

■ How to address the unsustainably ■ low PV module prices to ensure a renaissance of the PV industry in Europe



A position paper by the European Solar Manufacturing Council

The European Solar Manufacturing Council (ESMC) is the organisation representing the interests of the European PV manufacturing industry with more than 70 members. ESMC aims at promoting and supporting the PV manufacturing industry and its value chains at the European level, by creating a supportive political environment.



I. CONTEXT

Due to Russia's invasion of Ukraine and the ensuing conflict, the European Union (EU) has expedited efforts toward energy independence and climate neutrality. This prompted the launch of the REPowerEU plan, designed to rapidly decrease reliance on Russian fossil fuels, fortify the green transition, and establish a resilient energy system and Energy Union¹. The REPowerEU plan encompasses strategies such as the EU Solar Energy Strategy, aimed to double photovoltaic (PV) capacity by 2025, install 600 GW_{AC} (equivalent to 750 GW_{DC}) by 2030, enhance domestic production, and mandate rooftop solar for specific buildings². The deployment goal encounters a conceivable risk in terms of supply resilience. Presently, Europe's dependence on a sole source for its solar PV module requirements is striking, see Figure 1. China's dominance over the solar PV supply chain is pronounced, with as an illustrative example nearly 95% control over global wafer production. It commands the top 10 manufacturing companies across all stages of the value chain, except for PV grade polysilicon, where Germany's Wacker Chemie AG holds a notable presence³. In Europe, the estimated manufacturing capacity currently stands at 23 GW of annual polysilicon manufacturing capacity, 1.7 GW of ingot and wafers manufacturing capacity, 1.4 GW of cell manufacturing capacity and 9.4 GW of module manufacturing capacity. On the other hand, the European inverter manufacturing industry has remained strong and has an annual production capacity of nearly 70 GW.

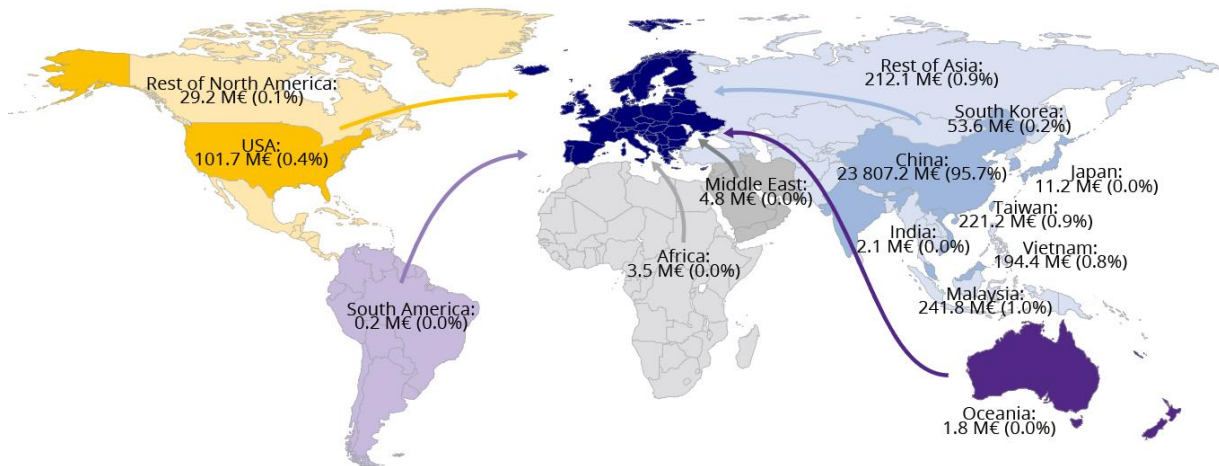


Figure 1. A visual representation of the import flows of PV modules into Europe in 2022 expressed in millions of euros and the share of the total extra-European import of modules in percentage. The raw data is based on the HS code 854143 from Trade Map⁴.

Due to the high important dependency of critical technologies for the energy transition, the Green Deal Industrial Plan for the Net-Zero Age, introduced in 2023, seeks to bolster the competitive edge of the EU's net-zero industry and support climate neutrality⁵. This emphasis on value chain resilience stems from supply chain disruptions, including those triggered by COVID-19 and the Suez Canal blockage⁶.

¹ [REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition](#)

² [EU Solar Energy Strategy](#)

³ [Building a competitive solar-PV supply chain in Europe](#)

⁴ [Dominant PV Trade Flows in Europe 2022](#)

⁵ [The Green Deal Industrial Plan: putting Europe's net-zero industry in the lead](#)

⁶ [The Effect of Suez Canal Blockage on Supply Chains](#)



The renewed drive to restore Europe's solar PV manufacturing ability has led to robust declarations from the European Commission, such as when EU Energy Commissioner Kadri Simson announced in March 2022 that:

"We need to bring manufacturing back to Europe, and the Commission is willing to do whatever it takes to make it happen, and part of this is looking at possible financing options".

