

Team Name: R-pha
Sector: Information Technology
Market: China



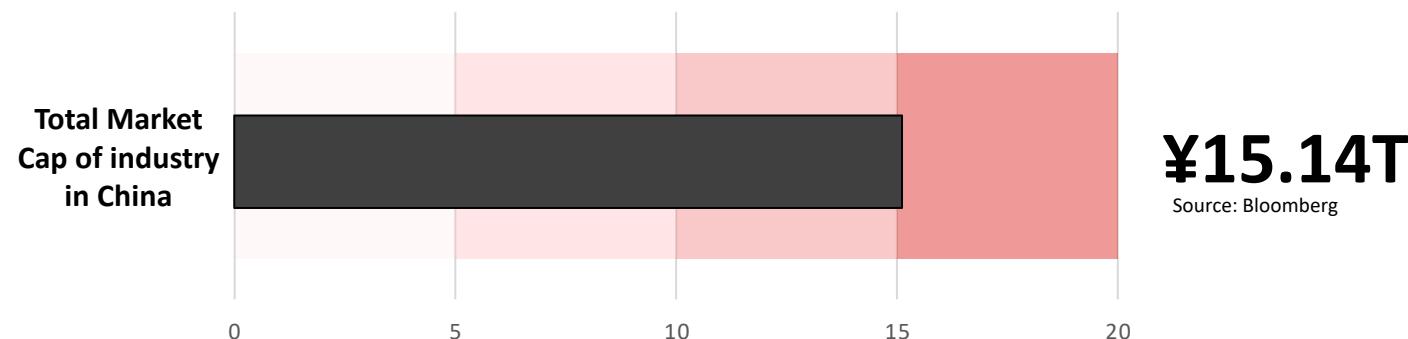
POLYMER



TEAM R-PHA

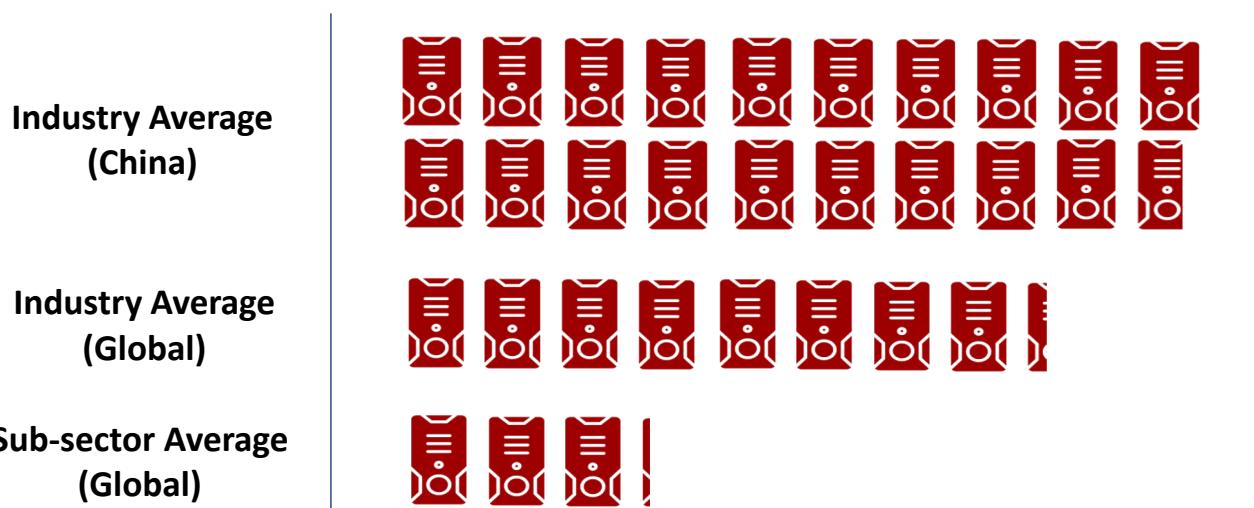
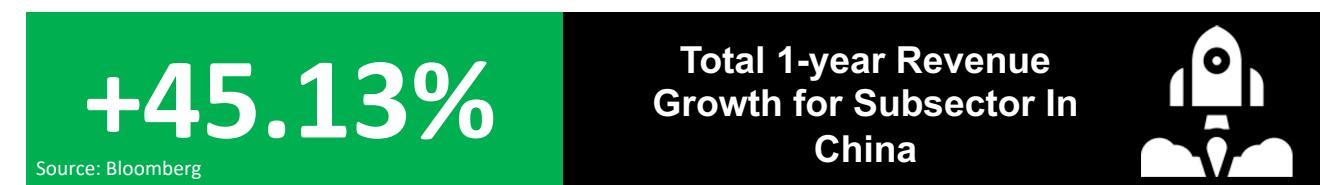
Executive Summary

