



No time to panic: a solar history lesson

REALITY CHECK alert: really big scandals happen in other industries, all the time. So we must all keep a sense of proportion about solar's current woes, believes Paula Mints.

A handful of bankruptcies and it's easy to get carried away with the doom and gloom.

But it's not just the solar industry that is in the midst of challenging times. The whole world is currently edging (back) towards recession. Lingering effects of the financial industry scandals continue, with significant amounts right now being spent to subsidise the fallout (both pre- and post-scandal). Take Greece for example - significant Government (i.e. public) money is being spent right now to stop that country defaulting on its debts (although to what extent this will be successful is still up for debate).

In the past, scandals have enveloped **Enron**, **WorldCom**, **Tyco**, and **Rite Aid**, not to mention the derivative nightmare that brought about

a global recession in its wake (also revealing the *Madoff Ponzi* scheme).

While the solar industry is currently mired in problems, we mustn't forget that the debt crisis in Europe, which now includes Italy, and the potential default of Greece, have far more significance than that of a startup U.S. solar manufacturer with a total capacity of 0.277778% of total global PV manufacturing capacity.

The point is this: yes, there has been a string of unfortunate (and one very public) bankruptcies of solar companies in the U.S. (four at the last count, because as we go to press **Stirling Energy Systems** has become the latest casualty). But it is more important to understand the market environment that helped lead to them, and what the current market environment portends in this regard.

This is important particularly in the U.S. where well-needed funding is being cut from the **National Renewable Energy Lab (NREL)** in Golden, Colorado, and because the pendulum of investment (from all sources) in the U.S. into the solar sector has swung from one extreme to another in just a few weeks.

Learning from history - the early years

In the 2000 to 2010 period, the PV industry grew from Megawatts to Multi-Gigawatt level of shipments (and demand). This extraordinary feat is depicted in *figure 1*. But how did this level of growth happen?

In 1989 Germany introduced its *1000 rooftops program*, taking place from 1989 through to 1993, and though this program did not precisely lead to a boom in demand for solar technologies, it did increase interest and activity.

In 1994, the government in Japan announced its own rooftop residential program - also providing subsidies to its PV manufacturing sector. These two subsidy programs were right at the vanguard in terms of Government experiments to stimulate the market for solar, via artificial subsidy instruments. Also during this time, the first *Renewable Portfolio Standards* appeared in the U.S.

During the late 1990s, Germany's *100,000 roofs program* - along with zero

In the end, most companies with a value proposition...and that are lucky enough to have investment... will survive, though even some of these companies will fail.



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financing - drove the industry over the 100-MWp mark in shipments.

On the manufacturing side, discussions about potential upcoming polysilicon shortages began, and the industry started to take advantage of the economies of scale possible with 100-MWp worth of shipments. But it is important to remember that technology manufacturers **lost money - negative margins** - during this time. Significant R&D took place in large companies, oil companies as an example, as they positioned themselves to focus on the goal of a large, vibrant, profitable future market.

It is worth noting that in 1997, the first year the PV industry shipped more than 100-MWp, the total demand in the U.S. was 15.6 MWp, with total demand in Europe at 31.9 MWp (Europe demand was primarily into Germany).

Table 1 presents supply data; as well as shipments from regional manufacturers to the first point of sale (from 1990 through to 1999), along with average module prices (ASPs).

To the present day - 2000 to 2011

The Feed-in Tariff (FiT) model of incentives, which is the most successful instrument for stimulating demand in PV industry history, was first implemented in 2000. In February 2000, Germany implemented a 99 pfennig power production buyback for grid-connected PV systems, with a 20-year duration of payments.

Beginning in January 2002, the initial rate began to decrease by 5% per year until the end of the program. In 2004, the revision of the EEG (Germany's renewable energy Act) created an even more attractive market for solar, and other countries in Europe started to take notice of this market's success.

In the U.S., the renewable portfolio standards (RPS) - which broadly mandate utilities to use renewables - began expanding, though, with the deadline for RPS fulfillment not imminent and penalties for non-compliance often weak, these platform programs did little to drive demand at this time.

