Major PV manufacturers' downstream project ambitions in 2015

Business | A growing number of tier-one PV module manufacturers have been changing business models in recent years from once being dedicated module suppliers to becoming project developers. Mark Osborne analyses the progress made by major PV manufacturers in their downstream ambitions in 2014 and expectations in 2015

Source: SunEdison.

The photovoltaic energy provider (PVEP) business model was first developed a few years ago in the US, led by its two largest integrated PV manufacturers, First Solar and SunPower. The success of the model, initially devised to ring-fence module manufacturing operations from competition from China-based producers, has led not only to more North American-based companies adopting it but also attracted the majority of tier-one Chinese producers as well.

In simple terms, becoming a PVEP enables a module manufacturer to better match production to end-market demand by generating an increasing amount of demand through internally developed PV projects that cushions against demand volatility.

Another key benefit relates to financials, as there are higher margins per megawatt to be had by selling a completed project than by simply selling modules. Even greater potential returns are possible from long-term retention of projects on the balance sheet or in the form of a yieldco vehicle, through which the full value of the asset can be recouped over its lifespan.

Module manufacturers are increasingly moving into downstream territory via the 'PV energy provider' business model.

Unsurprisingly, the PVEP model has not only attracted module manufacturers but the likes of US residential installer SolarCity and former polysilicon producer

Table 1

	2013	2014
First Solar	1,180	1,640(E)
SunPower	1,035	1,300(E)
SunEdison	536	1,048
Shunfeng (SFCE)	890	644
SolarCity	280	502
Canadian Solar	131	300
Yingli Green	128	261
JinkoSolar	230	290
Trina Solar	66	232
JA Solar	0	100
Hanwha Q CELLS	0	70(E)

Table 1. PV project completions in 2013 & 2014 include utility, commercial and residential.

Table 2

	2014 Guided	2014 Actual
First Solar	1,900	1,640(E)
SunPower	1,300	1300(E)
SunEdison	1,000	1,048
Shunfeng (SFCE)	2,000	644
SolarCity	500	502
Canadian Solar	400-500	300
Yingli Green	400-600	261
JinkoSolar	300-400	290
Trina Solar	400-500	232
JA Solar	200	100
Hanwha Q CELLS	200	50(E)

Table 2. Comparison of 2014 PV project completion guidance and actual and estimated completions.

MEMC, now renamed SunEdison. The twist with both SolarCity and SunEdison is that as their downstream success has gained momentum they have realised that having their own dedicated module manufacturing arms would potentially provide overall lower system costs, driving higher margin business.

Currently, SolarCity is building a 1GW integrated module manufacturing plant in the US, which will be completed most likely this year and on stream in 2016. SunEdison, meanwhile, outsources in-house designed modules to the likes of Flextronics but has publicly announced ambitions with potential partners to build large-scale integrated production plants in key emerging markets such as India and the MENA region. Therefore, both companies have been included in the analysis ahead of them both becoming module manufacturers and thus PVEPs.

However, the PVEP model is still evolving, and technically SunEdison and Shunfeng Clean Energy (SFCE) have already gone beyond PV to include wind energy in their project development portfolio. The data compiled for these 'clean energy' providers only relates to their PV operations.

In respect to First Solar, the company has been expanding its revenue opportunities within the EPC and O&M sectors and hopes to be a player in the residential market with the acquisition of n-type monocrystalline start-up Tetrasun, following SunPower and its strength in the commercial and residential markets.

Indeed the PVEP business model is at an early stage and rapidly evolving along with the channels to low-cost project financing.

Leaders and laggards

As shown in Table 1, the first-mover advantage enjoyed by leading CdTe thin-film producer, First Solar, followed by high-efficiency n-type monocrystalline module leader, SunPower, means the two companies were significantly ahead of their nearest rivals in project completion terms in 2013 and 2014.

> "There are higher margins per megawatt to be had by selling a completed project than by simply selling modules"

Both companies surpassed 1GW of project completions in 2013 for the first time, propelled primarily by large-scale utility projects in the US. However, several other US-based companies have expanded their downstream businesses at a faster rate, such as SolarCity and SunEdison. Both companies have doubled installations between 2013 and 2014.

SunEdison is notable for surpassing the 1GW mark for the first time in 2014, becoming the third largest of the PVEP firms by project completions.

It is interesting to note that both First Solar and SunPower have been capacity constrained during this period, while SolarCity and SunEdison have remained unshackled from any in-house manufacturing altogether.

Technically the fastest growing PVEP is China-based SFCE, which started as an EPC before acquiring the manufacturing operations of Wuxi Suntech. SFCE has grown more by project acquisition than pure project development, helped by being focused on the Chinese market, the largest in recent years and set to continue for several years to come.

