

Securing the chain

Supply chain | As prices rise and component availability remains tight, both solar's upstream and downstream are rallying behind the common cause of ensuring which projects can go ahead, do go ahead in a timely fashion. Liam Stoker assesses the industry's efforts to keep the supply chain moving forward.

As the preceding pages have documented, an array of factors, from raw material prices to end market demand to global shipping and freight pressures have nudged prices northward, impacting on upstream manufacturers and downstream developers alike.

The two ends of the stream have always enjoyed a close, albeit at times fractious, relationship, however the pricing pressures of the last nine months have led to them becoming perhaps more intertwined than before.

With perhaps more visibility over tightness in the supply chain, component manufacturers have been steadying themselves for pricing volatility since late last year. Concerns over glass pricing sent reverberations throughout the sector in November 2020 and while prices for that material have since stabilised, it proved to be the warning tremor before polysilicon pricing spiked in early 2021.

The surge in polysilicon price has ricocheted throughout the sector, with module prices up between 20 – 25% on last year, Jamie Vaux, commercial director at solar distributor Midsummer Energy, says. This led to a weakening of demand throughout the value chain, which in turn prompted manufacturers to reduce factory utilisation rates. Indeed, reports earlier this year suggested some factories were running at utilisation rates as low as 60%. The year to date has proven to be a careful balancing act, weighing up pricing and demand, with one clear factor in mind: margins.

Manufacturer results in the opening quarter expressly displayed the issue at hand. Canadian Solar, for example, witnessed revenue from its manufacturing division (CSI) increase marginally in the opening quarter, up 0.8%. However gross profit fell by nearly 60% on the back of a significantly higher cost base, resulting in the division slipping to a loss of US\$52.7 million. The clearest sign of the impact of pricing volatility was seen in the division's

gross margin, which had swung from 23.5% in Q1 2020 to just 9.7% in Q1 2021.

It proved to be a swing that refocused CSI to put profit over shipment volume, a pivot which was then reflected in the company's Q2 results. An (albeit marginal) improvement in the division's margin to 12.9% helped secure a return to profit, however a reduction in full year shipment forecasts illustrated the pressures price increases are placing elsewhere in the value chain. CEO Shawn Qu said the ~2GW reduction in shipment forecast this year would effectively be the result, in equal measures, of a recalibration of costs versus supply, the prevalence of logistics issues (see p.16) and projects being pushed back into later quarters.

That decrease in module shipment guidance has further caused Canadian Solar to tweak its capacity expansion plans for 2021, reducing its originally-forecasted module assembly capacity by 3GW while simultaneously increasing its intended solar cell manufacturing capacity by around 600MW. JinkoSolar has also scaled

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back its planned capacity expansions for the year, citing the pressure pricing increases have placed on end-user demand.

But the fact module makers are making tweaks rather than wholesale cancellations indicates that it's not necessarily a case of responding entirely to demand or pricing fluctuations, but rather in adapting to a new status quo wherein upstream pressures lie elsewhere in the chain. Both CSI and JinkoSolar have stepped up efforts

in producing more solar wafers and cells internally in recent years in much the same way as their 'Solar Module Super League' (SMSL) peers have – in August JinkoSolar confirmed it had broken ground on a 7GW ingoting and wafering facility in Vietnam, the first such major solar ingot facility outside of China – in order to exert more control over their supply chains. Henning Schulze, corporate assistant president at SMSL manufacturer JA Solar, says his company's vertically integrated nature has proven to be a considerable strength amidst pricing volatility. "It does make it easier to control the supply chain. And it, of course, also has the advantage for customers. Customers know not only where the modules come from, but also other products like cells, wafers, ingots. The whole supply chain is much more transparent to our customers," he says.

Controlling the chain

While module manufacturers have been able to lean on vertical integration in order to mitigate pricing volatility to a certain extent, other component providers have not been that lucky. Inverter producers have been forced to contend with a semiconductor chip shortage that's impinging on vast swathes of the global economy, from electric vehicles to consumer electronics, while tracker and mounting suppliers have witnessed steel prices more than double in the course of the last year. Between April 2020 and May 2021, the price of hot-rolled coil steel rose from US\$515 per short ton to US\$1,348, and has continued to increase since.

