



PV MODULETECH CONFERENCE

7 - 8 NOVEMBER 2017

Kuala Lumpur, Malaysia

MODULE SUPPLY, TECHNOLOGY, MATERIALS, QUALITY & BANKABILITY

Explained, qualified, certified & benchmarked

PRE-EVENT BROCHURE CONTENTS

- Leading global companies speaking at the event
- Keynote speakers & panellists on stage
- The full two-day conference agenda
- Topics & themes to be covered at the conference
- Companies & key executives to meet on-site

“PV ModuleTech 2017 is set to become the go-to annual event for all companies involved in the manufacture, testing, certification, insurance & deployment of megawatt scale utility solar in 2018-2020”

Finlay Colville,
Conference Chair PV ModuleTech 2017
& Head of Market Research at PV-Tech & Solar Media, Ltd.

Speaking & sponsorship enquiries

marketing@solarmedia.co.uk

Conference website

moduletech.solarenergyevents.com

Main event sponsors
& partners



MEYER BURGER





PVMODULETECH CONFERENCE

7 - 8 November 2017

KUALA LUMPUR, MALAYSIA

PV-Tech and Solar Media Ltd. announce
PV ModuleTech, a new conference
dedicated to understanding the critical
parameters behind the technology,
quality & reliability of PV modules
supplied to the global market today.

Some of the leading companies speaking



Keynote presentations from leading multi-GW module suppliers



Speakers confirmed from:



Other guest speakers to be announced

Attend also to hear PV-Tech's Finlay Colville deliver market forecasts & module supplier benchmarking analysis

CONFERENCE AGENDA

DAY ONE: 7 NOVEMBER 2017

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08:00-09:15 Registration and refreshments

09:15-10:30 WELCOME AND OPENING KEYNOTE SESSION: PV MODULE SUPPLY OPPORTUNITIES AND TECHNOLOGY DRIVERS

- PV-Tech Market Research – Finlay Colville – Global solar demand outlook and technology drivers
- LONGi Solar – Zhu Qiangzhong

10:30-11:15 DEFINING THE KEY FACTORS DRIVING MODULE SUPPLIER BANKABILITY

- Clean Energy Associates – George Touloupas – Quantifying Risk: Benchmarking of Suppliers based on Risk Scoring of Quality Assurance Monitoring Data
- DNV-GL – Frédéric Dross – Best practices for data-driven procurement of quality components

11:15-11:40 Morning break and networking

11:40-12:30 DEFINING THE KEY FACTORS DRIVING MODULE SUPPLIER BANKABILITY (CONTINUED)

- Black and Veatch – Ralph Romero – Reducing investor risk in module supply: the technical and commercial factors underpinning bankability studies
- Munich Re – Stefan Mathijssen – Reliable insurance of supplier warranty: a key feature of bankable PV modules

12:30-13:30 MULTI GIGAWATT C-SI MODULE SUPPLY IN A 100GW END-MARKET

- Canadian Solar – Alan Xu – Optimizing the design of 400 Watt PV modules
- Trina Solar – Lim Cheong Boom
- GCL Systems Integration – Zhang Chun – Development in mass production of multi-crystalline modules with diamond wire sawing of black silicon PERC solar cells

13:30-14:30 Lunch break and networking

14:30-15:30 MATERIAL CHOICE IN PV MODULES TO MAXIMIZE SYSTEM EFFICIENCY, LIFETIME AND RETURN-ON-INVESTMENT – PANEL DISCUSSION

- TÜV Rheinland – Miguel Labaru
- JinkoSolar – Andrea Viaro
- DuPont – Pai Rajoram
- Clean Energy Associates – Paul Wormser
- Cypress Creek Renewables – Jenya Meydbray

15:30-16:30 MODULE TECHNOLOGY FOCUS SESSION - PERC MODULE RELIABILITY IN THE FIELD

- Hanwha Q-CELLS – Jörg Müller
- PI-Berlin – Lars Podlowski – Accelerated lab testing for PERC degradation
- Panel discussion with Q&A

16:30-17:00 Afternoon break and networking

17:00-17:30 MODULE TECHNOLOGY FOCUS SESSION – THIN FILM

- First Solar – Lou Trippel – Thin film: rapid innovation with low risk

17:30 Session close

18:00-20:00 Evening drinks and networking reception

CONFERENCE AGENDA

DAY TWO: 8 NOVEMBER 2017

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08:30-09:00 **Welcome and refreshments**

09:00-10:10 **MODULE PRODUCTION EQUIPMENT AND MATERIALS TRENDS**

- Mondragon – Iñaki Legarda – Recent progress in module manufacturing equipment
- Coveme – Giorgio Longoni – Backsheets as an active material to improve PV module power output
- Meyer Burger