However, as Europe aims to increase the PV manufacturing capacities in the foreseeable future, the rapid expansion of Chinese manufacturing capabilities is a major threat. China's PV cell manufacturing capacity was 506 GW/a, and the Chinese PV module manufacturing capacity was 552 GW/a, as of the end of 2022⁷, and has surpassed 600 GW in early 2023. The well-established Chinese PV industry — entrenched within a robust domestic market projected to exceed 140 GW by 2023⁸ — possesses a cost-efficient prowess that Europe, even with extensive support, may take several years to match⁶. China's PV industry operates at scale, flourishing across a spectrum of business models ranging from niche specialization within a single value chain step to complete integration. While technologically Europe and China stand on comparable ground at the moment, the individual spending of some of the largest Chinese companies on their R&D departments in a single year is in the same order of magnitude (or far greater) than the total public EU spending on PV R&D for the 2014–2020 period under the Horizon 2020 programme⁹, potentially enabling China to swiftly outpace Europe in a near future.

Furthermore, the landscape of market dynamics is shifting fast, with overseas competitors advancing even more expeditiously. The Chinese PV industry have already developed — and the Korean, US and Indian PV manufacturing sectors are progressing — to a level that Europe's initial generation of emerging and established industrial projects will struggle to attain.

As European companies consider investing in revitalizing PV manufacturing, the underlying market design and operational framework are pivotal. Notably, market structures are rapidly evolving in various global regions. Substantial structural distinctions exist among major regions such as China, Europe, India, and the United States, and the playing field is remarkably uneven in the world. On an overall level, a recent study claims that China spent \$240 billion — 1.7% of its annual GDP — on industrial subsidies in 2019, primarily on industries that fall under the "Made in China 2025" initiative (which includes PV), whereas France invested 0.55% and Germany 0.41% in industrial subsidies in the same period for comparison¹⁰, see Figure 2. With regards to the PV industry, China has been giving massive state support and exploitation to their PV manufacturing industry for more than a decade, including heavily subsidising energy and water process³, financial aid^{3,12}, tax breaks^{3,12}, free and subordinated loans from state banks^{3,12}, free land³ and forced labour in the production of silicon^{11,12}. As a result, the companies in different regions do not compete on a level playing field, as Figure 3 illustrates.

⁷ Trends in Photovoltaic Applications — 2022 (will be published by the IEA PVPS task 1 in September)

⁸ [Global Market Outlook for Solar Power 2023 – 2027](#)

⁹ [PV Manufacturing in Europe: understanding the value chain for a successful industrial policy](#)

¹⁰ [Estimating Chinese Industrial Policy Spending in Comparative Perspective](#)

¹¹ [In broad daylight: Uyghur forced labour and global solar supply chains](#)

¹² [Over-Exposed: Uyghur region exposure assessment for solar industry sourcing](#)

