BERNREUTER RESEARCH
Polysilicon Market Reports

Johannes Bernreuter

The Polysilicon Market Outlook 2027

Technologies · Capacities · Supply · Demand · Prices

BERNREUTER RESEARCH
Polysilicon Market Reports

Your Polysilicon Market Guide

Despite rapidly growing demand from the solar sector, fierce cut-throat competition is currently dominating the polysilicon industry. Would you like to be up to date on the decisive market trends, the latest technological developments and future price points? *The Polysilicon Market Outlook 2027* provides you with all of that. The 102-page report analyzes hundreds of data and details, presents them in a clear and compact form and draws insightful conclusions to help you navigate in a volatile market.

► The **introduction** describes why the polysilicon industry is like a super tanker with a long brake path, how the increasing Chinese share in production has changed this behavior, and why the pork cycle from oversupply to shortage to oversupply has returned after a long break.

► The **background** chapter explains why monocrystalline solar cells and modules were able to replace the once dominant multicrystalline technology within just five years and how almost the same will happen between p-type and high-efficiency n-type cells.

► The **technology** chapter analyzes why the prevalent Siemens process has remained unchallenged, how much progress fluidized bed reactor (FBR) technology has made for producing polysilicon granules, and which activities are underway to upgrade silicon kerf loss from wafer sawing using metallurgical processes.

► The **capacity** chapter lists 63 polysilicon supply contracts and screens the construction projects of 36 new Chinese and three new Indian entrants and aspirants. A comprehensive table provides a concise overview of all plant shutdowns, capacity expansions and greenfield projects implemented and planned between 2019 and 2027. The chapter concludes with three trends that are shaping the global polysilicon industry today.

► The **supply** chapter presents four different scenarios of production volumes and end-of-year capacities for 45 polysilicon plants from 2020 through 2027. It highlights the market shares of the top ten manufacturers, points out China's dominance among the world's polysilicon production regions, and outlines how an industry shakeout could evolve. Finally, it details the production volumes of electronic-grade polysilicon for each manufacturer and shows impurity specifications and measurement data for electronic grade.

► The **demand** chapter quantifies the polysilicon demand of the semiconductor and photovoltaic (PV) industries from 2017 through 2027. It analyzes the downside bias of traditional PV forecast models and develops a new approach to predicting global PV installations. Moreover, the chapter provides a wealth of data on market shares of various solar cell technologies, cell efficiencies, wafer thickness and kerf loss, which all influence the specific silicon consumption.

► The **balance** chapter reconstructs the supply/demand balance for electronic-grade polysilicon since 2009, compares the various demand scenarios with supply on the total polysilicon market through 2027, and takes a special look at how close the market-clearing scenario (no oversupply) came to actual PV installations in the past. In addition, the chapter presents a scenario of the polysilicon demand for high-efficiency n-type solar cells.

► The **duty** chapter provides background on the anti-dumping measures of the Chinese Ministry of Commerce and shows data from customs statistics to assess the effect of Chinese anti-dumping duties on polysilicon imports from 2011 through 2022.

► The chapter on the U.S. **import ban** against products made with forced labor in the Xinjiang Uyghur Autonomous Region in northwestern China elucidates the coercive nature of labor transfer programs in Xinjiang and reveals who the main silicon metal suppliers of the top seven polysilicon manufacturers in China are. The chapter also quantifies the share of Xinjiang-based plants in the global output of solar-grade polysilicon.

► The **price** chapter examines the factors that have influenced the polysilicon spot price since 2020. Based on an analysis of Chinese industry cost curves, the chapter forecasts how the spot price will develop in China through 2027. For non-Chinese polysilicon, an alternative analysis explains how the price is formed outside China.

► The **outlook** chapter assesses the global quartz reserves for silicon metal production and predicts how much of these reserves will be consumed by polysilicon, silicones, aluminum-silicon alloys and silicon-based anodes for lithium-ion batteries by 2030.

Content Highlights

Chinese polysilicon market leader Tongwei will usher in a phase of fierce cut-throat competition in 2024. Tongwei is planning to bring 575,000 metric tons (MT) of new production capacity on stream, whereas Bernreuter Research expects a market growth of 200,000 MT at most in 2024.

