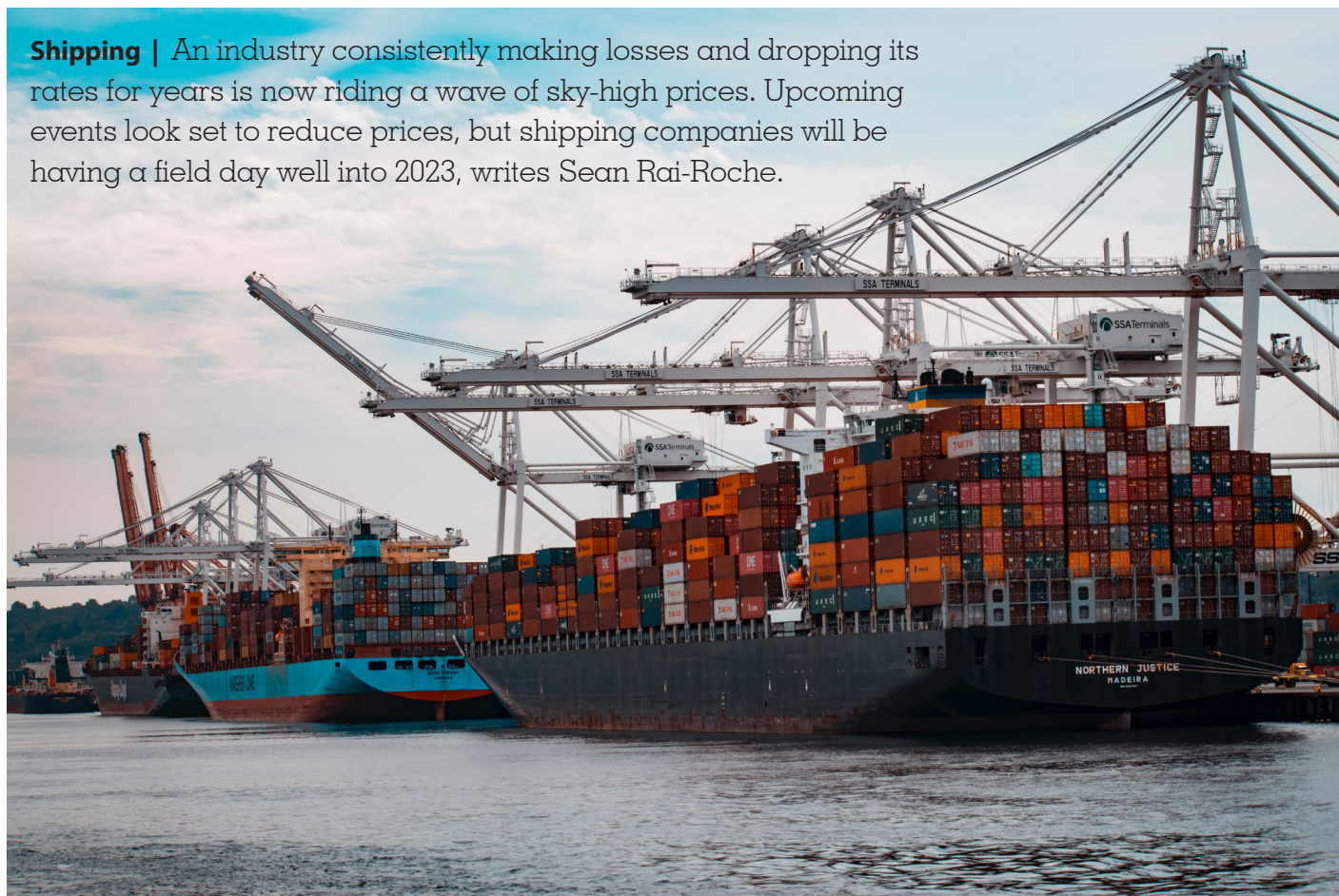


Waves in the shipping industry and what they mean for solar PV

Shipping | An industry consistently making losses and dropping its rates for years is now riding a wave of sky-high prices. Upcoming events look set to reduce prices, but shipping companies will be having a field day well into 2023, writes Sean Rai-Roche.



Credit: Andy L'Unsplash

The COVID-19 pandemic has been catastrophic for so many people and changed the world in myriad ways, from nationwide lockdowns to the shift to remote working and the rise of virtual business environments. But perhaps no industry has been impacted quite so much as the global shipping industry. Fear in March of 2020 was supplanted by sky high profits, with Q4 2020 reportedly the most profitable in container shipping history.

