

Recommendations for priority activities to overcome existing quality challenges in the Indian PV sector

The recommendations were developed by the participants within the framework of the 'International Forum on Quality in the Indian Photovoltaic Sector' held on March 1st and 2nd 2023 in New Delhi

Description	Leading organisation	Organisations to be involved
Review and refine specifications on performance requirements for modules and inverters in tenders , specifically for Indian conditions. Reference should be made to international standards where available that can be adapted.	MNRE	NISE, SECI, IREDA, NTPC, PSUs
Support testing laboratories in building up services according to the new versions of the IEC standards for PV components (funding for equipment and capacity building).	MNRE	NISE CPRI and other labs, PTB
Support R&D on long-term durability and lifetime of modules.	Governmental organizations	Research organizations
Create a guidance document on the consideration of quality aspects throughout the lifecycle of a PV power plant, making reference to existing standards and regulations.	BIS / MNRE	All sector stakeholders.
Standardized and segregated training courses for managerial and technical Solar PV workforce (onsite, by skill level, available in various regions of India).	MNRE – HR Division	Skills Council for Green Jobs

Bankability, tendering, planning and design

Recommendations for priority activities to overcome existing challenges

Nr	Description	Leading organisation	Organisations to be involved
1	Review and refine specifications for performance requirements for modules and inverters in tenders, specifically for Indian conditions. Reference should be made to international standards where available that can be adapted.	MNRE	NISE, SECI, IREDA, NTPC, PSUs
2	Define responsibilities for quality assurance and build capacity on quality aspects within MNRE	MNRE	GIZ, KfW, PTB
3	Creation of a guidance document on the consideration of quality aspects throughout the lifecycle of a PV power plant, making reference to existing standards and regulations.	BIS / MNRE	All sector stakeholders.
4	Review and refine standards for mounting structures	BIS / MNRE	All sector stakeholders.

Manufacturing of cells, modules and inverters

Recommendations for priority activities to overcome existing challenges

Nr	Description	Leading organisation	Organisations to be involved
1	Support R&D on long-term durability and lifetime of modules	Governmental organizations	Research organizations
2	Development of standards for tests for second life application	NPL	BIS, IIT, NISE , PTB
3	Publish information on draft PV standards on the National Manufacturing Portal (or other platforms)	BIS	NISE ,IIT, GIZ PTB
4	Capacity building of in-house testing labs to make sure the manufacturers are aware of standard requirements	CII PTB	Module manufacturers, labs
5	Create a rating system for the performance of PV modules	NISE, BEE, BIS	Test labs, MNRE,
6	Support testing laboratories in building up services according to the new versions of the IEC standards for PV components (funding for equipment and capacity building)	MNRE	NISE CPRI and other labs, PTB

Installation, commissioning, O&M and monitoring

Recommendations for priority activities to overcome existing challenges

Nr	Description	Leading organisation	Organisations to be involved
1	Standardized and segregated training courses for managerial and technical Solar PV workforce (onsite, by skill level, available in various regions of India). Needs to be an accountability on site/ supply chain – time/cost pressures can cause neglect on this point.	MNRE – HR Division	Skills Council for Green Jobs
2	Develop and promote standardized methods for calibration of relevant equipment as well as data collection methods (especially for irradiation and output data).	MNRE	NISE
3	Review and refine criteria and process for commissioning Use available QI aspects in the country (IEC 62446 –1 –2- 3) and this should be included in the tender stage.	MNRE (proposed to develop and give guidelines) NTPC (Implementing) SECI (implementing) NHPC (implementing)	State Nodal Agencies SECI, IREDA, NISE, CEA

Abbreviations

BEE	Bureau of Energy Efficiency	MNRE	Ministry Of New And Renewable Energies
BIS	Bureau of Indian Standards	NHPC	National Hydroelectric Power Corporation
CEA	Central Electricity Authority	NISE	National Institute of Solar Energy
CPRI	Central Power Research Institute	NPL	National Physical Laboratory
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	NTPC	National Thermal Power Corporation
IIT	Indian Institutes of Technology	PTB	Physikalisch-Technische Bundesanstalt
IREDA	Indian Renewable Energy Development Agency	SECI	Solar Energy Corporation of India
KfW	Kreditanstalt für Wiederaufbau		

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BEE	Bureau of Energy Efficiency
BIS	Bureau of Indian Standards
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CPRI	Central Power Research Institute
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IIT	Indian Institutes of Technology
IREDA	Indian Renewable Energy Development Agency
KfW	Kreditanstalt für Wiederaufbau
MNRE	Ministry Of New And Renewable Energies
NHPC	National Hydroelectric Power Corporation
NISE	National Institute of Solar Energy
NPL	National Physical Laboratory
NTPC	National Thermal Power Corporation
PTB	Physikalisch-Technische Bundesanstalt
SECI	Solar Energy Corporation of India



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