However, as deadlines for utility participation approached, utility

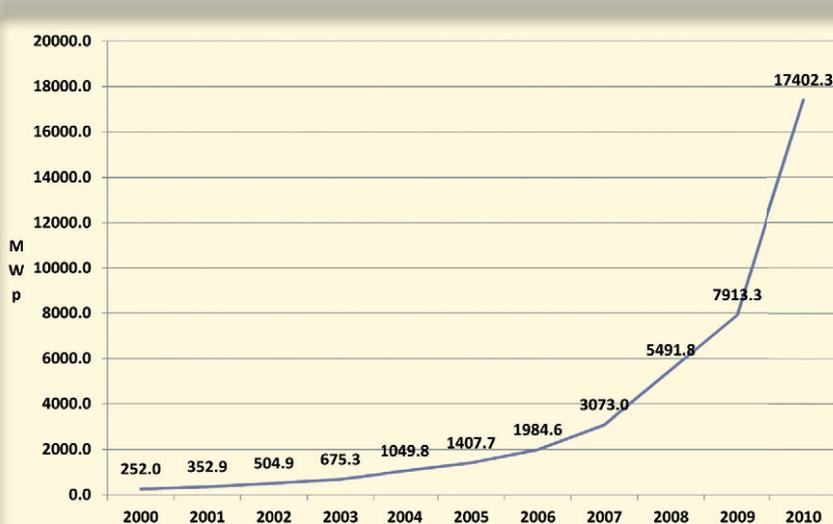


Figure 1: PV industry growth 2000 to 2010 (Copyright 2011 Paula Mints and Navigant)*

Year	Supply (U.S.) % of total	Supply (Europe) % of total	Supply (Japan) % of total	Supply (ROW) % of total	Supply (China/Taiwan) % of total	Total Shipments (MWp)	Average module prices (ASP)
1990	36%	21%	31%	13%	0%	42.6	US\$6.15
1991	35%	22%	31%	12%	0%	48.2	US\$5.90
1992	34%	26%	26%	14%	0%	54.1	US\$5.70
1993	40%	25%	22%	13%	0%	55.7	US\$5.20
1994	42%	24%	21%	13%	0%	61.0	US\$5.19
1995	43%	20%	20%	17%	<1%	71.5	US\$4.90
1996	43%	18%	22%	18%	1%	82.6	US\$4.15
1997	42%	18%	25%	13%	3%	114.1	US\$4.18
1998	38%	21%	27%	12%	3%	134.8	US\$3.55
1999	32%	17%	39%	10%	2%	175.5	US\$3.30

Table 1: Regional shipment shares and average module prices (ASPs) 1990 to 1999 (Copyright 2011 Paula Mints and Navigant)*

Year	Supply (U.S.) % of total	Supply (Europe) % of total	Supply (Japan) % of total	Supply (ROW) % of total	Supply (China/Taiwan) % of total	Total Shipments (MWp)	Average module prices (ASP)
2000	30%	23%	38%	7%	2%	252.0	US\$2.75
2001	27%	24%	41%	6%	1%	352.9	US\$2.65
2002	21%	24%	46%	5%	3%	504.9	US\$2.75
2003	14%	26%	52%	7%	2%	675.3	US\$2.65
2004	13%	26%	52%	5%	4%	1049.7	US\$2.90
2005	9%	29%	51%	5%	6%	1407.7	US\$3.03
2006	7%	31%	44%	5%	12%	1984.6	US\$3.39
2007	8%	32%	29%	5%	25%	3073.0	US\$3.50
2008	7%	31%	22%	8%	32%	5491.8	US\$3.25
2009	5%	18%	16%	14%	46%	7913.3	US\$2.18
2010	6%	15%	12%	14%	54%	17402.3	US\$1.48

Table 2: Regional shipment shares and average module prices (ASPs) 2000 to 2010 (Copyright 2011 Paula Mints and Navigant)*

