Analysis of the Technological Innovation System for BIPV in Sweden

IEA PVPS Task 15, Report T15-18:2024, February 2024
ISBN 978-3-907281-50-5

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The Technical Report is available for download from www.iea-pvps.org.

EXECUTIVE SUMMARY

This report provides an analysis of the Technological Innovation System (TIS) for Building Integrated Photovoltaics (BIPV) in Sweden for the period 2021-2023, following the guidelines of the IEA PVPS Task 15. (Report T15-16:2023)

The first known BIPV systems in Sweden were installed in 2001. However, BIPV has largely been an exception to the country's primary PV market of building-applied PV. Initial BIPV applications focused on solar shading solutions, but rooftop BIPV systems have since become more prevalent. More recently, façade BIPV systems have started to gain attention. Research related to BIPV has been limited and primarily linked to second and third-generation PV and to (BI)PV applications in urban areas.

The BIPV market in Sweden is considered to be in a niche phase, with discontinuous roof applications nearing commercial market development. In contrast, shading devices, parapets, and canopies are still largely in the demonstration phase. The functioning of the TIS is evaluated against the goal of achieving commercial market development, with approximately 10% of all building-related PV becoming building integrated.

To achieve this goal, knowledge development could be sufficient, with moderate fulfilment. Much of the knowledge development has been established abroad or by a limited number of actors, and knowledge diffusion is weak. There is a lack of engineering and product knowledge in the broader PV installation sector, as well as among architects, technical consultants, and potential clients. This adds up to a weak legitimacy of the technology, together with little technical guidance and a mismatch with construction industry practices. Entrepreneurial experimentation is also weak and limited to a few actors with little diversity in background and few holistic concepts or standardized solutions in their offerings. Furthermore, guidance for new actors to the BIPV TIS is very weak due to strong competing TISes (BAPV, utility scale PV) and an unlevel regulatory playing field. Among existing actors in the TIS, social capital development is weak due to a low number of specialized events. Financial and infrastructural resources are mostly sufficient, but there is a lack of suitably trained human resources.

The report concludes with recommendations, grouped into five categories: to increase diversity and focus of BIPV actors; to improve technical guidance and assurance for BIPV installations; to level the playing field between BIPV and other PV applications; to promote cultural change in the construction

and real-estate sectors; and to enhance social networks. More detailed recommendations are directed to different actor groups. Industry actors are recommended to increase cooperation between PV and construction industry; define best-practice in trainings and demonstration projects; apply for external financing of lab tests and verifications; and to collaborate on road-mapping, public campaigns, or market reports. Market actors (public or private) that want to support BIPV development can join collaborative efforts with industry; engage in demonstration projects or innovation procurement for reproducible BIPV concepts; or require cross-sector cooperation in tenders. Public authorities can enhance BIPV deployment by investigating how to address the unlevel regulatory playing field; encourage BIPV in municipal planning; clarify building code requirements; and support other actors' initiatives such as demonstrations, tests and verifications, workshops, etc. Finally, supporting and research or education actors can also get involved in investigating the unlevel playing field, or organisation of technical and scientific workshops; run BIPV courses for professionals or students; and support demos, tenders, lab tests, etc.