DAY 1: TUESDAY 13 MARCH 2018

08:00 – 09:00 Registration & refreshments

09:00 – 09:15: CONFERENCE WELCOME & PV MANUFACTURING OVERVIEW

MODERATOR: **David Owen,** CEO, **PV-Tech & Solar Media Ltd**

Finlay Colville, Head of Market Research, **PV-Tech & Solar Media Ltd**

- *Cell technology trends impacting the 100GW-plus landscape*

The opening talk at PV CellTech 2018 will provide a comprehensive overview of the technologies that have driven annual production levels to the 100GW mark in 2017. This will include an overview of the leading producers through the entire value-chain from polysilicon to modules, with both c-Si and thin-film approaches.

Contributions from p-type mono and multi, and n-type will be provided, with forecast for the next 2-3 years, with market-share allocations from diamond-wire cut multi wafers, black-silicon, PERC and the different n-type architectures being ramped up by new entrants today.

The presentation will also cover module shipments and end-market demand projections, including trends in 60/72-cell modules, half-cut cells and bifacial design.

09:15 – 10:45: PLENARY SESSION – WHY P-TYPE MULTI CONTINUES TO DOMINATE SOLAR CELL MANUFACTURING

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Yuepeng Wan, Chief Technology Officer, **GCL Poly**

- *Development of silicon materials to boost solar cell efficiency*

Guaqiang Xing, Corporate Vice President - Technology, **Canadian Solar**

- *Multi-PERC: the next technology wave sweeping the PV industry*

Alison Ciesla, Project Leader – Industry Collaborations, ARC Centre of Excellence in Advanced Silicon Photovoltaics & Photonics, **University of New South Wales**

- *Overcoming multi-PERC light-induced degradation: impacts & solutions*

Jiang Sheng, R&D Center, **GCL System Integration**

- *Multi-crystalline mass production roadmap for 21% efficiency PERC cells & >300W modules*

Recognizing the continued market-dominance of p-type multi in 2017, the opening plenary session at PV CellTech 2018 will have presentations from leading proponents of p-type multi that have been pivotal to the advances in multi in the past few years.

The p-multi segment has reacted strongly to the threat from p-mono in the past few years, and this can be seen in the market today with the rapid transition to diamond wire saws becoming mainstream for p-multi wafering, the shift in cell production to black-silicon concepts, and the implementation of PERC in China for multi cells.

This session will examine how multi stays competitive in the market during 2018 and beyond, and reaching efficiency levels way above what was thought possible from the technology just a few years ago.

10:45 – 11:20: Morning break & networking

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11:20 – 12:10: FOCUS SESSION - PRODUCTION EQUIPMENT & MATERIALS FOR ADVANCED CELL ARCHITECTURES

MODERATOR: **David Owen,** CEO, **PV-Tech & Solar Media Ltd**

Gunter Erfurt, Chief Technology Officer, **Meyer Burger**

- *Driving p- and n-type solar cell manufacturing beyond current cost, productivity & efficiency limitations*

Guangyao Jin, Chief Scientist, **DuPont Photovoltaic & Advanced Materials**

- *Evolution of metallization paste & its impact on cell technology development*

With the introduction of new cell types and investments in both p-type and n-type increasing significantly in the past few years, there is now new production equipment, process flows and materials being used to maximize line throughputs and conversion efficiencies.

This session will outline key equipment and materials availability, to meet the demands of new cell concepts, both as upgrades and for new capacity expansions.

12:10 – 13:15: N-TYPE SOLAR CELL MASS PRODUCTION AT THE GW LEVEL

MODERATOR: **Doug Rose,** Vice President – Technology Strategy, **SunPower Corporation**

Hyun Jung Park, Research Fellow – Solar R&D Laboratory, **LG Electronics**

- *n-type bifacial cell & back contact cell technology*

Liyou Yang, CEO, **Jinergy**

- *Mass production technology of heterojunction solar modules*

Zhi Yang, Jolywood

- *Jolywood's role in driving n-type cell production to the multi-GW level*

Until a few years ago, only SunPower and Panasonic (former Sanyo operations) had been pioneering premium n-type solar cell production. This changed when Yingli Green installed capacity in China, and LG Electronics set up new manufacturing capacity in South Korea.

LG Electronics has established some of the most advanced n-type cell capacity in the world, implementing novel process flows and creating dedicated in-house research activities supporting its GW-scale manufacturing.

