Catalyzing Innovation in PV Manufacturing

Brian R. Murphy, PhD
President & CEO

Solar Photovoltaics – An Industry in Transition
Solar PV Industry Growth

2009 Solar PV Shipments by Company

- First Solar
- Suntech
- Sharp Solar
- Q-Cells
- Yingli
- JA Solar
- Others

Annual Solar PV Shipments

* 2010 Navigant Consulting, Fulcrum Technologies Research

Venture Backed Growth and a hint of Irrational Exuberance
Solar PV Industry Growth

2009 Solar PV Shipments by Company*

- First Solar
- Suntech
- Sharp Solar
- Q-Cells
- Yingli
- JA Solar
- Others

Global Solar Installations Through 2015

- Others

Cataclysmic Industry Consolidation as Leaders Take Market Share

* 2010 Navigant Consulting
Wind Industry Growth

Global Wind Installations Through 2008*

- Nordex
- Vestas
- GE
- Gamesa
- Enercon
- Siemens
- Suzlon
- Others

Global Installed Capacity $23.9 \, \text{GW}_p$ in 2001 to $158.5 \, \text{GW}_p$ 2009*

* Wind Power 2009 – Spanish Wind Energy Association

* Global Wind 2009 Report – GWEC
Module Manufacturing

Yingli Solar

First Solar

Suntech

Q.Cells

Ja Solar

Sharp
Equipment
Supply Chain
Project Development & Installation
Niche Opportunities
Conclusions...

✓ Module manufacturers approaching 1GWp, strong balance sheet, corporate support ➔ continue to grow

✓ Module manufacturers in pre-production and low volume ➔ find strategic partner for acquisition

✓ Equipment manufacturers ➔ build on FPD, circuit board, and PV knowledge to develop tools optimized for high volume solar industry

✓ Supply chain ➔ strategic large customers, acquisitions to broaden product offering, develop products optimized for PV industry

✓ Niche products ➔ smaller market, potentially higher margins, the human mind knows no limits...