Sub-Sector: Semiconductors
Investment Horizon: 6 months
L/S Weighting: 130/30
Target IRR: 20.2%



Industry Trend and Growth Catalyst

- ✓ Generative AI driving growth for data centers exposed chip makers
- ✓ Industry trend showing we have experienced bottom of industry cycle in 2022
- ✓ Strong growth track record despite US sanctions, on-shoring by western countries and supply diversification
- ✓ Enormous R&D capital poured in China
- ✓ Inventory digestion Completed in Q123 PC market, recovery is expected
- ✓ China encouraging self sufficiency by handing out enormous subsidies
- ✓ Growing interest in end market such as vehicle production, especially EV
- ✓ Riding the Green Energy Wave of Decarbonization and Solar Power



Long: Xinjiang Daqo New Energy Co Ltd



Short: Tianshui Huantian Technology Co Ltd

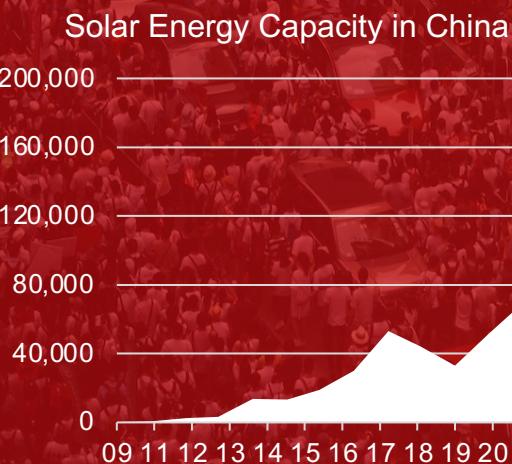


ESG and Sustainability Trend: Indispensable Part of Green Tech



Renewable Energy

Used in solar power, wind turbines etc. Helps harness, convert and store renewable energy as electricity, ensuring minimal power loss and efficient distribution



Energy Efficiency

Semiconductors can reduce power consumption and reduce environmental impact through the use of energy saving innovations such as Sensor signal processing in different industries



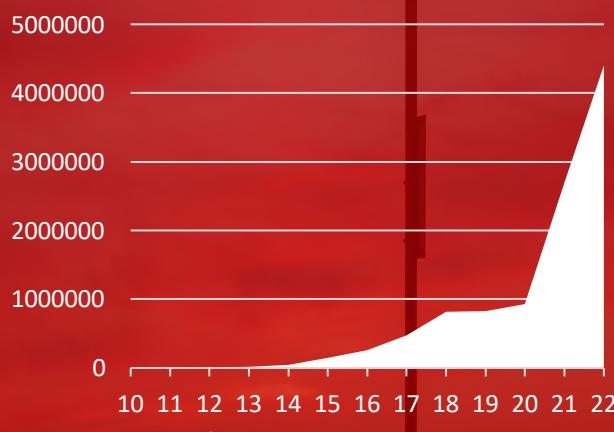
e.g. Smart Thermostat and Motion Sensor Lighting



Electric Vehicle

Semiconductors play a vital role in enabling energy-efficient power electronic components, on-board chargers and DC-DC converters, battery management, powertrains, and driver-assistance systems

EV Sales Volume In China



Smart City Development

"Action Plan for Innovation and Development of Intelligent Photovoltaic Industry", "Development Plan for the New Energy Vehicle Industry", "Renewable Energy Law of the People's Republic of China" and many other policies

¥200bn+

Subsidies and tax breaks poured into smart city and development in China

Source: MIT Technology Review

The Semiconductor Industry: A Booming Sector Powered by A.I. Mania



Raw materials

This stage involves the procurement of essential materials like **silicon, plastic, and copper**



Design

In this stage, companies create the **designs and blueprints** for **integrated circuits and other devices**



IC Manufacturing

Integrated circuits are manufactured in this stage, which includes **processes like wafer fabrication** and the addition of circuitry to silicon wafers



Assembly, Testing, Packaging

Semiconductor devices undergo assembly, testing, and packaging to ensure their functionality and protect them from damage.

