Regulatory aspects of BIPV

IEA-PVPS Task 15, Subtask C
International framework for BIPV specifications

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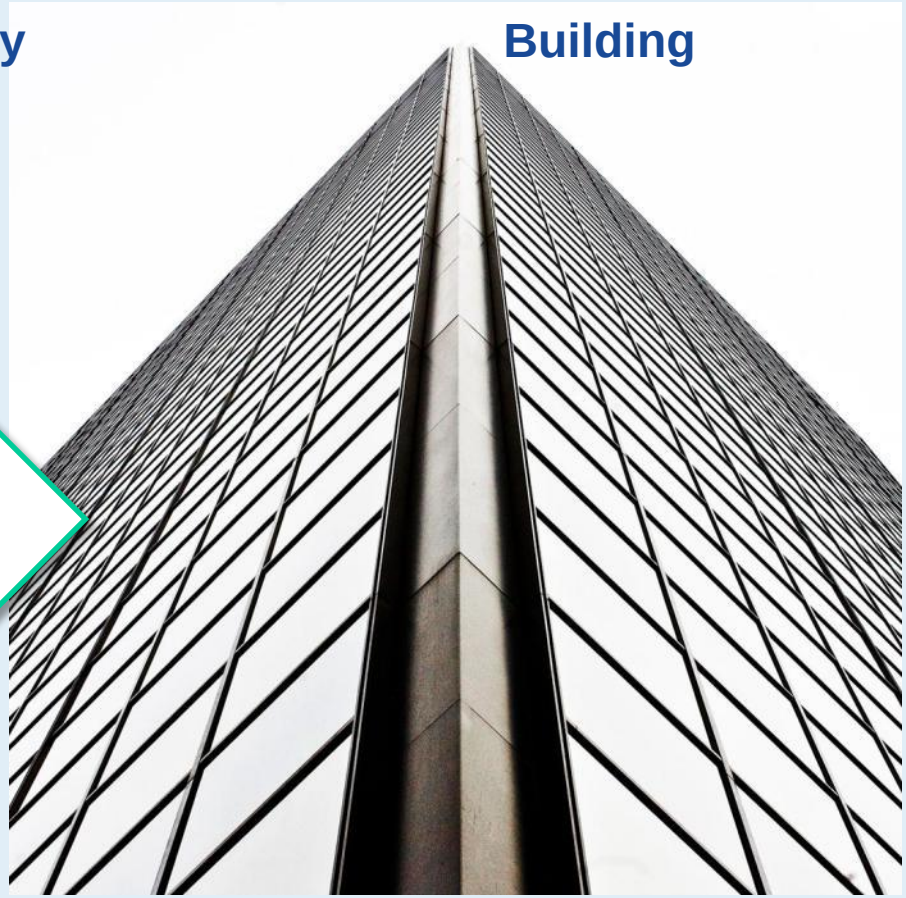
Motivation

Why do we need a new international framework for BIPV specifications?

