Create the Future, Collaborate Together

Report of Taskforce Activity

PV Taskforce: Solar Energy
Task Group: Advanced Characterization of Photovoltaic Devices

Dr. YOSHITA Masahiro

Renewable Energy Advanced Research Center (READ),
Department of Energy and Environment, AIST, Tsukuba, Japan

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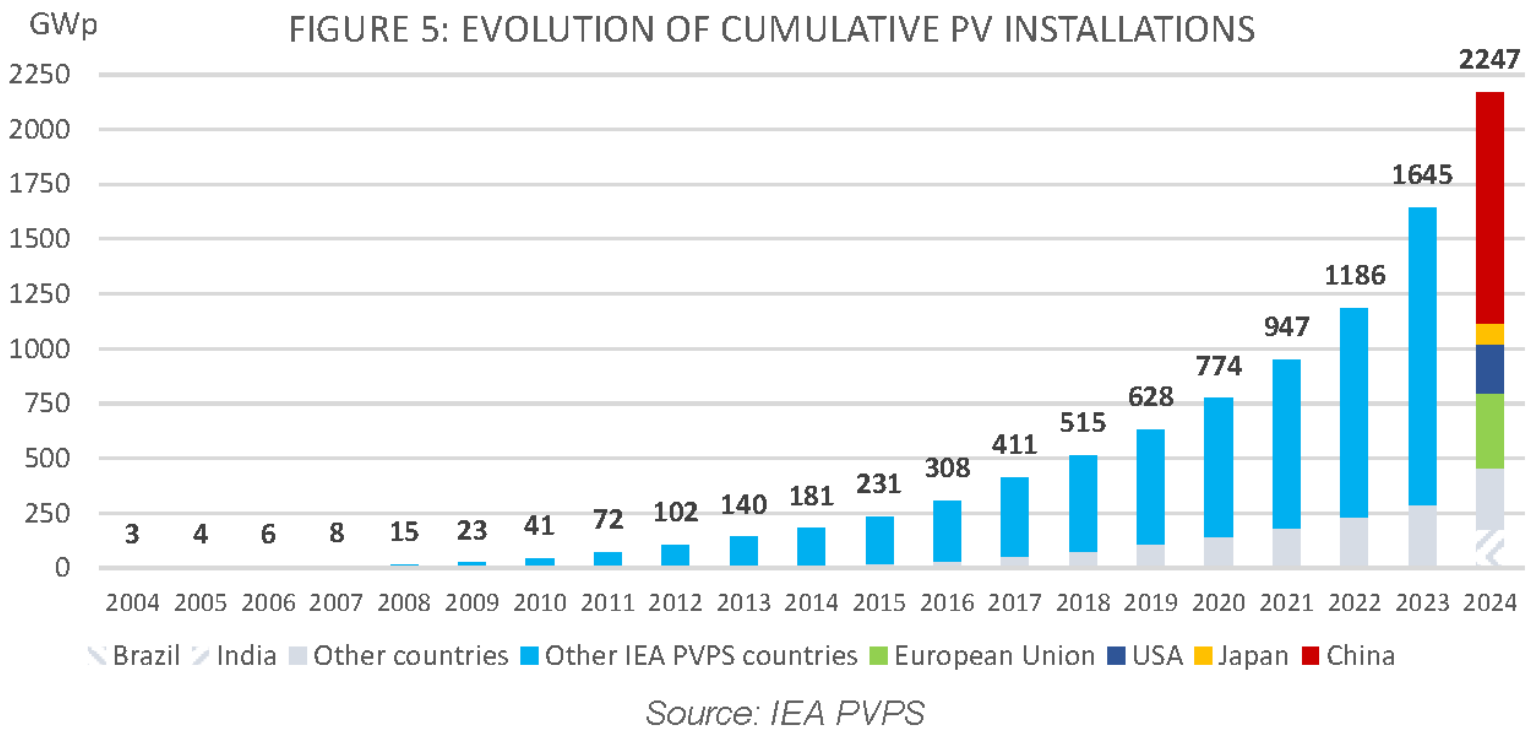
Introduction: Solar Energy



From: IEA PVPS, 2025 Snapshot of Global PV Markets

Solar Energy:

- One of the principle renewable energies
- Total amount of installation **> 2.2 TWp** (in 2024)

Task Group : Advanced Characterization of Photovoltaic Devices

AIST
Create the Future, Collaborate Together

Scope:

- Aiming to realize a carbon-neutral society, further expansion of solar power is urgently required. To achieve this, development of novel photovoltaic (PV) devices for a variety of PV applications is expected to be introduced into the market.
- We aim at **establishing globally consistent PV performance characterization techniques** for such novel PV devices and **disseminate the knowledge to the PV community world-wide**.