In contrast, several major global top-10 module producers have lagged behind the first movers. Although Canadian Solar had undertaken projects before 2013 as well as Hanwha Q CELLS and Yingli Green, the quantity and scale of the projects rarely matched those undertaken by First Solar and SunPower.

In fairness to Yingli Green, Trina Solar, JinkoSolar and JA Solar, downstream project ambitions have come later than most others and are therefore in a catch-up mode over the course of the next few years.

Table 3

	2013	2014	2015 Guidance
First Solar	1,180	1,640(E)	2,230(E)
SunPower	1,035	1,300(E)	1,670(E)
SunEdison	536	1,048	1.56GW-1.9GW(E)
Shunfeng (SFCE)	890	644	1.2-1.9GW(E)
SolarCity	280	502	920-1,000
Canadian Solar	131	300	695-765
Yingli Green	128	261	400-600
JinkoSolar	230	290	600-800
Trina Solar	66	232	700-715
JA Solar	0	100	200-350
Hanwha Q CELLS	0	70(E)	128-300

Table 3. PV project completion guidance for 2015 (including estimates)

Project challenges in 2014

Despite the wide disparity in projected completions between the first movers and the other leading PVEPs, 2014 proved to be a year of momentum building for most of the currently lower ranked companies (Table 2).

Canadian Solar, Yingli Green, JinkoSolar and Trina Solar completed more projects in 2014 than in the previous year. However as Table 2 shows, guidance given by many of these companies for project completions in 2014 were significantly higher than what was achieved.

Although Trina Solar, for example, was successful in accelerating project completions from 66MW in 2013 to 232MW in 2014, completions fell well short of its guidance range of 400MW to 500MW.

A key factor behind this trend was that these companies were building projects almost exclusively in China. It has been well documented that delays in project planning approvals, grid connections and a late-year surge in building, which was impacted by cold weather in certain

Source: First Solar.

regions, contributed heavily to the shortfalls in 2014.

Canadian Solar was impacted by delays to projects not only in China (though smaller exposure) but also in Japan due to a number of grid operators halting PV power plant connections in fear of claimed grid overload.

It should also be noted that continued growth in global downstream PV demand, meaning greater demand for tier-one producers' modules, could have played a part in dampening in-house project development, particularly given the recent stabilisation of module prices.

Producers such as Trina Solar, Canadian Solar, JinkoSolar and JA Solar reported record module shipments in 2014, considerably outpacing rivals.

Conversely, it could be argued that First Solar and SunPower's significantly lower dependence on third-party module business enabled them to better match project guidance with completions than other module producers in 2014.

Project guidance momentum in 2015

When analysing project completion guidance, and estimates where guidance has not been given (see Table 3), it is clear that the vast majority of PVEPs are planning to expand project completions in 2015. As shown in Table 3 estimates are given for several of the top PVEP developers for 2015.

The joint First Solar/SunPower yieldco could substantially boost their project activity.

In the case of First Solar and SunPower, 2015 guidance has been withheld due to both companies joining forces in establishing a yieldco and floating it on the US stock market.

Analysis of PV projects both parties have said will be rolled into the yieldco, coupled to ongoing projects and previously disclosed project plans for the year, as well as the fact the companies are working together with in-house manufacturing capacities, enables an educated estimate of project completions in 2015.

However, in respect to First Solar it should be noted that the strong project completion forecast takes into account higher capacity and utilisation rates than the company could achieve in 2014, coupled to its significantly rebuilt project pipeline that was previously articulated at its Analyst Day event in 2014.

In regards to SunPower's increased project completions, despite remaining capacity constrained through 2015 with only a small incremental increase in cell/

Table 4

	2015 Guided	2014 Pipeline	2015 Pipeline
First Solar	2,230(E)	13.7GW	13.5GW
SunPower	1,670(E)	8GW	10GW
SunEdison	1.56GW-1.9GW(E)	5.1GW	5.7GW
Shunfeng (SFCE)	1.2-1.9GW(E)	4GW	6GW
SolarCity	920-1,000	2GW	3.0GW
Canadian Solar	695-765	3.2GW	8.5GW
Yingli Green	400-600	1GW	1.6GW
JinkoSolar	600-800	1.1GW	600-800
Trina Solar	700-715	1.GW	1.0GW
JA Solar	200-350	400MW	200-350
Hanwha Q CELLS	128-300	950MW	2.17GW

Table 4. PV project pipelines 1Q 2015.

module capacity, it should be noted that it has a strong 1GW pipeline of 'C7'-based technology (low-concentrate CPV) in China.

SunPower therefore can utilise its 'Maxeon' solar cell production capacity to provide CPV systems built in China under a JV arrangement that technically exceeds its conventional solar cell/module nameplate capacity.

