Information paper

Stocks of solar modules in the EU - Qualified assessment

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In discussions regarding the sharp decline in solar module prices in 2023, the term "module glut" is frequently used to reference the purportedly high stock of solar modules in customs warehouses, particularly in European ports like Rotterdam. This is presented as an indication that the Chinese solar industry is flooding Germany and Europe with modules, posing a challenge to the European solar industry.

This paper is intended to contribute to objectifying the overheated debate.

The most important facts summarized

- On closer inspection, there is **no evidence of abusive overstocking** or abusive flooding of the European market by Chinese manufacturers.
- There are **no reliable figures on stocks** in the customs warehouses of European ports, **only estimates, which in turn** result **from approximations of inflows and outflows** to and from the warehouses.
- Both the data for inflows and outflows are subject to **considerable uncertainties that do not allow any reliable conclusions to be drawn**.
- The uncertainties in the estimates of the inflows are due to the fact that **official Chinese export figures do not contain any information on the output in GW,** but are estimated from the information on quantity, weight and prices with the aid of further assumptions.
- The data on outflows is subject to uncertainty because the **actual figures on installations** are **only** available with a **long delay**.
- It is undisputed that **warehouses** were **well stocked in the course of 2023.** However, this not only due to Chinese suppliers, but also to **all warehouses along the supply chain, from manufacturers to wholesalers and installers**. The reason for this was that players **massively expanded** their **orders for 2023 and built-up stocks** based on the expectation of high installation numbers and **after the experience supply chain bottlenecks in the last two years.**

The points in detail:

The available data on location stocks is very imprecise.

As there is no publicly available data on stock levels, these must be estimated. For this purpose, the inflows of modules from China into the warehouses and the outflows of modules from the warehouses are estimated.

Data from Chinese customs is used as the **basis for the inflows.** The relevant data can be found on the official website of Chinese customs under the commodity code 85414300.

However, this data does not contain any information on the output of the exported modules. The output must be estimated from the number of units, price, and weight, which leads to major uncertainties because the data may not only refer to modules, but also to complete photovoltaic systems that contain other components in addition to modules.

The NGO EMBER publishes an evaluation of Chinese export data with regular updates, on which the reports about a supposed module glut are based[1]. EMBER proceeds as described above and divides the

[1] https://ember-climate.org/data-catalogue/china-solar-pv-exports/

published prices with assumed sales prices per Wp to determine the output (in GW). Data from the Taiwanese market research company InfoLink is used for this purpose[2]. Upon request, EMBER confirmed to one of the authors of this paper on November 27, 2023, that the export code may also include complete photovoltaic systems or modules with other components and that the price data from InfoLink is subject to considerable uncertainty.

The authors' own evaluations of the published export data based on weights or quantities lead to more than 40% lower performance in GW compared to the evaluation based on prices.

The data on the discharge of modules from the storage facilities is also subject to great uncertainty. Like Germany, only a few countries provide monthly updated data. In addition, the figures are then corrected over longer periods of time. The more dynamically the markets move, the greater these corrections are. The uncertainties regarding the outflow of modules from the bonded warehouses to the European markets are correspondingly high.

In addition, there are indications that there have been significant outflows from European bonded warehouses in non-European markets. Several wholesalers have reported discussions with Chinese manufacturers indicating significant return shipments to China and sales to South America and Africa. These measures are common trade practices in view of the considerable capital commitment and storage costs that manufacturers would incur due to excessive stock levels (see sample calculations in the appendix).

The reasons for this encompass the overestimation of the European market volume 2023 in autumn 2022 (see next chapter) and, as a result, the fact that the goods sold or returned to South America and Africa consisted of older technology modules (monoPERC). As European customers swiftly transitioned to the newer generation (n-type TOPCon), older module generations no longer found any buyers in Europe.

Comparatively high stock levels were a consequence of market conditions.

Solar Power Europe (SPE) published the "EU Market Outlook for Solar Power 2023-2027" on December 12, 2023. SPE assumes that 55.9 GWp will be added in Europe in 2023[3]. Even though this figure represents an increase of 40% compared to the previous year and thus a new record, the expectations of some market players and analysts were significantly higher 12 to 14 months ago. Independent market observers continue to assume that the European market will be significantly larger than 55.9 GWp in 2023. Figures of over 100 GWp, nearly double the current expansion, have been mentioned among stakeholders[4]. The expectations of European distributors were correspondingly optimistic. Considering the experience of the past two years (2021 and 2022), which was characterized by supply bottlenecks because of the pandemic and the natural gas crisis, players along the entire supply chain, from importers to wholesalers and installers, have expanded their inventories.