Since the highs of 2020, prices have not come down in a material sense and still represent a massive extra cost for importers of solar products in the US and Europe, helping to push up the price of modules and in turn raise project capex costs. While significant supply additions are upcoming, it is unclear if this will lead to a dramatic reduction in freight costs. What is clear, however, is prices will never come down to the triple digit level seen in early 2020, while a number of regulatory and

geopolitical decisions could compound the situation further.

PV Tech has been tracking the shipping industry and its price impact on solar products for the best part of a year. Here, we draw on various sources to provide an exhaustive analysis on the container shipping sector, its impact on solar projects, what prices are expected to do moving forwards and the key factors that could cast the sector into further uncertainty.

A brief history of shipping prices

Cast your mind back to before the pandemic. In January and February 2020, container shipping companies were charging around US\$1,650 for 40-foot containers from Asia to Europe and around US\$3,000 to the West coast of the US, according to George Griffiths, global pricing specialist at S&P Global Platts. Some couriers were even charging triple digit rates to capture

Shipping costs have soared since the COVID-19 pandemic, placing strain on solar PV project LCOEs.

demand and many shipping firms were making losses year after year.

Then, COVID-19 hit. Economies shut down, demand collapsed and global commerce ground to a standstill as countries desperately tried to protect their populations with national lockdowns and social distancing measures. Consumer demand for home improvement goods and shipments of personal protective equipment (PPE) were the only thing keeping the industry alive. Moreover, local lockdowns and COVID-19 outbreaks saw containers dispersed around the world, rather than being returned quickly to vital export hubs.

Compounding the situation further were a series of alliances made by shipping firms in 2013 and 2014 to streamline their operations that saw fewer ships being used to transport the same amount of goods, which again had the effect of reducing the supply pool, says Griffiths.

As economies started to open back up and global trade resumed, demand soared. But this was not matched by an increase in supply. The result was a massive rise in the cost of shipping. The harpex index, which aggregates world charter rates for containers, is today up roughly 800% from April 2020. In 2021 alone, when most major economies were back in full swing and container prices were at their highest, shipping companies made profits for the year in the region of US\$200-250 billion after years of losses.

Anna Larson, communications director of the World Shipping Council (WSC), summarises the situation. "The current supply chain congestion is due to pandemic-induced extreme demand coupled with operational disruptions as manufacturers have closed plants, and ports and inland logistics are overloaded, tying up capacity and reducing supply. With these supply restrictions and the high demand, rates are pushed up."

However, Larson says it is important to understand that the sensational rates published in media are not representative. "They are normally spot rates, whereas, depending on the trade, the majority of the volumes transported go under contract rates agreed between shippers and carriers for longer periods based on mutual commitments."

That said, in the solar industry, there have been numerous reports of couriers reneging on contracts as higher offers come in and demand intensifies. Some are even offering 'premium' rates to ensure on-time deliveries. Moreover, the increased cost of shipping gets baked into the final cost of modules for developers, resulting in a meaningful impact on a project's capex costs and LCOE.

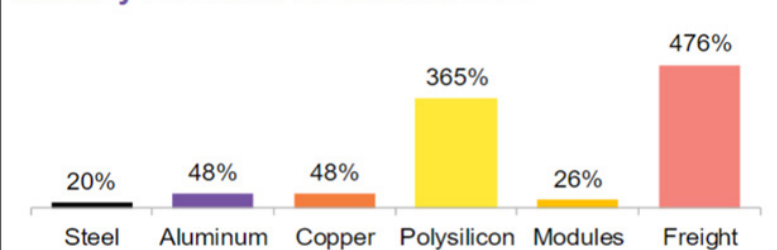
Impact on solar projects

The average price of shipping containers from Asia rose by 597% from mid-2020, with this particularly relevant for power components manufactured in China such as solar panels, inverters or batteries, noted BloombergNEF's (BNEF) 2H 2021 levelised cost of energy (LCOE) update.

A 40-foot container can hold about 840 modules, and if each module is rated at around 445W, there's the equivalent of about 374kW in each container. BNEF's analysis shows that while freight costs have been a negligible factor in total solar project capex in the past, accounting for just US\$0.01 – 0.02c/W. However now they are at US\$0.04 – 0.06c/W, representing

The price of freight as an input for key solar products has increased by more than that of polysilicon.