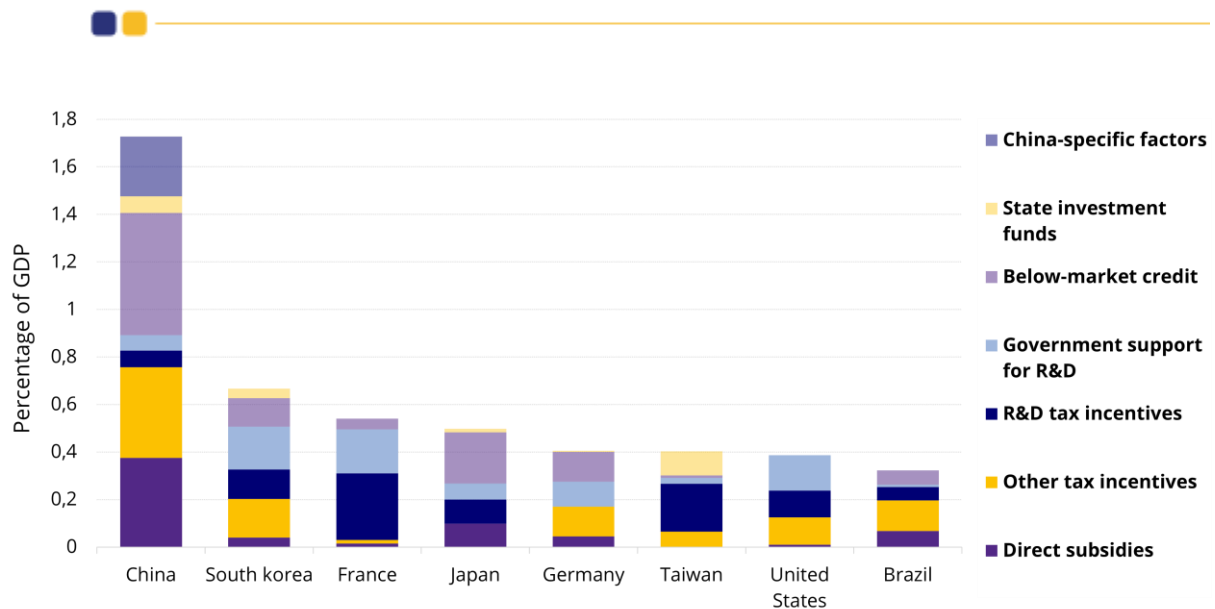


Figure 2. Industrial policy spending in key economies in 2019 in percentage of Gross Domestic Product (GDP). Included with permission from the authors of reference¹⁰.

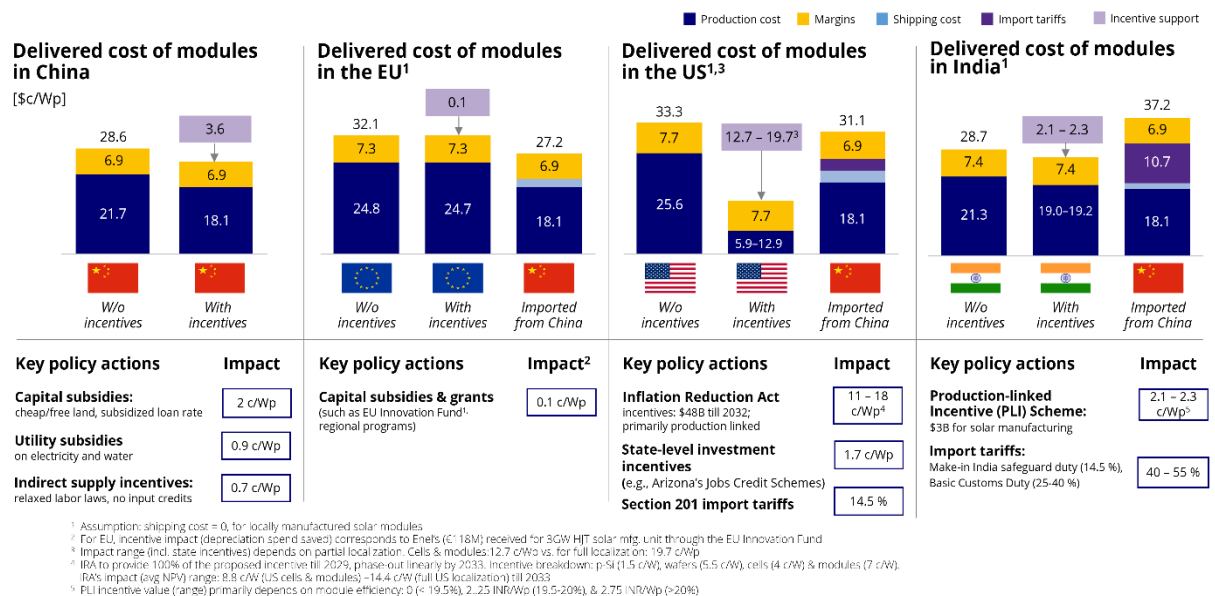


Figure 3. The estimated impact of incentives on local solar manufacturing cost across the regions in December 2022³. Note that this is a point in time assessment and do not include announced support from the EU through the NZIA nor the support from the Member States as they are not yet set.

Recently, the United States introduced the Inflation Reduction Act (IRA) in August 2022, offering tax credit incentives to manufacturers across the PV value chain. In addition, the United States puts import tariffs on cells and modules made in China, and partially extended these in December 2022 to manufacturing hubs in Cambodia, Malaysia, Thailand, and Vietnam to select suppliers. Furthermore, the U.S. Customs and Border Protection (CBP) agency detained more than 2 GW of PV modules under the Uyghur Forced Labor Prevention Act (UFLPA) in 2022¹³.

Concrete actions have been taken by the EU to bridge these differences, such as the Temporary Crisis and Transition Framework (TCTF), the proposal for a Net Zero Industry Act (NZIA), the establishment of the European Solar Industry Alliance (ESIA) and an endorsed goal of at least 30 GW of annual solar PV manufacturing capacity in Europe by 2025.

¹³ [Uyghur Forced Labor Prevention Act Statistics](#)



Examples are of engagement from the Member states include:

- The German government call to build up to 10 GW along the value chain, under the TCTF.
- The Spanish government have, likewise under the TCTF, announced €1 billion dedicated to net-zero industries and completed a call for interest.
- The Dutch government have allocated €412 million euros through the National Growth Fund for the PV program SolarNL, in support of large-scale production of PV cells and developing solar technologies and related manufacturing in the Netherlands.