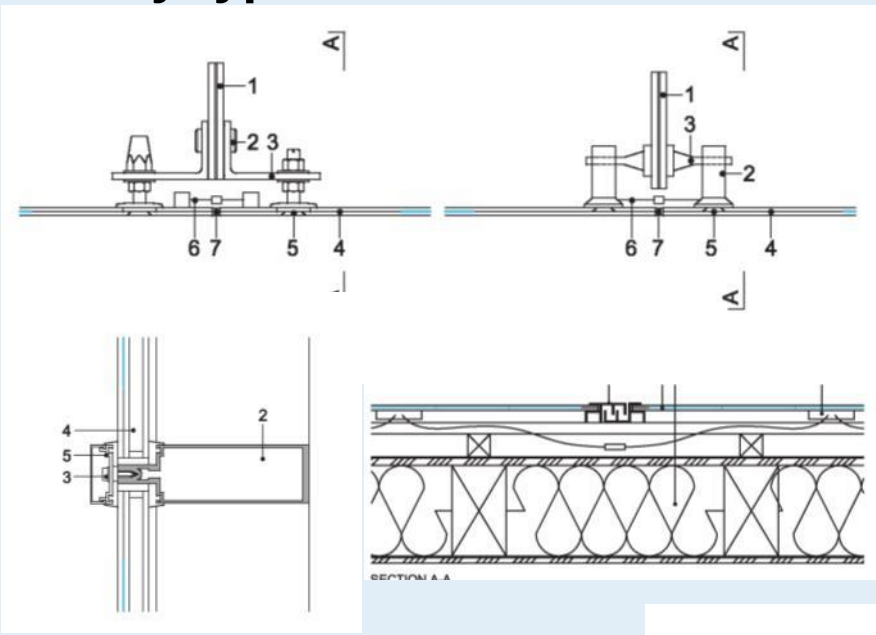
Photovoltaic Technology

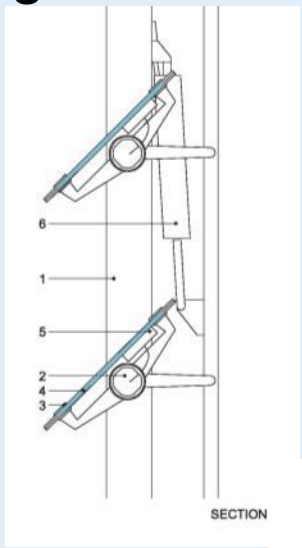
Building

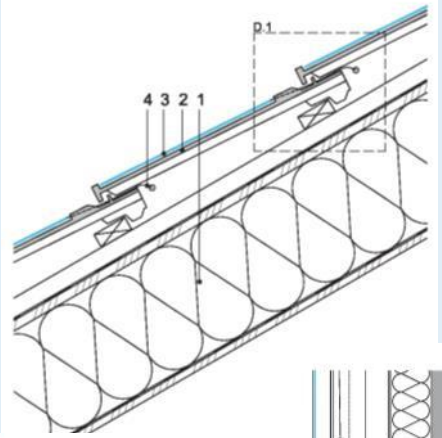


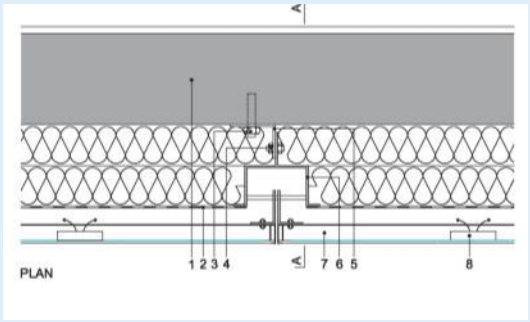
Motivation

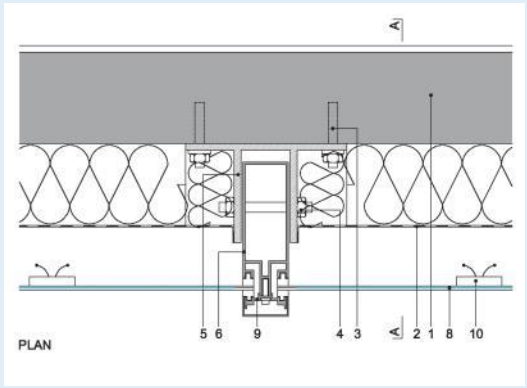
Every type of installation or building function has its own solution.