Investments into n-type capacity in China over the past 12 months have been huge, and driven by government mandates for high-efficiency cell production to supply premium performance modules for domestic consumption. New factories have been built, specific to n-type PERT, heterojunction and back-contact concepts, including companies such as Jinergy, Jolywood and GCL System Integration.

This session will showcase the leading n-type companies driving advanced cell manufacturing to the multi-GW level during 2018-2019. Understanding the progress of these companies and plans to expand beyond the GW level is now critical to the entire p-type cell community, in terms of cost and efficiency benchmarking.

13.15 – 14:15: Lunch break & networking

DAY 1: TUESDAY 13 MARCH 2018

14:15 – 14:45: MONO IS THE FUTURE!

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Xie Tian, Director of Wafer Quality Management, **LONGi Solar**

- *Mono wafer supply at the 50GW-plus level*

More than 50GW of mono wafers are set to be produced in 2018 a factor of six higher than mono production just five years ago. Covering both n-type and p-type, this increase in mono pullers (almost exclusively installed in China) has been the key factor in the growth in p-type mono PERC and the new investments going into n-type cell capacity.

Incredibly, despite this massive growth in mono wafer supply, there remains a shortage of mono wafers on the market as we enter 2018.

Understanding the quality level of the new mono ingot capacity and wafer supply remains critical, with performance levels from mono cells moving well above 20% in mass production now. Knowing also what supply levels will be available in 2018-2019 is essential for capacity expansion plans, and to establish exactly which companies will be the ones that are the first movers to meet the demands from the new n-type lines in China.

14:45 – 15:45: OPTIMIZING NEXT-GENERATION N-TYPE PRODUCTION LINES (PART 1)

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Ingrid Romijn, Program Manager Bifacial PV, **ECN**

- *Novel passivating contact technologies for bifacial solar cells*

Omid Shojaei, CEO, **INDEOTec**

- *Holistic approach for HJT cell manufacturing: simplification & cost reduction*

Anis Jouini, CEO, **CEA-INES**

- *Pushing the limits of industrial n-type solar cells: productivity, efficiency & bifaciality*

The success of many of the new n-type entrants in China today remains heavily dependent on the knowledge base that exists within research institutes and with leading production equipment suppliers.

For many years, Europe has been a leading voice in terms of n-type knowledge in the solar industry, across different research labs and equipment suppliers.

Divided up into two sessions over the different days of PV CellTech 2018, we will hear from the companies and research institutes that have been pivotal to the new phase of n-type investments, and that continue to drive process innovation that is essential to ensure that new entrants have a clear benefit in terms of efficiency, when compared to the progress being made from p-mono PERC manufacturing.

15.45 – 16:15: Afternoon break & networking

DAY 1: TUESDAY 13 MARCH 2018

16:15 – 18:00: PERC AT THE MULTI-GW LEVEL; WHAT-NEXT AFTER PERC!

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Wei Shan, CTO, **JA Solar**

- *Cell technologies after PERC*

Raymond de Munnik, VP Business Development, **Semco**

- *The ultimate technology brick for p-type & n-type cells*

Kang Cheng Lin, R&D Vice General Manager, **Aiko Solar**

- *The next step for mono-PERC*

Joris Libal, Project Manager Technology Transfer: Advanced Cell Concepts, **International Solar Energy Research Center Konstanz**

- *Cell bifaciality: driving down costs with new cell capacity & upgrades to Al-BSF production lines*

Shubham Duttagupta, Head of Monocrystalline Silicon Wafer Solar Cell Group, **Solar Energy Research Institute of Singapore (SERIS)**

- *SERIS' monoPoly™ technology: the next upgrade after mono-PERC*

One of the most common questions in the PV industry today is: What next after mono PERC? This question has been debated many times in the past two years actually, and while the n-type sector is going through an investment boom, the installed p-type mono PERC capacity is now working out the best way to move to the next efficiency and performance level.

Various upgrade routes are currently at the R&D and pilot-line stage, including half-cut cells, bifacial capability, moving to advanced wire interconnection methods, and passivated contacting.

This session will hear from different groups of stakeholders, proposing some of the options to move beyond PERC as part of the next major upgrade route for cell manufacturers.

