

Financial health of selected solar PV companies: a quick scan

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Key question

- A major consolidation process in the PV industry is unfolding

Who will be the winners?

- Chinese versus other Asian versus other-OECD companies?
- C-Si versus thin film Cl(G)S, CdTe, a-Si?

- We set out to draw some tentative conclusions

Overview

- Preliminary conclusions
- Introduction
- Brief financial risks review
- Company profiles

Preliminary conclusions

Conclusions -1-

- Most if not all solar companies (even the large, vertically integrated ones and the technology leaders) are in a difficult financial situation
- Published info suggests financially precarious situation for the reviewed Chinese companies: foremost LDK and (somewhat lesser) Suntech
- To date, First Solar shows most financial resilience to date; prospects highly dependant on progress utility-scale projects, cost reduction
- Less stringent auditing conditions and opaque financing possibilities blurr the picture from published data regarding Chinese companies
- As European stop-go subsidy bonanza diminishes, cost competitiveness increasingly important, esp. in sunny countries with high power prices

Conclusions -2-

- Chinese incentives recently stepped up: 1.7 GW Golden Sun, FiT 1 RMB (15.8 \$ct) /kWh. Badly needed to make up for huge supply glut, rising overseas protectionism, and less European subsidies
- Chinese companies face less favourable hourly labour cost and exchange rate developments
- **Yet: the five odd Chinese PV majors poised to survive have a huge home market, favourable supply chain and financing conditions.**
- **A few other Asian c-Si players may survive as well.**
- Polysilicon price plunging from \$474/kg in Feb'08 to \$23/kg to date. Shake-out among Chinese producers, pushed by leader GCL, seems very near. **Further major sustained price drop polysilicon not likely.**
- **Prospects thin film majors esp. dependant on cost-reducing capacity**

Main take-aways

- Impending shake-out in whole Chinese c-Si supply chain and appreciating real exchange rate RMB might slow down \$/Wp price drop c-Si modules. **Yet surplus supply capacity will keep financially hurting surviving players several years ahead**
- Rising importance utility-scale solar farms. Continuation of 30+% annual growth PV industry dependant on evolution of their competitiveness
- Point of gravity PV demand shifting from EU to sunny climate emerging economies and developing world
- **Larger production scale, more rapid technological and cost reduction progress as well as better global marketing than peers is key**

Introduction

Scope

- Presentation of the results of a quick scan of the financial health of selected PV companies
- Selection of PV majors in several world regions
- Companies covered:
 - China: Suntech, Trina, Yingli, LDK, JA Solar
 - Japan: Solar Frontier
 - Taiwan: Motech
 - Germany: SolarWorld
 - USA: SunPower, First Solar

Top 10 PV cell manufacturers in 2011 (MWp)

	<i>Technologies</i>	<i>Country</i>	<i>Production capacity</i>		<i>Capacity plans for end 2012</i>
			<i>2010</i>	<i>2011</i>	
Suntech Power	Crystalline (mono, multi)/Thin Film (a-Si, mc-Si) cells, modules	China	1 585	2 220	2 746
First Solar	Thin film modules (CdTe)	USA	1 412	1 981	2 520
JA Solar	Crystalline (multi) cells	China	1 463	1 690	3 000
Yingli Green Energy	Crystalline (multi) cells, modules	China	1 060	1 604	2 450
Trina Solar	Crystalline (mono) cells, modules	China	1 050	1 550	2 400
Motech Industries	Crystalline (mono, multi) cells, modules	Taiwan	945	1 100	1 600
Canadian Solar	Crystalline (mono, multi) cells, modules	Canada	523	1 010	2 000
Haeron Solar	Crystalline (mono, multi) cells, modules	China	155	940	1 376
Sunpower	Cristalline (mono) cells, modules	USA	563	922	1 200
Gintech	Crystalline (mono, multi) cells, modules	Taiwan	827	873	1 500

Source: Photon International, March 2012 and own research.