Price change for key solar cost inputs between January 2020 and November 2021



about 8% of BNEF's total capex benchmark last year.

BNEF's global capex benchmark for fixed-axis PV is now US\$690,000/MW, some 10% up from US\$630,000/MW on average in 2020. "This is the first time in more than a decade that our capex estimate increases," said the report.

BNEF's head of solar analysis Jenny Chase told PV Tech that she expects freight rates to remain flat in the near-term, meaning capex costs should not be subject to further upticks moving forward.

Meanwhile, fierce demand and port congestion have resulted in significant order delays, with a knock on effect on PV projects, particularly in the US and Europe. Late delivery of modules or other PV equipment can cause project delays, pushing back commencement of operations and disrupting companies' financials along the way.

In October 2021, the backlog of ships waiting outside the key twin ports of Los Angeles and Long Beach reached an all-time high of 112. In January, a Covid outbreak did cause another spike in congestion with 91 ships in the queue, but this number has steadily been falling and Griffiths believes the industry may have reached "peak delays".

"Delays on US West coast ports are starting to ease, with the vessel queue at the ports of Los Angeles and Long Beach falling from their January spike, however these delays and queues have begun building up at East Coast ports, in particular Charleston," says Griffiths.

An average of 18-day delays in October has now come down to roughly seven to 10 days from Asia to the US and Europe, says Griffiths. He expects delays to reduce by a couple of days every month from now on, although this is dependent on no more major disruptions to the sector.

Where are shipping prices headed?

Shipping costs remain relatively flat with some upwards and downwards

movements and solar importers can expect this trend to continue through 2022 and into 2023, when some major changes are set to occur. That said, project planning and financial forecasts should not expect shipping costs to plummet back down to early-2020 levels, instead reducing slowly but surely, meaning the impact on projects' LCOE will be minimal.

A 40-foot container from the key Chinese port of Shanghai to Europe's largest port of Rotterdam now costs around US\$11,100, down from a high of US\$14,800 in October 2021, according to data from the World Container Index. Meanwhile spot rates from Shanghai to New York stand at roughly US\$12,000 (down from US\$16,000 in September 2021) and US\$9,000 to Los Angeles (down from a high of US\$12,500 in September).

S&P Global Commodity Insights forecasts that Asia to Europe freight rates will peak at US\$14,000 for a 40-foot equivalent unit (FEU) in July, up from around US\$12,500 at the start of April. Asia to East coast North America will peak at US\$12,000/FEU in May, before falling slightly into July at US\$10,500/FEU, with West coast rates falling gently into the middle of the year from US\$8,000/FEU at the start of April to US\$6,500/FEU by June, says Griffiths.

Elsewhere, the cost of leasing vessels and hiring charter vessels has soared alongside traditional container line prices. Michelle Wiese Bockmann, markets editor at Lloyd's List, says the industry was paying five times more for a "clapped-out" old ship than it was a year ago, while short distance charter vessels were charging around US\$250,000, up from US\$25,000 last year, adding that long term contracts being negotiated now were roughly 400% higher than they were a year ago.

While it is unlikely freight rates will ease in the short-term, there is a growing tendency for fast freight forwarders and container lines to lock in longer term contracts at higher prices, says Bockmann.

Credit: Bloomberg Terminal, BNEF, LME, PV Infolink, Shanghai SteelHomeE-Commerce, Antaike and Shanghai Metals Exchange

This can be read in a couple of ways. Either the sustained high prices could be a signal that shipping companies don't expect prices to come down anytime soon or they predict that upcoming capacity additions will drive down prices and therefore want to lock in lucrative contracts, say both Griffiths and Bockmann.

Nonetheless, all analysts PV Tech spoke with expect prices to come down in 2023. This is because there is a substantial amount of containership orders in the works, with an additional 20% of the capacity of the current global fleet scheduled to come online, says Griffiths.

Bockmann says the current orderbook is around 800 ships with total twenty-foot equivalent unit (TEU) capacity of 6.3 million, adding that the current fleet in service is roughly 5500 ships and 24.7 million TEU.

"The volumes of capacity of new container ships that have been ordered in the last 18 months have been at record breaking levels," explains Bockmann. "Most of the orders were 18 months ago and lead times for shipbuilding is about two years," she says, reinforcing the idea that 2023 is when big changes are set to occur.