Tier 1: Advanced Performance Characterization Technologies

Tier 2: Capacity Building

Co-leaders:

Dr. YOSHITA Masahiro (AIST)

Dr. MÜLLEJANS Harald (EC-JRC)

RD20 leaders' recommendation

- ***Taskforces***
- ***Communication/knowledge sharing***
- ***Researcher exchanges***
- *Summer schools*
- *Workshops*

RD20

AIST

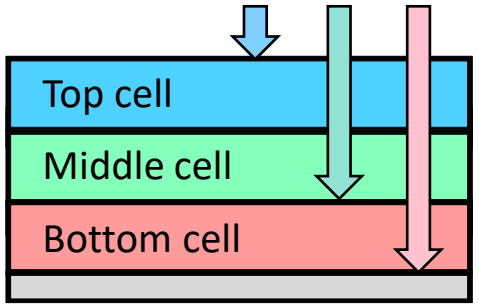
European Commission

T1: Advanced Performance Characterization Technologies

Activities

Aiming to establish advanced PV performance characterization technologies with high accuracy and to achieve conformity for high-efficiency novel PV devices (solar cells and modules)

- Main target: **Multi-junction (MJ) PV devices**



- **Confirm consistency of PV performance characterization technologies**

  through **interlaboratory-comparisons** among world-leading research laboratories

- **Strengthening collaboration among research laboratories in G20**

Current Status and Future Activity Plans

ongoing

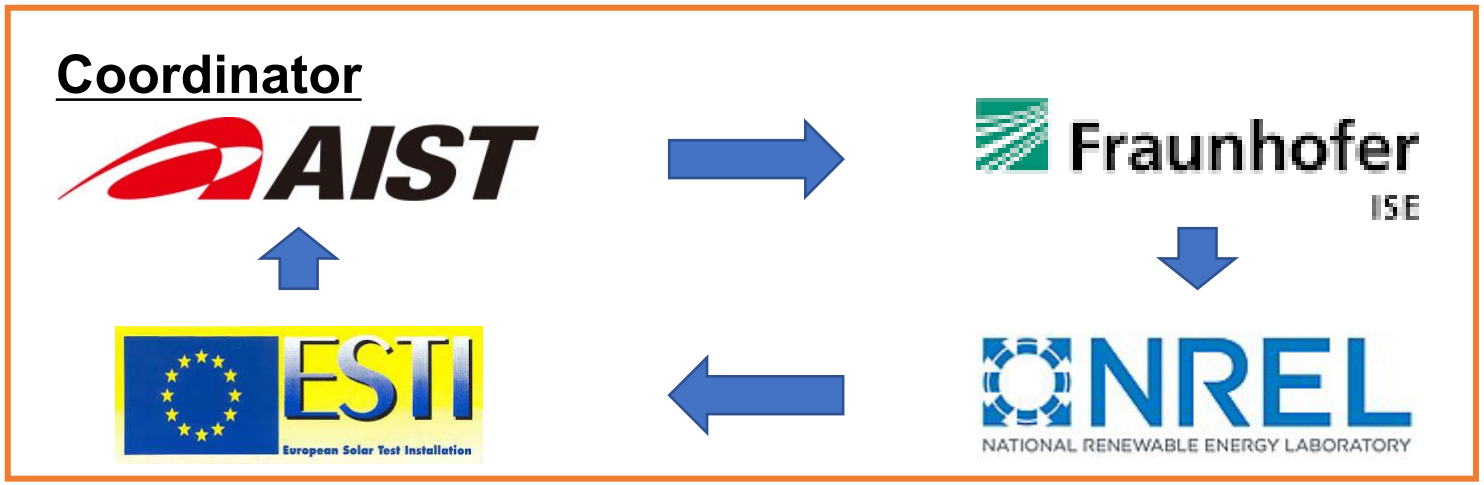
1. 1st interlaboratory-comparison for MJ PV devices with 4 participants
2. 2nd interlaboratory-comparison for MJ PV devices *discussion continued*
3. Interlaboratory-comparisons for emerging high-efficiency c-Si modules

- Commercially available:
  PERC, SHJ, TOP-Con, …
- Additional laboratories from
  China, India, Korea, Saudi-Arabia, Turkey, South Africa, …

Current Status and Future Activity Plans

1. 1st interlaboratory-comparison for MJ PV devices with 4 participants

III-V MJ PV cells
- GaAs-related materials
- Triple-junc.



Current Stage

- Completed measurements at 4 participants
- Analyzing & summarizing the results

Current Status and Future Activity Plans

ongoing

1. 1st interlaboratory-comparison for MJ PV devices with 4 participants
2. 2nd interlaboratory-comparison for MJ PV devices *discussion continued*

- New samples and additional laboratories

1) Candidates:
   - Advanced III-V MJ
   - III-V on Si, CIGS, etc. (stack)
   - **Perovskite on Si**

2) Tier 1 Labs (+ CSIRO (AUS), …)

Key consideration:
- how to prepare (or obtain) samples
- commercial (or pilot) products available ?

T2: Capacity Building

Activity Plans

Aiming to improve PV characterization techniques for all PV devices by providing assistance for characterization technology and **human-resource developments** to laboratories in the world-wide PV community.

Technical Training for PV characterization techniques

Webinar/Video	**PVMET Wiki**	**On-site Practical**
about a specific field for practioneers	detailed technical information	Short (1~3 m) or long (~1 y) term for exp. technical staff
list of potential topics	continued support	training programs/financing

Acknowledgement

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Thank you for your attention!