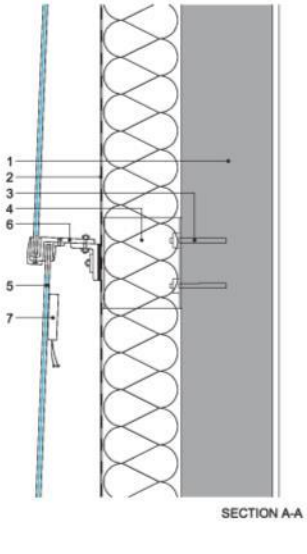


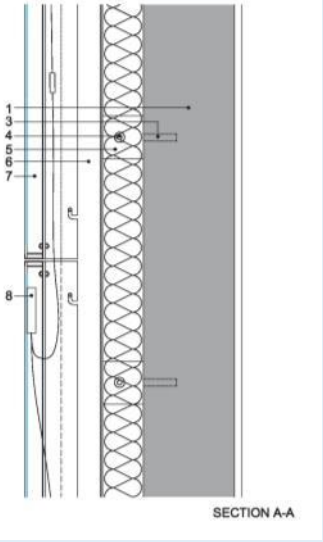






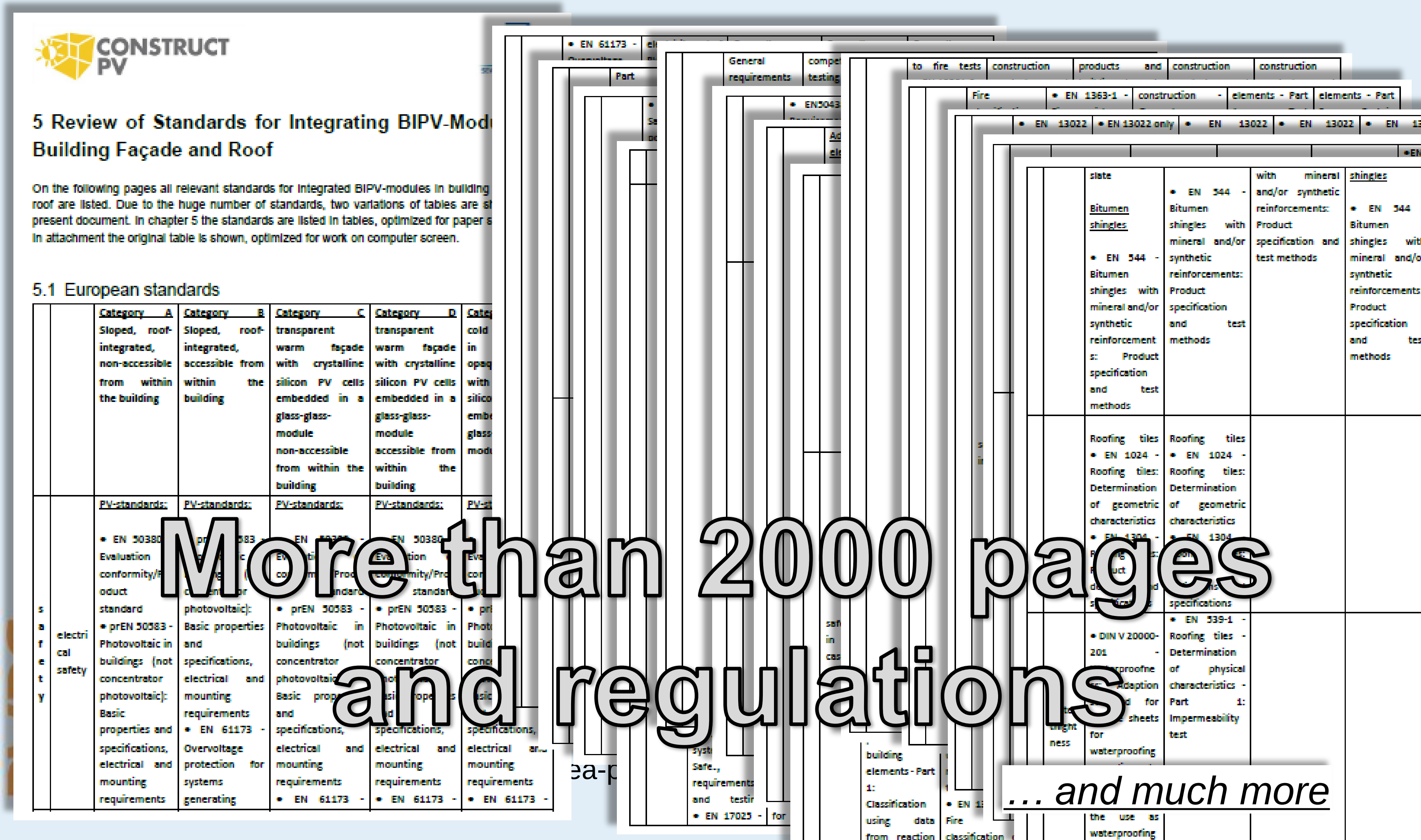






Source: SUPSI

Motivation

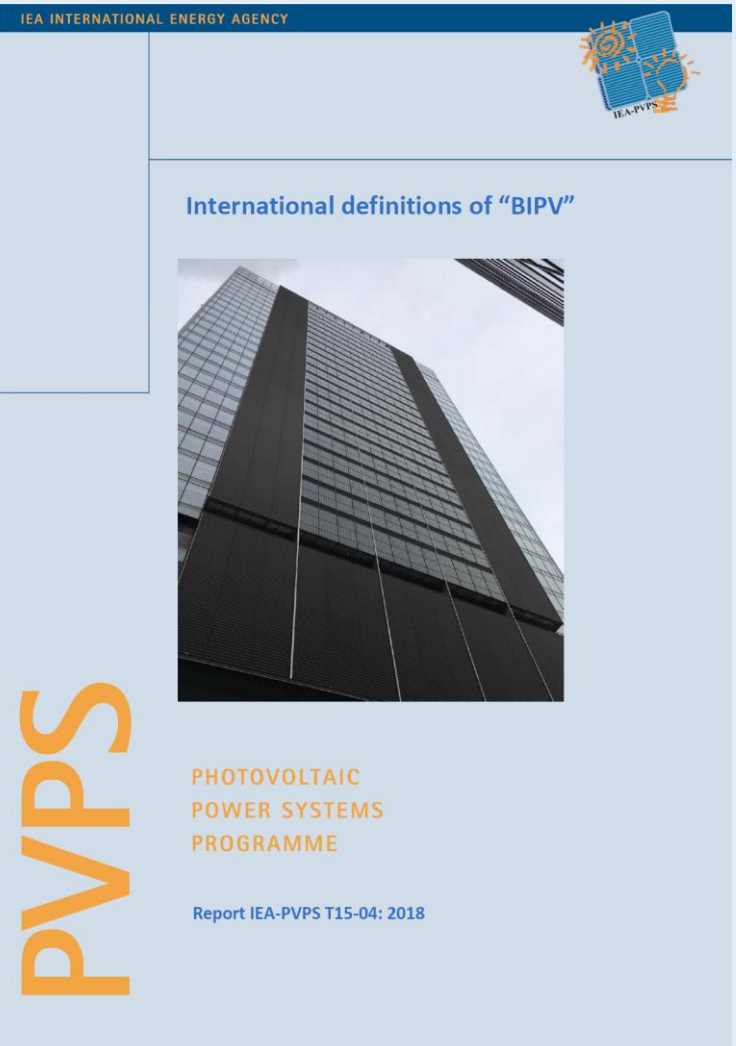

CONSTRUCT PV
5 Review of Standards for Integrating BIPV-Mod
Building Façade and Roof
5.1 European standards
More than 2000 pages
and regulations
… and much more

IEA-PVPS Task 15, Subtask C

International framework for BIPV specifications
