



The Hague Centre  
for Strategic Studies

# The silicon economy

## Polysilicon supply chains in times of geoeconomic transition

Ron Stoop and Irina Patrahau

October 2026





## The silicon economy

Polysilicon supply chains in times  
of geoeconomic transition

**Authors:**

Ron Stoop and Irina Patrahau

**Contributor:**

Sophie Tinselboer

The cover image was AI-generated.

October 2026

The research was commissioned by RESiLICON and executed by The Hague Centre for Strategic Studies (HCSS). The conclusions and recommendations presented in this paper are the result of independent research. Responsibility for the content rests with the authors and the authors alone.

© *The Hague* Centre for Strategic Studies. All rights reserved. No part of this report may be reproduced and/or published in any form by print, photo print, microfilm or any other means without prior written permission from HCSS. All images are subject to the licenses of their respective owners.

# Table of Contents

|           |                                                                                     |           |
|-----------|-------------------------------------------------------------------------------------|-----------|
|           | <b>Executive summary</b>                                                            | <b>IV</b> |
| <b>1.</b> | <b>Introduction</b>                                                                 | <b>1</b>  |
| <b>2.</b> | <b>The global polysilicon supply chain and the EU's position</b>                    | <b>3</b>  |
| <b>3.</b> | <b>Global policy initiatives to secure polysilicon</b>                              | <b>8</b>  |
| 3.1.      | The rise of China                                                                   | 8         |
| 3.2.      | Global initiatives                                                                  | 9         |
| <b>4.</b> | <b>Goals and means: the EU's strategic policy goals and the role of polysilicon</b> | <b>13</b> |
| 4.1.      | Strategic policy goals                                                              | 13        |
| 4.2.      | The role of polysilicon                                                             | 14        |
| <b>5.</b> | <b>Conclusion and policy recommendations</b>                                        | <b>16</b> |

# Executive summary

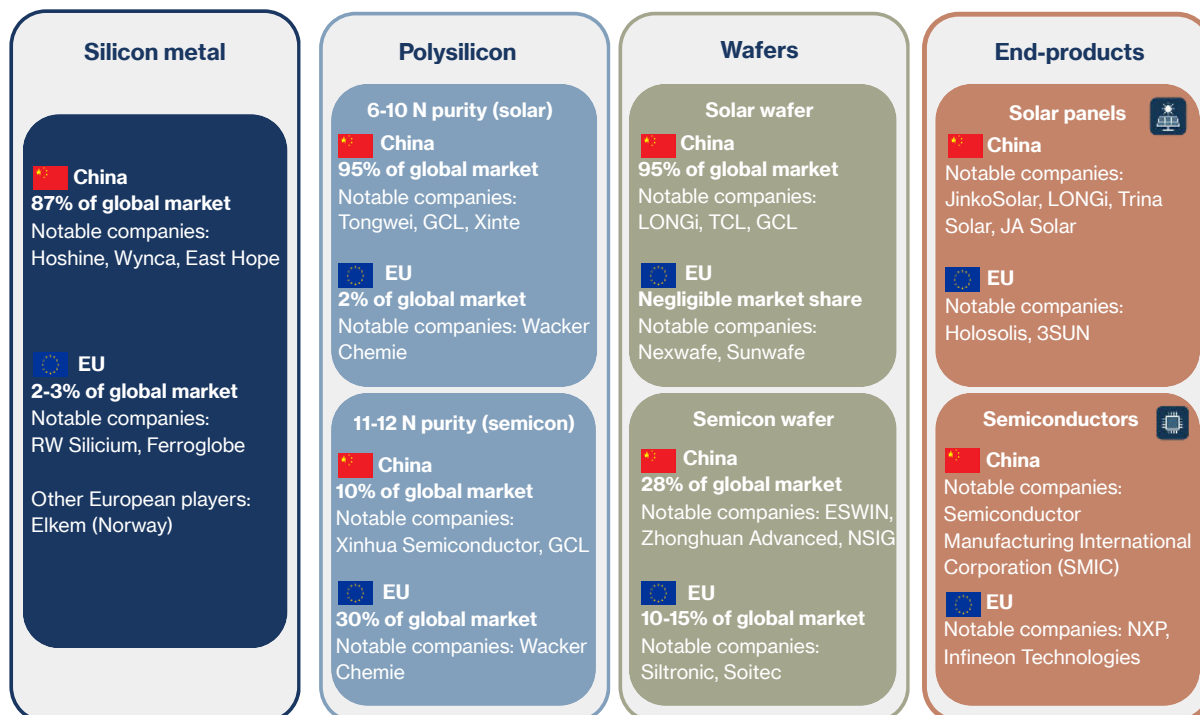
Technological transformations in the global economy are predominantly shaped by two intertwined transitions: the energy transition towards renewables and the digital transition reliant on advanced digital infrastructure and artificial intelligence (AI). The European Union (EU) highlights these as the “twin transition,” emphasizing the mutual dependency between abundant, affordable clean energy and digital technologies. The growing investments in defence capabilities are also driving the digital transition, with a growing need for semiconductor chips to support advanced warfighting capabilities.

At the heart of both transitions lies silicon, an abundant earth element critical for manufacturing semiconductor chips and solar panels - the body and brains of tomorrow's economy. Access to silicon and its refined form, polysilicon, is therefore a strategic priority globally, impacting economic growth and geopolitical power.

Despite silicon's natural abundance, only a small percentage is suitable for conversion into polysilicon, the material indispensable for chips, solar panels, and batteries. Polysilicon production is energy-intensive and costly, and geopolitical tensions have intensified competition over critical raw materials, including polysilicon. Against this backdrop, the EU seeks to secure its polysilicon supply through legislation like the Critical Raw Materials Act, Net-Zero Industry Act, and European Chips Acts. These are aimed at reducing import dependencies and strengthening strategic autonomy in clean energy and digital technologies.

Currently, the EU's position in the polysilicon supply chain reveals vulnerabilities, as shown in Figure 1. The EU has a relatively strong position in solar and semiconductor-grade polysilicon production, but insufficient downstream manufacturing to utilize polysilicon volumes, creating heavy dependence on Chinese technology and supply. Yet realizing the ambitions of the Chips Act and Net-Zero Industry Act requires a significant scaleup of downstream manufacturing, including ingots, wafers, and finished components for solar, battery, and semiconductor sectors within Europe. This should also come together with boosting polysilicon production, given that Europe's entire polysilicon capacity is fully concentrated in one company with a notable international position, especially in semiconductor supply chains, Wacker Chemie. Further investing in European polysilicon would ensure that Europe's current position in this supply chain is maintained, and future supply chains remain resilient and secure. In the semiconductors sector specifically, strengthening indispensable European capabilities in polysilicon production can provide a critical hedge against growing Chinese dominance and potential supply chain weaponization moving forward.

Figure 1. The Chinese and European position in polysilicon supply chains



Data from USGS Mineral Commodity Survey 2026, EU Raw Materials Information system, Bernreuter Polysilicon Market Outlook 2029, Bernstein Research, European Investment Bank, European Commission, Silverado.

Note: Notable companies include both active players in the supply chains and announced projects that have not yet started operations.

