



Enabling Framework for BIPV: IEA PVPS Task 15 Global Network - Best Practices, Multifunctional Properties of BIPV and Regulatory Challenges

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What is IEA PVPS?



- The International Energy Agency (IEA), founded in 1974, is an autonomous body within the framework of the Organization for Economic Cooperation and Development (OECD).
- The Technology Collaboration Programme was created with a belief that the future of energy security and sustainability starts with global collaboration. The programme is made up of thousands of experts across government, academia, and industry dedicated to advancing common research and the application of specific energy technologies.



What is IEA PVPS?



- The IEA Photovoltaic Power Systems Programme (PVPS) is one of the Technology Collaboration Programme established within the International Energy Agency in 1993
- 32 members - 27 countries, European Commission, 4 associations
- *“To enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems”*





Successful Building Integration of Photovoltaics

A Collection of International Projects



IEA-PVPS Task 15

Successful BIPV projects



J&P Loughheed Performing Arts Centre, Camrose (CA). Architect: Derec Sampson, Modules (c-Si) by Conergy. Copyright: © Gordon Howell, HME



Social Housing Apartment, Best (NL). Architects: NB Architecten, Modules (CIGS) by EigenEnergie.
© BEAR-iD

Successful BIPV projects



Aktiv Energy Tower, Fronius, Wels (AT). Architects: PAUATArchitekten, Modules (c-Si) by Ertex.
Copyright: Dieter Moor, ertex solar

Successful BIPV projects



Singyes Solar Office, Zhuhai (CN). Architect: Adam Huang. Modules (c-Si) by Singles Solar.

