



BERNREUTER RESEARCH NEWS

Polysilicon Market Updates

Polysilicon market observations towards the end of the year

Dear Reader,

As Bernreuter Research predicted in mid-September, the international polysilicon spot price average undercut the historical mark of US\$10/kg for the first time ever in late October. Although prices in the PV value chain from wafers to solar modules reached a bottom in late November and are climbing up again, the polysilicon spot price has remained below \$10/kg so far.

The main reason is the polysilicon inventory accumulated in the wake of the demand slump after the Chinese government capped domestic PV installations on May 31. Although the Silicon Branch of the China Non-ferrous Metals Industry Association (CNMIA) claims that "most domestic polysilicon enterprises have almost no inventory" (!), the association expects that polysilicon supply (production plus imports) in China will exceed demand by 30,000 to 40,000 metric tons (MT) in 2018.

Chinese solar wafer production – and, thus, demand for solar-grade polysilicon – had a global share of 83% in 2017; our preliminary estimates for the global polysilicon market are similar to CNMIA's forecast for China. Assuming that global PV installations in 2018 will be flat compared to 98 GW in 2017 or slightly higher, we expect that global polysilicon production could exceed demand by 40,000 to 50,000 MT in 2018 – although the production volume will probably be somewhat lower than the output in 2017.

The surplus results from sinking demand due to significantly lower specific silicon consumption per watt of solar cell power. This reduction has been driven by two factors:

- 1) Manufacturers of multicrystalline wafers have completely switched to diamond wire sawing this year as makers of monocrystalline wafers did before; diamond wire saws allow thinner wires that cause less kerf loss than the old slurry-based saws.
- 2) The market share of monocrystalline solar cells with higher efficiencies has risen considerably this year.

On top of the polysilicon production surplus comes the carryover of large polysilicon inventories from 2017. Both add up to an inventory ratio that far exceeds the normal value of 10% that polysilicon manufacturers maintain as a buffer for shipments. This huge inventory volume perfectly explains why the polysilicon spot price has slumped to values below \$10/kg.

Will the price recover with increasing demand in 2019? In our view: not really. Here comes the massive expansion of major polysilicon manufacturers in China into play: In the second half of 2018, GCL-Poly, Tongwei, East Hope, Daqo and Asia Silicon alone added a total capacity of 152,000 MT; another 76,000 MT will follow from Xinte Energy and Daqo in 2019.

All these new capacities are situated at locations with low energy costs, mainly in Xinjiang and Inner Mongolia. The new plants will push many manufacturers to the right (high-cost) side of the industry cost curve. Consequently, the polysilicon spot price will remain under pressure.

In a first approximation, we have assumed new PV installations of 110 to 120 GW in 2019. The polysilicon spot price may then rise to a range of \$10-11/kg during seasonal demand peaks; but it will return to a range of \$9-10/kg by the end of next year. Should high inventory levels persist, the price could approach or even undercut \$9/kg.

Under these circumstances, it is astonishing that 18 out of 24 Chinese polysilicon manufacturers are still in operation today, according to CNMIA. Among those are small factories whose cash production costs are definitely higher than the current spot price level of approx. \$9.50/kg. Hence, we believe that more plants will be shut down after the Chinese New Year in early February.

The massive new low-cost production capacity in China is a real game changer in the polysilicon industry. In our view, spot prices above \$10/kg will be a thing of the past in a few years. That's why we talk of a new era on the polysilicon market.

For now, we want to leave it at that. If you are interested in more information on the polysilicon market, see our recent comments on LinkedIn:

– Future market prospects for Wacker:

<https://www.linkedin.com/feed/update/urn:li:activity:6476478316776812544>

– Cash production costs and government subsidies in China:

<https://www.linkedin.com/feed/update/urn:li:activity:6470902674190626816>

– Specific silicon consumption:

<https://www.linkedin.com/feed/update/urn:li:activity:6468952608886321152>

And these are the updates we have published on our LinkedIn company page (<https://www.linkedin.com/company/bernreuter-research>) since we sent out our last newsletter in June:

– REC Silicon's blaming new layoffs on trade dispute is only half the truth (07/02/2018)

– Longi signs fourth major contract for polysilicon supply, this time with Xinte (08/01/2018)

– GCL-Poly cancels sale of 51% stake in polysilicon subsidiary to Shanghai Electric (08/04/2018)

– Longi to cooperate with cell producer Aiko Solar on CCz crystal pulling process (08/08/2018)

– Ferrosolar to open UMG silicon plant in late 2018, claiming 18.5% cell efficiency (08/15/2018)

– Polysilicon contract dispute: partial success for Kyocera in lawsuit with

Hemlock (08/21/2018)

- GCL-Poly's new polysilicon plant in Xinjiang will start operation in September (08/30/2018)
- Daqo's withdrawal from wafer business shows: multicrystalline silicon is in trouble (09/07/2018)
- GCL Poly's reference to rebounding polysilicon and wafer prices is outdated (09/19/2018)
- Why you should not write multicrystalline technology off too early (09/29/2018)
- GCL introduces mono-cast solar module – is the approach already economical? (10/02/2018)
- Brave new polysilicon world: Daqo targeting production costs of \$6.80/kg by 2020 (10/15/2018)
- REC Silicon is keeping the lights on at its polysilicon plant in Moses Lake (10/24/2018)
- Wacker feels the brunt of the polysilicon market downturn (10/25/2018)
- China-based producers intensify cut-throat competition on the polysilicon market (10/29/2018)
- After EBITDA loss, OCI mulls shifting polysilicon capacity to semiconductor (10/31/2018)
- After duties on EU polysilicon imports expired, focus is on US-China trade talks (11/02/2018)
- Hints on the success factors of monocrystalline silicon in the PV market (11/24/2018)
- Kyocera reaches settlement on long-term polysilicon contracts with Hemlock (12/03/2018)
- Osaka Titanium withdraws from polysilicon business for semiconductors (12/04/2018)

Take time for a rest during the quiet days of the year! We wish you a peaceful holiday season and a Happy New Year.

Best regards,
Johannes Bernreuter
Head of Bernreuter Research

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