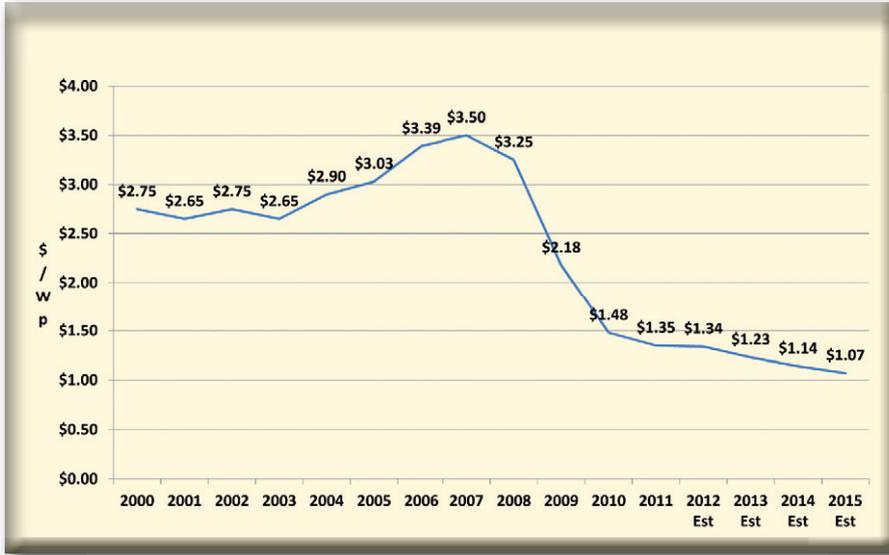


Figure 2: Average module selling prices (ASPs) from 2000 through to an estimate for 2015 (Copyright 2011 Paula Mints and Navigant)*

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activity stepped up. And at this time, the U.S. is a utility market – meaning that utilities buy the electricity produced. But incentives are still needed to stimulate demand.

During this period, FiTs proliferated across Europe, and in other countries such as South Korea, Japan and (to some degree) the U.S., prices increased, and, for the first time in PV industry history beginning in 2004, technology manufacturers enjoyed positive margins and profit.

Figure 2 presents average module prices from 2000 through to an estimate for 2015. The historical data in Figure 2 are hard, reflecting the global

average price to the first point of sale in the market.

What went wrong with solar?

As we all know however, sometimes, even though plans seem to be well laid out, things do go wrong, or, at least in a different direction much of the time.

In solar, FiTs drove the market sky high, and for a while, prices with it. As prices soared, startup manufacturers (and others) entered the industry, promising to drive costs down while maintaining profits.

Investors, enjoying the promise of trouble free returns from FiTs,

stimulated growth of the multi-Megawatt (utility scale) application. In addition, manufacturers in China announced plans to integrate from raw material through wafer and cell manufacturing, to module assembly and distribution.

Manufacturers in Taiwan, albeit a little more circumspect, focused on cell manufacturing. Though doubted by all, they succeeded in this regard. Considered together, manufacturers in China/Taiwan improved their share of global shipments from 2% in 2000 to 54% in 2010. The driver for interest by manufacturers in China/Taiwan (and for Government support in China), was the rapidly growing market in Europe.

From 2000 through 2010, demand in Europe for PV systems (primarily multi-Megawatt) grew by a compound annual rate of 69%. Europe’s demand growth is stronger than that of the compound annual growth for global shipments, which grew by 53% for the same period.

Shipments from China and Taiwan grew by a compound annual 39% for the period, with shipments from the U.S. declining by a compound annual 15%.

Table 2 presents shipment shares by region and ASPs from 2000 to 2010.

Table 3 presents European demand, global shipments and the shipment share of the U.S. and China/Taiwan from 2000 through 2010.

Great expectations, realistic outcomes

The current unfortunate spate of company failures can be traced back to the beginning of the solar boom. During this time individuals, companies from outside the solar industry, and entire countries (China for

Category	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	CAGR
European demand	74.1	120.0	172.6	232.6	472.4	676.1	1093.9	2178.7	4338.5	6568.0	13944.1	69%
Global Shipments	252.0	352.9	504.9	675.3	1049.7	1407.7	1984.6	3073.0	5491.8	7913.3	17402.3	53%
% Shipments China/Taiwan	2%	1%	3%	3%	4%	6%	12%	25%	32%	46%	54%	39%
% Shipments US	30%	27%	21%	14%	13%	9%	7%	8%	7%	5%	6%	-15%

Table 3: European demand, global shipments, 2000 to 2010 (Copyright 2011 Paula Mints and Navigant)*

Many new entrants, unfortunately, assumed that they could control price and cost, when in fact, neither are entirely in their control

example) viewed the market for solar as one that would exponentially increase annually - for many, many years to come.

Viewing the twin goals of all solar manufacturers - decreased manufacturing costs and higher conversion efficiencies - they, by-in-large, chose lower cost as a goal, and equating this goal with price, assumed that they could achieve their goals rapidly and with healthy margins. In fact, the need for margins has been largely publically ignored for the past five years in favour of the misunderstood goal of grid parity. The reality is that grid parity (which has many different meanings depending on whether it is whole-sale; retail; the region; or the level of subsidisation of conventional energy, to name a few) must float on top of margins. That is, a company must make money in order to, well, exist.

Many new entrants, unfortunately, assumed that they could control price and cost, when in fact, neither are entirely in their control. Many assumed that there would be a premium for solar energy or for efficiency, neither of which has been established. During 2009, when aggressive pricing for share was the tool (not unheard of historically in PV) of entry for the Chinese and Taiwanese manufacturers, they likely did not realise that they might be stuck with these prices for some time.

