

## IEA PVPS TASK 15 Enabling Framework for the Development of BIPV: Working Progress and Australian Contributions

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Australia is an active country member in the IEA PVPS Task 15 Enabling Framework for the Development of BIPV since 2018. This abstract is not for publication purpose but provides an update to Australian interested stakeholders on the Task objectives, current working progress and the contributions from Australia in the current phase. The author declares that all information related to this Task is developed by the Task experts as a collaborative outcome and can be identified from the Task homepage (IEA PVPS Task 15, 2021).

### Task Objective and Phases

The objective of Task 15 is to create an enabling framework to accelerate the penetration of BIPV products in the global market of renewables, resulting in an equal playing field for BIPV products, BAPV products and regular building envelope components, respecting mandatory issues, aesthetic issues, reliability and financial issues (IEA PVPS Task 15, 2021).

The first phase of Task 15 was running from 2016 to 2019 with the following subtasks:

- BIPV Project database
- Transition towards sound BIPV business models
- International framework of BIPV specifications
- Environmental benefits of BIPV
- Demonstration
- Dissemination

In total, 11 reports are developed and published on IEA PVPS Website as shown in Figure 1.

The currently running, second phase of Task 15 started at the beginning of 2020 and runs until 2023 with five subtasks (details in the next section). Forty-eight experts from eighteen countries have confirmed the contributions to this Phase. These experts represent researchers, building and (BI)PV professionals in the industry who have experiences in BIPV. On top of these experts, there are also more than 20 observers mainly from industry to support the information collection, outcome review, and dissemination. The next section will provide an overview of the five subtasks in this Phase.





**Figure 1: Published reports in Phase 1 of Task 15**

### Overview of the Current Subtasks

The main contents in this section are developed based on the Task Workplan (2019):

- Subtask A: Technological Innovation System (TIS) analysis for BIPV: The TIS analysis enables the identification of strengths and weaknesses of the innovation system and value chain, from which policy and strategy implications can be drawn at the national level. An action list will be created based on results of the TIS analysis that will show where to focus measures to help the BIPV market accelerate in individual countries.
- Subtask B: Cross-sectional analysis – learning from existing BIPV installations: Determination, analysis and assessment of the multifunctional performance (energy, economic, ecological and aesthetic) of selected BIPV plants using the newly developed multi-dimensional evaluation matrix
- Subtask C: BIPV Guidelines: The objective of this subtask is to consolidate existing BIPV knowledge and compile it into a technical guidebook for building professionals (architects, engineers and consultants).
- Subtask D: Digitalization for BIPV: This subtask will facilitate the application of BIPV over the whole value chain and improve its reliability with the potential of digitalization.
- Subtask E: Pre-normative international research on BIPV characterisation methods: Carry out pre-normative international research to develop new and optimised characterisation methods for BIPV modules and systems, based on the topics identified during the first phase of IEA-PVPS Task 15 and by analysis of national building codes that are relevant to BIPV installations.

### Contributions from Australia

The Solar Energy Application Lab at RMIT University (2021) represents Australia in this Task since late 2018. In Phase 1, as co-authors, we contributed to a report entitled 'BIPV Design and Performance Modelling: Tools and Methods'. We also led the discussions on Phase 2 plans and contributed to the development of workplan.

Since Phase 2 started in 2020, we lead the Subtask D which includes which includes 33 experts from 15 countries and 28 organisations, and participate in the other four subtasks. The details are as follows:

- Subtask A: Developing a country-based report on knowledge sharing of BIPV value chain and stakeholder ecosystem specifically focusing on the national adoption, innovation and institutional status as well as future directions. The report is expected to be completed in 2022.
- Subtask B: (1) Contributed to a report entitled 'Categorization of BIPV applications' as a co-author. This report is being reviewed by ExCo for approval. (2) Led the development of economic indicators in the multi-dimensional evaluation matrix. Currently the matrix has been finalised. We are leading the global case information collection process to validate the matrix. This work will be completed in 2022-2023.

- Subtask C: (1) Provided two Australian cases. (2) Contributing to the technical guidebook development. This work will be completed in 2022-2023. (3) As a co-author, contributing to a academic paper entitled “BIPV products and systems: A review on the energy behaviour”. The paper will be submitted later 2021.
- Subtask D: (1) A global survey was distributed through 20 professional bodies/channels in 13 countries, with the aim of exploring design methods and digital processes in building envelope simulation and modelling. We are the global survey leader supported by 14 experts as national-level contacts to produce industry reports for IEA PVPS. In total, 80 valid responses were collected. (2) Two reports based on survey results have been developed: a – ‘BIPV Design Methods and Workflows in Australia’. This work is also supported by the APVI COVID Response Research Funding. The report has been submitted to APVI in June 2022. b- ,BIPV Digitalization: Design Workflows and Methods (global experiences)’. This report is being reviewed by the Task experts internally and will be submitted to ExCo soon. (3) Contributing to the review of BIM-enabled tools and process for BIPV (D3, D4). The expected outcomes/reports will be completed in 2022-2023. (4) Leading the global case information collection/process aiming to conduct data mining of the project performances (D5). The report will be completed in 2023. (5) Leading the testing of design software platforms in comparison with real BIPV energy yield outcomes (D1). The report will be completed in 2023.
- Subtask E: (1) Contributed to E1 regarding BIPV SHGC calculation methods. The results will be finalised in 2022. (2) Representing Australia in the Joint Working Group for standardisation referring to BIPV between IEC TC 82 and ISO TC 160. JWG is responsible for existing standards IEC 63092-1, -2 and ISO 18178. New project 63092-3 on BIPV SHGC has been approved and started in 2021. (3) E3 BIPV fire safety: Provided the list of Australian based fire test labs; Contributing to the review of national BIPV fire safety requirements. A report entitled ‘Fire Safety Requirements of Applying BIPV in Australia’ has been developed. This work is also supported by the APVI COVID Response Research Funding. The report has been submitted to APVI in June 2022.

During Phase 2, we lead the organisation of Subtask D bi-monthly meetings, attend the meetings organised by other subtasks/activities, and present in the bi-annually task meetings by reporting the working progress in Subtask D. In April 2022, we also invited three industry presenters including a building professional in Australia to deliver their insights in a workshop organised by Task 15. Three media releases have been published with the support from APVI since 2020: Press Release: Development of BIPV Business Cases 2020; Media: PV Magazine, "Versatility of building-integrated PV tipped to increase PV penetration"; Media: PV Magazine, "Australia's 'largest' solar façade".

In summary, Task 15 will address the BIPV uptake issues by exchanging research, knowledge and experience, and offering the possibility to close gaps between all BIPV stakeholders, creating an enabling framework to accelerate the implementation of BIPV. We aim at helping stakeholders from the building sector, energy sector, the public, government and financial sector to overcome technical and non-technical barriers in the implementation of BIPV in the Australian built environment by the development of processes, methods and tools that assist them.

## References

- PV Magazine (2020) <https://www.pv-magazine-australia.com/2020/12/04/versatility-of-building-integrated-pv-tipped-to-increase-pv-penetration/>
- PV Magazine (2021) <https://www.pv-magazine.com/2021/04/08/australias-largest-solar-facade/>
- Solar Energy Application Lab (2021) <https://www.rmit.edu.au/about/schools-colleges/property-construction-and-project-management/research/research-centres-and-groups/solar-energy-application-laboratory>

IEA PVPS Task 15 (2021) <https://iea-pvps.org/research-tasks/enabling-framework-for-the-development-of-bipv/>

IEA PVPS Task 15 (2019) Workplan