This stage is often carried out by **outsourced semiconductor assembly and test companies (OSATs)**



\$70.30 bn



\$88.66 bn

The global semiconductor materials market size valuation in 2022 (in USD)

Source: Mordor Intelligence

\$1 tn

Anticipated revenue of the global semiconductor industry in 2030 (in USD)

Source: Deloitte

24%

global semiconductor industry's capital expenditures growth in 2022

Source: IC Insights

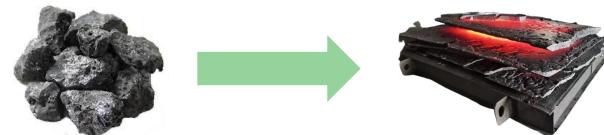
Xinjiang Daqo New Energy Overview



Xinjiang Daqo New Energy Co.,Ltd. (688303.CH) produces polysilicon, silicon wafers and more. Our target price is \$48.9.

Technological Competencies for Sustainable Growth

For one, clean-tech subsidiary Daqo Greentech¹ has developed a waste treatment system **recovering vent gas** and **transforming silicon slag to ferrosilicon**



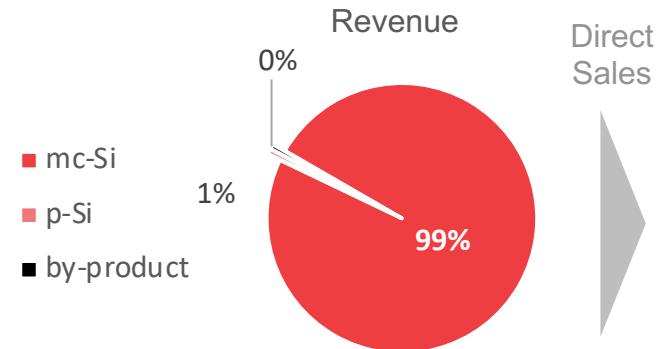
Daqo's comprehensive material treatment system includes a **heat recycling system** and **utilization of SiCl₄**



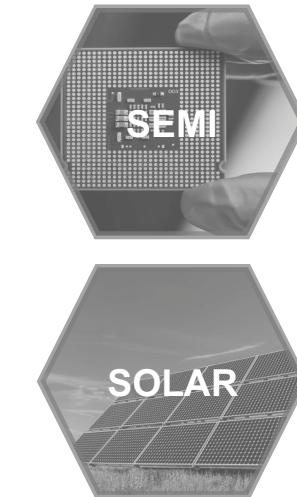
Daqo is an industry leader in employing **IoT** and **data analytics** to optimize production and ensures high-quality and efficient manufacturing

Notes: 1) Direct translation from 新疆大全绿创环保科技有限公司
Source: Annual Report

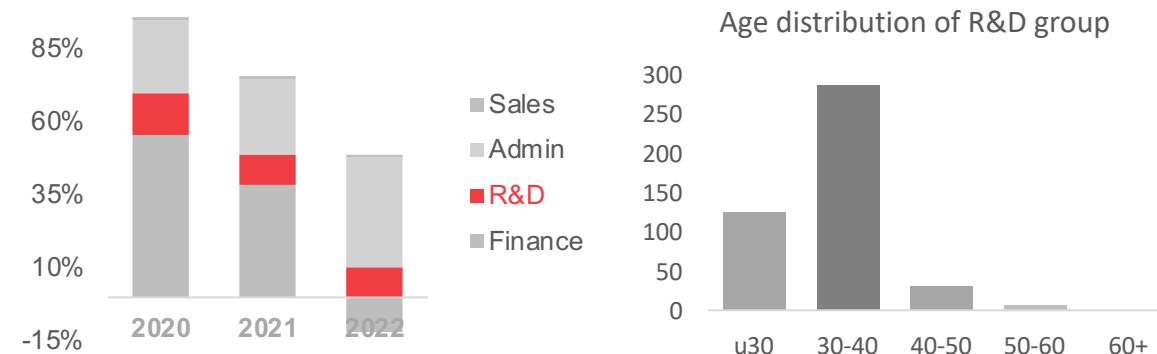
Daqo's business is simple and effective...



Sales channel exists inland with downstream demand for **monocrystalline chips** creating **long-term contracts/partnerships**