These visionary endeavours have materialized into a mosaic of projects, totalling over 30 GW in capacity (encompassing ingots, wafers, cells, and modules)^{3,14}. These ventures are poised for production commencement as early as 2025, and several enterprises are already engaging in limited but escalating production operations.

However, all these efforts might be in vain as the EU PV manufacturing industry has come under severe pressure from sudden and sharp drop in the prices of imported PV modules from China since June 2023.

II. THE CRITICAL SITUATION WITH UNSUSTAINABLY LOW PV MODULE PRICES

Europe's solar import spending surged from about €6 billion in 2016 to over €25 billion last year, see Table 1, with a clear majority coming from China⁴, see Figure 1.

Table 1. Summary of Extra-European Import and Export values of European Countries and the EU27 expressed in billions of euros. The raw data is extracted from Trade Map (International Trade Centre) for HS-codes 854142 and 854143 respectively⁴.

	Extra-European import		Extra-European Export		Trade Balance		
	Cells [€, billions]	Modules [€, billions]	Cells [€, billions]	Modules [€, billions]	Cells [€, billions]	Modules [€, billions]	Total [€, billions]
Europe	0.44	24.88	0.02	0.13	-0.42	-24.75	-25.17
EU27	0.42	23.93	0.02	0.13	-0.40	-26.81	-24.21

Chinese-made PV modules are currently piling in European warehouses, with an estimated 40 GW_{dc} of capacity stored — equivalent to 2022's entire continent-wide installation volume — which are valued at approximately €7 billion¹⁵. Domestically produced modules can't match the imports, and from 2021 to 2022, Chinese solar modules imports grew 112% to around 87 GW_{dc}, while installations PV Manufacturing in Europe: understanding the value chain for a successful industrial policy lagged in, resulting in a 47 GW_{dc} gap in 2022 between shipped and installed modules.

Despite the large inventory at the start of the year, in January 2023 imports rose 17%, February 22%, March 51%, April 16%, and May 6% YoY, which is a pace that if it continues will lead to an import record at 120 GW_{dc}², surpassing expected installations of 62.4 GW_{dc}⁸.

Last year's stockpiling along with the ongoing strong imports and installation volumes that do not match the import is leading to a situation where the buildup is expected to grow, with Rystad Energy predicting 100 GW_{dc} of module in storage in Europe by end of 2023². With the current

¹⁴ [European Solar Industry Alliance — Projects:](#)

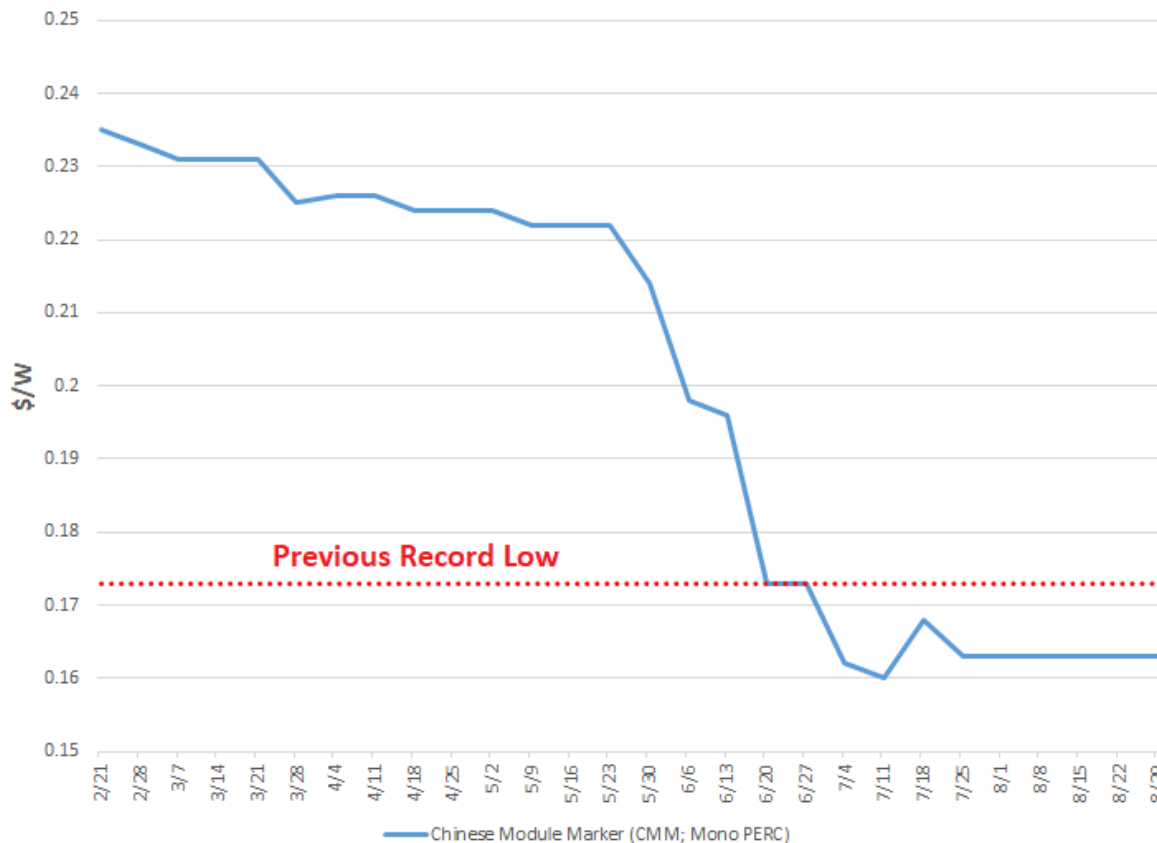
¹⁵ [Europe hoarding Chinese solar panels as imports outpace installations; €7 billion sitting in warehouses](#)