In light of these dynamics, three policy recommendations emerge for the EU:

- 1. Coordinate EU-wide polysilicon supply chains across semiconductors, solar photo-voltaics, and batteries.** Europe's strong polysilicon position risks decline without capacity growth matching global and domestic demand. A coordinated EU approach will enable strategic planning, optimize resource allocation, and secure reliable supply to meet the ambitious targets set by the NZIA and Chips Act. It could make use of instruments under the Industrial Accelerator Act that pairs strategic European needs with demand-side incentives in the solar manufacturing chain for the consumption of polysilicon produced in the EU or likeminded partners for European solar and semiconductor chip producers.
- 2. Mobilise EU financing to close gaps in polysilicon supply chains.** By leading coordination, the EU can identify weak points and prioritise investments. Targeted financial support is essential to help European producers scale up production, innovate sustainably, and compete effectively against heavily subsidized international rivals.
- 3. Develop a tailored policy for polysilicon and related midstream products caught between the Critical Raw Materials Act and Net-Zero Industry Act.** Polysilicon falls under NZIA but shares challenges with CRMA projects, warranting a closer policy review for these in-between sectors. Creating a specialized framework will address regulatory ambiguities and ensure these critical materials receive appropriate support and oversight.

With its polysilicon supply chain at a crossroads, the EU must act decisively to overcome dependencies, reduce exposure to geopolitical risks, and capitalize on the economic opportunities presented by the twin energy and digital transitions. Coordinated policies advancing domestic production and international collaboration will be crucial for securing Europe's technological sovereignty and long-term industrial competitiveness.

# 1. Introduction

Two technological trends shape the global policy landscape: the energy transition and the digital transition. Both are essential to Europe's future competitiveness, sustainability, and strategic resilience, with far-reaching implications for European societies and economies. Advanced digital technologies, specifically semiconductor chips (referred throughout this paper as semiconductors), also support defence capabilities, which is essential considering European goals of defence readiness. The combination of these trends is named the "twin transition".<sup>1</sup>

Access to both clean technologies and semiconductors - the body and the brains of the future economy - will be among the defining factors of economic growth and strategic autonomy. Take, for example, artificial intelligence (AI): a trillion-dollar industry that is already reshaping global power markets, creating new business models, and challenging existing industrial practices.<sup>2</sup> These new forms of digital infrastructure require large amounts of high-quality chips across a range of applications, providing a major boost to the semiconductor industry. The same applies to solar photovoltaics (PV), currently the largest energy technology in terms of annual capacity additions, and one of the fastest-scaling energy technologies ever recorded.<sup>3</sup> Countries around the world are jockeying for control over these technologies and are increasingly willing to use coercive economic tools to position themselves strategically within these value chains.

One element lies at the heart of these transitions: silicon. It provides the foundation for a plethora of technologies that make modern society possible, including semiconductor chips and solar panels. In its unprocessed form, it is one of the most abundant materials, representing more than 25% of total weight of all elements in the earth's crust.<sup>4</sup>

But access to silicon is not a given. Despite the general abundance, only a small fraction of silicon is suitable for processing into polysilicon, the material used in chips, solar panels and batteries.<sup>5</sup> Highly refined and advanced materials like polysilicon have become the subject of intensified geopolitical competition. Increasing domestic polysilicon production capacity have become strategic goals for many countries, while restrictions, bans and technology blockades are becoming increasingly common.<sup>6</sup> China, the United States, and India, among others,

<sup>1</sup> 'What Is the "twin Transition" - and How Can It Speed Sustainable Growth', World Economic Forum, 26 October 2022, <https://www.weforum.org/stories/emerging-technologies/twin-transition-playbook-3-phases-to-accelerate-sustainable-digitization/>.

<sup>2</sup> 'AI Market Projected to Hit \$4.8 Trillion by 2033, Emerging as Dominant Frontier Technology | UN Trade and Development (UNCTAD)', 7 April 2025, <https://unctad.org/news/ai-market-projected-hit-48-trillion-2033-emerging-dominant-frontier-technology>.

<sup>3</sup> 'Global Electricity Review 2026', *Ember*, n.d., accessed 28 August 2026, <https://ember-energy.org/latest-insights/global-electricity-review-2026>.

<sup>4</sup> 'Mineral Resource of the Month: Silicon', accessed 28 August 2026, <https://www.usgs.gov/publications/mineral-resource-month-silicon>.

<sup>5</sup> CSIRO, 'Quartz: A Mineral with Hidden Potential', accessed 28 August 2026, <https://www.csiro.au/en/news/All/Articles/2024/December/quartz-silicon-critical-mineral>.

<sup>6</sup> Irina Patrahau et al., *Raw Material and Supply Chain Vulnerabilities in the Dutch Defence Sector: An Analysis of the Air Defence & Command Frigate* (The Hague Centre for Strategic Studies, 2025), <https://hcscs.nl/report/raw-material-supply-chain-vulnerabilities-dutch-defence-sector-frigate/>.

Highly refined and advanced materials like polysilicon have become the subject of intensified geopolitical competition.

are taking large steps to strengthen their supply resilience. This points to the increasing politicization of polysilicon supply chains.

For the European Union (EU), securing supplies of (poly)silicon is a strategic goal. Through initiatives such as the Critical Raw Materials Act, Net-Zero Industry Act, and the two European Chips Acts, the EU has expressed its ambition to reduce its dependencies on imported materials and components that are essential for energy and digital technologies, such as solar panels and semiconductors.<sup>7</sup>

This policy brief analyses the relevant geoeconomic dynamics that shape the security of the EU's polysilicon supply and identifies ways for the EU to boost polysilicon resilience for its solar, semiconductor and battery sectors. In the next section, the brief outlines the polysilicon supply chain and the EU's global position in this chain. In section 3, global policy developments to secure polysilicon are discussed from China, the United States, Japan, India and Southeast Asian countries. Section 4 analyses the EU's strategic policy goals and the role that polysilicon is likely to play. Finally, the brief draws conclusions and recommendations for EU policymakers to increase the resilience of the polysilicon supply chain.

---

<sup>7</sup> 'European Chips Act | Shaping Europe's Digital Future', 1 September 2026, <https://digital-strategy.ec.europa.eu/en/policies/european-chips-act>; European Parliament. 'Chips Act 2.0 | Legislative Train Schedule'. 2026. <https://www.europarl.europa.eu/legislative-train/theme-a-new-plan-for-europe-s-sustainable-prosperity-and-competitiveness/file-chips-act-ii>; European Commission, 'Critical Raw Materials Act', 3 May 2024, [https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act\\_en](https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en); 'Net-Zero Industry Act', accessed 8 September 2026, [https://commission.europa.eu/topics/competitiveness/green-deal-industrial-plan/net-zero-industry-act\\_en](https://commission.europa.eu/topics/competitiveness/green-deal-industrial-plan/net-zero-industry-act_en).

## 2. The global polysilicon supply chain and the EU's position

A defining feature of the polysilicon supply chain is its segmentation: There are two main purity levels, each with their own volumes and market dynamics. First, the solar polysilicon market, with purity levels of around 99,9999% (6N) purity to 99,99999999% purity (10N), accounts for roughly 97-98% of the market by metric tonnage.<sup>8</sup> This means that the vast majority of polysilicon production is high-purity silicon, but at a lower purity level than that required for semiconductors. A much smaller segment, around 3-4% of production in terms of tonnage, consists of semiconductor-grade polysilicon, with purity levels of around 99,99999999% (11N) to 99,999999999% (12N)<sup>9</sup>. Although these volumes are much smaller, the value per tonne is significantly higher. Nevertheless, due to rapid scaling, the solar silicon supply chain has overtaken the semiconductor segment in overall market value, with the semiconductor branch representing only about 10-20% of total revenue.<sup>10</sup>

To get these products, several processing steps are necessary, of which the simplified version is: quartz mining, silicon metal production, polysilicon production, ingots and wafers, and further downstream production. Europe's position in the polysilicon and downstream product supply chain consists of a few relatively strong positions alongside several vulnerable segments, as shown in Figure 2 and discussed below.