With regard to SunEdison, which remains fabless, the estimated project completions are due to the company acquiring First Wind and only guiding combined completions in the range of 2,100MW to 2,300MW. SFCE has also not provided a breakout of guided PV and wind project completions for the year.

An overriding factor in the expected project completions in 2015 for First Solar, SunPower, SunEdison and SolarCity is the looming tax credit (ITC) reduction at the end of 2016.

Recently, market research firms IHS and Bloomberg New Energy Finance (BNEF) have forecast total PV installations in the US to reach over 9GW in 2015, up from around 6.4GW in 2014.

The remaining companies listed in Table 3 have all provided guidance during March and early April when releasing fourth quarter and full-year financial results for 2014.

Clearly the likes of SolarCity, Canadian Solar, JinkoSolar, JA Solar and Trina Solar are all expecting to double completions in 2015 over actual completions in 2014.

This is not a surprise when considering that those heavily dependent on the Chinese market experienced delays in 2015, enabling projects in 2014 that were already designed, financed and initiated to provide a strong base for completion growth in 2015.

A good example of this factor is JinkoSolar. The company's management noted in its Q4 earnings call that it expected module shipments to its own downstream projects in China to be in the range of 160-180MW in the first quarter of 2015 and was in line to have 350MW of projects on the subsidy catalogue in China in the same quarter.

One of the late starters in the project business, Trina Solar, failed meet the low end of completion guidance in 2014, yet has guided project completions 200MW higher than the high end of last year's guidance.

The strategy employed by Trina Solar is to sell plants built overseas, primarily those in the UK, while holding the Chinese projects on its balance sheet. Management noted in its Q4 earnings call that it already had 300MW of projects under construction.

However, the company was more confident this year in meeting guidance, noting that it expected 50MW of projects to be completed in Q1, around 50MW in Q2 and approximately 200MW to be completed and grid connected in Q3. Though completions are still loaded to the back end of the year, management noted it expected around 450MW to be completed in Q4, 2015. It should be noted that the figures far exceed the clarity given for projects in 2014.

Shunfeng was another company that recently reported in Q1 2015 that it had over 1.4GW of PV projects currently under construction.

> "Once-dedicated PV module suppliers have found alternative revenue streams and in some cases quickly divorced themselves from upstream market volatility"

Project pipelines and pipedreams

Any serious analytical study of what a PV project pipeline actually means is almost impossible as there is no financial and industry standard benchmark as to what a pipeline constitutes in terms of future project completions and revenue.

The fixation with pipelines by the larger project developers, compared to the smaller rivals that rarely divulge such data, should be noted.

However, such is the care and attention given to pipeline divulgence compared to actual annual completions, it is worth logging what the key PVEPs are saying about this aspect of the downstream business.

As shown in Table 4, actual guided completions in 2015 bear little correlation to the pipeline figures. The majority of companies listed have a pipeline figure higher than that of the previous year, which is intended to illustrate the future growth of projects as they move from a planned stage to an implementation stage.

Though simple in context, there is little correlation year to year to the pipeline and actual PV project completions. Although companies attempt to qualify the terminology surrounding pipelines, those listed have yet to reach any common ground and therefore further interpretation is almost meaningless.

That said, it is worth noting that several companies, hopefully using the same in-house metrics, have grown their pipelines significantly in the last 12 months.

SunPower has added 2GW to its pipeline, which includes 1GW in China and assumptions over translating projects in the US to completions due to ITC expiration. SunEdison on the other hand has more than doubled its pipeline, fuelled by the US, China and overall overseas expansions.

Although it seems First Solar's leading pipeline figure may have slightly declined year on year, it has promised 5GW of potential projects in India after the Indian government issued new and aggressive targets through 2020.

As mentioned earlier First Solar's potential yieldco JV with SunPower could catapult project development along the same trajectory that SunEdison has proved possible after establishing its own yieldco in 2014.

PVEP evolution

The migration to a PVEP business model is clearly underway for a number of companies but the model itself is likely to evolve and morph as companies leverage the successes or failures of the pace of the transition.

Once-dedicated PV module suppliers have found alternative revenue streams and in some cases have quickly divorced themselves from upstream market volatility and competition.

Momentum is building for 2016 and beyond with the news that Canadian Solar plans to initiate its first global yieldco financial vehicle, bolstered by its acquisition of project developer Recurrent Energy from Sharp Corporation, and yieldcos planned by the likes of Trina Solar and JinkoSolar and the already mentioned JV plans of First Solar and SunPower.

Based on the above analysis, PVEP project growth has not been without short-term challenges but near-term growth projections indicate the path to further financial security, manufacturing scale and global footprint migration. ■