential building retrofit in Florence (IT) and Bern (CH)
- Retrofit of the facade of a government building in Florence (IT)
- Roof integration of PV modules over a residential single-dwelling house in Belgium
- The realization of a purpose-built experimental building in Paris (FR)
- The realization of PVNB s in the Bizkaia connected corridor in Bilbao (ES)
- The PV integration in a series of Electric Vehicles
- The realization of two different kind of Agri-PV systems in Spain and France



3. Economic, Life Cycle and Regulatory analysis

As part of other technical work done on the project, Becquerel Institute (BI) designed a comprehensive **techno-economic model** aimed at simulating the manufacturing costs of IPV modules across various applications. This model, shaped by prior as well as new experience and research, was presented to pilot lines managers and was used to define a first manufacturing cost benchmark, with the contribution of various partners. In parallel, the cost competitiveness of various IPV cases was calculated for different locations in Europe, allowing to define cost targets at system and module level, helping the suppliers of IPV products to better define their strategy and guide the future activities in the project.

Furthermore, BI led the environmental **life cycle assessment** (E-LCA), delving into methodologies and impact indicators specific to IPV segments. The review made by BI laid the foundation for defining the functional units to be used for each IPV segment and to list the relevant impact indicators for IPV LCA. The use cases to be analysed have been defined, as well as scenarios.



On the regulatory front, BI analysed **EU and national frameworks** linked to IPV, offering insights into support schemes and sector-specific regulations. Findings are summarized in a deliverable published on the project website. Plus, BI consolidated technical specifications and requirement for IPV segments, engaging partners for feedback and alignment with EU standards.

In the next months, BI will keep on working on the simulation of IPV manufacturing processes to improve the techno-economic simulation tool, in close collaboration with Pilot Line managers to better meet their needs. The data collection process for the E-LCA will accelerate, in order to obtain a first dataset that should allow to conduct a preliminary assessment. Efforts on resource and energy efficiency, as well as on social LCA will be kicked off

The study by Becquerel Institute, available on the Seamless-PV website



4. Fostering the collaboration between the BIPV and the Construction sectors

Thanks to the efforts of SUPSI and ETA Florence, supported by all the partners, SEAMLESS-PV has successfully launched the **EU Solar Buildings Platform** (www.eusolarbuildings.com).

The Platform, aims to advance BIPV into the built environment, fostering innovation, collaboration, and education. By connecting stakeholders and promoting innovation, the cluster supports the EU's RepowerEU and Renovation Wave initiatives, contributing to ambitious renewable energy targets.



The panel discussion of the EU Solar Building strategy day in which the project coordinator presented Seamless-PV to the audience



A snapshot of the platform website, which will be further developed and expanded in the coming months. Stakeholders can already register to the platform and fill in a survey

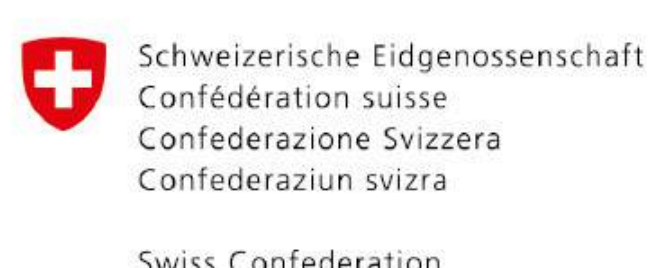
Most importantly, the project organized a kick-off event in Brussels, the EU Solar Buildings Strategy Day, in collaboration with Solar Power EU, convening over 70 participants for workshops and networking. Manufacturers, research institutes, and associations engaged with decision-makers to define strategic outlooks for the BIPV market and industry.

These efforts provided crucial input for a public consultation with the European Commission, in collaboration with Solar Power EU, to address barriers to solar energy deployment. Looking ahead, the project plans to develop a Digital Hub for the EU BIPV Innovation Cluster and action plans for new training models and national initiatives to enhance cross-collaboration between the PV and construction sectors in the next 6-12 months.



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