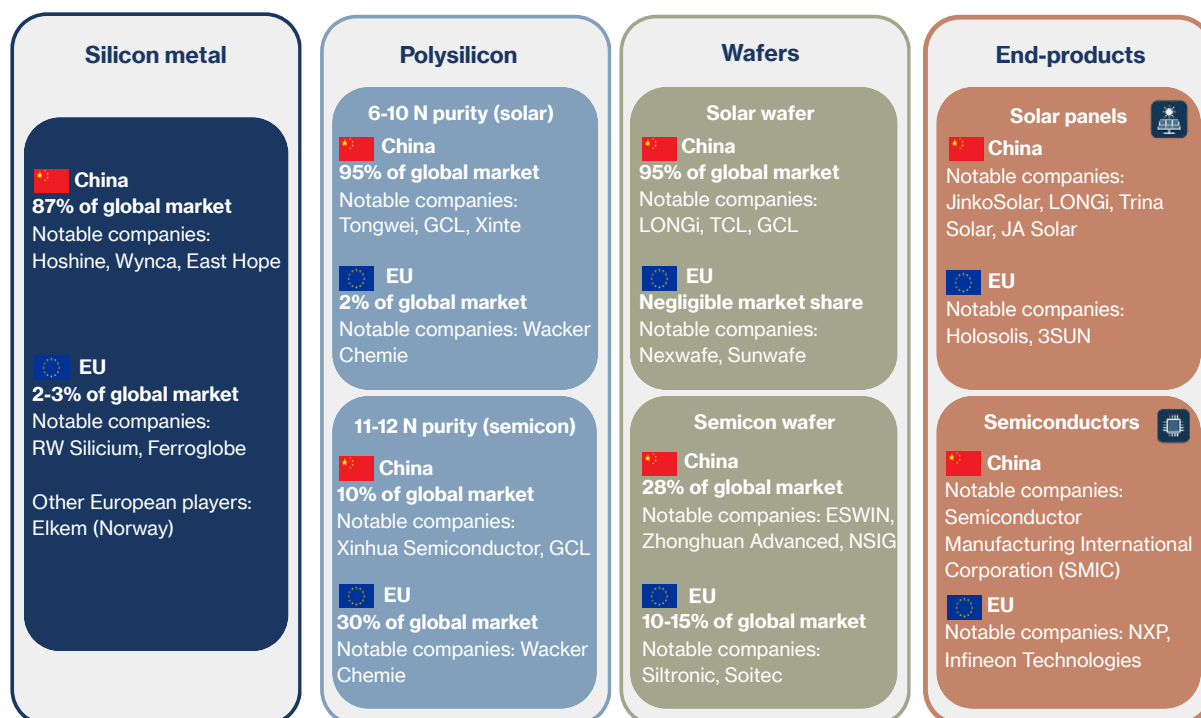
<sup>8</sup> Semiconductor Industry Association (SIA), 'Semiconductor Industry Association (SIA) Comments - Polysilicon Section 232 Investigation', 6 August 2025, <https://www.semiconductors.org/wp-content/uploads/2025/08/Semiconductor-Industry-Association-SIA-Comments-Polysilicon-Section-232-Investigation.pdf#page=1>.

<sup>9</sup> Semiconductor Industry Association (SIA), 'Semiconductor Industry Association (SIA) Comments - Polysilicon Section 232 Investigation'.

<sup>10</sup> 'Polysilicon Production: Siemens Process', accessed 28 August 2026, <https://www.bernreuter.com/polysilicon/production-processes/>.

Polaris Market Research & Consulting, Inc, 'Polysilicon Market Key Growth Drivers and Trends by 2034', 14 January 2026, <https://www.polarismarketresearch.com/industry-analysis/polysilicon-market>.

Figure 2. The Chinese and European position in polysilicon supply chains



Data from USGS Mineral Commodity Survey 2026, EU Raw Materials Information system, Bernreuter Polysilicon Market Outlook 2029, Bernstein Research, European Investment Bank, European Commission, Silverado.

Note: Notable companies include both active players in the supply chains and announced projects that have not yet started operations.

## Quartz mining & silicon metal production

The production process starts with quartz, which is essentially silicon dioxide,  $\text{SiO}_2$ . In theory, different types of quartz can be used, but because of the costs of refining, producers prefer to start with the highest-grade quartz deposits possible. Current high-grade deposits are found in Europe, including Norway, as well as in the United States, Brazil, Australia, Canada and China.<sup>11</sup> The highest purity quartz is almost exclusively sourced from one spot in Spruce Pine, North Carolina.<sup>12</sup> The main mining operations in Spruce Pine are managed by Belgian company Sibelco, as well as The Quartz Corp, a joint venture between French Imerys and Norwegian Norsk Mineral.

Even these relatively high-purity quartz deposits must first be processed into what is known as silicon metal, with a purity of around 98-99%. The bulk of this material is used in chemical applications, making up 54% of total demand, and aluminium production, with 38% of the total demand.<sup>13</sup> A smaller share is further upgraded into polysilicon, of which 6% is estimated to go to solar applications, and 2% to electronic ones, like semiconductors.<sup>14</sup>

<sup>11</sup> U.S. Geological Survey, *Mineral Commodity Summaries* (2026), <https://www.usgs.gov/centers/national-minerals-information-center/mineral-commodity-summaries>.

<sup>12</sup> Bernreuter Research, *The Polysilicon Market Outlook 2029* (Bernreuter Research, 2025).

<sup>13</sup> SCREEN, *Silicon Metal* (2023), 13, [https://screen.eu/wp-content/uploads/2023/12/SCREEN2\\_fact-sheets\\_SILICON\\_METAL-update.pdf](https://screen.eu/wp-content/uploads/2023/12/SCREEN2_fact-sheets_SILICON_METAL-update.pdf).

<sup>14</sup> SCREEN, *Silicon Metal*.

China plays an outsized role in this stage, representing about 87% of silicon metal production capacity in 2025.<sup>15</sup>

The EU has several active quartz mines and the knowledge and expertise to produce these materials. Companies such as Elkem and Ferroglobe operate mines both inside and outside the EU and produce metallurgical-grade silicon for further downstream processing.<sup>16</sup> However, its output as a percentage of the total has declined significantly since the 90s, when Europe made up about 25% of total silicon production (1996).<sup>17</sup>

## Polysilicon

The production of polysilicon is the central step in converting relatively 'impure' silicon metal into highly concentrated polysilicon. In this process, the metallurgical-grade silicon is broken down, and impurities are removed to produce much higher-purity silicon, with an originally German technique called the 'Siemens process'.<sup>18</sup> At this stage, the distinction between solar-grade and semiconductor-grade silicon becomes important. Semiconductor-grade silicon is processed much further than the solar-PV one to remove impurities, and is thus costlier to produce.<sup>19</sup>

The EU entirely leans on the capacity of Wacker Chemie, a German company known as one of the world's leading producers of extremely high-purity, semiconductor-grade polysilicon.<sup>20</sup> As such, Europe has a market share of about 2% of global capacity in polysilicon production, with Chinese companies dominating most of the market.<sup>21</sup> For semiconductor-grade polysilicon, however, Wacker Chemie is relatively strong and commands around 30% of the global market.<sup>22</sup>

## Ingot pulling and wafer slicing

The polysilicon is then processed into solid form and pulled into ingots, which are large, cylindrical bars of highly pure silicon. The ingots are subsequently sliced into wafers and further cleaned and processed according to their end use, either for solar panels or for shipment to the global wafer and semiconductor industries. Additionally, byproducts of the process, silane gas and silicon oxide, are further processed and used in the battery industry. See the section on batteries below.

The EU plays only a modest role in both solar and semiconductor wafer manufacturing. While some projects for solar ingots and wafers are under development, such as Sunwafe in Spain

<sup>15</sup> U.S. Geological Survey, *Mineral Commodity Summaries*.

