Analysis of the Technological Innovation System for BIPV in Australia 2024

IEA PVPS Task 15, Report T15-19:2024, May 2024
ISBN 978-3-907281-53-6

Editors:
R.J. Yang, Nilmini P. Weerasinghe, M.A.C.L. Gunarathna, W.M.P.U. Wijeratne [1]

[1] RMIT University, Australia

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

EXECUTIVE SUMMARY

This report describes the analysis of technological information systems (TIS) conducted for BIPV in the Australian industry. The TIS analysis is conducted to identify the status of Australian BIPV industry in terms of its strengths and weaknesses. The main intent of this report it to understand how BIPV industry has evolved in Australia over the years and the level of development it has achieved. The outcome of this report is beneficial for BIPV suppliers, design consultants, building developers, relevant government authorities and academic institutions to (1) identify the opportunities and limitations and (2) assist decision making in BIPV adoption. The study follows the required research process for TIS as guided by the IEA PVPS Task 15 report 'Guide for Technological Innovation System Analysis for Building-Integrated Photovoltaics 2023'.

BIPV in non-domestic buildings in Australia was first installed around 2000 with the aid of the government's renewable energy programmes. There were a few installations from 2000-2006; however, this trend did not continue as expected in subsequent years. A slight interest in the BIPV from the building sector has been visible since 2016 with the recent installations and approved projects. BIPV installations as roof tiles or roof sheets in domestic buildings are growing gradually, although they are poorly documented. To date, award-winning BIPV applications, such as rainscreen facades, windows, balustrades, roof sheets, tiles, and skylights, have been installed in Australia. Most of them are small units. The BIPV integrated roof sheets, tiles, skylights and rainscreens are operated in a niche market, whereas others, such as balustrades, curtain walls and windows, are in the demonstration phases. Several actors such as the building and construction sector, PV sector, utility/energy sector and property sector, exist in the upstream and downstream value chains of the BIPV here. New suppliers and distributors are entering the present Australian market; nevertheless, the uptake of BIPV is still low in Australia due to knowledge gaps. The BIPV market was assessed applying TIS analysis in eight functional areas, and revealed that Australian BIPV is characterised as follows:

- Knowledge development is explored to identify the breadth and depth of current BIPV knowledge and different ways of contributing to knowledge in Australia. Knowledge development is weak. Although research units develop scientific knowledge in collaboration with relevant industries at a satisfactory level, the technical expertise transfer from and to practitioners is limited. A few actors participate in creating a knowledge pool in the industry.
- Knowledge diffusion is explored to identify the ways of theoretical and practical distribution of knowledge among the stakeholders and within the industry. Poor knowledge diffusion is

attributed to inaccessible information and limited sharing among a wider community. Knowledge is not distributed equally across the value chain.

- Entrepreneurial experimentation is examined to understand the level of probing into new technologies and applications. Entrepreneurial experimentation is weak because there are limited market entrances, and only a few demands of the adopters are addressed. Entrepreneurs have more opportunities to introduce various BIPV applications for different market segments. Resource mobilisation is investigated to identify important resources, their respective “bottlenecks” and how they evolve over time. BIPV-related resource availability is weak because there are few experts, scarce resources, and fewer funding opportunities for upstream and downstream suppliers.
- Development of social capital is explored to understand how to create and sustain social relations such as trust, common understanding and mutual recognition. Social capital is inadequate due to the discrete nature of the building and PV industries, lack of demonstration projects, misconceptions, and limited awareness, which have hindered the development of trust and confidence in society.
- Legitimacy is examined to understand the social acceptance of BIPV technology and compliance with the institutional frameworks. Legitimation is weak in Australia as positioning BIPV with the institutional framework is not visible. Regulations complying with building codes, especially those addressing fire safety and structural loads, are necessary.
- Guidance is explored to understand the expected business potential, expressed customer demand and policy regulations. Guidance is weak as there is a lack of clear vision on the market. However, the government and relevant authorities aim to positively implement clean energy development and applicable policies and regulations.
- Market formation is examined to understand the actual market development and the driving and restraining forces. Market formation is weak as government, entrepreneurs and lead users do not contribute actively to the development of the BIPV.

This evaluation assists identification of weaknesses and strengths and the recommendation of strategies to expand the current market. Key recommendations are: 1) form a BIPV Alliance to create a common platform to link actors, 2) introduce live lab testing modules and systems, 3) develop building codes, particularly on fire safety, and 4) initiate government intervention to support both upstream and downstream actors.

Despite the weakness of BIPV status in Australia, the authors are delighted to observe a significant increase in interest in the building sector recently. Some of the suggested initiatives have been undertaken since the publication of the report, which will open great opportunities for the Australian BIPV market.