

## News Release

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### FOR IMMEDIATE RELEASE

#### BT IMAGING INTRODUCES NEW PRODUCTION TOOLS TO INCREASE SILICON PHOTOVOLTAIC CONVERSION EFFICIENCY ACROSS THE PV SUPPLY CHAIN

##### *New Tools Provide a Complete Grading Solution for Cast Mono Wafer Manufacturing*

Sydney, Australia, May 10, 2012— BT Imaging Pty Ltd (BTi), the world's leading supplier of luminescence-based [inspection and quality control systems](#) for the photovoltaic (PV) manufacturing industry, today announced a suite of tools aimed at enabling PV wafer makers and cell makers to communicate and collaborate on achieving the best [cell efficiency](#). In addition, the suite of tools also enables [cast mono](#) manufacturers to accurately identify yield detractors and reduce cell efficiency spread. The suite of tools includes: the next-generation iLS-W2 for on-the-fly photoluminescence (PL) inspection of electrical wafer quality; the all-new iS-G1 for inline cast mono grain inspection; a new automation unit, the iQ, that houses the iLS-W2 and/or iS-G1 so that existing production lines can be upgraded; and, the QS-W2, a fully integrated inspection tool that can automatically sort wafers. With this suite of tools, wafer makers and fully integrated PV manufacturers can inspect every wafer in production and understand its electrical performance before they make it into a cell, thereby commanding premium pricing for wafers and cells.

“With tight margins in the PV value chain, our customers are focusing on higher cell efficiency as a key differentiator,” stated Ian Maxwell, chief executive officer of BT Imaging. “In designing this suite of tools we had three important considerations. The tools all needed to be production ready, retrofittable into existing production lines, and enable customers to reap the efficiency benefits of cast mono manufacturing. I am very pleased that we can offer our customers the capabilities they seek.”

#### **Achieving the Best Cell Efficiency Across the Supply Chain**

Historic and continued drops in subsidies combined with supply and demand and competitive dynamics have significantly compressed margins in the solar value chain. Higher cell efficiency has become a key factor to differentiation and profits. The next-generation iLS-W2 enables wafer makers and cell makers to communicate and collaborate on achieving the best cell efficiency.

The iLS-W2 inspects and grades the electrical quality of silicon PV wafers at full wafer line speeds using PL imaging and integrated image processing algorithms. Unlike competitive tools, the iLS-W2 offers on-the-fly inspection at 3,600 wafers per hour—a 2x increase over the iLS-W1. In addition, the iLS-W2 has a modular compact design that enables it to easily integrate into any wafer inspection system. With cell makers setting higher specifications for wafer makers, the iLS-W2 has been specifically designed with a universal grading system to help PV manufacturers determine wafer specifications based on grading and then sort wafers at the end of the wafer manufacturing line. Demonstrating and understanding electrical wafer quality is an important metric across the supply chain. Sorting wafers according to electrical performance allows wafer makers to command premium pricing. Fully integrated manufacturers can optimize their processes efficiently, and cell makers are able to buy wafers based on value. The iLS-W2 is capable of grading as-cut multi-crystalline and cast mono wafers, with the ability to grade CZ mono silicon PV wafers being added in the near future.

### **PL Imaging Enables High-Yield Cast Mono Wafers**

In the drive to higher cell efficiency, cast mono silicon PV wafers are being seen as a major technology for the future of wafer manufacturing in the solar industry. As wafer producers migrate capacity to cast mono, they have to contend with new yield challenges. The main benefit of the mono-like wafer is that an alkaline texture process can be used which increases the cell efficiency by about 0.5% absolute—a significant gain. Thus, the current industry practice is to manually sort wafers based on the fraction of mono-crystalline area in a wafer. Grade A wafers sell at up to a 50% premium (to standard multi) since the 0.5% efficiency gain can be achieved from the alkaline texture.

Even though the Grade A wafers look optically perfect, there is often a wide efficiency spread due to defects like dislocations that go undetected by standard optical inspection technologies. With BT Imaging's new suite of tools, manufacturers can efficiently grade cast mono wafers. The iS-G1 is an optical inspection module, which grades wafers based on mono area fraction. The iLS-W2 is a PL module, which grades mono-like wafers based on dislocation count. Both of these modules can inspect wafers on the fly at the end of the wafer manufacturing line or beginning of a cell line, and sort wafers according to their electrical quality and value. Together the iS-G1 and iLS-W2 provide a complete grading solution for cast mono wafers.

### **Complete Production Solution**

Existing production lines can easily integrate the iLS-W2 with any wafer inspection system. The new iQ automation unit can be retrofitted into existing wafer lines to enable grading with the iS-G1 and the iLS-W2. This compact automation unit contains an internal belt which moves the wafer under the iLS-W2 for inspection. The iQ has adjustable belt height, flexible handshaking, and supports any communication protocol, enabling it to be easily installed between any wafer inspection system and sorter system in a factory. The QS-W2 is a stand-alone sorter which automatically loads and sorts wafers with the iS-G1 and iLS-W2.

**BT Imaging Introduces New Tools.....Page 3 of 3**

Tools are shipping from July 2012. BT Imaging is accepting orders now. The iLS-W2, iS-G1, iQ, and QS-W2 will be on display at BT Imaging's booth – Hall E4, Stand 635 – at the 6<sup>th</sup> SNEC Power PV Expo in Shanghai, China from May 16 through May 18. For more information, or to request a demo, please contact Wayne McMillan, vice president of sales and marketing at [wayne.mcmillan@btimaging.com](mailto:wayne.mcmillan@btimaging.com).

**About BT Imaging**

BT Imaging designs and develops luminescence-imaging systems for the photovoltaic manufacturing industry. BT Imaging's systems are used for research, product and process development, production manufacturing inspection, and quality control of silicon blocks, wafers, photovoltaic cells and photovoltaic modules. Originally developed at the world-leading Centre of Excellence for Advanced Silicon Photovoltaics and Photonics at the University of New South Wales, by Thorsten Trupke, BT Imaging's chief technical officer, and Robert Bardos, the company's vice president of research and development, BT Imaging's patented photoluminescence technology uniquely allows real time electronic inspection of every wafer or solar cell processed through a manufacturing line. Headquartered in Australia, BT Imaging has a world-class R&D centre with close ties to the University of New South Wales; a sales and marketing operation based in California; and distributors in Japan, Korea, Taiwan, China and South East Asia. BT Imaging's management team brings together outstanding expertise in semiconductor physics, chemical engineering, photovoltaics, image processing, inspection, and yield.

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