<sup>16</sup> 'Elkem Silicon Products Salten', Elkem.Com, accessed 21 September 2026, <https://www.elkem.com/about-elkem/worldwide-presence/norway/elkem-salten/>; 'Silicon Metal | Ferroglobe PLC', accessed 21 September 2026, <https://www.ferroglobe.com/solutions/silicon-metal>.

<sup>17</sup> 'Silicon Statistics and Information', accessed 28 August 2026, <https://www.usgs.gov/centers/national-minerals-information-center/silicon-statistics-and-information>.

<sup>18</sup> Semiconductor Industry Association (SIA), 'Semiconductor Industry Association (SIA) Comments - Polysilicon Section 232 Investigation'.

<sup>19</sup> Semiconductor Industry Association (SIA), 'Semiconductor Industry Association (SIA) Comments - Polysilicon Section 232 Investigation'.

<sup>20</sup> Bernreuter Research, *The Polysilicon Market Outlook 2029*.

<sup>21</sup> Bernreuter Research, *The Polysilicon Market Outlook 2029*.

<sup>22</sup> Bernreuter Research, *The Polysilicon Market Outlook 2029*.

having received EU funding in 2025, there is very little domestic wafer manufacturing capacity in the EU.<sup>23</sup> Nexwafe in Germany is one of the few producers.<sup>24</sup> Norway had some modest production under NorSun, but the company filed for bankruptcy at the end of 2024.<sup>25</sup>

For semiconductor wafers, Siltronic is an important global producer headquartered in EU, with sites in Germany, the US and Singapore, and with an estimated 13% market share.<sup>26</sup> Together with other Japanese (Shin-Etsu Chemical, SUMCO Corporation), Taiwanese (GlobalWafers) and Korean (SK Siltron) suppliers, the five are said to command 75% of the global semiconductor wafer market.<sup>27</sup> However, Chinese companies have experienced a massive expansion since 2020, with their global market share growing from 3% to 28% in 2025.<sup>28</sup>

## Downstream – Solar photovoltaics

In the solar industry, wafers are used as a basis for solar cells. These cells are the main operating material for solar power. The cells are lined up in a grid pattern and integrated into solar modules, which include the cells, the conductive elements, the aluminium, glass and plastic casing, the cables and other auxiliary parts. These modules are then shipped, and installed on residential scale (e.g. roofs, walls, fences) or utility scale (e.g. solar fields, floating solar).

Europe's solar cell manufacturing capacity has virtually disappeared, with the few remaining producers such as Holosolis and 3SUN working to start up their operations.<sup>29</sup> As a result, it is highly vulnerable to supply shocks, with 98% of its solar panels imported from China in 2023.<sup>30</sup>

## Downstream – Semiconductors

The semiconductor industry also works with ingots and wafers but uses a far more precise 'cleaning' process. Ingots are sliced into thin wafers, although thicker than those used for solar manufacturing. These wafers are cleaned and cut to size using a multi-step cleanroom process, which can span different locations, to finally become a packaged product for semiconductor producers. The semiconductor foundries use these bespoke wafers to process their circuits on. Billions of circuits are printed on a surface area of a few square centimeters.

<sup>23</sup> EIT InnoEnergy, 'InnoEnergy Secures €200M from Spain for Sunwafe Solar Project', 2025, <https://www.eit.europa.eu/news-events/news/innoenergy-secures-eu200m-spain-sunwafe-solar-project>.

<sup>24</sup> Nexwafe, 'EpiNex Wafers: High-Efficiency Solar Wafer Technology', accessed 22 September 2026, <https://www.nexwafe.com/epinex-wafers>.

<sup>25</sup> 'NorSun AS: Resource Efficient and Highly Innovative n-Type Mono-Silicon Wafers for Europe', European Commission, 2026, <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/projects-details/43089234/101133050/INNOVFUND>.

<sup>26</sup> 'Germany: EIB Supports Development of Siltronic's next Generation of Silicon Wafers', European Investment Bank, 2022, <https://www.eib.org/en/press/all/2022-409-eib-supports-development-of-siltronic-s-next-generation-of-silicon-wafers>.

<sup>27</sup> Siltronic, *Foundation of Digital Life: Annual Report 2025* (2025), [https://www.siltronic.com/fileadmin/investorrelations/Archiv/2025/Q4/260420\\_Siltronic\\_Annual\\_Report\\_2025\\_safe.pdf](https://www.siltronic.com/fileadmin/investorrelations/Archiv/2025/Q4/260420_Siltronic_Annual_Report_2025_safe.pdf).

<sup>28</sup> Andrew David, 'China's Underestimated Semiconductor Silicon Wafer Industry', 10 June 2026, <https://silverado.org/media/china-underestimated-semiconductor-silicon-wafer-industry/>.

<sup>29</sup> 'Europe Solar Supply Chain Map 2026: PV Manufacturing Capacity & Factory Updates', accessed 18 September 2026, <https://sinovoltaics.com/reports/europe-solar-supply-chain-map-2026-the-latest-pv-manufacturing-capacity-and-factory-updates/>.

<sup>30</sup> 'EU Imports in Green Energy Products Higher than Exports', 14 October 2024, <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20241014-1>.

In semiconductor manufacturing, the EU has a modest, but declining position, with a market share of 10% in 2023.<sup>31</sup> Most semiconductor wafer production is concentrated in East Asia (Taiwan, Japan, South Korea), with some additional production in the US and China. Furthermore, in semiconductor manufacturing itself, Europe holds positions in only a few segments, such as semiconductor equipment and the production of automotive and power semiconductor devices for industrial applications, including power grids.

## Downstream – Batteries

The battery industry has emerged as an important user of silicon products. Whilst they do not use polysilicon itself, they do use derivative products from the polysilicon production process, such as silane gas (SiH<sub>4</sub>) and silicon monoxide (SiO). These products are used in the battery anode: adding silicon helps increase the energy density of batteries.<sup>32</sup> They are usually mixed into graphite anodes with a blend up to 20%, but high-tech battery startups like LeydenJar are experimenting with 50% or sometimes even 100% pure silicon anodes to further increase energy density.<sup>33</sup> If silicon anodes become the industry standard, this would further increase demand for polysilicon.

Europe has some battery manufacturing capacity, but its domestic production footprint leans heavily on Chinese, Korean, and Japanese companies. Several highly anticipated initiatives started by homegrown European firms, most notably Northvolt and Morrow Batteries, have failed to achieve commercial scale at the quality level required.<sup>34</sup> Europe is seeking to enter the next-generation battery market through projects such as solid-state battery initiatives in Spain (Basquevolt), and silicon anode technology in the new generation of batteries (Leydenjar). Another Dutch initiative is E-magy, which develops nanoporous silicon anodes that allow for silicon percentages up to 85%.<sup>35</sup> However, China and the US are moving faster in the silicon anode battery landscape, with a few companies already achieving gigawatt-hour (GWh) scale production, leaving the EU as a trailing player.<sup>36</sup>

Concluding, the EU plays only a modest role in global polysilicon supply chains and in the upstream and downstream steps. This is not to say that Europe has to start completely from scratch. The EU still has knowledge and technology along the value chain, as well as legacy quartz and upstream production, some high-quality polysilicon production, and a footprint in a subset of semiconductor segments.

<sup>31</sup> 'Chips Act: Council Gives Its Final Approval', Consilium, accessed 18 September 2026, <https://www.consilium.europa.eu/en/press/press-releases/2023/07/25/chips-act-council-gives-its-final-approval/>.