After the economic slump in the construction industry, in particular because of rising interest rates, and the installation of solar systems falling short of high expectations, there was a corresponding backlog in European customs warehouses. However, the resulting high stock levels are unrelated with unfair trading practices or Chinese manufacturers flooding the European market. On the contrary, many European

[2] www.infolink-group.com/search/?keyword=%20module%20price
[3] (https://www.solarpowereurope.org/insights/outlooks/eu-market-outlook-for-solar-power-2023-2027)
[4] (https://www.infolink-group.com/energy-article/solar-topic-2023-pv-industry-overview, screenshot in the appendix).

players have also built-up high stock levels and have suffered financial losses, partly due to the devaluation of stored goods that has become necessary.

Appendix

Estimates of capital tied up in stock and storage costs.

In the reports on excessive inventories, figures ranging from 65 GWp to over 100 GWp were cited. These figures are used as the basis for the following estimates.

Capital commitment

Assuming a purchase price of 15 (or 20) cents/Wp:

- At 65 GWp: 9.75 (13) billion euros of capital tied up in modules in stock
- At 100 GWp: 15 (20) billion euros of capital tied up in modules in stock

In view of the sales value of the modules in stock of EUR 11.7 (15.6) (for 65 GWp) or EUR 18 (24) (for 100 GWp) billion (assuming sales prices of 18 (24) cents/Wp), it seems implausible that manufacturers would tie up capital of this magnitude in warehouses.

Storage costs

Assuming a cost of 0.5-0.6 cents/Wp for the storage of modules over a period of 12 months, the following results:

- At 65 GWp: 325-390 million euros per year in storage costs
- At 100 GWp: 500-600 million euros per year in storage costs

It seems unrealistic for market participants to bear such high costs for storage in addition to the high costs of manufacturing their products.

Market volume forecasts for 2023 from fall 2022 by pv-infolink

InfoLink CONSULTING

Category Solar > Market trends

Author Richard Chen

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Keywords search

Review

November 29, 2023
Markets see lower inventory draws in October, except India with slight increases

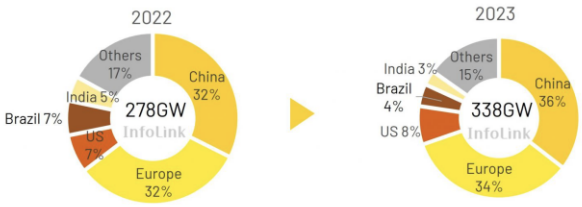
November 23, 2023
Solar market trends and prospects in Latin America

November 03, 2023
Middle East's challenging outlook for PV industry

Keywords

PV market

The energy crisis brought by the Russia's invasion of Ukraine in 2022 and countries' rising awareness of renewables result in robust solar market, with global module demand reaching as high as 280 GW in 2022, up 56.5% from the preceding year. As energy transition continues across the globe in 2023, InfoLink projects the global demand to increase 21.6%, hitting 338 GW.



Compared with last year, the global market growth will be weaker this year, due to higher base period and the fact that last year's stronger-than-expected growth was mainly ascribed to the Russia's conflict with Ukraine and surging energy prices, meaning that if there is no such significant event this year, the solar market would not grow as markedly as last year. Worldwide, countries with bigger market size face unfavored policies, such as the U.S.' Uyghur Human Rights Policy Act and India's Basic Customs Duty (BCD), which limit imports, as well as Brazil's imposition of grid fee on distributed generation projects. Overall, these policies make it difficult for the global solar market to sustain the same growth as last year. Having said that, the market on the whole is expected to add 60 GW more of demand this year despite lower growth rate. Demand may grow further if there's policy changes, which, could help push global demand to 398 GW under an optimistic scenario.

Compared with demand growth, capacity expansion across the supply chain is significant. In 2022, there was only 294 GW of polysilicon capacity at the beginning of the year, falling short of 280 GW of demand. Consequently, prices stayed high across the supply chain until the fourth quarter, when new polysilicon lines started coming online, with total capacity exceeding 500 GW at the end of the year. This allowed prices to dip—polysilicon and wafer prices both plunged deeper than expected, while module prices also slipped along with the upstream, from USD 0.265/W (RMB 2/W) in early November to USD 0.235/W (RMB 1.8/W) in January 2023.