(started in 2015 end in 2019)

Deliverables:

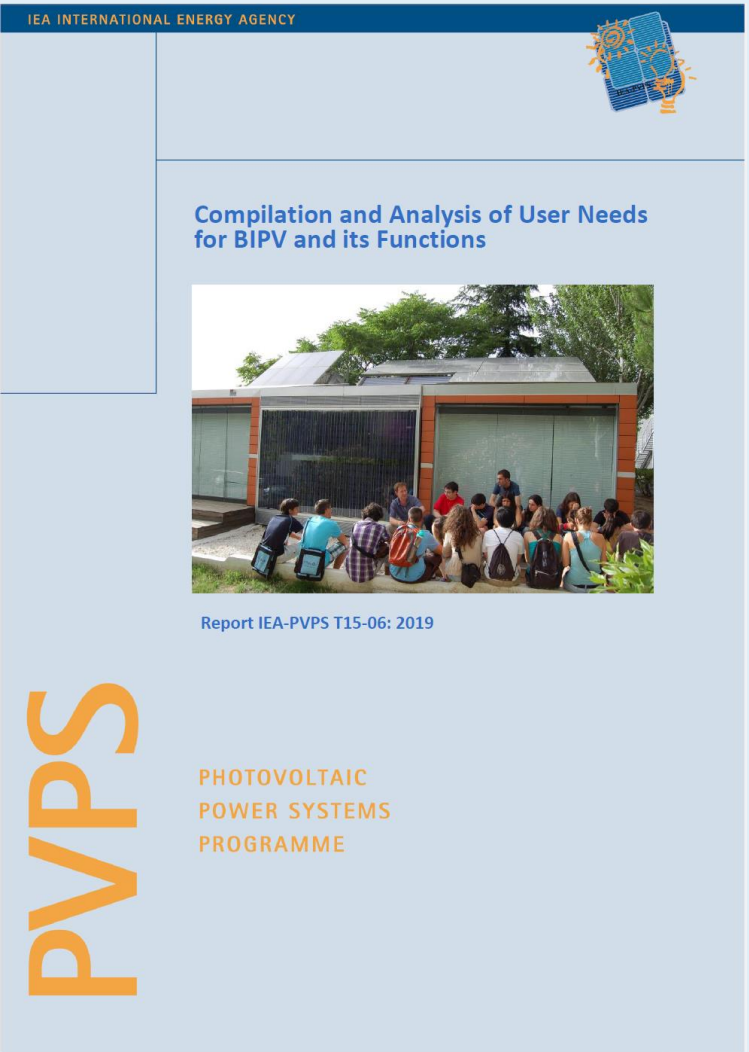
- International definition of »BIPV« (Activity C.0)
- Analysis of user needs for BIPV & BIPV functions (Activity C.1)
- BIPV technical requirements overview (Activity C.2)
- Multifunctional BIPV evaluation (Activity C.3)
- Suggest topics for exchange between different standardization activities on international level (Activity C.4)