technology transition in the solar industry — from P-type to N-type cells¹⁶ — stockpiled modules could face declining interest from buyers if left in the warehouses for too long.

Announcements for new production capacities in China show no pause and more companies are ramping new production lines, against all prudent business rules: inevitably it is expected that the strong imbalance that already exists between market demand and production will lead to a prolonged situation of low prices, pushing for a consolidation of the industry in China and the absolute inability outside of China to develop any competitor. This situation is reinforced by the announcement of the Chinese government that it will support the manufacturing industry by increasing its local market, from 92 GW in 2022 to possibly 150 GW in 2023. This increase is anyway much lower than the new additions in manufacturing capacities and will lead to further price decreases.

The oversupply has led to that the prices of PV modules has dropped by more than 35% to 0.16 $\$/W_p$ in recent weeks¹⁷, see Figure 4. The red line in Figure 4 marks the previous record low (which goes back to Jan 2018) for the Chinese Module Marker (CMM), according to OPIS data. Modules have been trading below that level for more than two months now, reflecting how far prices have fallen.



Oil Price Information Service, LLC. All rights reserved.

Source: OPIS APAC Solar Weekly Report

Figure 4. Chinese Module Marker (CMM) prices development since February highs. Compiled by OPIS for this report.

In addition to a global overcapacity in module production — deriving from the rapid expansions of the major Chinese companies — the partly closing of the US and Indian PV market towards China

¹⁶ [International Technology Roadmap for Photovoltaic \(ITRPV\) — 2022 Results — 14. Edition, April 2023](#)

¹⁷ OPIS APAC Solar Weekly Report



by import tariffs and the Uyghur Forced Labor Prevention Act in the US (that effectively forbids certain volumes of Chinese modules to enter the American market) has led to a situation that the only two major markets in the world that is left completely open for the modules produced in mainland China are the domestic Chinese market and the European market. Regarding the Uyghur Forced Labor Prevention Act in the US, about 40% of all the detained PV modules in 2022 have been released. There are reports that comparatively large volumes of PV modules, which were intended for the American market — but which were rejected by the American customs as it was judged as high risk that parts of the underlying value chain included forced labour — have and are being redirected to Europe and are sold (for obvious reasons) at fire sale prices. This is possible as Europe does not yet have legislation on forced labour in place, although it is underway¹⁸. Consequently, pending the EU legislation on forced labour Europe is becoming a dumping ground for unethically produced Chinese modules.

The current pricing of modules is unsustainable from a global industry perspective. European manufacturers are definitely not able to cover their production costs. Interestingly, this seems to be the case for the state-supported Chinese manufacturers as well. For instance, examining the Q1 & Q2 financial report from Jinko Solar, — one of the top 5 largest module producers in 2022⁷ — and calculating somewhat backwards, their disclosed figures points toward a production cost of about ~0.20 \$/W_p, Q1 and ~0.197 \$/W_p in Q2 2023 and average sales prices of ~0.24 \$/W_p and ~0.23 \$/W_p in Q1 and Q2 respectively. Consequently, even with certain material costs having decreased since Q1 2023, the profitability of major Chinese manufacturers since the drop of module prices in June, Figure 4, who have the competitive advantages of both size and support by Chinese industry policies, seems questionable at the current price-level of PV modules.

A potential additional reason for the low current unsustainable low module prices, for which the European Solar Manufacturing Council (ESMC) does not have direct evidence, are that the well-timed collapse in prices likely is a response from China to strangle Europe's plans to re-establish PV manufacturing in Europe already in the cradle. Such strategies have openly been advocated by Chinese industry company leaders in other industry segments, such as in the car industry¹⁹. Moreover, the example made on the disclosed figures of Jinko Solar above also points towards this possibility. If Chinese manufacturers are exporting modules to Europe within the price range of 0.15–0.18 \$/W_p, while upholding a comparatively higher average global selling price, consequently means that the low prices in Europe is counterbalanced by elevated prices in other regions, giving rise to significant market distortions and hints of a local dumping in Europe.