<sup>32</sup> 'Revolutionizing EV Battery Production: Silane's Impact on Silicon-Anode Advancements', Applied Sciences from Technology Networks, accessed 18 September 2026, <https://www.technologynetworks.com/applied-sciences/blog/revolutionizing-ev-battery-production-silanes-impact-on-silicon-anode-advancements-384880>.

<sup>33</sup> Wei Zeng et al., 'Insights into the Coupled Thermal Behavior of Silicon/Graphite Composite Anodes in High Energy Density Lithium-Ion Battery', *Energy Storage Materials* 84 (January 2026): 104841, <https://doi.org/10.1016/j.ensm.2025.104841>, Tim, 'LeydenJar Closes New Investment Round to Launch First 100% Silicon Anode Production Facility', *LeydenJar*, 10 September 2025, <https://leyden-jar.com/leydenjar-closes-new-investment-round-to-launch-first-100-silicon-anode-production-facility/>.

<sup>34</sup> Guillaume Ragonnaud, *Powering the EU's Future: Strengthening the Battery Industry* (European Parliamentary Research Service, 2025), [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_BRI\(2025\)767214](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2025)767214); 'The Board of Directors of Morrow Batteries ASA Has Resolved to File for Bankruptcy Proceedings', *Mynewsdesk*, 6 May 2026, <https://www.mynewsdesk.com/morrow-batteries/pressreleases/the-board-of-directors-of-morrow-batteries-asa-has-resolved-to-file-for-bankruptcy-proceedings-3446829>.

<sup>35</sup> 'Solution', *E-Magy*, n.d., accessed 18 September 2026, <https://e-magy.com/solution/>.

<sup>36</sup> Milo McBride, *Battery Geopolitics: Balancing Industrial Power in the Race to Store Energy* (2026), <https://carnegieendowment.org/research/2026/06/battery-geopolitics-balancing-industrial-power-in-race-to-store-energy>.

# 3. Global policy initiatives to secure polysilicon

## 3.1. The rise of China

In the last 15 years, China went from a polysilicon producer amongst many to a country dominating the solar silicon supply chain, having nearly all (roughly 95%) of the global production capacity for solar-grade polysilicon within its borders.<sup>37</sup>

For semiconductor-grade polysilicon, the picture is still different. Chinese companies have not yet managed to produce this extremely pure material at a scale sufficient to dominate the market.<sup>38</sup> This is partly a technological issue, partly a market access limitation. Chinese industry lacks the long-standing supply contracts and trust of many customers of semiconductor-grade polysilicon, particularly wafer and chip producers outside China.<sup>39</sup> These customers generally rely on multi-year validation processes and long-term offtake contracts, where confidence in the consistency and quality of the material is non-negotiable.

Nonetheless, China has spent the last 20 years intensely focused on building up its position in the polysilicon and semiconductor supply chain, working its way up through various stages, including metallurgical silicon and polysilicon production, wafer production and chip manufacturing.<sup>40</sup> More recently, several Chinese companies have also begun moving into the production of the extremely high-purity silicon needed for semiconductors.<sup>41</sup>

Even though market access remains difficult due to long-standing supplier agreements and lengthy qualification periods, China is effectively building its own internal supply chain. Chinese wafer and chip producers are essentially forced to use the high-quality 11N silicon produced by domestic suppliers, with the hope of building experience and scale in these segments.<sup>42</sup>

<sup>37</sup> 'EXCLUSIVE: China Polysilicon Firms Plan \$7 Billion Fund to Shut a Third of Industry Capacity | Reuters', accessed 28 August 2026, <https://www.reuters.com/sustainability/climate-energy/china-polysilicon-firms-plan-7-billion-fund-shut-third-industry-capacity-2025-07-31/>.

<sup>38</sup> Bernreuter Research, *The Polysilicon Market Outlook 2029*.

<sup>39</sup> Alex Rubin, *China Plans to Dominate a Key Semiconductor Material* (2025), <https://itif.org/publications/2025/09/08/china-plans-to-dominate-a-key-semiconductor-material/>.

<sup>40</sup> David, 'China's Underestimated Semiconductor Silicon Wafer Industry'.

<sup>41</sup> 'China's Underestimated Semiconductor Silicon Wafer Industry', 10 June 2026, <https://silverado.org/media/china-underestimated-semiconductor-silicon-wafer-industry/>; 'Executive Summary – Solar PV Global Supply Chains – Analysis', IEA, accessed 28 August 2026, <https://www.iea.org/reports/solar-pv-global-supply-chains/executive-summary>.

<sup>42</sup> 'Exclusive: China Targets 70% Advanced Domestic Silicon Wafer Use by 2026 - Nikkei Asia', accessed 28 August 2026, <https://asia.nikkei.com/business/china-tech/exclusive-china-targets-70-advanced-domestic-silicon-wafer-use-by-2026>.

Chinese companies have not yet managed to produce this extremely pure material at a scale sufficient to dominate the market.

If China succeeds in developing and scaling a domestic supply of high-purity silicon and surpassing global competitors, it would further consolidate its strategically important position in global semiconductor supply chains. This could enable Chinese producers to strengthen their competitive position in international markets, placing pressure on both current and future European suppliers and making it more difficult for them to maintain or expand their market share.

Such developments could also have significant implications for the EU's downstream semiconductor industry and, relatedly, digital and defence capabilities. Increased reliance on Chinese suppliers could expose European manufacturers to supply chain vulnerabilities, while intensified competition could affect the competitiveness of downstream industries that depend on high-purity silicon and semiconductor components. Over time, this could deepen asymmetric dependencies within the global economic system.

These risks are particularly significant given the strategic importance of semiconductors and the role of the semiconductor industry as one of the areas in which European countries and their partners retain important competitive advantages relative to China. A stronger Chinese position across both upstream material production and downstream semiconductor value chains could therefore challenge Europe's industrial resilience, technological competitiveness, and strategic autonomy.

## 3.2. Global initiatives

The solar polysilicon market is a dynamic, often volatile commodity market. Prices often follow 'boom' and 'bust' periods, with supply struggling to catch up in time.<sup>43</sup> Since a polysilicon factory takes several years to build, there is often a mismatch between the price when the new plant is announced and the price when the actual factory comes online, also referred to as the 'Pork cycles', which often appear in commodity markets.<sup>44</sup> The semiconductor polysilicon market is less volatile, with long-term offtake agreements. However, developments in solar polysilicon markets can affect the profitability of polysilicon suppliers, potentially impacting the semiconductor segment as well.<sup>45</sup>

Over the last 15 years, the polysilicon market has experienced repeated cycles of global over-supply, pushing prices well below global production costs (sometimes below 5\$/kg), followed by periods of sharp price increases, such as in 2022 when the solar market expanded rapidly (peaking at 39\$/kg in August 2022).<sup>46</sup> This did not just affect Western producers but also, and especially, Chinese companies, who are the largest global solar polysilicon producers and have been experiencing losses for the last few years. Chinese industry sought in August 2026

<sup>43</sup> Ivan Lerner, 'Polysilicon for Photovoltaics Growth Driven by Government Policies', *ICIS Explore*, n.d., accessed 28 August 2026, <https://www.icis.com/explore/resources/news/2009/07/12/9231221/polysilicon-for-photovoltaics-growth-driven-by-government-policies>.

<sup>44</sup> 'Why the Pork Cycle Has Returned to the Polysilicon Market', accessed 28 August 2026, <https://www.bernreuter.com/newsroom/polysilicon-news/article/why-the-pork-cycle-has-returned-to-the-polysilicon-market/>.

<sup>45</sup> Rubin, *China Plans to Dominate a Key Semiconductor Material*.

<sup>46</sup> 'What Does the Future Hold for the Price of Polysilicon? — RatedPower', accessed 28 August 2026, <https://ratedpower.com/blog/price-of-polysilicon/>.