Proponents of the successful FiT incentive model obviously did not foresee that this instrument would be a) so difficult to control and b) so expensive to support.

The new entrants of just a few years ago must learn what the old guard knew before the few short years of easy incentives and healthy

margins gave way to the current uncertain market conditions and low margins.

They must learn to survive and thrive with a patchwork of uncertain incentives, many of which lack the key requirement for a thriving market - stability. They must find the allusive price-elastic customer - that is, the customer who will pay more for electricity generated from solar for philosophical reasons, or because for some reason they need the reliable electricity supplied by solar (one example of a potentially price elastic customer is mining operations. By contrast the off-grid customer is not price elastic).

In the end, most companies with a value proposition (a product that fits today's market), and that are lucky enough to have investment (meaning money) will survive, though even some of these companies will fail. The solar market is brutal, and the industry is still in startup mode. It needs and deserves public and private investment so that it can continue to develop its technologies.

Currently, the U.S. solar industry is suffering the slings and arrows of visible failures that happened on the eve of an election that promises to be brutal. The U.S. solar industry does not deserve to be fodder for either the media, or any particular party's political agenda.

***Author's note:** *All of the data and analysis used in this article is based on primary research, which is, no secondary sources, no other literature, et al, were used. No data were harmed in the analysis presented, which is based on classic market research principles.*

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ANNOUNCEMENT

IN THE UNITED STATES BANKRUPTCY COURT FOR THE DISTRICT OF DELAWARE

In re:)	Chapter 11
EVERGREEN SOLAR, INC. ¹)	Case No. 11-12590 (MFW)
Debtor.)	Related Docket No. 13

NOTICE OF AUCTION AND SALE HEARING

PLEASE TAKE NOTICE that on August 15, 2011, Evergreen Solar Inc. (the "Debtor"), entered into an agreement (the "Asset Purchase Agreement") to convey substantially all of the Debtor's assets (together, the "Assets") to ES Purchaser, LLC ("NewCo"), as more fully set forth in that motion for approval of the Asset Purchase Agreement and other related relief, filed with the United States Bankruptcy Court for the District of Delaware (the "Bankruptcy Court") on August 15, 2011 (D.I. 13) (the "Sale Motion"). The Debtor seeks to sell to NewCo or such other successful bidder(s) at an auction (the "Successful Bidder") the Assets covered by the Asset Purchase Agreement free and clear of all liens, claims, encumbrances and other interests pursuant to section 363 of the Bankruptcy Code, except as set forth in the Asset Purchase Agreement.

PLEASE TAKE FURTHER NOTICE that the terms and conditions of the proposed sale to NewCo are set forth in the Asset Purchase Agreement attached to the Sale Motion. The Asset Purchase Agreement represents the results of extensive prepetition marketing efforts conducted by the Debtor to obtain the highest and best offer for the Assets.

PLEASE TAKE FURTHER NOTICE that on September 9, 2011, the Bankruptcy Court entered an order (the "Bidding Procedures Order") approving the bidding procedures (the "Bidding Procedures"), which set the key dates and times related to the sale of the Assets under the Asset Purchase Agreement. **All interested bidders should carefully read the Bidding Procedures.**

PLEASE TAKE FURTHER NOTICE that, pursuant to the terms of the Bidding Procedures Order, in the event that there is more than one Qualifying Bid¹ for one or more Lots of the Assets, an auction (the "Auction") to sell the Assets will be conducted at the offices of Bingham McCutchen LLP, 399 Park Avenue, New York, New York 10022 on **November 1, 2011, at 10:00 a.m. (ET)** (the "Auction Date"). Only the Debtor, NewCo, the Qualifying Bidders, the Supporting Noteholders, the Indenture Trustee, and the Creditors Committee and advisors to each of these parties, may attend the Auction in person, and only NewCo and such other Qualifying Bidders will be entitled to make any subsequent bids at the Auction.

PLEASE TAKE FURTHER NOTICE that a hearing (the "Sale Hearing") will be held before the Honorable Mary F. Walrath, United States Bankruptcy Judge, on **November 4, 2011 at 9:30 a.m. (ET)**, to confirm the results of the Auction and approve the sale of the Debtor's assets to NewCo or Prevailing Bidder, in the United States Bankruptcy Court for the District of Delaware, 824 Market Street, Wilmington, Delaware 19801. The Debtor, with the consent of the Supporting Noteholders, which consent shall not be unreasonably withheld, may adjourn the Sale Hearing one or more times without further notice by making an announcement in open Court or by the filing of a hearing agenda pursuant to Local Rule 9029-3 announcing the adjournment.

