

Solar Photovoltaic

Sector updates – thin film on radar screen

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to summarize...

- ASP continues to rise unexpectedly to above US\$0.9+ per W in Q4, and shipment demand in 2011 looks strong
- Our pick – we continue to like Comtec Solar (0712 HK)
- Policy announcement in 2011 not particularly good news for the sector in longer-term
- Why thin film? A reasonable choice for consumer products and rural area
- A closer look into film thin turnkey solution – Anwell plant visit

ASP continues to rise unexpectedly to US\$0.9+ per W in Q4. In our last updates, we indicated that a fall in ASP together with subsidy is inevitable. We believe cost leadership should maintain their profit margins despite the pressure on ASP. However, ASP of polysilicon, wafers and modules are actually strong especially for wafers. Wafer prices rose to US\$0.85-0.90 in Q3 from around US\$0.80-0.85 in Q2, and there is saying of reaching US\$1.0 per W. Norway's REC, one of the biggest solar energy equipment providers, is increasingly upbeat about solar energy prices for 2011. Its Chief Executive, Ole Enger, indicated that prices may be pressured next year in Q1 due to a slowdown in solar energy growth rates as well as new supplies hitting the solar market, but it would not be as bad as the company's original forecast.

Shipment demand in 2011 looks strong, demand for capacity. While for 2011 contracts, Comtec Solar and GCL Poly secured significant contracts beyond 2010. Comtec Solar secured 770MW wafer orders for 2011 from leading module producers such as JA Solar (JASO US), Suntech Power (STP US), Dongfang Electric (1072 HK) and Sunergy (CSUN US). GCL-Poly (3800 HK) signed RMB2.8b wafer contracts (we estimate at around 3,800MW worth wafer) for 2011 to 2013. In fact, according to a new forecast from iSuppli Corp, installations will go up to 20GW for 2011, up from a 14.2GW forecast made in 2010. In view of strong orders, solar companies are expanding capacities. In Oct, First Solar (FSLR US) announced 500MW thin film expansion to be completed by mid-2011. One day later, Yingli Green Energy (YGE US) also announced a 700MW PV module expansion to 1,700MW in mid-2011.

Our pick. Within the solar universe, we have a BUY call on Comtec Solar (0712 HK) and positive view on Solargiga (0757 HK), GCL-Poly (3800 HK) and Trony Solar (2468 HK). Whereas our view is neutral on Singyes (0750 HK).

New policy details announced in Sep – central procurement arrangement. While we are positive towards solar sector with respect to both silicon base and thin film technology, there is potentially difference in demand and margin upon implantation of new policy. 《關於加強金太陽示範工程和太陽能光電建築應用示範工程建設管理的通知》 released on Sep 2010 include certain changes. A significant change is that modules, inverters and lead acid batteries for solar farms will be handled by central procurement. In shorter-term, since the size of local solar farm demand is small, and impact on solar products prices are limited. Our channels suggest that solar products ASP are remaining strong as they are rushing overseas demand. In longer-term, however, it is likely to see price competition in Chinese market.

The technology features of thin film. Although there are direct ASP pressures for solar farms equipments including solar modules, impact on silicon base PV modules should be larger than thin film. As far as we know, solar farms are usually constructed at researched location with light intensity, temperature and shadows matter considered. Therefore, although silicon base PV modules have their shortcomings, we believe solar farms are more likely to utilize crystalline silicon panels because of higher efficiency and proven life-span. Thin films are more utilized for electronics, consumer products and simple building structures, in our view. Currently, the world's leading thin film producer, First Solar, used CdTe technology. Cadmium involved is indeed toxic and it is not abundant in nature. We believe amorphous silicon would be better choice than CdTe for thin film to grow in the future due to raw material concern, possibly making up larger proportion of panel supply within years.

CAPEX concern of thin film technology. Although thin film has its advantages over crystalline silicon technology, there are concerns with respect to turnkey solution and CAPEX. Crystalline silicon players are usually specialized in certain parts of the value chain which effectively reduce CAPEX. For instance, GCL-Poly built polysilicon production facility at US\$70 per kg in the past. Considering conversion ratio of 6.1g per W, CAPEX for polysilicon production is estimated at US\$0.43 per W, while the management indicated current cost could be 30% off to US\$0.30 per W. And for mono-wafer production, without government subsidy, we estimated CAPEX for Comtec Solar (0712 HK) to do wafers at US\$0.20 per W. We believe the CAPEX for cell and modules could be even smaller. Unlike mature crystalline silicon technology, thin film turnkey solution is not readily available in the market. There are famous equipment providers for crystalline silicon that fail to produce cost effective thin film equipments. Top thin film providers usually develop its own solution and produced thin film itself, and they have no plan to sell their equipments. Our channels suggest that major non-Chinese-made thin film equipments could cost up to US\$2.5-3.0 per W. Trony Solar and Anwell (ANW SP) are two companies saying that their CAPEX could be as low as US\$1.0 per W. We have been to production facility of Anwell in Henan to take a closer look at their thin film equipments.