Will Norman, 'Polysilicon Sector Could See Shortage by 2028 If Leaders Cut Production', *PV Tech*, 24 June 2025, <https://www.pv-tech.org/polysilicon-sector-could-see-shortage-by-2028-if-leaders-cut-production/>.

to curb production to support full prices and limit losses among domestic companies.<sup>47</sup> This makes the polysilicon market not only highly volatile but also highly politicized. State-directed policies can affect the viability of non-Western producers and trigger unexpected bankruptcies, potentially threatening supply security in Europe and other non-Chinese markets.

Below, policy initiatives from six countries that are actively trying to build their polysilicon resilience are assessed, providing context and perspective to the EU's own options in this supply chain.

## United States

Given China's ambition to dominate the semiconductor market in the future, the US has in recent years been trying to stymie China's emergence as a semiconductor and solar manufacturing giant.<sup>48</sup> It has done so through a variety of initiatives, with initial measures comprising anti-dumping and countervailing duty investigations on China and collaborating countries.

The most recent measure is the Section 232 Trade Expansion Act, coming into effect in December 4<sup>th</sup>, 2026, which seeks to shield the US polysilicon industry from extremely low-priced Chinese imports and bolster the US domestic production.<sup>49</sup> This expansion includes minimum import prices on polysilicon and its derivatives with complementary tariffs on downstream products. It also includes an onshoring incentive program in which the Commerce Secretary can grant tariff relief on products like production equipment to starting and developing/improving companies.

Moreover, the US has blocked solar panels that may contain inputs from supply chains in Xinjiang, which is known for forced labor, effectively restricting Chinese producers' access to the US market.<sup>50</sup>

These incentives can address the bottleneck in the PV supply chain of limited cell and wafer production capacity.<sup>51</sup> For instance, Korean company Hanwha Qcells completed its solar hub in Georgia, US, in 2026, making the company having established a fully integrated solar manufacturing base in the US.<sup>52</sup> However, these new US measures are under scrutiny, with worries arising on the potential closing of polysilicon plants in the US, these measures not leading to (enough) economic and industrial growth, and countries/companies asking for exemptions.

<sup>47</sup> Vincent Shaw, 'Chinese Polysilicon Majors Pledge to End Loss-Making Sales', *Pv Magazine Global*, 7 August 2026, <https://www.pv-magazine.com/2026/08/07/chinese-polysilicon-majors-pledge-to-end-loss-making-sales/>.

<sup>48</sup> 'US Section 232 Solar Import Hurdles: Well Meant, Not Well Done', accessed 8 September 2026, <https://www.bernreuter.com/newsroom/polysilicon-news/article/us-section-232-solar-import-hurdles-well-meant-not-well-done/>.

<sup>49</sup> 'New Tariffs and Minimum Import Prices on Polysilicon, Derivatives and Solar Products', BDO, 18 August 2026, <https://www.bdo.com/insights/tax/new-tariffs-and-minimum-import-prices-on-polysilicon-derivatives-and-solar-products>.

<sup>50</sup> Nichola Groom and Nichola Groom, 'EXCLUSIVE: Exclusive: U.S. Blocks More than 1,000 Solar Shipments over Chinese Slave Labor Concerns', China, *Reuters*, 11 November 2022, <https://www.reuters.com/world/china/exclusive-us-blocks-more-than-1000-solar-shipments-over-chinese-slave-labor-2022-11-11/>.

<sup>51</sup> 'Part 2: Mapping the Gaps in the US Solar Supply Chain – from Polysilicon to Modules - PV Tech', accessed 8 September 2026, <https://www.pv-tech.org/us-pv-supply-chain-bottlenecks/>.

<sup>52</sup> Jeon Ji-woo, 'Hanwha Qcells Completes US Solar Hub in Georgia', *The Korea Herald*, 10 June 2026, <https://www.koreaherald.com/article/10768351>.

The polysilicon market is not only highly volatile but also highly politicized.

## Southeast Asia: Malaysia, Thailand and Vietnam

Early US measures to secure their supply chains by excluding Chinese suppliers incentivized Chinese companies to relocate their production bases to Southeast Asian countries. This resulted in 84% of investment in solar manufacturing in this region being from China since 2018.<sup>53</sup> However, where China moved, US followed up with country-wide measures, such as anti-dumping and countervailing duties.<sup>54</sup> This led to a decrease of the solar industry growth and investment in Vietnam, Thailand, Malaysia and Cambodia.

Malaysia is looking to build out its semiconductor industry through its National Semiconductor Strategy, launched in 2024, which includes areas such as upstream wafer fabrication and tax exemptions for major material refiners.<sup>55</sup> This also includes developing and enhancing the existing plants and attracting foreign direct investment in manufacturing. OCI Terrasus, the Malaysian subsidiary of the South Korean polysilicon manufacturer OCI Holdings, operates a semiconductor-grade polysilicon production facility in Malaysia, with wafers manufactured in Vietnam.<sup>56</sup> This initiative is in line with OCI Holding's goal to double its semiconductor-grade production capacity to meet the increasing demand.<sup>57</sup>

Thailand has introduced the Siam Silica strategy that aims to expand semiconductor production capacity and strengthen regional cooperation in the industry.<sup>58</sup>

Vietnam is currently developing its domestic semiconductor industry, stimulated by strategic policies and domestic and foreign investment.<sup>59</sup> As an example, Japanese Tokuyama opened the first semiconductor-grade polysilicon factory of Vietnam in Ho Chi Minh City.<sup>60</sup>

## Japan

Japan closed their last domestic solar-grade polysilicon manufacturers in 2022, while some Japanese companies have moved their manufacturers overseas.<sup>61</sup> Yet, in the same year they introduced the Economic Security Promotion Act that prioritizes ensuring stable supplies of critical materials and innovation and development of advanced technologies.<sup>62</sup>

<sup>53</sup> 'Solar Manufacturing in Asia at a Crossroads', 25 June 2026, <https://rhg.com/research/solar-manufacturing-in-asia-at-a-crossroads/>.

<sup>54</sup> 'Solar Manufacturing in Asia at a Crossroads', 25 June 2026.

<sup>55</sup> 'Cover Story: National Semiconductor Strategy to Guide Industry up Value Chain', accessed 28 August 2026, <https://theedgemaalaysia.com/node/714965>.

<sup>56</sup> 'World Bank Group's IFC and OCI TerraSus Partner on Southeast Asia's First Semiconductor-Grade Polysilicon Manufacturing Facility in Malaysia', Text/HTML, IFC, accessed 8 September 2026, <https://www.ifc.org/en/pressroom/2026/world-bank-group-s-ifc-and-oci-terrasus-partner-on-southeast-asia-s-first-semicond>.

<sup>57</sup> 'OCI Expands Non-China Solar Supply Chain for U.S. Market - UPI.Com', UPI, accessed 8 September 2026, [https://www.upi.com/Top\\_News/World-News/2026/08/27/oci-holdings-us-market/7811787875947/](https://www.upi.com/Top_News/World-News/2026/08/27/oci-holdings-us-market/7811787875947/).

<sup>58</sup> 'Thailand's Semiconductor Plan Has a Washington Problem', The Lowy Institute, 8 September 2026, <https://www.loyyinstitute.org/the-interpreter/thailand-s-semiconductor-plan-has-a-washington-problem>.

<sup>59</sup> 'Resolution 57: Policies Paving the Way for Semiconductor Industry', Vietnamlawmagazine.Vn, accessed 8 September 2026, <https://vietnamlawmagazine.vn/resolution-57-policies-paving-the-way-for-semiconductor-industry-78656.html>.