10:10-11:30 **CHARACTERIZING AND PREDICTING MODULE PERFORMANCE RELIABILITY**

- PV Lighthouse – Malcolm Abbott – Simulation and modelling tools: how they can be used in manufacturing to enhance productivity and yield
- BT Imaging – Ian Maxwell
- Eternal Sun – Marcello Passaro – Performance and reliability testing of High Efficiency module technologies
- Solinno – Rhett Evans – True module quality: developing module quality metrics for the PV industry

11:30-11:50 **Morning break and networking**

11:50-12:30 **MODULE TECHNOLOGY FOCUS SESSION – BIFACIAL MODULES: EXPLAINING THE TECHNOLOGY AND COMMERCIAL OFFERING**

- ISC Konstanz – Radovan Kopecek – Bifacial modules: technology overview and how to maximize performance benefits on-site
- Panel discussion with Q&A

12:30-13:30 **MANUFACTURING FOR EXCELLENCE AT THE MULTI-GW LEVEL**

- JinkoSolar – Daniel Chang
- DuPont - Rahul Khatri
- JA Solar – Helen Zhou

1330-1415 **Lunch break and networking**

14:15-15:30 **MODULE TECHNOLOGY FOCUS SESSION - BEYOND 5 BUSBAR MODULES: HALF-CUT, SINGULATED CELLS, SHINGLING AND MULTI-WIRE GRIDS**

- REC Solar
- CSEM – Antonin Faes – Moving from 5 busbar to multi-wire module interconnection: cost-reduction and performance benefits
- CEA-INES – Yannick Veschetti – Advanced module design and performance benefits
- Panel discussion with Q&A

15:30-16:00 **Afternoon break and networking**

16:00-17:00 **MADE-IN-INDIA MODULES FOR GLOBAL INDUSTRY DEPLOYMENT: UNDERSTANDING THE KEY SUPPLIERS, TECHNOLOGIES AND PRODUCT AVAILABILITY**

- IndoSolar – Paul Gupta
- Adani Solar - Srinivasamohan Narayanan – Bankable GW-levels of PV modules made in India from state-of-the-art cell and module production lines

17:00 Conference close

TOPICS & THEMES COVERED AT THE EVENT

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PV MODULE QUALITY, RELIABILITY & CERTIFICATION

The quality and reliability of PV modules continues to be one of the most scrutinized aspects of all PV module supply, with warranty offering seeing increased demands and guarantees in order to minimize risk during operation over 20-30 years.

As new manufacturers and technologies emerge also, third party certification will remain vitally important to protect financial returns to the investment community, and insuring that modules perform optimally in the field.

Module quality and reliability will be a recurring theme across all sessions at PV ModuleTech 2017, including the different routes in which module manufacturers are seeking to guarantee their product performance; and how third party bodies are seeking to verify these claims, or undertake their independent due-diligence and company auditing for bankability reporting.

- Certification, standards, and environmental consideration; how can the industry establish consistency across PV module manufacturing?
- Failure rate analysis of PV modules
- Component audits including: cells used; the supply of backsheets, glass, encapsulants, sealants
- The reliability of warranties and guarantees offered by module manufacturers going forward
- Factors used in bankability studies for module suppliers to large-scale sites

PV MODULE TESTING AND INSPECTION

In-house PV module testing is essential to ensure that efficient manufacturing processes are followed, but also to maintain the quality of the end product.

New testing and inspection processes have been developed in recent years to monitor different parts of the production stage, with the ultimate goal of ensuring reliability in the field.

PV ModuleTech 2017 will look at existing testing processes put in place by leading module manufacturers, and how new developments are poised to improve reliability further in coming years.

- Equipment and processes currently used in factories for module testing
- In-line vs batch testing for efficiency measurements
- PID/LID testing to guarantee long-term performance levels in the field
- Trends and developments in equipment and processes used for testing
- Faults testing across module the manufacturing process
- Tests for micro-cracking, and measures that can be taken to minimize this fault mechanism
- Simulation and modelling tools, and how they can be used in manufacturing to enhance productivity and yield

INNOVATION & TRENDS IN PV MODULE DESIGN & ARCHITECTURES

PV module supply remains highly diverse today, with many module designs and technologies being employed by several hundred module manufacturers, and with most seeking to introduce differentiation within the manufacturing process to increase market competitiveness.

Presentations during both days of PV ModuleTech 2017 will cover the key technologies and trends across PV module manufacturing, and how new production equipment, materials and process flows are impacting on module performance and specification roadmaps, and why downstream developers and EPCs need to be aware of what's on the market today from GW-level module suppliers.

- Module manufacturing requirements for mass production of >400W panel supply
- Drivers for 48, 60, 72 & 96-cell modules, and the impact on manufacturing, equipment and material supply
- Bifacial module performance and module production challenges

TOPICS & THEMES COVERED AT THE EVENT

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- Glass-glass module design parameters, and supply-chain requirements
- Half-cut and singulated-cell module technologies, and capital equipment requirements
- Solar shingle manufacturing challenges and performance targets
- Thin-film panel technology innovation from established suppliers; what technologies and processes from thin-film companies can create value-added propositions for EPCs

PV MODULE DEMAND FROM A DIVERSIFIED 100GW GLOBAL END-MARKET

The PV industry is moving at a rapid pace towards a 100 GW global end-market, with an increasing number of countries requiring module supply. Understanding this landscape is a fundamental requirement of all module suppliers, and which modules are best suited for deployment in harsh operating environments.