Report C0

International definitions of "BIPV"

- Provides an overview of current building-integrated photovoltaic (BIPV) definitions
- Draws on current standards, PV funding programmes and research projects/programmes
- Recommends a BIPV definition for use in IEA-PVPS Task 15 in the context of standardisation

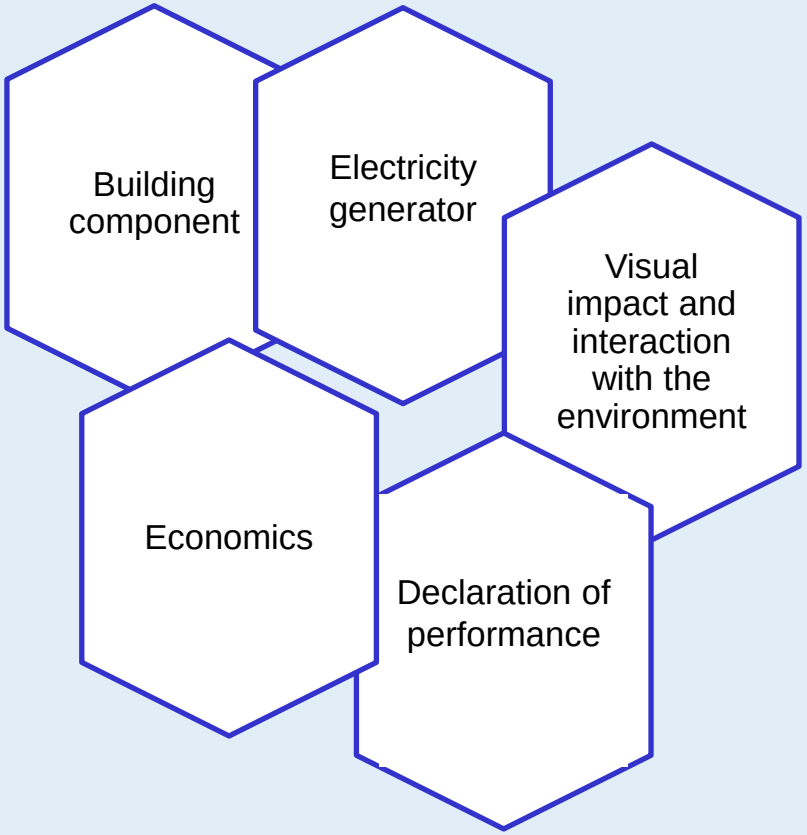


Report C1

Compilation and Analysis of User Needs for BIPV and its Functions

- Compiles needs for BIPV from the user's perspective (building owner, building occupants, planning and construction professionals)
- Analysis focusses on classifying needs according to their suitability for treatment within an international framework for standardisation

User needs


Building component
Electricity generator
Visual impact and interaction with the environment
Economics
Declaration of performance

Report C2

Analysis of requirements, specifications and regulation of BIPV

- Focuses on the requirements, specifications and regulations relevant to the development of BIPV performance and safety standards
- Presents a comprehensive list of possible requirement items and analyses specifications and regulations related to BIPV
- Provides information and proposals to support the development of international BIPV standards
- Already used in preparation of IEC 63092