<sup>60</sup> Patrick Jowett, 'Japan's Tokuyama Opens Polysilicon Factory in Vietnam', *Pv Magazine India*, 27 August 2026, <https://www.pv-magazine-india.com/2026/08/27/japans-tokuyama-opens-polysilicon-factory-in-vietnam/>.

<sup>61</sup> 'Solar PV Strengthens Japan's Energy Security and Economy', accessed 8 September 2026, <https://www.renewable-ei.org/en/activities/column/REupdate/20260202.php>.

<sup>62</sup> Michael Breger, 'A Tale of Two Approaches to Revitalize Japan's Semiconductor Industry', 10 March 2026, <https://fsi.stanford.edu/news/tale-two-approaches-revitalize-japans-semiconductor-industry>.

To increase autonomy in solar panel production, Japan now focuses on a perovskite alternative to silicon based solar modules and only provides subsidies for the former.<sup>63</sup> In this way, they domesticize the solar modules supply chain, as Japan is a global leader in iodine supply, a critical raw material needed for perovskite modules.

Japan is also subsidizing foundational (semiconductor) upstream suppliers, particularly in silicon wafer production, including wafer producers such as SUMCO and Tokuyama.<sup>64</sup> As mentioned above, in August 2026, Tokuyama opened a semiconductor-grade polysilicon factory in Vietnam, as a further (collaborative) attempt to ensure a stable supply chain.<sup>65</sup> Other initiatives are a collaboration with Taiwan for TSMC to produce semiconductors in Kumamoto, and the domestic initiative of Rapidus, a plant for development of logic semiconductor chips.<sup>66</sup>

## India

India is building up its polysilicon production. Its Production Linked Incentive scheme uses performance-based incentives that subsidize the establishment and production of polysilicon domestically.<sup>67</sup> The Indian government is currently considering updating this scheme with additional capital expenditure-based subsidies for polysilicon manufacturing, to account for the high cost of the set-up of new plants.<sup>68</sup> This scheme has been accused by the Chinese government to infringe on the World Trade Organisation's Agreement on Subsidies and Countervailing Measures, although India claims that the Chinese government has misunderstood the goals of this measure.<sup>69</sup>

Moreover, India supports mandated sourcing by way of its Approved Lists of Models and Manufacturers (ALMM) policy by designating approved solar modules and manufacturers allowed to be used within government (subsidized) projects (LIST-I) and the cells used to produce these modules (LIST-II).<sup>70</sup> The latter is a domestic content requirement, in which only supply from domestic companies is approved. The Ministry of New and Renewable Energy has announced an additional list of approved ingots and wafers, starting in 2028.<sup>71</sup>

These incentives caused growth of the Indian polysilicon industry into almost entirely domestically owned and locally serving, with the 3<sup>rd</sup> largest solar cell and module capacity. In 2025, India's module capacity was 3 times higher than the demand, thus facing an overcapacity.<sup>72</sup>

<sup>63</sup> Brian Publicover, 'Japan to Exclude Silicon Solar from New Subsidies, Prioritize Perovskite', *Pv Magazine Global*, 1 September 2026, <https://www.pv-magazine.com/2026/09/01/japan-to-exclude-silicon-solar-from-new-subsidies-prioritize-perovskite/>.

<sup>64</sup> 'Japan to Give Sumco \$530 Million to Boost Wafer Capacity, Nikkei Reports', *Reuters*, 11 July 2023, <https://www.reuters.com/technology/japan-give-sumco-530-mln-boost-wafer-capacity-nikkei-2023-07-10/>.

<sup>65</sup> Jowett, 'Japan's Tokuyama Opens Polysilicon Factory in Vietnam'.

<sup>66</sup> Breger, 'A Tale of Two Approaches to Revitalize Japan's Semiconductor Industry'.

<sup>67</sup> Sethuraman N. R, 'India Plans Polysilicon Incentives to Reduce Reliance on China', *China, Reuters*, 7 August 2026, <https://www.reuters.com/world/china/india-plans-polysilicon-incentives-reduce-reliance-china-2026-08-07/>.

<sup>68</sup> E. T. Sustainability, 'India Weighs Subsidy Push to Build Polysilicon Base for Solar Supply Chain', accessed 8 September 2026, <http://sustainability.economictimes.indiatimes.com/news/policy-and-regulation/india-weighs-subsidy-push-to-build-polysilicon-base-for-solar-supply-chain/133472684>.

<sup>69</sup> 'India to Vigorously Defend Incentive Schemes at WTO', *The Financial Express*, 25 February 2026, <https://www.financialexpress.com/business/news/india-to-vigorously-defend-incentive-schemes-at-wto/4154699/>; 'China Initiates Dispute Regarding Indian Measures on Batteries, Auto Parts and e-Vehicles', World Trade Organisation, 2025, [https://www.wto.org/english/news\\_e/news25\\_e/ds642rfc\\_20oct25\\_177\\_e.htm](https://www.wto.org/english/news_e/news25_e/ds642rfc_20oct25_177_e.htm).

<sup>70</sup> *APPROVED LIST OF MODELS AND MANUFACTURERS (ALMM)*, n.d., accessed 8 September 2026, <https://mnre.gov.in/en/approved-list-of-models-and-manufacturers-almml/>.

<sup>71</sup> 'MNRE Mandates to Use Local Ingots, Wafers – Indosol Solar', accessed 28 August 2026, <https://www.indosolsolar.com/blogs/mnre-mandates-to-use-local-ingots-wafers/>.

<sup>72</sup> 'Solar Manufacturing in Asia at a Crossroads', 25 June 2026, <https://rhg.com/research/solar-manufacturing-in-asia-at-a-crossroads/>.

## 4. Goals and means: the EU's strategic policy goals and the role of polysilicon

### 4.1. Strategic policy goals

Europe appears increasingly aware that, without structural change, many of its strategic sectors risk being marginalized by cheaper and increasingly sophisticated Chinese exports. Recent initiatives to stem this tide include foreign subsidy regulations and strategic frameworks to support local production. The Industrial Accelerator Act, presented in March 2026, outlines new EU procurement rules and the prospect of introducing made-in-EU local content requirements in public procurement.<sup>73</sup> The Chips Act 2.0, was proposed by the Commission in 2026 building on the original 2023 Chips Act, with the target to strengthen the EU's semiconductor ecosystem and reduce strategic dependencies.<sup>74</sup> These two acts could provide the basis for producers of solar panels and semiconductors to source their polysilicon in Europe.

Polysilicon is caught in between two acts, the Critical Raw Materials Act (CRMA) and the Net-Zero Industry Act (NZIA). The EU has designated silicon metal as a critical raw material under the CRMA, aiming to reduce the non-EU dependency in critical raw materials (CRM) supply chains and setting benchmarks for CRM domestic production. In that context, strategic projects chosen under the CRMA are meant to receive shortened permit procedures and supported in attracted finance.<sup>75</sup> However, as polysilicon is a more refined version of silicon metal, it falls under the purview of the NZIA. The NZIA is focused on the downstream applications and aims to have the EU's overall strategic net-zero technologies manufacturing capacity by 2030 be at 40% of annual deployment needs.<sup>76</sup> Yet the denomination of polysilicon as a component under the NZIA makes it difficult for European projects to scale, given

<sup>73</sup> 'The Flaws in the European Union's Proposed Industrial Accelerator Act and How to Fix Them', Bruegel | The Brussels-Based Economic Think Tank, 2 September 2026, <https://www.bruegel.org/policy-brief/flaws-european-unions-proposed-industrial-accelerator-act-and-how-fix-them>.

<sup>74</sup> 'European Chips Act | Shaping Europe's Digital Future', European Parliament. 'Chips Act 2.0 | Legislative Train Schedule'. 2026. <https://www.europarl.europa.eu/legislative-train/theme-a-new-plan-for-europe-s-sustainable-prosperity-and-competitiveness/file-chips-act-ii>.