The unjustifiably low module prices are indeed impacting current European PV manufacturers, their plans for scale up capacities, and the plans of potential European PV manufacturers to establish production facilities in the EU.

An illustrative situation that underscores the pressing challenges and the vulnerability of the European PV industry pertains to the state of Ingot and Wafer production. Ingot producer Norwegian Crystal filed for bankruptcy in August²⁰ and shortly thereafter, NorSun AS, driven by the significant price collapse in Europe, have announced that they temporarily halt production at the Årdal plant and institute temporary layoffs for their employees until the year's end²¹. Consequently, Europe currently finds itself almost without ingot and wafer production for the PV industry.

¹⁸ [Proposal for a ban on goods made using forced labour](#)

¹⁹ [BYD calls for Chinese automotive unity, 'demolish the old legends'](#)

²⁰ [Insolvency of Norwegian Crystals](#)

²¹ [Dramatic price collapse in Europe creates short-term challenges for NorSun Årdal](#)



In addition, ESMC has surveyed its members on their operational situation and PV modules in their stock, which is presented in Table 2. Because of the sharp drop in PV modules prices, the majority of European PV modules manufacturers have already ramped down or stopped production of PV modules, and suspended implementation of projects for the production capacity expansion. The survey showed that this year ~1000 MW of European PV modules have been produced by the 12 respondent companies, and that ~420 MW of those are currently kept in stock due to a lack of sales prospect. The average production costs of the regular modules in stock are ~0.33 €/W_p according to our survey. Accordingly, the current losses for European PV modules manufacturers taking part of the survey accumulates to ~76 million € if they would sell the modules in their stock at the current market prices (as 1 MW price difference is 180 000 € comparing with the imported PV modules from China and taking 0.15 €/W_p as a reference).

Table 2. Result of a survey sent out by ESMC in week 35, end of August 2023, to European manufacturers. The disclosed situation of the below responding producers has in addition been confirmed bilaterally by additional manufacturers, but also by additional European companies that supply European module manufacturers with materials or components.

European PV module manufacturers	1	2	3	4	5	6	7	8	9	10	11	12-14 ¹	Total/Average	15 ²
Current annual production capacity [MW/a]	3 000	1 400	800	500	300	250	200	100	80	70	25	67	6 792	3 000
Actual production of PV modules between January-August 2023 [MW]	0	302	214	102	86	100	100	54	20	4	7	30	1019	900
Current (end of August) production utilization rate	0%	50%	25%	30%	10%	30%	50%	N.A.	50%	25%	35%	75%	35%	35%
PV modules in stock, MW (end of August) [MW]	0	>165	68	70	13	55	40	8	3	1.5	4	9.5	~400	N.A.
Stock in comparison to 2023 actual annual production capacity	-	55%	31%	68%	15%	55%	40%	15%	5%	50%	50%	22%	37%	N.A.
Average costs of PV modules in stock, (BOM price) [€/W _p]	N.A.	N.A.	0.30	0.36	0.24	0.34	0.30	N.A.	0.38	0.36	0.6	0.86	0.32	N.A.
Actual losses on stock, [€ million]	N.A.	N.A.	10	8	3	10.5	6	N.A.	N.A.	0.7	2-3	14	7.3	N.A.

¹ Total of 3 Building Integrated PV Module manufacturers.

² A PV module component manufacturer.

The substantial decrease in prices of imported PV modules from China gives rise to two adverse systemic effects. Initially, European PV firms face challenges in selling their domestically produced goods promptly, leading to staffing reductions at European facilities and severe financial losses. Furthermore, the prospect of investors supporting new European PV manufacturing sites is bleak if ongoing price trends persist for a year or longer. This will be preceded by two different up-coming scenarios:

1. EU's reliance on imported PV modules will escalate, undermining the EU efforts to bolster the overall resilience and independence of the European energy transition, specifically in PV manufacturing.
2. Establishment of manufacturing facilities in the EU by the major Chinese companies after the disappearance of the European companies. Chinese PV manufacturers have started to reach out to regional Governments across Europe asking for their interest in hosting GW



scale manufacturing plants, and thereby positioning themselves to take advantage of the funding instruments that the EU and the member states are putting in place^{22,23,etc.}

In contrast to 2012, when the European PV industry faced a mass departure and numerous bankruptcies, European manufacturers with enough resources can today find secure haven in the USA. The Inflation Reduction Act, along with stringent import regulations and anti-dumping tariffs, ensures both reliable investment conditions and a predictable market. As a result, several EU manufacturers have declared intentions to pursue further expansion stages in the USA. The next logical step could involve complete production relocation from Europe to the US. This is not far off in time as a few companies has already started planning for such a move if the current situation is not addressed or does not change in the near future. The TCTF framework ensures the possibility for the European PV manufacturing companies to receive support for the capital expenditure. However, the problem with the TCTF is the unnecessarily complicated rules, which makes the instrument cumbersome, slow and does not provide certainty in the short term, which is what the industry needs to reach final investment decision (FID). In addition, the operational costs (OPEX) still show a huge gap in comparison to the PV production from China and the supported situation in the US.