Source: EurObserv'ER PV Barometer, www.eurobserv-er.org (April 2012)

Financial terms

Revenue	Gross income from a company's business activities [per year]
Operating income	Earnings before interest and taxes. Non-recurring items often not included [per year]
Net income	Bottom line result [per year]
Current ratio	Liquidity risk indicator Total current assets / total current liabilities [Ult. Q1'12] [<1 high risk]
Debt/Equity	Solvability risk indicator Total debt / total shareholder value * 100 [Ult. Q1'12] [>200 high risk]
Beta	Relative company total financial risk indicator Regression coefficient between (monthly) % changes of stock value and % changes of S&P500 value (last 36 months) [>1 sensitive to business cycle; > 2.5 very sensitive/very high risk]

Brief financial risk review

Financial risk

Financial risk of investing in a company

- Financing risk
- Business risk

Financing risk

- Liquidity risk: risk of failure to meet short-term financial obligations on time
- Solvency risk: risk of not being able to meet all financial commitments

Business risk

- Systemic (perfectly correlated with macro-economic business cycles)
- Idiosyncratic (non-systemic)

Idiosyncratic business risk

Sector/technology-specific business risk: e.g.

- **market support incentives specifically targeted at the PV sector**
- strong technology and market dynamics drive large-amplitude pro-cyclical boom-and-bust investment cycles
- Amplified by by pro-cyclical cost changes of fossil generation (coal and natural gas prices)
- Tempered by pro-cyclical dependence on scarce raw materials
- **Unfavourable development in price ratios between raw materials of competing PV technology (e.g. tellurium versus polysilicon)**

Non-sector company-specific business risk: e.g.

- **Backlog on technological progress by sector peers**
- Sudden emergence of a competitor with a disruptive PV technology
- Restructuring risk following imbalances between manufacturing production and market demand

Country-specific business risk e.g. exchange rate risk



Renminbi per US\$1.00 (noon buying rate in New York)

Period	Average rate
2007	7.61
2008	6.95
2009	6.83
2010	6.45
2011	6.35
2012	
January	6.31
February	6.30
March	6.31
April	6.30

Company financial risk factors

Summary overview: Chinese versus non-Chinese

Company averages	Financial risk		
	Liquidity	Solvability	Relative total risk
	Current ratio	Debt/ Equity	Beta
PRC companies	1.10	222	2.88
Non-PRC companies	2.90	87	N/A
All companies reviewed	1.90	162	2.63

Company profiles

Suntech (Wuxi, Jiangsu)

Debt/ Equity	Current ratio	2011 (mn USD)			2012 (estimates) (mn USD)		2013 (estimates) (mn USD)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
282	0.64	3,147	-645	-1019	2,070	-231	2,270	-124

- Crystalline silicon PV modules and systems ; also a-Si thin film PV
- Vertically integrated company: 2.4GW cell/module capacity; 1.6 GW ingots/wafers
- **World's largest manufacturer of solar panels, but has frequently disappointed investors in the past**
- ASP(avg selling price per watt) modules: '09 \$2.40, '10 \$ 1.82, '11 \$ 1.51
- Avg conv. eff. *cells* ult. '11: mono c-Si 18.2%, multi c-Si 16.6%
- Estimated module production costs : about \$1.00 per watt (Q4 2011)
- **High debt/equity ratio, weak balance sheet, continued negative earnings outlook**

Trina Solar (Changzhou, Jiangsu)

Debt/ Equity	Current ratio	2011 (mn USD)			2012 (estimates) (mn USD)		2013 (estimates) (mn USD)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
102	1.59	2,048	31	-38	1,680	-73	1,970	12

- **Vertically integrated crystalline silicon PV: ingots to modules**
- 1.5GW shipments in 2011; Expects 2.0-2.1 GW module shipments in 2012 (May 23, 2012)
- Ingot/wafer prod.cap. 1.2 GW; Cell/module prod. cap. 2.4 GW (April 2012)
- Conv. efficiency: Mono c-Si *cells* 19% Multi c-Si *cells* 18.1% (end 2011);
- **Low cost supplier of crystalline silicon PV modules:** average productions in Q4 2011 \$0.94/watt (but according to estimates production costs could be \$0.75/watt assuming normalized inventory costs); Q1 2012 \$0.86/watt.
- ASP modules per watt: \$2.10 in 2009, \$1.75 in 2010, \$1.33 in 2011
- **Expected to become profitable again in 2013 due to its low-cost production**

Yingli (Baoding, Hebei)