Tracker manufacturers have been forced to adapt and amend procurement practices, bulk buying steel and locking in long-term contracts, often from new suppliers in a bid to contain the volatility. After withdrawing its full-year guidance amidst "unprecedented" increases in the cost of steel, tracker manufacturer Array Technologies took actions to mitigate its exposure to such price increases, negotiating longer-term contracts with material



Credit: LONGi Solar

With material and shipping costs having soared in the past year, manufacturers and developers alike are finding ways to mitigate these new pressures.

and freight providers. Likewise the global semiconductor chip shortage has led inverter manufacturers to search for new providers

But for every company to have lost out in pricing volatility, there's an entity to have benefited. Polysilicon manufacturers have largely never had it so good, with most – like solar glass manufacturers earlier in the year – posting record profits in the second quarter. Daqo New Energy is to capitalise on its bumper Q2 by ploughing investment into an ambitious capacity expansion plan despite a forecasted levelling out of average selling prices throughout 2022.

As those upstream have been able to mitigate, those further down the supply chain have perhaps not had the same luxuries, instead anxiously watching key component prices creep up. Down the stream, it's also a matter of control and restraint.

Bidding time

"Pricing has been extremely challenging," says George Hershman, president at US-based renewables EPC Swinerton. With module prices on the rise and margins shrinking across the board, an inevitable consequence is projects being pushed back until such a time that module prices normalise. Industry estimates vary in this regard, with anywhere from 10 – 20% of utility-scale solar projects in the US having

reported to have been delayed, however there has yet to be any widespread report of cancellations.

Indeed, Hershman says that his company has yet to record a single cancellation, with its clients merely electing to push back by a quarter or two. "A number of our customers are either trying to extend out their COD dates and get to somewhere where we can see some cost reductions in some commodities, and we're working with them on that, to try and push those projects out as far as possible," he says. "We haven't had any project cancellations - usually our projects don't just go to hard cancelation, they go on hold - and we try to move them into a later period of time where the economics may work."

But these delays are not always possible, especially if a developer has negotiated a power purchase agreement that has a hard deadline. Investors are not exactly famed for their patience, and uncertainty in the market – be it relating to pricing or availability, or anything else for that matter – can lead to issues with a project's bankability. "Once there's uncertainty in the market, then the tax equity goes somewhere else [and] the debt financing goes somewhere else, right? Lenders don't like uncertainty, and they have money to lend... so they're going to go find markets that bring more certainty," Hershman says.

As a result, it is a developer or EPC's job to manage not just the supply chain, but an investor's expectations under the current market conditions. Pushing projects into forthcoming quarters may be one option to explore, but is clearly not applicable as a 'one size fits all' solution given how each project is designed to different time frames. It could then fall on the developer to lean higher up the value chain, leveraging any size or scale it can in the hope of securing better deals.

Distributors have meanwhile managed client expectations by making pricing increases incrementally, rather than in one fell swoop. Midsummer Energy's Vaux says constant communication with his company's customers, explaining the situation and keeping them informed, has been critical to keeping them on side. Furthermore, it has led to a change in the way modules are purchased. "We have done as much forward buying at lower prices as we possibly can, to minimise the impact on our customers," Vaux says.

Arevon Energy, the solar and storage developer recently spun out of investor Capital Dynamics, intends to use its scale in the coming months to not just get it the best possible deal, but to secure its supply of key components in the first place. CEO

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John Breckenridge says Arevon – which has a 4.5GW portfolio of solar and storage assets at various stages of operation and construction alongside a 3GW pipeline of further projects – will be using its "purchasing might to help us navigate the tight supply situation". This doesn't just include components and other hardware, but "everything from EPC contractors to [shipping] containers", Breckenridge adds. "We're consolidating our purchases and we have our procurement organisations very focused on all of that. There are a lot of things we're doing in this tight market that are designed to address some of these issues," he says, adding: "If you don't do that efficiently, especially on smaller projects,



Phase II of the Moss Landing Energy Storage Facility in California was commissioned in mid-August, despite battery cells being in short supply.