Requirements, specifications and regulation of BIPV

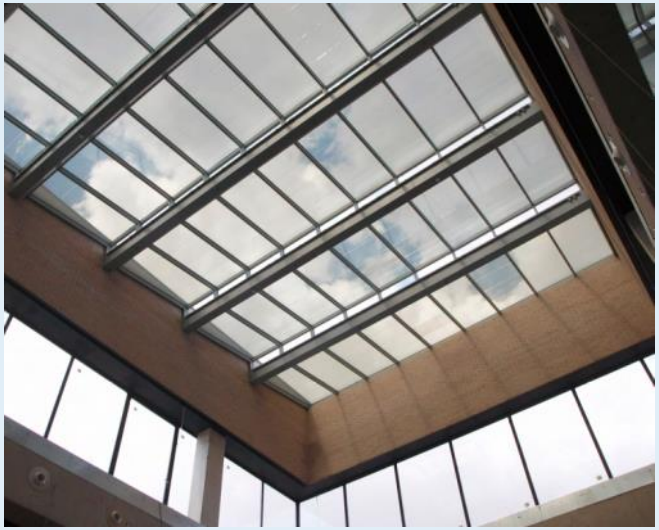
Overview of specifications and regulations

- International standardisation of BIPV and related standards
- EN 50583 and the equivalent international standards

Requirement analysis

- Items for BIPV
- Categorization
- Level for international standardization of BIPV

Requirements, specifications and regulation of BIPV



San Anton Market (Madrid, Spain).Low-e photovoltaic glass atrium.
Source and copyright: ONYX.

Residential building renovation in Zurich (Switzerland). Arch. Karl Viriden
Source and copyright: Viridén + Partner AG.

Report C4 (draft)

Multifunctional Characterisation of BIPV – Proposed Topics for Future International Standardisation Activities

- Identifies areas needing international standardisation on multifunctional characterisation of BIPV modules and systems
- Recommends approaches to meet this need
- Identifies features of BIPV which require modifications to existing testing procedures
- Provides an overview of testing types and proposes test modifications
- Documents experience made with multifunctional evaluation of BIPV modules and systems

Report C4 (draft)

Multifunctional Characterisation of BIPV – Proposed Topics for Future International Standardisation Activities

Features of BIPV which require changes to existing testing procedure

- Related to „conventional“ building components
- Related to „conventional“ PV modules
- Effect of installation in the built environment

Types of testing and proposed test modifications to account for BIPV features

- Electrical
- Mechanical
- Fire safety
- Optical and thermal
- Durability and reliability
- Curved elements

Multifunctional BIPV evaluation

(prev. C3)

- Experience with application of EN 50583
- Standards not covered in EN 50583
- Normative references for EN 50583

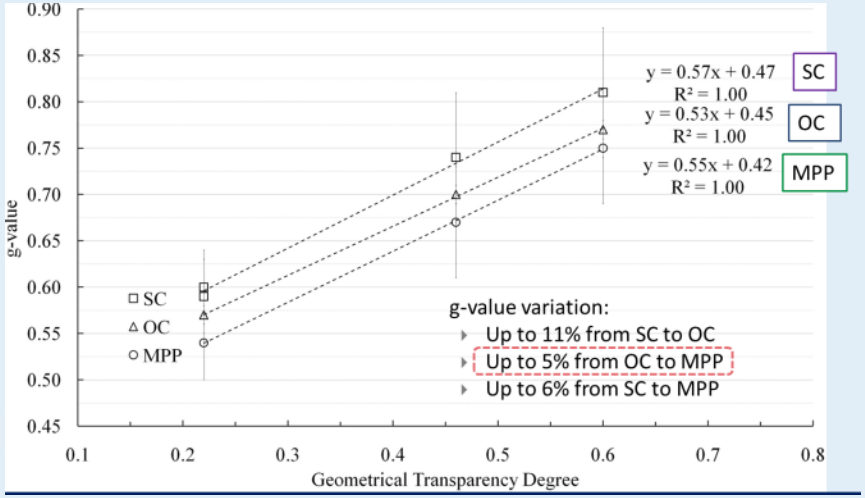
PVPS

Report C4 (draft)