The polysilicon shortage in 2021 and 2022, which drove the spot price up to almost US$40/kg, has lured many Chinese aspirants into the industry. The new report from Bernreuter Research screens 36 companies; among them, 14 have started to construct or already to ramp up a new polysilicon plant. Besides Tongwei, however, other leading manufacturers have also expanded production. If all new capacities were ramped up in 2024, oversupply would swell to 1.4 million MT. With its low manufacturing costs and proven product quality, Tongwei will push most, if not all, new entrants out of the market.

In total, the third shakeout wave in the polysilicon industry will eliminate a capacity of up to 2.4 million MT, compared to 275,000 MT during the second wave – from 2018 through 2020 – and 135,000 MT during the first – between late 2010 and early 2013. For 2024, Bernreuter Research expects the polysilicon price to undercut the all-time low of US$6.75/kg reached in June 2020.

While China's share in the global polysilicon output will further increase to 90% in 2023 (to even 92.5% in solar-grade material), the non-Chinese manufacturers Wacker, OCI, Hemlock Semiconductor and REC Silicon will remain exempt from the shakeout. The reason for that is the Uyghur Forced Labor Prevention Act in the United States, which bans products from the Xinjiang Uyghur Autonomous Region in northwestern China. The legislation has created a separate, higher-price market for non-Chinese polysilicon manufacturers, which do not use silicon metal from Xinjiang as feedstock.

The shakeout in China is coming even though the polysilicon industry's largest customer, the solar sector, is growing rapidly. In contrast to other analysts, Bernreuter Research assumes that annual PV installations will rise from 425 GW in 2023 to 1,100 GW in 2027, which is equivalent to an average annual growth rate of 26.8%. Traditional forecast models have mostly underestimated PV growth. Therefore, Bernreuter Research has adopted a more aggressive approach. The rapid growth will fuel strong demand for silicon metal, which is made of quartz (SiO2). As a result, quartz for silicon metal will run short in the second half of this decade.

With in-depth analysis of demand, sophisticated supply/demand scenarios and price forecasts through 2027, the latest purity and cost data on the dominant Siemens process and fluidized bed reactor technology, as well as many other market trends, *The Polysilicon Market Outlook 2027* provides comprehensive, detailed and up-to-date information on the global markets for solar-grade and electronic-grade polysilicon.

Johannes Bernreuter

About the author

***Johannes Bernreuter**, 58, is head of the polysilicon market research specialist Bernreuter Research. Before founding the company in 2008, Bernreuter became one of the most reputable photovoltaic journalists in Germany because of his diligent research, clear style and unbiased approach. He has earned several awards, among others the prestigious RWTH Prize for Scientific Journalism from the RWTH Aachen University, one of the eleven elite universities in Germany. Originally an associate editor at the monthly photovoltaic magazine Photon, Bernreuter authored his first analysis of an upcoming polysilicon bottleneck and alternative production processes as early as 2001. After preparing two global polysilicon market surveys for Sun & Wind Energy magazine in 2005 and 2006, he founded Bernreuter Research to publish in-depth polysilicon market reports.*

Table of Contents

List of Tables and Figures

1. Introduction: The Return of the Pork Cycle

2. Background: From Multi to Mono to N-type

3. Technologies: The Field Narrows

4. Capacities: The Herd Runs into Oversupply

5. Supply: Global Scenarios through 2027

6. Demand: Market Perspectives through 2027

7. Balance: Supply and Demand through 2024

8. Duties: Chinese Wall with Selective Gates

9. Import Ban: The Chinese Forced-Labor Issue

10. Prices: The Valley Is Deep after the Peak

11. Outlook: Quartz, the Next Bottleneck

Appendix I

Companies covered

USA

Hemlock Semiconductor
Wacker Polysilicon North America
REC Silicon
High-Purity Silicon America

Germany

Wacker Chemie

Japan

Tokuyama
SUMCO/Mitsubishi Materials

South Korea

OCI Company

Malysia

OCI Malaysia

Arabian Peninsula

GCL Saudi Arabia

India

Reliance New Energy Solar
Indosol Solar (Shirdi Sai Electricals)
Adani Infrastructure & Developers