Presentations will discuss the pull on module supply to the industry, defining the opportunities for module suppliers, with market sizes and segmentations, and how this ultimately defines the parameters for module supply manufacturers and equipment/materials suppliers.

- Which countries and end-markets are driving different module technologies?
- How much demand is coming from rooftops and ground-mount, and which module technologies are best suited for these applications?
- What is the split for modules going into harsh environments, and how does this impact on module design and specification?
- How do the channels to market (distributors, installers, EPCs) impact on module requirements and pricing, and production processes in manufacturing?
- Pricing trends for modules across different countries and segments
- What will the module demand landscape look like in 2020; which module technologies will see increase market-pull and why?

PRODUCTION EQUIPMENT & PROCESSING TRENDS IN MODULE MANUFACTURING

Capital equipment for PV module manufacturing continues to evolve with the demand for increased line throughputs, while module line capex has been declining to well below 10c/W in recent years. The supply of production equipment is still a blend of Chinese and European supply, with European equipment suppliers driving new module line availability across India and other emerging end-markets.

Session talks at PV ModuleTech will review new capital equipment being used in state-of-the-art module fabs today, and how this translates to increased productivity at lower cost. With module production currently the highest cost stage in c-Si manufacturing, knowing where the bottlenecks are and the equipment/processes being implemented is now of vital importance to the industry.

- Process flow improvements to overcome module assembly bottlenecks
- Economy-of-scale benefits from multi-GW module production
- Capex trends for module production lines
- Turn-key production line market adoption and new technologies being incorporated
- Benefits from contract module manufacturing, and the use of OEM brand supply
- New automation tools, and cost benefits for PV module producers
- Moving to module production costs below 10c/W, and the role of equipment/materials suppliers in driving this transition
- Equipment supply to regional markets that are promoting domestic module assembly for local deployment

TOPICS & THEMES COVERED AT THE EVENT

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ADVANCES IN MATERIALS USED IN MODULE MANUFACTURING

As the PV module market becomes increasingly competitive and manufacturers look to differentiate their products, efficiency and performance gains from materials has become an important area of focus.

Advances in manufacturing techniques, and materials used, also provide opportunities for further cost reduction.

Presentations at PV ModuleTech 2017 will examine key materials used in PV module manufacturing currently, including preferred supply chains. The talks and discussions will also consider some of the emerging trends in materials and showcase some of the latest developments.

- Trends in the reflectivity of backsheets and glass in order to maximise total internal reflection
- Development of hybrid POE/EVA encapsulants and other potential new processes, such as UV down-conversion
- The use of new module architectures and assembly methods, including new concepts such as Tpedge modules
- The development and use of new materials in manufacturing modules to enhance overall performance

PANEL POWER OPTIMIZATION & MAXIMIZING END-USER RETURNS

Maximizing the performance of PV modules is becoming a key differentiator in the market-place, with companies increasingly optimizing module performance for specific applications or project locations.

Technologies and processes to decrease cell-to-module (CTM) losses have made large inroads into PV manufacturing in the past few years, moving to 4 and 5 busbar designs, with some manufacturers implementing grid-based cell interconnection schemes.

Sessions at PV ModuleTech 2017 will review the new technologies and trends being implemented within modules to improve performance in the field, and quantifies the returns on investments that are on offer to installers and EPCs.

- What technologies and processes are being implemented to reduce cell-to-module losses at the module assembly stage?
- What other benefits are on offer from multi-busbar and grid interconnection techniques?
- Which PV module manufacturers are driving the 'smart' PV module of tomorrow, and what equipment and suppliers are behind this transition? Includes smart power electronics technologies at the module assembly level.
- What is the return-on-investment for installers and EPCs, and how to define the performance/cost ratio in GW-level PV production?

BENCHMARKING THE MODULE SUPPLIER LANDSCAPE

Performance metrics to benchmark module suppliers remain a key focus of PV manufacturers, backed up with technical facts and figures underpinning the quality and reliability of products offered to the market.

Again, this theme will be tackled frequently during the two days of PV ModuleTech 2017: how manufacturing metrics are being used; how module suppliers can be ranked by technology expertise, use of state-of-the-art production equipment and materials, and traceable component supply and verification; what do we mean by quality rankings and bankability studies, and how reliable or useful are they in practice?

- What technical metrics are being used by PV manufacturers to support brand and quality in the market-place?
- Is there a case for splitting performance metrics for PV modules used for rooftop and utility scale applications?
- What parameters are being used by equipment and materials suppliers to support module supplier reliability claims?
- Which PV module manufacturers are emerging as the leading suppliers of multi-GW supply to the end-market out to 2020?
- How are independent engineers performing bankability studies?