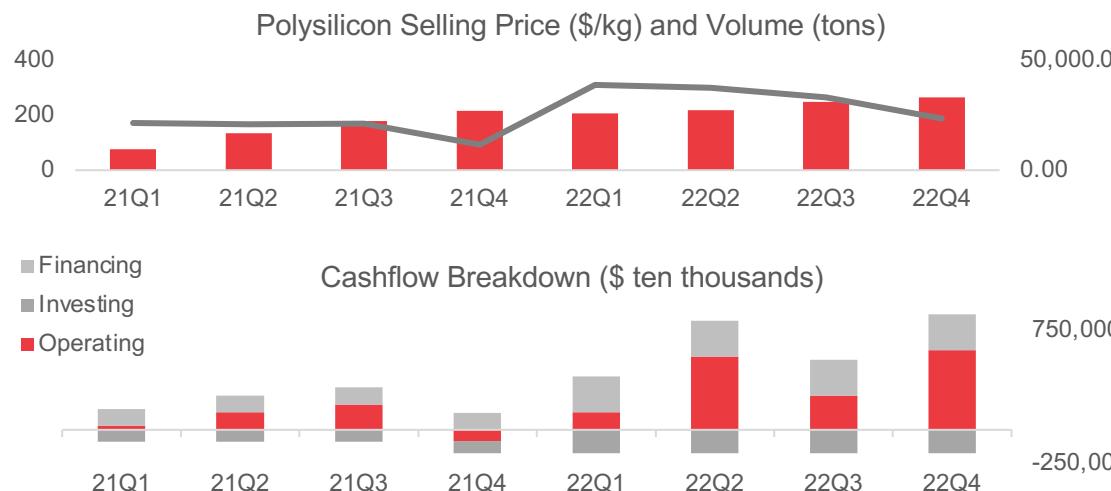
...with shown dedication in tech and innovation



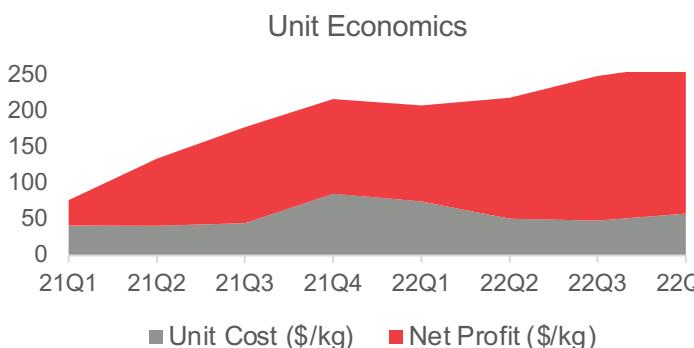
Looking into Xinjiang Daqo New Energy



Strong operating activity despite price fluctuations



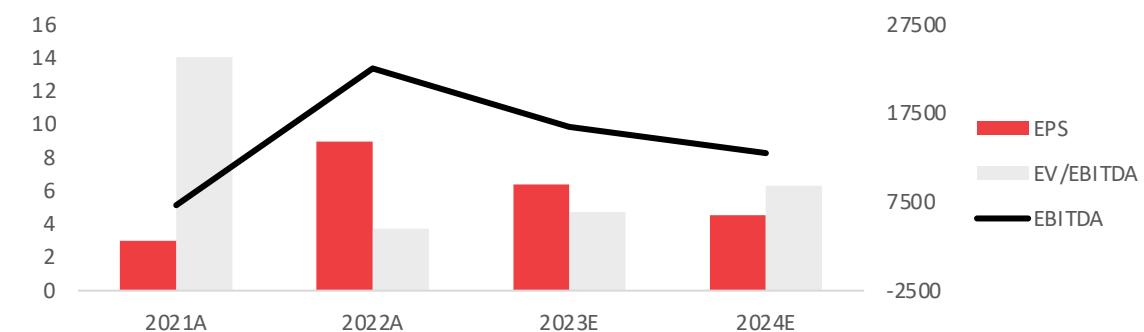
Observation: the growth of Daqo's **cashflow** is driven by **operating activities** and that by **selling volume**. Therefore, while polysilicon price moves short-term consensus, Daqo's moats create long-term value



Unit sales has consistently achieved a **profit margin of above 70%** for mc-Si, and even **above 90%** for by-product sales

Source: Annual Report

Daqo New Energy is undervalued...



The recent decline in **net profit** is due to a **fall in company sales volume** and a **fall in market price of polysilicon**. As an early expert in producing low energy consumption polysilicon with automation, Daqo will **survive** the downward trend with **significant cost advantage**. The fundamental edge yields **strong and consistent FCF** and thus we believe Daqo is **undervalued**

...with outstanding per unit ESG performance

Metric	Unit	Result	YoY
Water consumption density	'000 ton water / ton p-Si	0.05	-16.7%
Greenhouse gas emission density	'000 ton CO2 / ton p-Si	42.35	-7.7%
Comprehensive energy consumption density	ton standard coal / ton p-Si	8.50	-8.9%