<sup>75</sup> European Commission, 'Critical Raw Materials Act'.

<sup>76</sup> 'Net-Zero Industry Act - European Commission'.

Yet the denomination of polysilicon as a component under the NZIA makes it difficult for European projects to scale.

that the challenges that polysilicon projects face are more similar to other types of CRM than to component fabrication.

Regardless of the specific Act under which they fall, support for European critical raw material miners, processors and polysilicon manufacturers is weak, and new projects remain vulnerable to volatile global market prices and significant geopolitical intervention from other countries. The EU has virtually no polysilicon production capacity apart from the supply provided by Wacker Chemie. Moreover, Europe is missing the midstream (ingot/wafer) and downstream (solar, batteries, and to some extent semiconductors) production capacity to create domestic offtake contracts for European polysilicon producers. The legislative framework lacks both financial incentives and clear protective measures for production in the EU.<sup>77</sup>

The contrast with the US, and to a lesser extent India, is becoming increasingly apparent. Europe risks falling behind in the critical raw materials sphere, including polysilicon, unless it develops an adequate framework that not only addresses China's distorted market practices, but also provides investment certainty and enables rapid industrial development within its borders.

## 4.2. The role of polysilicon

As mentioned before, the EU aims to increase its domestic production of solar panels and semiconductors. The NZIA states that, by 2030, the EU should produce 40% of its own solar panels in order to reduce its dependence on foreign players.<sup>78</sup> Based on current growth rates and capacity, this would translate to roughly 30.4 gigawatts (GW) of domestically produced solar modules, cells, ingots/wafers, and polysilicon. Currently, EU production capacity for solar modules is put at 12 GW, the cell capacity at 2 GW and the ingots/wafers capacity at 0 GW, meaning the sector would have to scale up massively compared to its current capacity.<sup>79</sup>

According to the Chips Act, the EU aims to account for 20% of global semiconductor production by value in 2030.<sup>80</sup> Reaching this from the current market position of 12,7% would mean that chip production across all segments would have increase significantly.<sup>81</sup>

Meeting the increased demand from both solar PV and semiconductors will require a robust supply of polysilicon. Currently, Wacker is the dominant European polysilicon producer, with significant export volumes to global markets. It is expected that some of the additional demand driven by expanded EU semiconductor manufacturing will be met by redirecting a portion of Wacker's polysilicon production from exports back to the domestic market. However, existing long-term contracts with international clients create constraints, meaning Wacker and other producers cannot simply shift all output inward without repercussions or contractual penalties. Consequently, redirecting exports alone will be insufficient to satisfy the new capacity needs.

<sup>77</sup> 'Special Report 04/2026: Critical Raw Materials for the Energy Transition', European Court of Auditors, accessed 28 August 2026, <http://www.eca.europa.eu/en/publications/sr-2026-04>.

<sup>78</sup> 'Net-Zero Industry Act', European Commission, 16 March 2023, [https://single-market-economy.ec.europa.eu/publications/net-zero-industry-act\\_en](https://single-market-economy.ec.europa.eu/publications/net-zero-industry-act_en).

<sup>79</sup> Anatoli Chatzipanagi et al., *Clean Energy Technology Observatory: Photovoltaics in the European Union - 2025 Status Report on Technology Development, Trends, Value Chains and Markets* (2025), [https://setis.ec.europa.eu/publications-and-documents/clean-energy-technology-observatory/ceto-reports-2025\\_en](https://setis.ec.europa.eu/publications-and-documents/clean-energy-technology-observatory/ceto-reports-2025_en).

<sup>80</sup> 'The EU Chips Industry', European Council, 2025, <https://www.consilium.europa.eu/en/policies/eu-chips-industry/>.

<sup>81</sup> Eur. Council, 'The EU Chips Industry'.

Meeting the increased demand from both solar PV and semiconductors will require a robust supply of polysilicon.

In light of these limitations, scaling up production capacity for both semiconductor-grade and solar-grade polysilicon within Europe becomes imperative. Building new facilities or expanding existing ones would not only support the European climate and digital goals but also enhance supply chain resilience by reducing dependency on polysilicon imports from non-EU countries. This approach is critical given the strategic importance of semiconductors and renewable energy technologies in Europe's industrial and climate-neutral ambitions. Additionally, securing a reliable domestic polysilicon supply will help buffer the EU industry against global market volatility, geopolitical risks, and potential trade disruptions, ensuring that Europe's semiconductor production growth is sustainable and competitively positioned on the world stage.

In light of these limitations, scaling up production capacity for both semiconductor-grade and solar-grade polysilicon within Europe becomes imperative.

---

# 5. Conclusion and policy recommendations

The EU stands at a crossroads in its polysilicon supply chain. Its position in solar and battery supply chains is negligible, not only because it lacks the production capacity needed to meet demand, but also because it lacks the downstream production capacity to absorb such volumes. This creates an upstream-to-downstream dependence on Chinese technology and products. For the semiconductor supply chain, the situation is somewhat better but remains fragile. The entire semiconductor-grade polysilicon ecosystem relies heavily on a single player, in a sector where supply-demand imbalances and extreme price volatility have already driven several key producers into bankruptcy.

To achieve the strategic goals of the Chips Act and the Net-Zero Industry Act, the EU should therefore increase its polysilicon production, particularly solar-grade polysilicon, to reduce its reliance on foreign, and specifically Chinese, suppliers. At the same time, the Union needs to expand its downstream manufacturing capacity, including silicon for battery applications, as well as ingot, wafer, cell and module production for solar; and wafer and fab production for semiconductors.

Certainly, not all production processes can be on-shored due to immense costs and resulting inefficiencies, so cooperation with key non-Chinese players is essential. In the semiconductor space specifically, achieving a position of real indispensability may offer the best security guarantee against increasing Chinese dominance and the potential weaponization of semiconductor supply chains in the future. Ensuring that semiconductor-grade polysilicon remains a key European capability is therefore essential.

To maintain and strengthen the EU's polysilicon position, three policy recommendations are developed for EU policymakers, inspired by the other global policy initiatives analysed in this brief. These should be implemented jointly to ensure effectiveness and achieve impact.

1. **Coordinate EU-wide polysilicon supply chains across semiconductors, solar photo-voltaics, and batteries.** Europe's strong polysilicon position risks decline without capacity growth matching global and domestic demand. A coordinated EU approach will enable strategic planning, optimize resource allocation, and secure reliable supply to meet the ambitious targets set by the NZIA and Chips Act. It could make use of instruments under the Industrial Accelerator Act that pairs strategic European needs with demand-side incentives in the solar manufacturing chain for the consumption of polysilicon produced in the EU or likeminded partners for European solar and semiconductor chip producers.

2. **Mobilise EU financing to close gaps in polysilicon supply chains.** By leading coordination, the EU can identify weak points and prioritise investments. Targeted financial support is essential to help European producers scale up production, innovate sustainably, and compete effectively against heavily subsidized international rivals.
3. **Develop a tailored policy for polysilicon and related midstream products caught between the Critical Raw Materials Act and Net-Zero Industry Act.** Polysilicon falls under NZIA but shares challenges with CRMA projects, warranting a closer policy review for these in-between sectors. Creating a specialized framework will address regulatory ambiguities and ensure these critical materials receive appropriate support and oversight.



The Hague Centre  
for Strategic Studies

**HCSS**

Lange Voorhout 1  
2514 EA The Hague

**Follow us on social media:**

@hcssnl

**The Hague Centre for Strategic Studies**

Email: [info@hcss.nl](mailto:info@hcss.nl)  
Website: [www.hcss.nl](http://www.hcss.nl)