18:30 – 20:30 Drinks reception & networking

DAY 2: WEDNESDAY 14 MARCH 2018

09:00 – 11:00: CELL MANUFACTURING GLOBALIZATION & PROFITABILITY SESSION

MODERATOR: **David Owen,** CEO, **PV-Tech & Solar Media Ltd**

Holger Neuhaus, Director Innovation & Technology, **SolarWorld Industries GmbH**

- *From Lab-to-Fab: continuous innovation in high-volume PERC manufacturing*

Srinvasamohan Narayanan, Technology Advisor, **Adani Group**

- *The return to global solar cell production: meeting the demands in a post-100GW production world*

Chung-Han Wu, CTO, **Boviet Solar**

- *The competition of cell technologies, from the point of view of a Southeast Asia PV manufactu*

As the PV industry moves to a new era of 100GW-plus annual deployment, and an increased number of countries and end-markets move to the multi-GW level of demand, the industry is likely to see a redistribution of cell and module capacity being installed globally.

The timelines for this may indeed be accelerated by the constant trade barriers and restrictions being imposed upon origin-of-manufacture. Almost every solar manufacturer is fighting to keep supply channels open to as many different markets as possible, and avoid anti-dumping of import tariffs being applied.

This session will hear from some of the companies that have been adding new cell capacity outside China in the past few years, or have been pushing technology upgrades to remain competitive. The goal will also be to evaluate the next steps for Vietnam based cell capacity, what is possible for new investments within India for the next 4-5 years, and how Europe and the US can establish growing levels of domestic manufacturing capacity during the period 2020-2030.

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Basma Amezian, Business Development, **Singapore Solar Exchange**

- *Pricing trends in c-Si manufacturing*

Paul Gupta, Managing Director, **Indosolar**

- *Challenges to overcome to enable global PV manufacturing with profitability*

The second part of this session will address the economics of solar cell manufacturing today. Is there still a viable business model for pure-play cell manufacturing, given the sheer volume of new capacity being added in China by the likes of Tongwei, for example?

Pricing trends through the value-chain will be examined, including mono and multi, and high-efficiency versions. This will be compared to cell processing costs, and targets that are likely to be required for new n-type entrants in 2018 and beyond.

MODERATOR: Finlay Colville, Head of Market Research, **PV-Tech & Solar Media Ltd**

Gordon Deans, Founder & Chief Operating Officer, **Aurora Solar Technologies**

- *Enhancing quality control in PV cell production*

11:00 – 11:20: Morning break & networking

DAY 2: WEDNESDAY 14 MARCH 2018

11:20 – 12:FUTURE OF SOLAR CELL MANUFACTURING

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Martin Green, ARC Centre of Excellence in Advanced Silicon Photovoltaics & Photonics, **University of New South Wales**

- *PV manufacturing ten years back & ten years forward: key R&D trends that have continue to drive mass production cell metrics*

Pierre Verlinden, PV Technology Expert

- *Moving to Terawatt levels of annual solar cell production: aligning research, technology & production roadmaps*

Andreas Bett, Director of Fraunhofer ISE, **Fraunhofer ISE**

- *Challenges for silicon photovoltaics*

Solar cell manufacturing now sits at a critical stage in its evolution, with investments at the multi-GW scale being announced regularly, and new technologies such as PERC, being moved from R&D to mass production at a rapid pace.

This session sees some of the most respected and acknowledged industry experts give their views on how the industry has exploited R&D achievements in the past decade to reach 100GW with 20% cell efficiencies widespread.

The speakers will also give outlooks as the next range of cell platforms that could see adoption as leading concepts over the next 5-10 years and – crucially – what needs to happen in order for the industry to successfully move to these next technology and performance nodes.

The session is almost certainly going to be an unmissable part of PV CellTech 2018, and will likely spark many new and ongoing discussions way beyond the two days of the event.

12:45 – 13:15: PANEL DISCUSSION: WHAT THE DOWNSTREAM SEGMENT NEEDS FROM UPSTREAM CELL TECHNOLOGY INNOVATION

MODERATOR: **Chuck Sutton,** Vice President – FBR Polysilicon Sales, **REC Silicon**

Jenya Meydbray, Vice President of Solar Technology, **Cypress Creek Renewables**

Guest panelist, 8minutenergy Renewables

This new session feature at PV CellTech will address some of the key issues that R&D specialists need to be aware of in terms of their technologies being fully adopted by downstream channels for mega-scale solar projects. Typically it takes several years from pilot-line acceptance to multi-GW mass production, and it is only recently that global developers and EPCs have built up experience using PERC-based modules.

If some of the new n-type based companies are looking to have strong global shipment coverage in the next few years, there are likely some key messages that will emerge from this session that can be fed into development plans during 2018.