Xinjiang Daqo New Energy's Catalysts and Risks



Capacity enhancement projects are being built with expected strong cash inflows

Project Overview

Phase III Stage B

Annual production of 35,000 tons of polysilicon

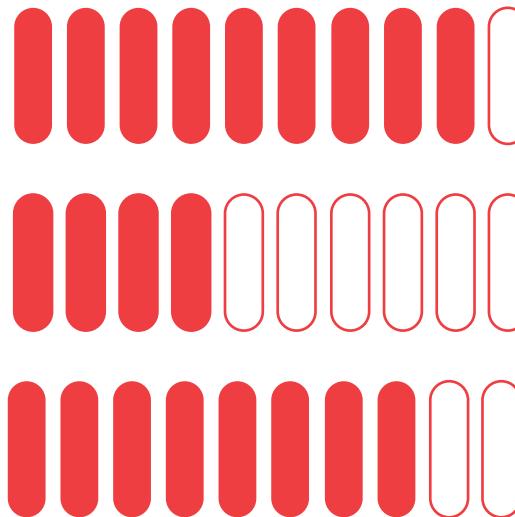
Semi

1,000 tons of high-purity semiconductor materials

Inner Mongolia Baotou Phase I

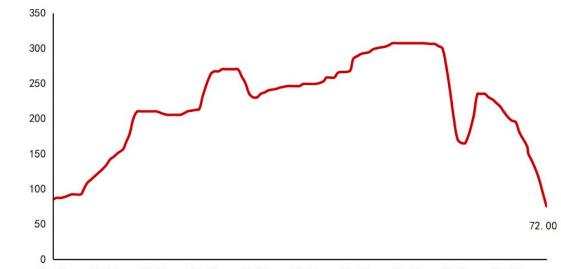
Annual production of 100,000 tons of polysilicon

Cumulative Investment-to-Budget (%)

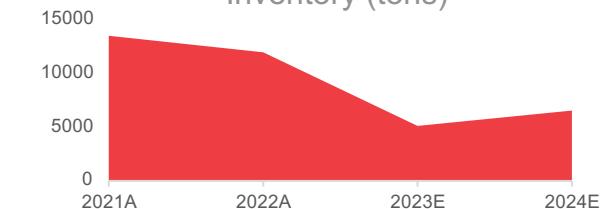


Inventory Outlook

Polysilicon Spot Price (\$/kg)



Inventory (tons)



The fundamental moats are however, coupled with structural and macro risks

Dual Listing

Daqo is also listed in the US as **NYSE:DQ**. The stock price may fluctuate due to differences in **laws, regulations, and securities regulatory concepts** between China and the US

Project Risk

The company faces risks in expanding its **semiconductor business**, such as the **high technical difficulty** of production and different application areas

Political Risk

Daqo may be subject to increased trade friction and adverse effects on its production and operations due to its **inclusion in the Entity List** by the **U.S. Department of Commerce's BIS**

Tax Policy Risk

Daqo's **tax liability** may increase significantly if it is unable to maintain its high-tech enterprise qualification or its main business is no longer included in the **"Catalog of Encouraged Industries in Western China"**

Source: Annual Report

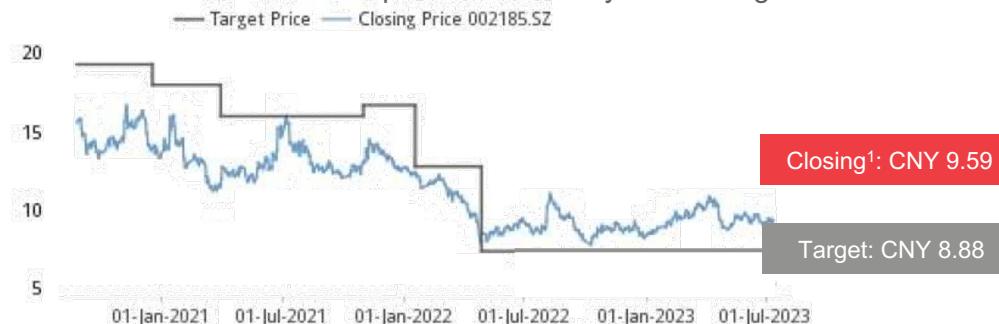
Huatian Technology Overview



Tianshui Huatian Technology Co.,Ltd. (002185.CH) specializes in testing and packaging for the semiconductors, devices and components

Company Overview

- The Company was founded on December 25, 2003
- The Company had IPO on Shenzhen Stock Exchange in November 2007
- Mainly business: Semiconductor components assembly and testing