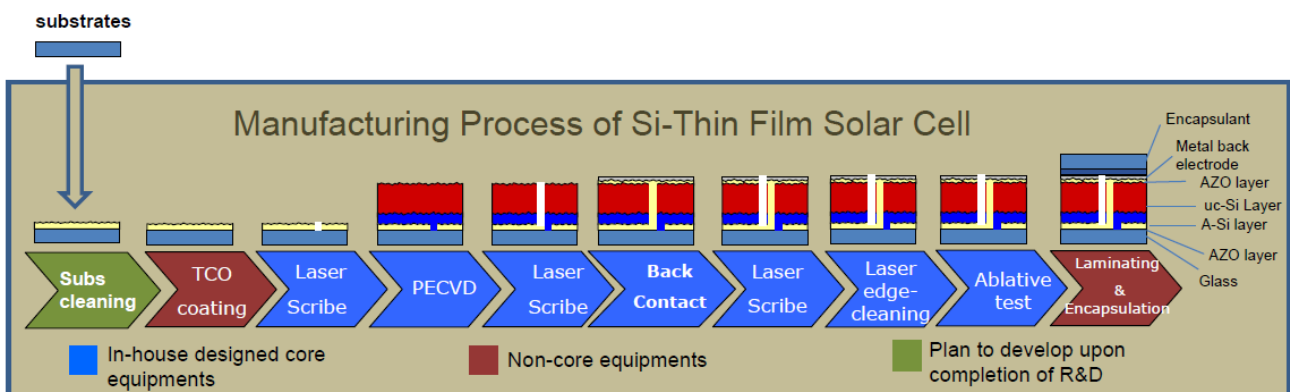
Trony Solar (2468 HK, Not Rated) – the first mover in China

- Develop thin film turnkey solution, owning 17 patents with additional 24 pending patents
- Completed 15MW semi-auto production line in Jul 2007
- Completed 70MW fully automatic production line in Aug 2009
- There was actual production of 69.2MW in 2009
- Provided thin film panels mainly for off-grid usages such consumer products especially in rural area
- Capacity to reach 205MW by end of 2010, with plans of 3 more 60MW production lines by mid 2012 to reach 385MW
- Average CAPEX for 1MW thin film production line is as low as US\$1.0 per W
- Competitive manufacturing cost of US\$0.98 per W in Q2 FY12/10A
- Conversion efficiencies of single-junction and double-junction amorphous-silicon thin film are relatively low at 6.0% and 6.5%
- Developing a-si/a-GeSi double-junction of target conversion rate of 7.5% by 2011 and 9.0% by 2012

Anwell (ANW SP, Not Rated) – plant visit note in Henan

- Founded its optical disc (OD) business back in 2004 and gradually become major OD equipment provider and OD manufacturer
- Enter into solar business since 2007, beginning with research and development
- Develop thin film turnkey solution – in-house design of automation, PECVD, sputtering, laser scribe and ablation
- Indicated CAPEX cost of current production line as low as US\$0.5-1.0 per W, depending on the type of thin film to be produced
- Indicated production cost less than US\$0.5 per W with gas and energy saving solutions
- Began production of 7.5% efficiency single junction thin film with a 50MW production line, target to modify to 80MW
- Progressing with 10% efficiency double junction thin film
- Following the start of mass production, plan to raise capacity to 150MW in 3 years

Chart 1. Anwell thin film manufacturing process



Source: Anwell

Chart 2. Anwell in-house designs – key to its proprietary turnkey solutions



Source: Anwell

Chart 3. Anwell Henan Sungen plant



Source: Anwell

Chart 4. Anwell production line of 40-50MW capacity, with medium-term target to modify to 80MW

Laser scribing equipment



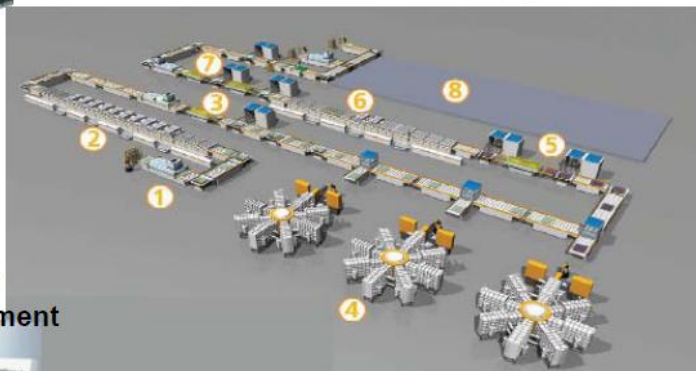
Sputtering system for TCO and back electrode



Transportation system



Substrates cleaning equipment



PECVD system



Source: Anwell

Disclosure of interests: SBI E2-Capital Securities Limited was acted as sub placing agent for Comtec Solar Systems Group Limited (stock code: 712) in September 2010.

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