13.15 – 14:15: Lunch break & networking

14:15 – 15:15: OPTIMIZING NEXT-GENERATION N-TYPE PRODUCTION LINES (PART 2)

MODERATOR: **Bruce Lee,** Global Applications Manager – Photovoltaics, **MacDermid Enthone**

Christian Buchner, Vice President - Business Unit PV, **SCHMID Group**

- *Advanced doping technologies for high efficiency n-type cell architectures*

Jef Poortmans, Scientific Director, **IMEC**

- *n-PERT & beyond*

Feng Li, Deputy General Manager of Technology Center, **Yingli Green**

- *Development of n-type bifacial solar cells in mass production*

This session forms part 2 of the n-type equipment and R&D focus, from leading voices driving current expansions and technology upgrades.

DAY 2: WEDNESDAY 14 MARCH 2018

15.15 – 15:45: Afternoon break & networking

15:45 – 16:30: TECHNOLOGY INNOVATION & ROADMAPS FROM THE INDUSTRY'S LEADING CELL PRODUCERS

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Hongbin Fang, Director of Technical Marketing, **LONGi Solar**

- *23%+ efficiency mono-PERC: leading the way to lower LCOE*

Qi Wang, Chief Scientist, **JinkoSolar**

- *Crystalline-Silicon PERC solar cell fab research & manufacturing*

PV CellTech would not be complete, without hearing directly from the senior technology advocates of the leading cell producers in the PV industry today.

This session will feature three of the largest cell producers in the industry, and companies that have been particularly influential in driving new technologies as a result of strong R&D investments.

Production cost and efficiency levels obtained by LONGi Solar, JinkoSolar and JA Solar set the benchmarks for the entire industry, and the companies have been driving both mono and multi GW-scale production, setting up overseas cell capacity, and developing n-type know-how in-house also.

Understanding exactly how these companies have achieved technology-leadership in the industry today, and what plans they have going forward, is critical for the whole industry including materials suppliers and equipment manufacturers.

16:30 – 17:00: PANEL DISCUSSION: DIRECT WAFERING STATUS UPDATE & PROSPECTS FOR 2018

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Adam Lorenz, Chief Technology Officer, **1366 Technologies**

Stefan Reber, Chief Executive Officer, **NexWafe**

Direct or kerfless wafering remains a highly attractive technology to drive wafer processing and costs to levels not currently available from the two-stage ingot/wafer steps used across the industry today.

In recent years, two companies have emerged as leading candidates to be the first-movers in the direct wafering space: 1366 Technologies and NexWafe.

This panel discussion session will enable the audience at PV CellTech to understand the potential cost savings on offer from direct wafering, and what factors they need to be tracking in order to stay abreast of the technology and proposed manufacturing capacity additions.

17:00 – 17:30: THE NEW ITRPV ROADMAP

MODERATOR: **Finlay Colville,** Head of Market Research, **PV-Tech & Solar Media Ltd**

Markus Fischer, Vice President R&D Operation, Hanwha Q CELLS; Co-Chair, **ITRPV Steering Committee**

- *ITRPV 9th edition: 2018; report release & key findings*

Back for the third time at PV CellTech, Markus Fischer will once again give the first airing of the very latest ITRPV roadmap. This feature at PV CellTech has been one of the most popular contributions at PV CellTech in the past, and the timing – at the end of the two days of talks – provides a perfect chance to compare the outcome from the leading manufacturers with what the ITRPV roadmap is predicting.

With the ITRPV roadmap also being one of the few platforms giving a long-term (10-plus years) forecast for PV technology, it will also be fascinating to see if any of the suggestions featured in our The Future of Solar Cell Manufacturing will show also in the ITRPV plans.

DAY 2: WEDNESDAY 14 MARCH 2018

18:00: THE 100GW PARTY, CO-HOSTED BY PV-TECH & UNSW

To celebrate the PV industry hitting 100GW of annual solar cell production, PV-Tech and the University of New South Wales are co-hosting the 100GW Party straight after the conference talks finish on Day 2.

The Party will include talks from special industry guests, live technology debates, a PV manufacturing quiz, and other activities (including drinks), making it the ultimate PV networking event of 2018!

The 100GW Party will provide the perfect way to gather thoughts after two days of fascinating talks, meet up with former colleagues and industry experts, and enjoy what is set to be a truly unmissable evening of solar fun and excitement!

Organised by PVTECH UNSW SYDNEY