Company Offerings



Notes: 1) as of 31 July, 2023.
Source: Company; Bloomberg

Investment Thesis

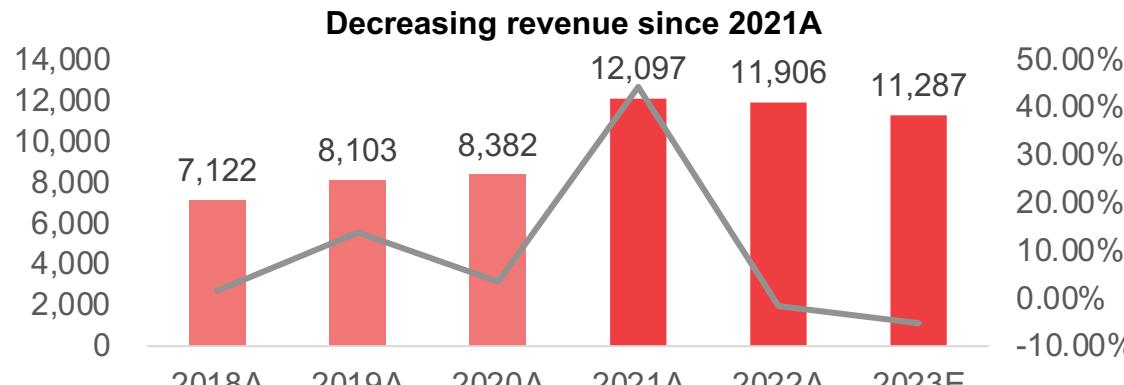
- | | |
|--------------------------------|---|
| Wealth Creation
Unfavorable | <ul style="list-style-type: none">Decreasing net income from 2018A - 2022ARevenue and net income decreases in 2023EHistorically low dividend per share |
| Growth
Unfavorable | <ul style="list-style-type: none">Asset growth surpassed revenue growth from 2018A - 2022AEquity growth surpassed EPS growth in 2022A - 2023EVery high excess cash and will have to reinvest to support profitability |
| Risks
Unfavorable | <ul style="list-style-type: none">Overvalued: 2023E P/E (91.4x vs 32.8x Industry average) and 2023E EV/EBITDA (14.2x vs 7.0x industry average)Low asset turnover with DIO and DSO higher than industry average |
| ESG
Unfavorable in General | <ul style="list-style-type: none">Lower R&D expense ratio than industry averageLower % of local sourcing and producing than industry averageMore years to take to reach net zero emissions target than industry averageNo representation of women on the Board or in key management positionsInsufficient ESG policiesLess water use than industry averageNo material accident from 2020A – 2022A |

Huatian Technology's Financial Performance Is Disappointing that Hinders Wealth Creation and Growth

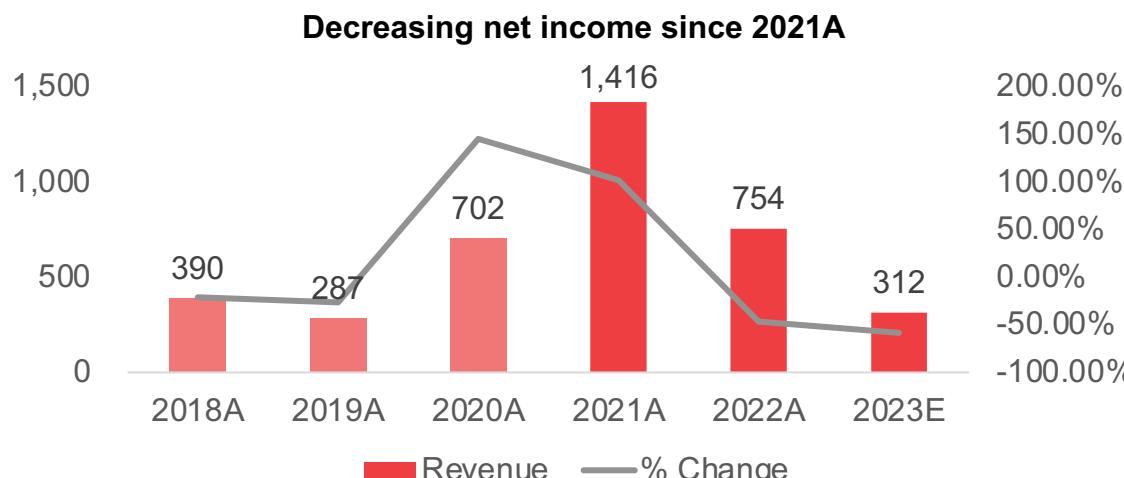


Financial Overview

(in CNY millions)



Revenue — % Change



Revenue — % Change

Explanation

- Insufficient end-consumer demand in semiconductor market because of geopolitical conflicts and slowing economic growth
- In 2022, most suppliers' GMs declined by 1-8pp. For 2023, we expect a flat GM or a 1-3pp decline
- Low asset turnover with DIO (81.6 days) and DSO (57.9 days) which are higher than industry average
- Semiconductor industry entered new stage of supply-demand balance after period of high-speed growth and capacity