China

Tongwei
GCL Technology
Xinjiang Goens (GCL)
Jiangsu Xinhua Semiconductor (GCL)
Daqo New Energy
Xinte Energy (TBEA)
Asia Silicon (Hongshi Holdings)
East Hope
Inner Mongolia Dongli PV
Shaanxi Non-ferrous Tianhong REC
Inner Mongolia Erdos Polysilicon
Bayannur Juguang Silicon Industry
Yichang CSG Silicon Materials
Qinghai Huanghe Hydropower
Luoyang China Silicon
New entrants:
Qinghai Lihao Semiconductor Materials
Ningxia Runyang Silicon Material Tech.
Xinjiang Jingnuo New Energy Industry
Hongyuan Energy Technology (Baotou)
Hoshine Silicon Industry
Gansu Guazhou Baofeng Silicon Material
Xinjiang Qiya Silicon Industry
Xinyi Silicon Industry (Yunnan)
and many more aspirants

Manufacturers of upgraded silicon kerf

REC Solar Norway (formerly Elkem Solar)
Hunan Lixin Silicon Material Technology
Geely Juneng (Zhejiang) Technology

Customer Reviews

“Invaluable report and well worth the investment”

Bernreuter Research does an outstanding job of presenting the polysilicon market in great detail and explaining the market conditions affecting it. The Polysilicon Market Outlook 2027 *gives detailed history as well as projections on how the market is expected to respond to the supply and demand variables in play. It also provides information on the various companies comprising the market. The report is invaluable and well worth the investment.*

Douglas S. Tinnel, Director, Supply Chain at **Silfex – A Lam Research Company**

“Incredibly enlightening and thorough”

I recently purchased the Polysilicon Market Outlook 2027 *from Bernreuter Research, and I must say, it exceeded my expectations. As an academic deeply involved in researching markets, I found the insights provided on the polysilicon market to be incredibly enlightening and thorough. The report is detailed, well-structured, and presented in a way that is both accessible and informative. It has significantly contributed to my understanding and research work. I highly recommend Bernreuter Research to anyone looking for in-depth analysis and data on the polysilicon industry.*

Mehrshad Motahari, Chief Financial Officer of **Green Ferro Alloy (FZC) LLC**

For more customer reviews, please go to:
https://www.bernreuter.com/references/customer-reviews/

BERNREUTER RESEARCH
Polysilicon Market Reports

NEW: The Polysilicon Market Outlook 2027

Technologies • Capacities • Supply • Demand • Prices

Immediately available

- **Paperback:** 102 pages (hard copy only, no electronic file available)
- **Content:** 2,908 characters (w/o spaces) per page; 92 tables and figures
- **Release date:** November 28, 2023
- **Dimensions:** 29.3 x 20.7 x 0.75 cm (11.5 x 8.15 x 0.3 inches)
- **Delivery time:** 1 to 3 business days to most locations worldwide (via FedEx)
- Free shipping

Quantity	Unit Price
1	**2,990.00 €**
2	**2,490.00 €**

Quantity: - 1 + Add to Cart

Report Details | Table of Contents | Customer Reviews | Free Info Package

Overview of the report

Fierce cut-throat competition is dominating the **polysilicon industry** again. What will this industry look like after a **shakeout**? How will the **spot price** develop through 2027? What effect does the U.S. import ban have against products made with **forced labor in Xinjiang**? Which polysilicon manufacturers source **silicon metal** from Xinjiang? Will **quartz** for the production of silicon metal run short? What are the prospects for **polysilicon plants outside China**? How large will the polysilicon demand be for high-efficiency **n-type solar cells**?

These and many other questions are answered by *The Polysilicon Market Outlook 2027*. If you would like to be up to date on the decisive **market trends**, the latest **technological developments** and future **price points**, the **102-page** report provides you with all of that. It analyzes hundreds of data and details, presents them in a clear and compact form, and draws **insightful conclusions** to help you navigate in a volatile market.

For more details, please go to:
https://www.bernreuter.com/polysilicon/industry-reports/polysilicon-market-outlook-2027/