Falling prices at risk from external shocks

While analysts and experts are broadly agreed on the trajectory of the shipping industry and where prices are headed, they all expressed caveats to the above predictions. First and foremost, the ongoing threat of COVID-19 outbreaks in ports and key transport hubs could complicate price predictions, while China's zero COVID policy could cause further lockdowns in crucial manufacturing centres, which could again cause demand and delay spikes.

"At the moment, all eyes are on China

which is currently undergoing a series of COVID-related lockdowns, so should that result in some closed ports, there could be a significant build up in demand and delays spreading across the exporting region, tying up capacity and containers themselves," says Griffiths.

Bockmann places the greater risk on China's zero-COVID policies, which have seen entire cities shutdown due to a few cases. "It's not actually the pandemic

"...it's kind of like a slow moving car crash because you know what's coming, you're going to see ships building up while they wait to collect"

anymore," she says, "it's that policy and the shutdowns. At the moment, we're not seeing any immediate impact but it's kind of like a slow moving car crash because you know what's coming, you're going to see ships building up while they wait to collect"

"Obviously manufacturing will be compromised," she continues. "Then you'll have delays at the port and a repeat, probably on a lesser scale, of what happened at the beginning of the pandemic because there's interruption to manufacturing."

On top of this, the shipping industry's drive to decarbonise may also cause extra delays and upward pressure on prices.

The International Maritime Organisation (IMO) has set decarbonisation targets for 2030 and 2050, with the 2030 target being a cut in the carbon intensity of all ships by 40%. This means more money for research

and development and some older ships being taken out of circulation or travelling slower.

"The challenge for deep sea shipping is that there are no zero carbon technologies and fuels available for use, and significant investments and regulatory progress is needed on a global level to decarbonise the industry," says Larson.

Liquefied natural gas (LNG) could be a potential stop-gap that complies with IMO 2030 regulations but it won't be accepted under 2050 conditions, so a long-term solution is needed with ammonia and methanol being potential options albeit ones already in high demand.

"Individual carriers are investing in research and technology development around future low and zero carbon fuels, and WSC is working for regulation and multilateral dialogue through the IMO," adds Larson.

At the same time some older, more polluting ships will also need to travel slower in order to reach the new emissions goals, which will likely result in longer transit times in a market which is already struggling with reliability, says Griffiths.

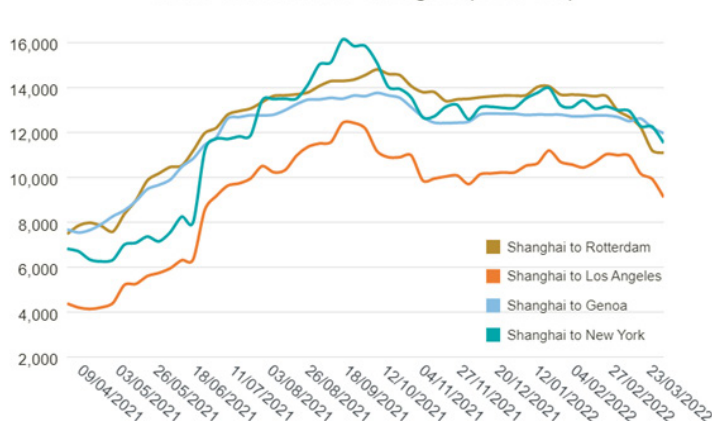
Shipping to remain a thorn in solar's side

The solar sector knows all too well the disruption that can be caused from crises in the shipping industry, from increased module prices to project delays. While solar companies should be anticipating a decline in shipping prices moving forward, nothing is set in stone. A number of factors threaten to block the downwards trajectory of prices and unforeseen geopolitical events could compound the situation further still. Companies may have to make some difficult decisions moving forward – i.e. whether to lock in long-term contracts at today's rates or continue to use spot market prices – that will depend on their business model and operational needs. That said, while the days of three-figure rates are well and truly behind us, there is reason to hope that prices will move steadily down this year, with 2023 set to change the game further as the shipping industry's fleet gets a 20% bump.

2022 will certainly be an improvement on last year, with 2023 set to ease pricing pressures considerably further. But, as we all know, a year is a long time in solar and prudent companies will have multiple contingency plans in place.

Shipping costs from Shanghai to major western ports have continued to rise through 2021, although there are signals that rates may come down.

Trade Routes from Shanghai (US\$/40ft)



Source: World Container Index via Drewry Supply Chain Advisors