

# AZonic Solar

## Low Cost Manufacturing of CIGS Photovoltaic Cells

AZonic Solar is an energy development company whose mission is to achieve grid parity using a chemical vapor deposition (CVD) process tool for the high-volume manufacturing (HVM) of copper indium gallium diselenide (CIGS) photovoltaic (PV) cells. Presently, PV-generated power is approximately twice the cost of that generated by the dominant peak load source, natural gas. This price difference is the primary factor limiting the widespread acceptance of solar energy for terrestrial electrical power generation. The goal of achieving "grid parity," defined as PV generated power equaling the cost of that generated by the present dominant peak-load technology, is projected to occur in the U.S. by 2015 as a result of the Solar Initiative America program. AZonic Solar intends to be a leader in this effort by greatly reducing the cost of manufacturing while increasing the electrical power output of CIGS PV cells.

### Technology

Although technology is available today for manufacturing photovoltaic cells, new technologies which reduce the cost-per-peak-watt of these components and the Levelized Cost of Energy (LCOE) for facilities are highly desired. AZonic Solar's chemical vapor deposition (CVD) technology uses very pure, low cost sources of copper, indium, gallium, and selenium and then mobilizes these sources with an inexpensive gas. The mobilized material contacts an inexpensive large area substrate (glass) resulting in the deposition of the CIGS PV cell. This CVD technique will reduce the manufacturing cost of CIGS PV cells by at least 50% on an area basis. Further, the CVD technique is ideal for the formation of highly efficient PV cells with efficiencies in excess of 30%. The combination of low cost manufacturing and high efficiency PV cells will reduce the cost-per-peak-watt by more than 80% for CIGS PV technology.

### Market Potential

The market for copper indium gallium diselenide (CIGS) deposition equipment is projected to grow from \$23 million in 2008 to \$350 million in 2015. Assuming that a chemical vapor deposition (CVD) process tool for CIGS is introduced in 2012, revenues in excess of \$250 million are anticipated for the sales of such a tool over the 2012 to 2015 time period. Such sales represent a 6% share of market served in 2013 growing to 50% in 2015. The low cost per watt of manufactured CIGS PV cells from CVD is anticipated to drive the CVD deposition tool to a dominant presence in the market place.

### Strategy

The company plans to further develop and improve the technology working in conjunction with researchers at the University of Florida and other strategic partners. Once completed, the company plans to develop the technology into high volume manufacturing tools which will be sold to PV cell manufacturing companies worldwide.

# AZonic Solar

## Management Team

### **Douglas Meyer, Ph.D. - President**

Dr. Meyer has 25 years of experience in the semiconductor industry and a thorough understanding of management, marketing, and new business development. He is a recognized expert in the fields of chemical vapor deposition and epitaxy. Meyer has worked for some of the most notable semiconductor equipment companies in the world including Applied Materials, ASM, Watkins Johnson, ATMI and Centrotherm Thermal Solutions.

### **Michael Todd, Ph.D. – CTO**

Dr. Todd has more than 13 years of experience in the semiconductor industry. He is a recognized expert in the fields of chemical vapor deposition and precursor chemistries. Todd's previous employers include Rockwell Science Labs, ATMI and ASM.

### **Tim Anderson, Ph.D. – Technical Advisor**

Dr. Anderson is a distinguished professor of Chemical Engineering at the University of Florida. He has been at UF for more than 30 years. Anderson's research interests include electronics materials processing, thermochemistry, chemical vapor deposition, bulk crystal growth and photovoltaics.

### **Daniel Queyssac - Member, Board of Directors**

Mr. Queyssac is a 30-year veteran of the semiconductor industry. He has held top roles in corporate management and is the former President of ASM America and former chief operating officer of STMicroelectronics worldwide.

### **Armand Ferro, Ph.D. - Member, Board of Directors**

Dr. Ferro is 30-year veteran of the semiconductor industry and spent 10 years in corporate research and development. He is the former president of ASM Epitaxy and a former vice president for research and development at General Electric.

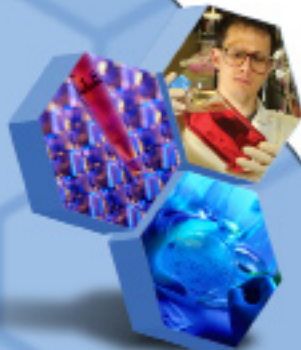
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