



**Pivotry Radiometer** is a free monthly newsletter about new developments in the solar renewable energy industry and based upon the “game changers” from the Pivotry Perspectives Workshops conducted by Wayne Chang, Ph.D. You are welcomed to share this newsletter with others.

**Pivotry Radiometer** is in four sections this month:

### Highlights from the Year 2009

#### **1. Game Changers**

It has been one year later since the original Pivotry Perspectives Workshop on solar PV “game changers” was first presented. The three highlighted game changers were New Materials, Hybrids & Integration, Standards & Roadmaps. These game changers achieved significant density in 2009, despite being in a crisis year of the worst global economic recession. Many companies introduced new innovative products and services; and examples have been described in previous Newsletters. Companies who were more vertically integrated, e.g. PV cell and panel manufacturing and installation, were able to control costs as a competitive advantage (ref-1.1). Many countries have also aligned with initiatives for creating Global PV Standards and Roadmaps (ref-1.2).

#### **2. Crossing the \$1/ Watt cost barrier**

One pivotal theme was the PV industry’s progression to reduce the manufacturing cost for modules to less than \$1/Watt. In 2009, First Solar became the first company to officially cross this barrier (ref-2.1). Some notable game changers included: using thin-film CdTe/CdS (new materials) over conventional Si; using hybrid inkjet-like very high rate film deposition; and vertically integrating cell and module manufacturing...as well as end of life recycling. First Solar reported (ref-2.2) their production run time to manufacture panels from “glass in” to “glass out” is less than 3hrs!

#### **3. Feed-in Tariffs (FIT)**

The solar PV industry growth is critically linked to feed-in tariffs. Spain throttled back its annual capacity to a cap of 500 MW in 2009, this represented an enormous reduction relative to 2.5 GW added in 2008. Combined with a frosty credit market in a global economic recession, the industry slammed into its first ever down cycle. 2009 has been a shakeout year with a significant number of panel makers losing money, and reducing manufacturing capacity. This caused overall panel prices to fall by as much as 30 to 40%. On the upside, Germany’s FIT program in 2009 saw an increase of 2.5 GW as investors bought in at the heavily discounted prices (ref-3.1). The Province of Ontario, Canada also launched a lucrative FIT program for 2009, and there is a domestic content requirement that is intended to provide economic stimulus but may also temper expectations (ref-3.2). More FIT programs are anticipated in the future. To also reinforce the importance of such programs globally, the SEMI PV Group has released in December a whitepaper on recommended best practices (ref-3.3).

#### **4. Top Ten Highlights and Perspectives**

The top ten solar trends and stories from Greentech Media (ref-4.1) and PV-tech.org (ref-4.2) show an interesting blend of global perspectives that are noteworthy...will 2010 be the same?

### **REFERENCES & LINKS**

- 1.1 <http://www.emasiomag.com/article-6537-chinesefirmsrideverticalintegrationtosolarcostleadership-Asia.html>
- 1.2 [http://www.pvgroup.org/NewsArchive/CTR\\_033052](http://www.pvgroup.org/NewsArchive/CTR_033052)
- 2.1 <http://investor.firstsolar.com/phoenix.zhtml?c=201491&p=irol-newsArticle&ID=1259614&highlight=>
- 2.2 <http://www.csmantech.org/Digests/2009/2009%20Papers/007.pdf>
- 3.1 <http://www.reuters.com/article/idUSTRE5AM36E20091123>
- 3.2 <http://www.renewableenergyworld.com/rea/news/article/2009/10/ontario-fit-program-off-to-a-cautious-start>
- 3.3 [http://www.semi.org/en/Press/ctr\\_033439](http://www.semi.org/en/Press/ctr_033439)
- 4.1 <http://www.greentechmedia.com/articles/read/top-ten-solar-trends/>
- 4.2 [http://www.pv-tech.org/news/ a/pv-techs\\_top\\_10\\_stories\\_of\\_2009/](http://www.pv-tech.org/news/ a/pv-techs_top_10_stories_of_2009/)

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