Debt/ Equity	Current ratio	2011 (mn USD)			2012 (estimates) (mn USD)		2013 (estimates) (mn USD)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
211	0.99	2,332	-428	-510	2,020	-87	2,220	-17

- Vertically integrated crystalline silicon PV manufacturing: **polysilicon to modules**
- Balanced vertically integrated prod. cap. 1.85 GW; 2.45 GW expected ult.'12
- Expects 2012 module shipments: 2.4GW; 1.6GW shipped in 2011
- Expects surging utility-scale projects in western China
- In-house polysilicon production has had start-up problems
- Average production cost in Q4 2011 \$0.97/watt
- **Has strongly increased its debt over the past year, but still holds a substantial cash reserve**

LDK (Xinyu City , Jiangxi)

Debt/ Equity	Current ratio	2011 (mn USD)			2012 (estimates) (mn USD)		2013 (estimates) (mn USD)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
409	0.53	2,158	-460	-655	2,020	-300	2,580	-167

- Vertically integrated multi/monocrystalline silicon PV producer and utility-scale “solar farm” project developer; **major polysilicon producer**
- In 2011: wafers sold 1.54 GW, modules sold 0.55 GW, poly-Si prod. 10455 MT
- New entrant in cells (3Q 2010). Cap 1Q 2012: cells 1.7 GW, modules 1.7 GW
- Planned cap. 4Q 2012: wafers 4.5 GW, cells 2.2 GW, modules 2.6 MW
- **Very bad Q1’12 results.** 2012 est.: poly-Si 5000-7000MT, wafer 2-2.5 GW prod, module prod 0.9-1.2 GW, no earnings guidance [26 Jun’2012]
- High product rejects issue; **power supply cuts in Jiangxi Prov**
- ASP module (watt): 2009 \$1.81, 2010 \$1.83, 2011 \$1.31
- **Balance sheet strongly deteriorated in 2011, Q1’12. Negative earnings outlook.**

JA Solar (Shanghai, China)

Debt/ Equity	Current ratio	2011 (mn USD)			2012 (estimates) (mn USD)		2013 (estimates) (mn USD)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
105	1.77	1,370	-66	-202	1,300	-94	1,570	-31

- **Mono/multi c-Si PV cells and modules**; polysilicon and wafers mainly outsourced ; largest shareholder: Jinglong BVI.
- 2011 prod.cap.: wafers 1 GW; cells 2.8 GW; modules 1.2 GW → 2.0 GW ult. 2012 (exp.); wafers and cells capacity stable in remainder 2012.
- End 2011: avg conversion eff. mono and multi c-Si cells 18.6% and 17.1%
- Higher inlands sales share than most Chinese peers (>50% in 2011)
- ASP (watt) for modules: 2010 RMB 11.6, 2011 RMB 8.7
- Lawsuit on \$100 mn receivables ongoing, related to Lehman bankruptcy
- **Financial results negative but better than several competitors. Balance sheet still fairly resilient.**

Motech Industries

- Little public info in English available
- Taiwan based 1-tier crystalline cells and 2-tier modules manufacturer
- Shipments Oct. 2010 – Sep. 2011: 1.2 GWp
- Q'11 cell capacity 1.5 GWp/y and wafer cap. 0.5GWp
- Revenue in 2011: NT\$ 28,233 mn (US\$ 943 at current exchange rate)
- Net income Q1'11: NT\$ 686 mn (US\$ 23 mn at current exchange rate)
- Net income Q2'11: - NT\$ 637 mn (- US\$ 21 mn at current exchange rate)
- Net income Q3'11: - NT\$ 574 mn (- US\$ 19 mn at current exchange rate)
- Ult. Q3'11: debt/equity 68.4% , current ratio ult.: 2.36
- Motech may profit from tolling agreements with PRChina PV producers suffering from US trade barriers (receiving wafers => processing => sending cells in return)
- **In conclusion, Motech suffers from global supply glut but still financially resilient**

Solar Frontier (Tokyo, Japan)