Successful BIPV projects

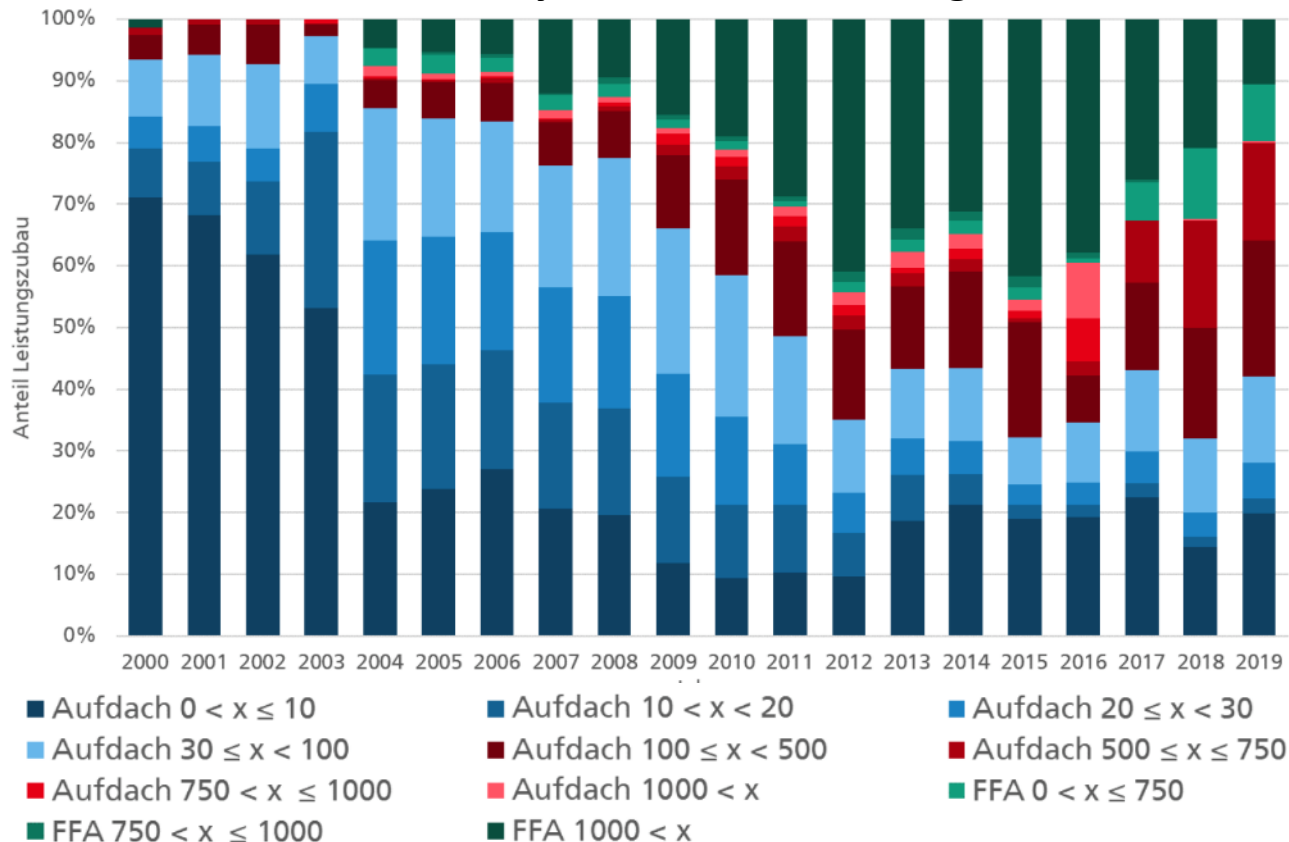


Vala Gard office, Helsingborg (SE), Architect: Tengborn arkitekter, Modules (c-Si) by NAPS Solar Systems Oy, © Skanska Torben Ådahl

Categorization of BIPV applications



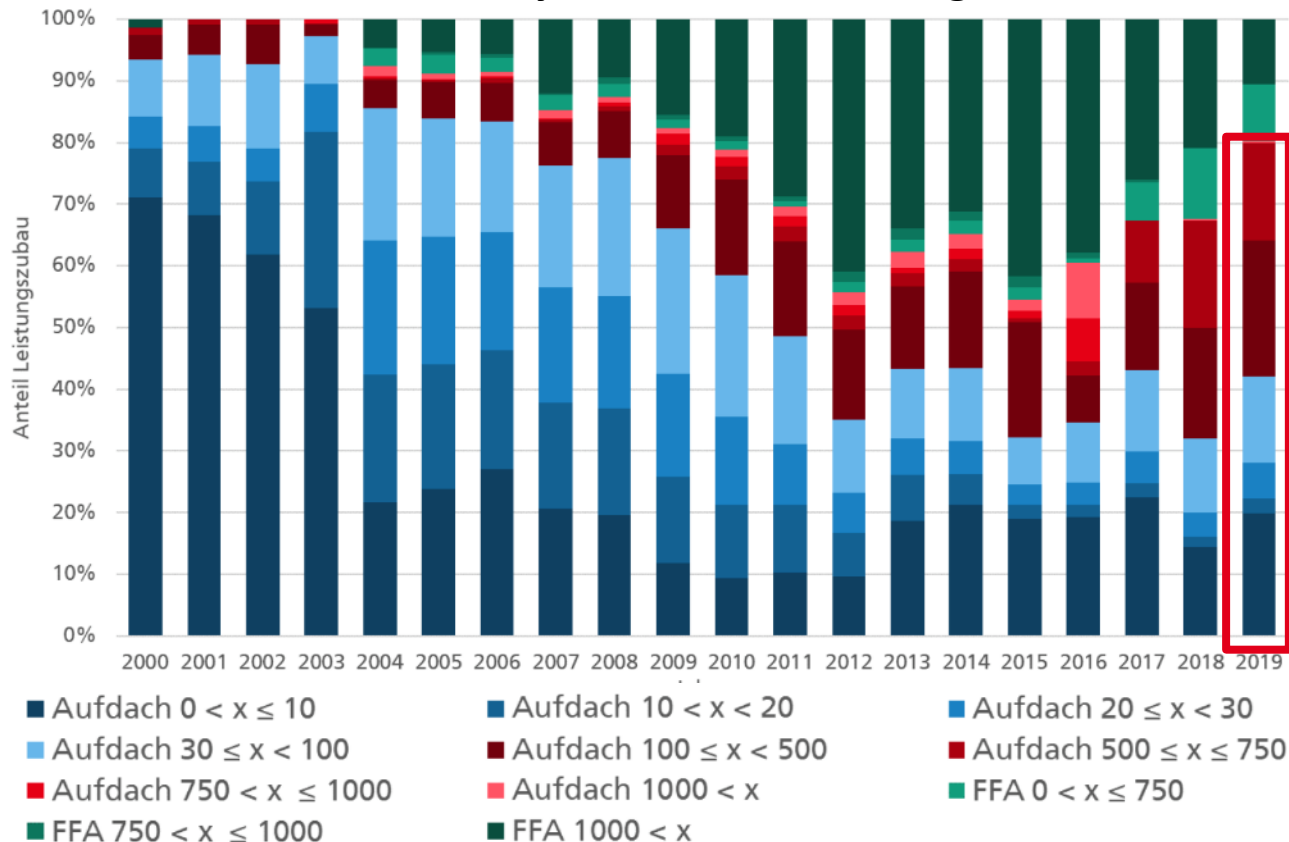
70% of PV Power in Germany installed on buildings!



