

Industry Flash

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Taiwan Solar View

Cautious on Demand Growth and Falling Prices

- **Key takeaways** — We recently visited several solar names in Taiwan – Gintech, Motech, Solartech, Green Energy – and overall the theme has been on concerns over: 1) weaker bookings by customers, and lower ASP due to USD/EUR movement; 2) difficulty in fundraising for capacity expansion; 3) using longer-term contract to secure Poly-Si supply and long-term downstream contracts; and 4) larger players pursuing vertical integration to save costs.
- **Funding and credit risks** — While companies still expect strong demand growth in 2009, funding difficulty and credit risks on downstream customers are already forcing solar wafer and PV cell makers to have second thoughts on their expansion plans as demand increase slows. Also, companies are slowing, admitting to pricing pressure in 2009E (10-20% y/y ASP drop).
- **US demand** — Key to note is the terms on existing US solar energy subsidy bill (passed along with the US\$700bn rescue plan) does not offer good IRR (under 5% based on our assumptions), and new plans through the congress would still need to tackle lobbying groups sponsored by oil companies. Note US still a relatively small global solar demand, 10% of total in 2008E and Germany/Spain/Italy policies will still be key to near-term growth.
- **Remain cautious on TW solar plays** — We are cautious about the prospects for Taiwan solar plays, as they face fixed COGS due to a rising percentage of long-term supply contracts and weaker pricing for their output, which will likely put pressure on their margins in 2009.

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Figure 1. Grid Parity Assumptions for US (California)

1kW System Cost (Assumption: US\$7.5/watt, 30% ITC rebate, US\$2/W subsidy from California)	3,250
System lifetime (years)	20
Maintenance cost	1%
Annual cost for system (US\$)	200
Sun hours per year	1,600
Cost per kW based on 1600 sun hours (US\$)	0.18
Cost of capital (IRR, assume no tariff rebate)	4.5%

Source: Company Reports and Citi Investment Research estimates

See Appendix A-1 for Analyst Certification and important disclosures.

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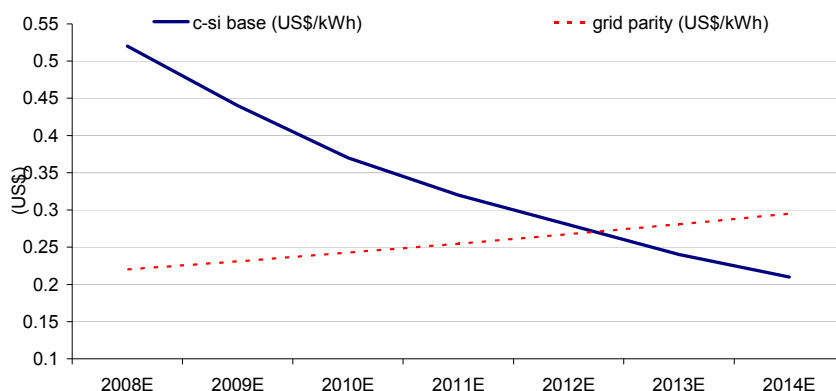
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Figure 2. Solar Demand and Supply Outlook

Solar Demand (in MW)	2006	2007	2008E	2009E	2010E
Germany	1,150	1,400	1,800	2,100	2,500
Spain	90	280	950	450	700
US	150	250	450	800	1,600
South Korea	5	30	90	180	450
Italy	5	35	250	700	950
Other EU	30	120	250	380	700
Japan	320	350	370	480	800
China	20	40	60	150	250
ROW	150	300	450	950	1,500
Total Installation	1,920	2,805	4,670	6,190	9,450
Thin Film Share	7%	8%	9%	9%	10%
C-Silicon based Module Demand (MW)	1,786	2,581	4,250	5,633	8,505
Silicon Conversion Ratio (g/w)	9.0	8.6	8.3	8.0	7.8
Solar Poly Demand (metric tons)	16,070	22,193	35,273	45,063	66,339
Semi Poly Demand (metric tons)	24,750	26,750	29,000	31,670	33,100
Total Poly Demand (metric tons)	40,820	48,943	64,273	76,733	99,439
Solar Poly Supply (metric tons)	13,820	20,972	37,835	80,075	129,040
Semi Poly Supply (metric tons)	19,800	21,400	23,200	25,336	26,480
Polysilicon Production (metric tons)	33,620	42,372	61,035	105,411	155,520
% Oversupply	-18%	-13%	-5%	37%	56%

Source: Company Reports and Citi Investment Research estimates

Figure 3. Grid Parity Analysis



Source: Citi Investment Research

Figure 4. Grid Parity Assumption

Assumption	2008E	2009E	2010E	2011E	2012E	2013E	2014E
Poly Price (US\$/kg)	100	90	80	70	60	50	40
Wafer ASP (US\$/pcs)	6.7	5.5	4.4	3.7	3.0	2.5	2.0
Cell Margin (%)	18%	15%	13%	11%	10%	10%	10%
Cell ASP (US\$/watt)	3.4	2.7	2.2	1.9	1.6	1.4	1.2
System ASP (US\$/watt)	7.5	6.3	5.3	4.6	4.0	3.5	3.1
c-si base (US\$/kWh)	0.52	0.44	0.37	0.32	0.28	0.24	0.21

Source: Citi Investment Research estimates

Figure 5. Taiwan Solar – Fund Raising Plans

Company	Original Plan	Revised Plan
Gintech	(1)Syndicated loan of NT\$48bn and 30m shares GDR in July	(1)GDR pending but the syndicated loan will ensure operation until Feb'09. Now they keep the GDR plan or considering other options for 2009.
Motech	Considering the fund raising through equity or debt	Cancel the fund raising plan as the syndicated loan is sufficient for operation
E-Ton	Planned to raise fund through equity in May but the plan was cancelled	Net yet decided
Green Energy	Completed rights issue in Oct'08 for 5.9m shares at NT\$140.	For further expansion, will need to raise fund in 2H09
Sino American Silicon	Completed rights issue in May'08 for 10m shares at NT\$110	N/A

Source: Company Reports

Appendix A-1

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