To summarize, the existing European PV module manufacturers, along with raw materials and component suppliers are in imminent danger of liquidity problems. The situation needs to be addressed latest at year end when inventories of the companies have to be de-valued based on the market conditions, resulting in that Europe will face another wave of PV companies filing for insolvency at the beginning of 2024. In addition, basically all previous communicated capacity expansion is currently being put on hold. In the interim, major Chinese manufacturing companies have initiated strategic moves to position themselves to capitalize on the potential void left by the impending wave of bankruptcies among European companies. With the prospect of getting access to the support measures being put in place by the EU and its member states, the Chinese companies are at the moment proactively engaging with and securing the backing of local European governments. The involvement of foreign manufacturers in the European PV industry through collaborations and joint ventures with European stakeholders can potentially inject a positive momentum, expediting the scaling up of manufacturing volumes. This accelerated growth can offer benefits to the overall European value chain. However, it's crucial to recognize that while such partnerships can enhance manufacturing capabilities, true European resilience cannot be achieved if completely foreign controlled manufacturers simply replace the European manufacturers that are now facing the risk bankruptcy due to the low module prices.

III. PROPOSED ACTIONS – URGENT IMPLEMENTATION IS NECESSARY

The current challenges of the import of unsustainably low-priced modules from China poses a severe threat to European PV manufacturing capabilities, jeopardizing any aspirations of establishing a resilient PV manufacturing value chain in Europe. To address these challenges, the European Solar PV Industry Alliance is actively developing mid- and long-term proposals across various fronts, encompassing financing, supply chain, demand-side, and skills frameworks.

However, a majority of European PV manufacturing industry stakeholders hold a clear and united stance that if the issue of the unsustainably low-priced PV modules will not be addressed with a comprehensive package of concrete emergency measures by September-October 2023, the

²² [Aiko Solar that has the support Burgenland of Austria to set up a 2GW PV module factory.](#)

²³ [Longi is planning for the first Chinese plant in Germany.](#)



European PV manufacturing sector is poised to face a wave of bankruptcies towards the end of 2023 and the beginning of 2024. Subsequently, the revival of European PV manufacturing would be considerably more challenging, as private investments would become increasingly elusive.

Various EU market trade defence measures could be considered and implemented after thorough examination. However, when assessing the immediate urgency for emergency measures, both the European Commission and Member States should prioritize efforts aimed at securing the off-take for European PV manufacturers through the enforcement of the Net-Zero Industry Act. This should include the option of purchasing European-produced PV modules to swiftly stabilize the European PV market as soon as possible.

Consequently, emergency fast-track measures for safeguarding European PV modules manufacturing should be combined with secured market share for the entire European PV manufacturing value chain. The European PV manufacturing companies ask the European Commission and the Member States for immediate protection both on European and national levels:

- 1. Immediate exclusion from the European market of solar modules produced with forced labour.** We cannot and will not compete against slave labour produced products. We are committed to ensuring fair competition and will not tolerate products made through exploitative practices. Currently, large volumes of unethically produced PV modules that were originally bound for the US market are now being dumped in Europe due to existing Uyghur Forced Labor Prevention Act (UFLPA). One such solution is to leverage the UFLPA Entity List, even before the corresponding European Regulation takes effect in the next 18–24 months. This will enable us to address this pressing issue immediately and protect the integrity of our market.
- 2. Swift emergency acquisition of European PV manufacturers' PV module inventories in response to the forced price decline caused by Chinese unjust trade practices.** These PV modules, for example, could be procured through the refinement of competitive bidding processes within the *Temporary Crisis and Transition Framework* (TCTF) or elaborating the *Ukraine Facility* framework for Ukraine aid and rebuild, and/or eventually as well for energy aid for Africa. An expedited emergency measure aimed at protecting European PV module producers during this pivotal period will effectively tackle this issue and is critical for the survival of many European manufacturing companies. Currently European PV module manufacturers maintain an estimated 500 MW of produced PV modules as inventories, as they are unable to sell them in the European markets at prices that cover their manufacturing costs. Based on the numbers presented in Table 2, € 75–100 million annually from 2023 till 2025 should be treated as a temporary fast-track delivery measure for 50–300 projects across the EU or as one support package to support Ukraine. The European centralized buy-out instrument could be potentially elaborated using two supporting frameworks:
 - a) using [Temporary Crisis and Transition Framework](#) (TCTF) (adopted on 9 March 2023) section 2.5.1. *Investment aid for accelerating the rollout of renewable energy and for energy storage* (a competitive bidding process is not mandatory for projects with installed capacity equal or below 1 MW or projects with an installed capacity equal or below 6 MW, if they are 100% owned by SMEs or renewable energy communities).
 - b) Supporting Ukraine with additional decentralized PV generation through the proposed [Regulation of the European Parliament and the Council on establishing](#)



[the Ukraine Facility](#) (20 June 2023) – 5% of *Ukraine Reserve* would amount to at least € 500 million in 2024-2027).