**Additionally
installed power
2000 to 2019
according to size
and application.**

Calculation according to „EEG-
Anlagenstammdaten“

70% of PV Power in Germany installed on buildings!



**Additionally
installed power
2000 to 2019
according to size
and application.**

80 % on buildings

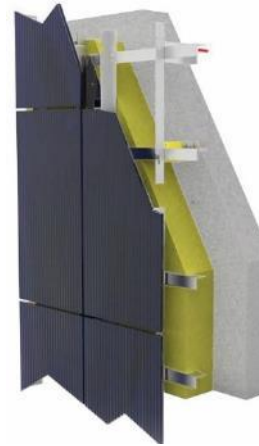
Calculation according to „EEG-
Anlagenstammdaten“



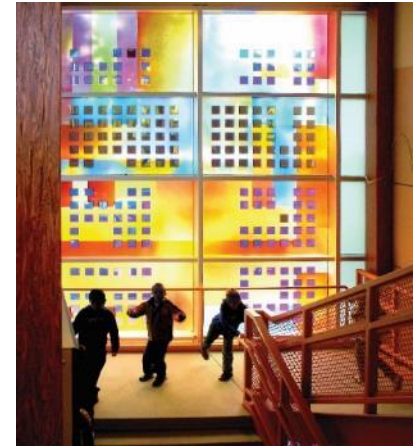
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picture © Fraunhofer ISE



picture © AVANCIS



solar art © Sarah Hall

level of individual customization

module geometry	standard size	custom size	standard width, adaptable length	custom size
appearance	close to conventional appearance, frameless modules	close to conventional appearance	surface texture, different colors	sophisticated artistic design
constructive integration	additional layer	glazing integrated	module-integrated backrail system for ventilated facades	glazing integrated

Who is Task 15?



- Operating Agent: Johannes Eisenlohr
- Subtask leaders: Michiel van Noord, Gabriele Eder, Costa Kapsis, Nuria Martin, Rebecca Yang, Helen Rose Wilson
- Experts from 18 countries, from research, architecture, industry etc.



- Contacts:
https://iea-pvps.org/research-tasks/enabling-framework-for-the-development-of-bipv/contacts_t15/

What is IEA PVPS Task 15?



IEA PVPS Task 15 – Enabling Framework for the Development of BIPV

Objective:

- 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 multifunctional aspects, mandatory issues, regulatory issues, aesthetic issues, reliability and financial issues.



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Reports of Task 15



<https://iea-pvps.org/research-tasks/enabling-framework-for-the-development-of-bipv/>



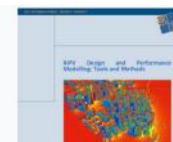
Successful Building Integration of Photovoltaics – A Collection of International Projects



Development of BIPV Business Cases – Guide for stakeholders



Multifunctional Characterisation of BIPV



BIPV Design and Performance Modelling: Tools and Methods



Analysis of requirements, specifications and regulation of BIPV



Coloured BIPV Market, Research and Development



Compilation and Analysis of User Needs for BIPV and its Functions



BIPV research teams & BIPV R&D facilities An international mapping, second version



International definitions of "BIPV"



Inventory on Existing Business Models, Opportunities and Issues for BIPV



BIPV Research Teams and BIPV RD Facilities. An International Mapping

How to accelerate the use of BIPV in architecture?