- Develops and manufactures CIS thin-film solar modules;
- **100% subsidiary of Showa Shell Sekiyu K.K.**
- Showa Shell Sekiyu K.K. is listed on the Tokyo Stock exchange (5002:JP) and 35% owned by Shell and 15% owned by Saudi Aramco
- Prod. capacity 1 GW. **Hold world record for CIS cell conversion efficiency**
- Module conv. eff. ~13%: better than CdTe and (much better) than a-Si; better performance ratio (kWh/Wp) than c-Si
- Showa Shell Sekiyu K.K. is a profitable company whose major business is oil refining and sales of petroleum products. The solar business (together with an “Electric Power” business unit) is part of the Energy Solutions unit. The Energy Solutions unit had about 2% of total 2011 revenues and incurred an operating loss in 2011 and Q1 2012.
- May profit from high Japanese FIT rate + worldwide solar plant business
- No additional financial information on the solar business publicly available

Solar World (Bonn, Germany)

Debt/ Equity	Current ratio	2011 (mn €)			2012 (estimates) (mn €)		2013 (estimates) (mn €)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
195	4.61	1,047	-302	-306	N/A	N/A	N/A	N/A

- Designs, manufactures and delivers crystalline silicon PV systems
- Less competitive than PRC peers
- US subsidiary successfully filed anti-dumping complaint at FTC against PRC competitors. So far, EU refrains from erecting trade barriers.
- Exp. prod. cap ult.'12 : wafers 1 GW, cells 0.8 GW, modules 0.85 GW
- In Q1'12: declining sales -29% vs Q4'11, esp. in US but sales in home market (still) fairly robust; small **black** bottomline (€7 mn)
- **The limited info suggests that SolarWorld will have a hard time to survive as 2-tier PV company , highly contingent on future German FiT evolution**

Sun Power (San José, CA, US)

Debt/ Equity	Current ratio	2011 (mn USD)			2012 (estimates) (mn USD)		2013 (estimates) (mn USD)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
56	2.15	2,312	-520	-604	2,680	-6	3,070	-18

- Downstream integrated c-Si company: cells (manufactured by JV partner) to systems; also concentrated tracking systems; utility-scale project developer
- Technology leader: high efficiency cells; expect sales of 0.9-1.2GW shipments in 2012
- Cost target of \$0.86 per watt (on an efficiency-adjusted basis) by end 2012
- Close to bankruptcy at the end of 2011; received financial backing by Total, now owning 66% of the company
- **Innovative but cost competitiveness trails. Depends on deep pockets of Total**

First Solar (Tempe, AZ, USA)

Debt/ Equity	Current ratio	2011 (mn USD)			2012 (estimates) (mn USD)		2013 (estimates) (mn USD)	
		Revenue	Operating income	Net Income	Revenue	Net Income	Revenue	Net Income
27	2.48	2,766	-69	-39	3,480	353	3,520	343

- Vertically integrated CdTe thin-film PV modules; develops utility-scale projects
- Expected capacity 2.5GW by the end of 2012
- Has long been the cost-leader at under \$0.75/watt manufacturing costs in Q4 2011; forecasts \$0.74/watt for 2012; costs at full capacity would be \$ 0.67/watt
- Rapid price decline of silicon based PV systems may threaten cost leadership
- Problems with cap. utilisation (85%) in Q1 2012. Avg conv. eff. (12.4%) needs to increase faster. Shut down \pm 1/3 of capacity in April 2012
- Focus on utility-scale projects (LCOE target \pm 10 \$ct/kWh) , non-subsidy markets competing with peaking gas and gasoil power plants, further cost reduction
- **Stronger balance sheet and lower debt than its peers; positive earnings outlook for 2012 and 2013. Yet much uncertainty: new strategy still has to prove being effective**

Overview of company financial risk factors



Company	Financial risk		
	Liquidity	Solvability	Relative total risk
	Current ratio	Debt / Equity	Beta
Suntech	0.64	282	3.05
Trina	1.59	102	2.84
Yingli	0.99	211	2.35
LDK	0.53	409	3.14
JA Solar	1.77	105	3.03
Solar Frontier	N/A	N/A	N/A
Motech	2.36	68	N/A
Solar World	4.61	195	N/A
SunPower	2.15	56	2.53
First Solar	2.48	27	1.44

For sustained financial health of a PV major,
faster technological progress and cost
reduction than average peer is paramount



Thank you for your attention

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