- 3. Encouragement for European PV installers and project developers to incorporate a minimum share of European production along the entire PV value chain sold in Europe.** This will secure a stable market for European manufacturers in the medium term. A prerequisite for this is a clear definition of what a European solar PV module is. This must be developed and implemented within the framework of the currently ongoing negotiations of the Net-Zero Industry Act. The European PV manufacturing industry urgently requires assurance regarding the uptake of domestic production, commencing no later than 2026. This could be initiated with a 10% target, that is subsequently increased every year toward the 2030 goal of 40%, as stipulated in the NZIA. However, the current version of NZIA lacks the necessary yearly benchmarks, concrete mechanisms, or a mandatory framework, which is crucial for securing future investments in the sector. In addition, the introduction of a Net-Bonus system (resilience criteria and ESG criteria) within the NZIA framework, that will support all parts of the European value chain should be seriously considered. Starting from 10% European produced capacities along the entire value chain requirement in 2026 and continuing with 15% in 2027, 20% in 2028, 30% in 2029 and 40% in 2030 would ensure realistic and at the same time gradually increasing PV manufacturing capacities in Europe.

A robust monitoring and implementation framework must be devised to ensure swift action if additional measures become necessary. Future installation capacities should be closely aligned with European production capacities from previous years to maintain equilibrium in the market. This alignment will empower every project developer to gradually increase the proportion of imported PV volumes in comparison to European-sourced PV production. Specifically, by 2026, project developers would have the right to install PV volumes ten times larger than European-sourced production in 2025, followed by 6.7 times larger volumes in 2027 compared to 2026, 5 times larger volumes in 2028 compared to 2027, 3.3 times larger volumes in 2029 compared to 2028, and 2.5 times larger volumes in 2030 compared to 2029.

This proposed system serves as an automatic incentive for PV project developers, EPC companies, and installers to progressively increase European PV manufacturing production without adversely affecting the European PV deployment market. While alternative frameworks may be considered to secure European PV manufacturing capacities, it is essential to provide precise descriptions of European off-take capacities for each year between 2026 and 2030. These measures should be promptly integrated into the NZIA to provide investors with the certainty they need for secured European PV manufacturing off-take, fostering a stable and sustainable market environment.

The proposed measures should be implemented in combining short-term emergency measures with medium-term systemic measures to secure at least 40% European PV manufacturing capacities in 2030. The summary of the proposed measures is described in Table 2.

Lastly, the current situation has a demobilizing effect investors interest to support PV capacity expansion projects, and EU should also consider to give startups and companies with major expansion plans support to carry out project development, especially subsidies for feasibility studies and business plans as well as bank guarantees for special-purpose vehicles (SPV).



Table 3. Proposed immediate short-term and medium-term measures to safeguard the production of European PV modules (2023–2025) and ensure off-take for the entire European PV manufacturing value chain (2026–2030).

No.	Action	Expected effect	Pre-conditions
1. Short-term	Activate EU procurements scheme to buy-out 420–500 MW European produced PV modules annually in 2023–2025	Stabilized European PV manufacturing capacities for one-two years (2023–2024)	<ul style="list-style-type: none"> • Secure €75–100 million annual financing • Elaborate <i>TCTF</i> framework in the Member States • Elaborate <i>Ukraine Facility</i> in the EU (5% of <i>Ukraine Reserve</i> would amount at least €500 million in 2024–2027)
2. Short-term	Activate trade defence measures: for example, forced-labour legislation to stop forced labour produced PV modules flows to the EU	Stabilized European PV manufacturing capacities for two-three years (2023–2025)	<ul style="list-style-type: none"> • Adopt effective solutions with immediate effect —making use of the U.S. Uyghur Forced Labor Prevention Act Entity List while EU Regulation will become effective in 18–24 months
3. Medium-term	Include 40% market share capacities for the European PV manufacturing into NZIA	Stabilized European PV manufacturing capacities and secured new manufacturing capacities in 2026–2030	<ul style="list-style-type: none"> • Adapt NZIA respectively
4. Medium-term	Include Bonus-point resilience system in the public procurements and auctions of NZIA	Stabilized European PV manufacturing capacities and secured new manufacturing capacities in 2026–2030	<ul style="list-style-type: none"> • Adapt NZIA respectively