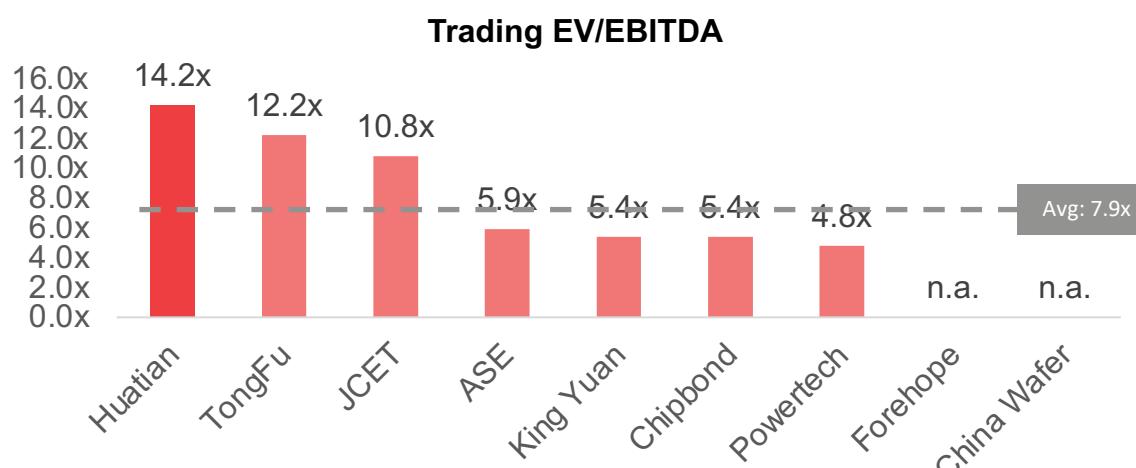
	2018A	2019A	2020A	2021A	2022A	2023E
Revenue	7122	8103	8382	12097	11906	11287
% Change	1.60%	13.79%	3.44%	44.32%	-1.58%	-5.20%
Net Income	390	287	702	1416	754	312
% Change	-21.27%	-26.43%	144.67%	101.75%	-46.74%	-58.56%
Total Assets	12443	16045	19309	29974	30971	n.a.
% Change	32.84%	28.95%	20.34%	55.23%	3.33%	n.a.
EPS	0.16	0.11	0.26	0.50	0.24	0.10
% Change	-21.12%	-30.94%	126.55%	96.09%	-53.19%	-58.66%
Total Equity	6375	9919	11626	17964	19198	16028
% Change	6.33%	55.59%	17.21%	54.52%	6.87%	-16.52%

Source: Company; Bloomberg

Huatian Technology Is Overvalued and Has Unfavorable Risks



It is overvalued and...



Notes: Refer to appendix for more comprehensive multiples. 1) as of 30 July, 2023 17:15 ET.
Source: Company; Bloomberg

...coupled with other risks



- **42.9%** of 2022 A revenue is based from **overseas**
- The US CHIPS Act allocates \$2 billion to fund microelectronics research, fabrication, and training
- The industry trending towards **self sufficiency**



- Company operations closely correlated with semiconductor industry cycles
- **Fluctuations** in semiconductor industry will pose operational risks for company
- **Increasing competition** in the industry



- Fluctuations in **prices of key raw materials** (gold wire, lead frames, plastics which account for 50-60%) leads to fluctuations in company earnings
- 1-year change of **gold price is +10.21%**¹
- **Rising labor costs** also pressuring company's cost control



- Rapid **development of IC market** and **frequent replacement of electronics** requires company to accelerate R&D and new product development
- If R&D capabilities and new products **cannot meet market and customer demand**, company faces risks of failure



- In January 2019, the Company **completed the acquisition** of Malaysia Main Board listed company **Unisem**
- Potential operating conditions below expectations would lead to a need for **goodwill impairment**