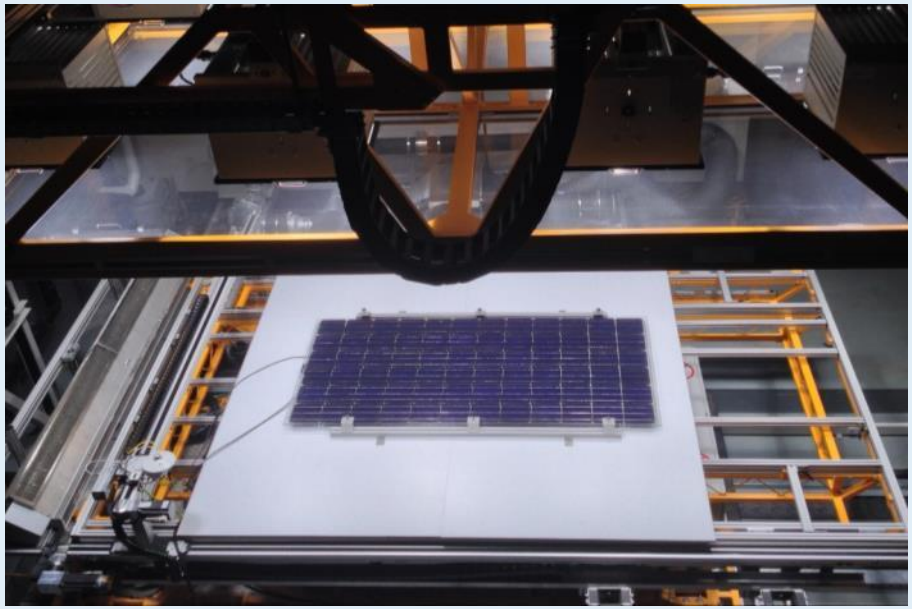
Multifunctional Characterisation of BIPV – Proposed Topics for Future International Standardisation Activities

Example

- Calorimetric g-value determination with BIPV module under open-circuit and MPP conditions



L. Olivieri, F. Frontini, et al.; G-value indoor characterization of semi-transparent photovoltaic elements for building integration: New equipment and methodology, Energy and Building, vol 101, 2015



Concordia University's Solar Simulator and Environmental Chamber (SSEC) laboratory. Source and copyright: K. Kapsis, 2019.

Interaction with IEC/TC82 PT 63092

Development of a BIPV International Standard/Technical Specification

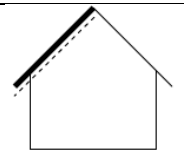
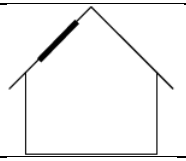
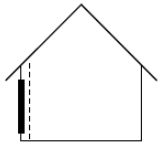
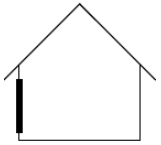
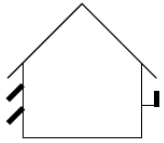
IEC 63092 Photovoltaics in buildings –
Part 1: Building-Integrated Modules
Part 2: Building-Integrated Systems

- Some participants of STC are members of IEC PT 63092
- The analysis of equivalence of EN and international standards in STC, Activity C2 has been used in revising IEC 63092

IEC 63092

- It applies to photovoltaic modules used as construction products (Part 1), and to their corresponding systems to integrate them into the building (Part 2).
- It focuses on the properties relevant to basic building requirements, and on the applicable electro-technical requirements (PV modules).
- It is inspired by the European EN 50583.
- It references international standards, technical reports and guidelines.

IEC 63092

Category A:	**Sloping, roof-integrated, not accessible from within the building** The BIPV modules are installed at a tilt angle between 0° and 75° including horizontal (see Fig.1), with another building product installed underneath.	
Category B:	**Sloping, roof-integrated, accessible from within the building** The BIPV modules are installed at a tilt angle between 0°and 75° including horizontal (see Fig.1).	
Category C:	**Non-sloping (vertically) envelope-integrated, not accessible from within the building** The BIPV modules are installed at a tilt angle between and including both 75° and 90° (see Fig. 1) with another building product installed behind.	
Category D:	**Non-sloping (vertically), envelope-integrated, accessible from within the building** The BIPV modules are installed at a tilt angle between and including both 75° and 90° (see Fig. 1).	
Category E:	**Externally-integrated, accessible or not accessible from within the building** The BIPV modules are installed to form an additional functional layer (as defined in 3.1) exterior to its envelope (e.g. balcon y balustrades, shutters, awnings, louvers, brise soleil etc.).	

IEA next phase

- Subtask E - Pre-normative international research on BIPV characterisation methods
  - Putting the recommendations of the presented Activity C4 into practice!

  (more detail in the presentation of J. Eisenlohr)

- Anyone interested in participating, please contact Johannes Eisenlohr and/or Helen Rose Wilson

Thank you very much for your attention

Join us for the next phase of IEA PVPS task 15!

Dr Helen Rose Wilson, Fraunhofer ISE (Germany)
Prof Francesco Frontini, SUPSI (Switzerland)
Dr Nuria Martín Chivelet, CIEMAT (Spain)