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Bifacial solar PV technology initiates a new pathway to future PV

In the recent development of the Photovoltaic market, an increase in demand for more efficient and cost-effective technology in order to compete against conventional energy sources and also other renewable sources of energy. In the last decade, Solar photovoltaic cells and modules through different structural and fabrication approaches have improved significantly in terms of efficiencies and power output. The efficiency value of crystalline silicon solar cells has approached the so-called Auger limit 29.4%. Efficiency values exceeding 22% which were feasible only with laboratory solar cells ten years ago can be achieved today with industrially produced structure, whereas prototypes already reach values above 26%. Manufacturers now a day are investigating the total value chain from the polysilicon to the kilowatt-hour. They are the main emphasis on higher efficiency, reliability production efficiency; power output and boosts system performance. Recently, PV manufacturers have increased the focus on improving efficiency with advanced cell architectures and module markers were interested in glass-glass module configurations. The move in particular towards mass production of PERC and other advanced cell technologies and transparent backside

products is now enabling solar's evolution to bifacial technology. The choice at the cell level to go bifacial is mainly between PERC, PERT, and heterojunction (HJT). However, PERC is clearly predominant, because it is now so widespread and almost has become a standard in today's p-type monocrystalline segment. Moving from PERC to bifacial technology is not only easy but also almost free for manufacturers as basically no additional cost is involved to turn a monofacial PERC cell into a PERC bifacial cell (it only requires to change the rear contact grid). But PERC comes with a caveat- and that is a lower facility of 70 to 80%. On the other hand, PERC and HJT, which are based on n-type and intrinsically bifacial in nature, have a higher facility of up to 90% and above 90%. Bifacial cells are more and more appearing on the market. However, the combination of plateauing peak efficiencies from standard screen printed solar cells and a significant reduction in the cost of solar glass in the recent years-making the use of double-sided glass encapsulation viable-has pushed bifacial solar modules back into the spotlight. Therefore, the bifacial PV looks to work its way towards a larger share of the PV market.

Biography

Utpal Gangopadhyay received his Master of Science (Physics) degrees from Kalyani University, Nadia, West Bengal in 1981. He received his Ph.D degree in "Solar Photovoltaic" also from Kalyani University in May 1989. He is around 30years research experience in the field of Mono & Multi-crystalline Silicon Solar Cells and Semiconductor related Device like V-Groove MOSEFT, μ -Si : H TFT, Silicon /porous silicon related Microsensors.. He worked as a Research Professor in the School of Electrical and Computer Engineering, Sungkyunkwan University, South Korea in the year 2001-2002 and a Research Scientists in Photon Semiconductor & Energy Limited Company, South Korea in the year 2002-2003 & 2004-2005 respectively. He is presently the Professor of Physics in Meghnad Saha Institute of Technology,

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