



**FlexTech Alliance Presents at
National Academy of Sciences in Washington, DC**

Dr. Mark Hartney, Chief Technology Officer for the FlexTech Alliance (www.flextech.org), recently spoke at a National Academy of Sciences (NAS) Symposium on *the Future of Photovoltaics Manufacturing in the U.S.* The day-long symposium, held in Washington, DC on April 23, 2009 was organized in cooperation with the U.S. Department of Energy. Dr. Hartney was part of a three-person panel on “Next Generation Flex Display Opportunities”, which also included the National Institute of Standards and Technology (NIST) and the Palo Alto Research Corporation (PARC).

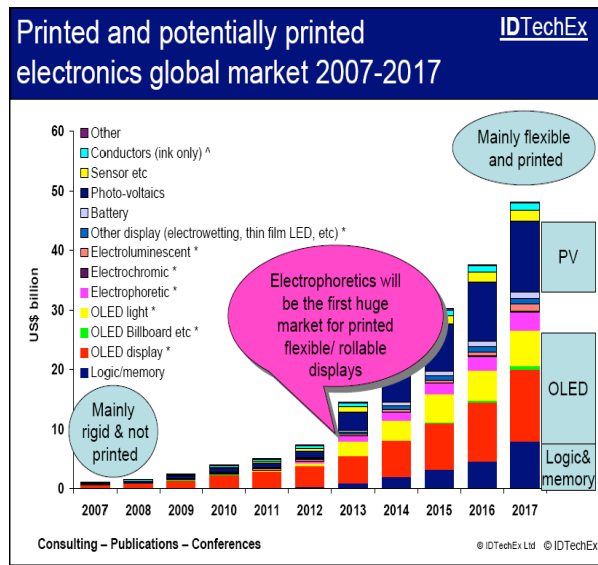
Other organization making presentations at the day-long symposium included Applied Materials, BP Solar, Dow Corning, DuPont, First Solar, IBM, IMEC, NREL, Solar Fields and SunPower. Capitol Hill was represented by Rep. Gabrielle Giffords (D-AZ) and Rep. Marci Kaptur (D-OH).

Dr. Hartney’s remarks, *New and Synergistic Opportunities in Flexible and Printed Electronics*, outlined how flexible, printed electronics – including flexible photovoltaics - represents an enormous economic and technical opportunity for U.S. manufacturers and its supply chain. As electronic products become larger, manufacturing methods must adapt. "Micro" and "nano" technologies are important, but device characteristics, e.g., ruggedness, low weight, and conformability, are more important in some applications. Essentially, the new products must be flexible, deformable and, eventually, low cost.

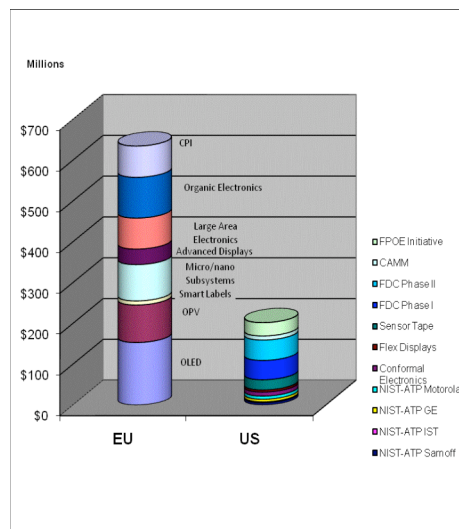
	Flexible & Printed Electronics	Silicon Electronics
Transistors	thousands	billions
Feature Sizes	10’s of microns	10’s of nanometers
Cost of Fab	~\$ 10M-\$200 M/fab	\$ 2-3 B/fab

The market opportunity for this diverse industry shows significant growth potential over the next 5-7 years, forecasted to reach nearly \$50 billion in 2017. One of the new equipment processes, roll-to-roll

manufacturing (R2R), offers significant advantages over processing of individual substrates, as it can be high speed continuous processing modularized for different unit steps or integrated into a complete line.



Supply chain investments are already being made in substrates, materials, barriers, tools, and processes. Challenges remain for the U.S. to effectively compete in today's global market. Principal among these challenges are increased R&D funding and developing prototypes. The EU is expected to outspend the U.S. in development by over \$500M from 2001-2013.



The other key factor to address for ultimate success in this arena is the transition from R&D to volume manufacturing of products. High volume production capability is achieved through investments in tooling and processes. These must be accompanied by investments in testing and quality control.

Dr. Hartney urged U.S. policy makers to gain widespread industry buy-in for much needed collaboration in common infrastructure development and more innovative manufacturing methodologies. Sustained

federal and state R&D commitments can ensure fundamental materials knowledge, support tools and processes, and early prototyping of critical needs that drive learning cycles. Consideration of a cross-agency federal initiative is warranted to facilitate cooperation and to move more quickly towards successful commercialization of flexible, printed electronics.

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