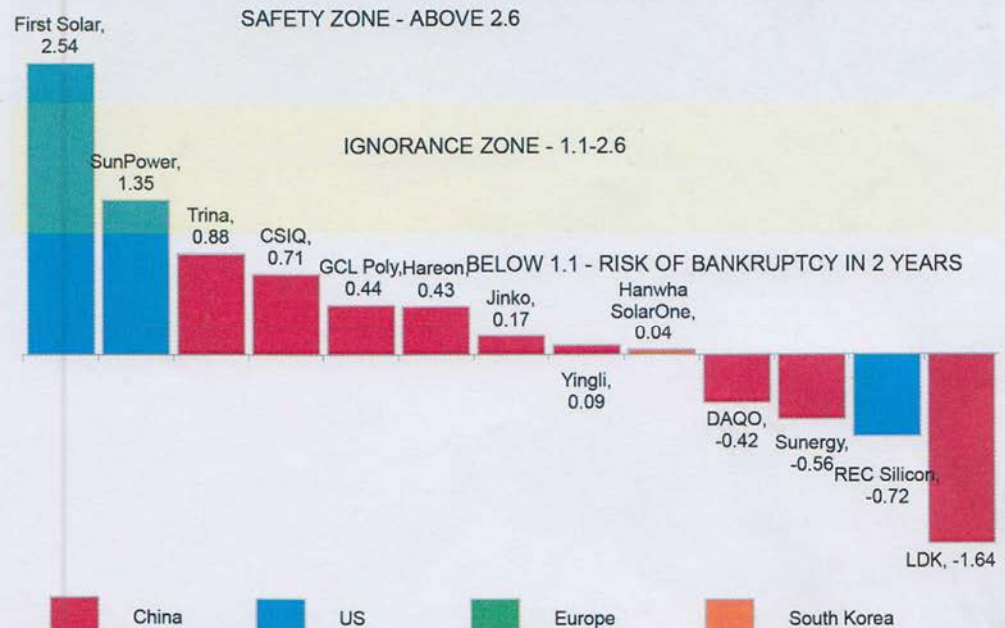


Table 4: Tier 1 module makers, February 2014

Company	Capacity (MW/yr)
Yingli	3000
First Solar	2200
Trina	2400
Canadian Solar	2400
JA Solar	1800
Hanwha SolarOne	1500
Jinko Solar	1500
SunPower	1200
Hanwha Q-Cells	1100
ReneSola	1200
REC Solar	1200
Kyocera	1080
ET Solar	1000
Solar Frontier	960
Solarworld	850
CNPV	800
Risen Energy	800
BYD	750
Phono Solar	450
Vikram Solar	150

Source: Bloomberg New Energy Finance Note: Tier 1 criteria [here](#). SunEdison would meet the criteria as a brand, but owns no module manufacturing capacity.

Figure 7: Altman-Z scores of quoted pureplay PV manufacturers, as of Q3 2013



Source: Bloomberg New Energy Finance Note: Developed by Edward Altman in 1968, Altman-Z score is a measure shown to correlate with the probability of business failure leading to bankruptcy. It is a function of tangible assets, working capital, retained earnings, EBIT, market value of equity, total liabilities, and historical revenue. Data [here](#).

Expansion through acquisition has been undertaken by [Shunfeng Photovoltaic](#), which took over Wuxi Suntech, and [Tongwei](#), previously an agricultural products firm, now the new owner of LDK's Anhui assets. Others are already building capacity by purchasing new equipment - Realforce Power, for example, recently started a [500MW new module line](#) and targets total module capacity of 2GW in 2014. All three companies target project development. Shunfeng plans 3GW per year during 2014-2016; Tongwei will focus on on distribution-grid connected projects; Realforce aims for 4GW of PV projects including some in the US and Japan by 2014.

Thin film module makers also reduced costs and plan for expansions. By Q3 2013, US leader First Solar has cut its production cost to \$0.59/W, with the efficiency raised to 13.3%, compared with \$0.67/W and 12.7% one year ago. Japanese CIGS firm Solar Frontier plans to construct another [150MW](#) factory in the Tohoku region of Japan in 2014, to run in 2015. The new Chinese thin film player Hanergy, which acquired thin film startups US MiaSolé and German Solibro in 2012 and 2013, plans to [construct a 600MW factory](#) during March to December 2014, including 300MW/year for each of the two technologies. In 2014, we anticipate that thin film modules will continue to account for 7-10% of the PV market.

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