- Photovoltaics is a mature technology and it is becoming an increasingly "flexible" technology
- The number of available products increased in the last years
- When we talk about architectural integration, the efficiency of the solar cell is no longer a priority but it is part of the discussion
- The **costs of the system and of the process** play a fundamental role
 - Components
 - System
 - Design and Process
- Different products for different applications: roof, façade, accessory,...



- **Subtask A: Technical Innovation System (TIS) Analysis for BIPV (van Noord)**
 - Identifying measures to increase implementation of BIPV, clear action and business plan, etc.
- **Subtask B: Cross-sectional analysis: learning from existing BIPV installations (Eder)**
 - Analysis and comparison of the multi-functionality of BIPV (energy relevant, economic, environmental, visual impact)
- **Subtask C: BIPV Guidelines (Kapsis, Martin)**
 - Guidebook and technical presentation that provide a complete pathway from BIPV design to installation, maintenance and safety
- **Subtask D: Digitalization for BIPV (Yang)**
 - Using the opportunities of digitalization to make BIPV more easily accessible, more reliable and cheaper
- **Subtask E: Pre-normative international research on BIPV characterization methods (Wilson)**
 - Optimized characterization methods, facilitate local/national building component approval of BIPV, contribute to international alignment of normative requirements on BIPV products and systems

BIPV – Multifunctional Properties and Requirements



- Mechanical resistance and stability
- Safety in case of fire
- Environmental requirements and sustainable use of natural resources
- Safety in use
- Protection against noise
- Thermal and optical requirements (insulation, daylighting, shading, glare)
- Durability and reliability
- Tightness against Water/Air/Dust

→ Connection to a large and heterogeneous set of standards!





- Requirements from electrical perspective (e.g. IEC standards) and from building construction perspective (e.g. ISO standards) overlap
- Global requirements and globally traded components vs. national/regional/local requirements
- New and innovative business models for operating PV systems can be challenging, when the PV is an integral part of the building
- Very complex regulation of energy markets in general (not specific for BIPV)
- Task 15:
 - Provide lessons learned from TIS analyses in different countries
 - Offering help and guidelines for different stakeholders
 - Contribution of Task 15 experts, e.g. to ISO/TC 160 + IEC/TC 82 joint working group, revision of EN 50583, etc.

Task 15 is interested in inputs and views from the market!



- What are your views on barriers for an accelerated BIPV adoption?
- What is still missing?
- What could an international collaboration like Task 15 do to support?

• Any inputs welcome!

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Industry Workshop at the previous Task 15 plenary meeting with more than 100 participants and 12 short contributions from industry partners

10:00 Welcome and Opening, Task 15 brief overview
- Johannes Eisenlohr and Francesco [Frontini](#) -

10:15 – 12:00 Focus topic 1 – BIPV Products

- [Solaxess](#) – Peter Roethlisberger
- Onyx – [Severo Natanael](#) de la Calle
- [Longi](#) – Song Zhang
- Advanced Solar Power - Ben Wu
- [Ertex](#) – Daniel [Gutleiderer](#), Christian Ulrich
- [Sunovation](#) – Christof [Erban](#)

Q&A session (15 min discussion), Coffee Break (15 min) with 6 break out rooms

12:15 – 14:15 Focus topic II – BIPV Projects and Planning Process

- Arup – Ignacio Fernández
- Aurecon group - Adolfo Fernandez Benito
- [Soltech](#) – Anna [Svensson](#)
- White [Arkitekter](#) – Rickard Nygren
- BEAR-iD – [Tjerk Reijenga](#)
- [EnerBIM](#) – Philippe [Alamy](#)

Q&A session (15 min discussion), Additional 6 break out rooms (15 min)

Thank You for your Attention

Looking forward to the discussion

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