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Scale has become particularly pertinent in the energy storage sphere where product availability is of real concern. Tesla’s Megapack product is sold out until 2023 with other manufacturers citing long lead times. “If you want access to batteries today, and you’re a small buyer, you’re going to be waiting a long time and paying a high price. We’re buying billions of dollars worth of batteries, so that gives us a lot of more opportunity to access that market,” Breckenridge says. While co-located solar-storage projects are on the rise, particularly in the US where more than 34% of the 459GW+ currently sat in an interconnection queue is hybridised, the prospective introduction of a standalone energy storage investment tax credit could lead to further pressure on the supply chain, Breckenridge says. “If we have an IT, for batteries, even though in the long run that’s good for a battery, the battery industry, and the storage industry, that actually in the short run may exacerbate the problem,” he says. “So it’s interesting how regulatory moves which have certain positive goals in mind sometimes have these other consequences that we have to manage through,” Breckenridge adds, noting how the solar ITC has ensured demand for solar modules has remained high in spite of pricing issues.

Regulatory hurdles elsewhere, however, could pose altogether different challenges in terms of supply and demand.

Avoiding chaos at the border

Allegations of forced labour in the solar supply chain are nothing particularly new, with polysilicon providers named in numerous reports last year, however it was not until the summer when governments began to match action with rhetoric. The US’ decision in late June 2021 to enact a withhold and release order (WRO) on products made by Hoshine Silicon Industry and its subsidiaries – effectively acting

as a block on solar products made using polysilicon connected to the Xinjiang-based supplier – amounted to the first major response to allegations in the solar industry, however other nations are said to be laying the groundwork for similar sanctions.

Arevon’s Breckenridge says that while the industry must of course tackle allegations of forced labour head on, it must also find a way to facilitate a continued flow of solar modules from the industry’s largest suppliers. “To abruptly just start stopping panels at the border without any sort of way for the industry to have been prepared for that has a huge cost to it, potentially. And so I think the industry has to find a way to address this problem without creating total chaos,” he says.

While a limited amount of modules have been detained so far – ROTH Capital’s Philip Shen indicated in mid-August 2021 that around 100MW had been seized by customs officials at the time, with a further 2.1GW of solar projects jeopardised by related concerns – the WRO offers little certainty to developers or other module buyers with the US Department of Commerce not confirming the identities of manufacturers suspected to be in breach of it.

A traceability protocol developed by the US Solar Energy Industries Association (SEIA) alongside its members intends to provide assurances that modules coming into the US are free of forced labour. Swinerton, which has helped in the design of the protocol, has distributed documentation to all of its vendors to ensure compliance, while the EPC is currently undergoing a material audit of its supply chain. “Is it perfect? Are we 100% clear on where everything comes from today? No, but we recognise that this is an issue,” Hershman says.

“There’s heightened levels of concern around modules, but we’re also looking at our tracker manufacturers and where

their products are coming from. We’re taking as much information as we can from other industry sources, and a number of suppliers in the industry are looking at their own supply chain and providing more information. There’s a heightened level of scrutiny, and where we maybe took things for granted before, we’re now requiring our vendors and suppliers to provide us information,” Hershman says.

All of this scrutiny and clarity will, inevitably, come at a cost. Andy Klump of Clean Energy Advisory, a consultant also working on SEIA’s protocol and manufacturer compliance with it, has suggested there may be a few months of delay as manufacturers get their paperwork in order and costs associated with compliance could be passed onto the customer, but nothing more than US\$0.02c/W. Still, coming on the back of nine months of material cost increases, those few cents could easily be the difference between economic viability and a project being nudged back further. Midsummer Energy’s Vaux is expecting module demand in Europe to be shaped by requests for similar transparency. “That may translate into changing module preferences, and there are likely bottlenecks that will come into play there,” he says.

Regulatory decisions are “creating a ripple effect in the market”, Hershman says. The filing of a petition in late August arguing for anti-dumping and countervailing duties in place under Section 201 in the US to be extended to include module manufacturing subsidies throughout Southeast Asia would turn those ripples into waves.

Section 201 tariffs have been in place in the US since February 2018 and are due to expire after a term of four years, however the Biden administration could yet choose to extend them pending the results of an investigation from the US International Trade Commission. Those tariffs, set at 30% on cells and modules imported from China, have raised the prices of modules from mainland China and pushed trade elsewhere. To extend those tariffs elsewhere, Hershman says, would have a significantly limiting impact on US solar deployment. “For an industry so ripe for growth and with so much opportunity, it would really just put the brakes on,” he says. ■

See overleaf for more detail on trade policy.