PLEASE TAKE FURTHER NOTICE that, pursuant to the Bidding Procedures Order, the Bankruptcy Court has currently set: (a) **October 20, 2011 at 4:00 p.m. (ET)** as the deadline for (i) all general objections to the Sale of the Assets; (ii) all objections to the cure amount owed by the Debtor under any prepetition executory contract that is scheduled to be assumed and assigned, by counterparties to such agreements (the "Counterparties"); (iii) objections by Counterparties to the adequate assurance of future performance by NewCo; and (iv) Counterparties to request adequate assurance information regarding bidders other than NewCo that will or may participate at the Auction (the "General Objection Deadline"); (b) **October 26, 2011 at 5:00 p.m. (ET)** as the Bid Deadline; and (c) **November 2, 2011 at 4:00 p.m. (ET)** as the deadline for supplemental objections with respect to objections regarding (i) adequate assurance of future performance by Qualified Bidders other than NewCo, and (ii) objections to issues arising from and in connection with the Auction and/or the Debtor's selection of a Prevailing Bid made by a Prevailing Bidder other than NewCo.

PLEASE TAKE FURTHER NOTICE that all objections must be: (a) in writing; (b) signed by counsel or attested to by the objecting party; (c) in conformity with the Bankruptcy Rules and the Local Rules; (d) filed with the Clerk of the Bankruptcy Court, 824 Market Street, Wilmington, Delaware 19801 by no later than the General Objection Deadline, or other applicable deadline as indicated above; and (e) served in accordance with the Local Rules so as to be received on or before the relevant objection deadline by the following: (i) Bingham McCutchen LLP, 399 Park Avenue, New York, NY 10022, Attn: Ronald J. Silverman, Esq. (ronald.silverman@bingham.com), counsel to the Debtor; (ii) Akin Gump Strauss Hauer & Feld LLP, One Bryant Park, New York, NY 10036, Attn: Michael S. Stamer, Esq. (mstamer@akingump.com) and James Savin, Esq. (jsavin@akingump.com), counsel to the Supporting Noteholders; (iii) Maslon Edelman Borman & Brand, LLP, 3300 Wells Fargo Center, 90 South Seventh Street, Minneapolis, MN 55402-4140, Attn: Clark T. Whitmore, Esq. (clark.whitmore@maslon.com), counsel to U.S. Bank National Association; (iv) the Office of the United States Trustee, 844 King Street, Suite 2207, Wilmington, Delaware 19801, Fax: (302) 573-6497; and (v) Kramer Levin Naftalis & Frankel LLP, 1177 Avenue of the Americas, New York, NY 10036, Attn: Thomas Mayer, Esq. (tmayer@kramerlevin.com), counsel to the Committee.

PLEASE TAKE FURTHER NOTICE that this notice is subject to the full terms and conditions of the Sale Motion, the Bidding Procedures Order and the Bidding Procedures, and the Debtor encourages parties in interest to review such documents in their entirety. Copies of the Sale Motion, the Asset Purchase Agreement, the Bidding Procedures Order and the proposed Sale Order may be examined by interested parties between the hours of 8:00 a.m. and 3:00 p.m. (ET) at the office of the Clerk of the Court, 824 Market Street, Wilmington, Delaware 19801, or by appointment during regular business hours at the offices of the Debtor's attorneys: Bingham McCutchen LLP, 399 Park Avenue, New York, NY 10022, Attention: Scott K. Seamon, Esq. Additionally, copies of these documents (i) may be downloaded from the Court's docket at www.deb.uscourts.gov and from the website of the Debtor's claims and noticing agent, Epiq Bankruptcy Solutions, LLC, at <http://dm.epiq1.com/Evergreen>; or (ii) will be provided to you at the Debtor's expense by sending an email to Scott K. Seamon at scott.seamon@bingham.com.

PLEASE TAKE FURTHER NOTICE that dates set forth in this notice are subject to change, and further notice of such changes may not be provided except through announcements in open court and/or the filing of notices and/or amended agendas. Parties in interest are encouraged to monitor the electronic court docket and/or the noticing agent website for further updates.

¹ The last four digits of the Debtor's federal tax identification number are 2254. The Debtor's mailing address is 138 Bartlett Street, Marlboro, MA 01752.

² Terms not defined herein have the meanings ascribed to such terms in the Asset Purchase Agreement and/or the Bidding Procedures.