Daqo's ESG Performance Is Better than Huatian Technology's

ESG Comparison: Daqo Energy vs. HT-Tech						
		Daqo Energy		HT-Tech		
Category	Sub-category	Metric	Weighting	Score	Score	Rationale
E	Climate change	Increase in power/energy efficiency	6	4	3.6	Power semiconductors are key enabler to increase energy efficiency and reduce CO2 emissions
E	Natural Resources & Pollution	Water use	3.5	3.5	3.5	Risk of water shortage could mean rationing for the consumer as was recently the case in some regions of Taiwan where factories were given priority
E	Climate change	Climate mitigation - own operations	2.5	2.5	0	Emissions rising in importance for companies with fab facilities introducing net zero targets
E	Responsible Sourcing	Materials sourcing	2	1.8	1.6	In times of US-China frictions, dominance by China on the extraction or processing of rare earth metals used in semiconductors is a geopolitical risk
E	Responsible Sourcing	Responsible sourcing overall	2	2	1.5	Supply chain auditing is critical to ensure a company nor its suppliers do not support indirectly illegal activities, amoral behaviors (e.g child labor, human rights violations) or conflicts (e.g. minerals from Congo)
S	Community & ethics	Localization of manufacturing	7	7	6.5	Governments are mandating more localized manufacturing but resulting in higher costs
S	Customer	Investment and innovation	6	6	3.5	Continuous investment in technology and manufacturing is required to innovate and advance the capabilities of devices which benefits society but burdens shareholders
S	Customer	Affordability and access	5.5	3.6	4.2	Semiconductors support a wide range of end-markets which advance living conditions, globalization, and improve communication while driving productivity gains
G	Corporate Governance	Board composition, executive compensation, and shareholder rights	2	1.3	0.3	Good governance ensures accountability and transparency
G	Employee Health and Safety	Workplace conditions, accident rates, and safety training programs	1.5	1.5	1.5	Workplace safety prevents injuries, disabilities, and fatalities
G	Diversity and Inclusion	Representation of women and minorities and overall workforce demographics	1.5	1	0	Diversity and inclusion in the workforce can lead to innovation and better decision-making
Total Score Out of 39.5			34.2	26.3		

Source: Company; Bloomberg, BNP Paribas

Appendix – ESG Scoring Methodology

Category	Sub-category	Metric	Weighting	Measured By
Social	Community & Ethics	Localization of manufacturing	7	(Weighting/Industry highest)*% of local factories
Social	Customer	Investment and innovation	6	(Weighting/Industry highest)*R&D cost/Revenue
Environmental	Climate change	Increase in power/energy efficiency	6	(Weighting/Industry highest)*Output unit
Social	Customer	Affordability and access	5.5	(Weighting/Industry average)*Gross margin
Environmental	Natural Resources & Pollution	Water use	3.5	(Weighting/Industry average)*Water usage per unit of production value
Environmental	Climate change	Climate mitigation - own operations	2.5	(Weighting/Industry average)*Years needed to reach net zero target
Environmental	Responsible Sourcing	Materials sourcing	2	(Weighting/Industry average)*% of supplies from local suppliers
Environmental	Responsible Sourcing	Responsible sourcing overall	2	(Weighting/Industry average)*% of supplies from qualified suppliers
Governance	Corporate Governance	Board composition, executive compensation, and shareholder rights	2	Presence of Employee CSR Training, Health and Safety Policy, Business Ethics Policy, Anti-Bribery Ethics Policy, Equal Opportunity Policy, Gender Pay Gap Breakout, Human Rights Policy, Policy Against Child Labor, Quality Assurance and Recall Policy, Consumer Data Protection Policy, Community Spending
Governance	Employee Health and Safety	Workplace conditions, accident rates, and safety training programs	1.5	Weighting - (Weighting/Industry average)*Material accident number
Governance	Diversity and Inclusion	Representation of women and minorities and overall workforce demographics	1.5	(Weighting/Industry average)*(% of women in the Board/key management + Labor rights condition)

Appendix – Comparability of Trading Companies

Company	Business Description	Revenue by Business Segment	Revenue by Geography
Xinjiang Daqo New Energy Co Ltd	A leading manufacturer of polysilicon in China.	Polysilicon: 86%	China: 92%, Asia ex-China: 8%
Tongwei Co Ltd	A leading manufacturer of polysilicon in China.	Polysilicon: 88%	China: 85%, RoW: 15%
GCL Technology Holdings Ltd	Polysilicon and wafer manufacturer for solar industry.	Polysilicon: 65%, Wafers: 35%	China: 72%, Asia ex-China: 28%
Xinte Energy Co Ltd	A leading manufacturer of polysilicon in China.	Polysilicon: 90%	China: 88%, Asia ex-China: 12%
Wacker Chemie AG	A leading manufacturer of silicon-based products for the semiconductor, solar, and chemical industries.	Polysilicon: 34%, Wafers: 29%, Other: 37%	Europe: 64%, Asia: 36%
OCI Holdings Co Ltd	A leading manufacturer of polysilicon and other silicon-based products.	Polysilicon: 59%, Wafers: 22%, Other: 19%	South Korea: 67%, Asia ex-Korea: 33%

Company	Business Description	Revenue by Business Segment	Revenue by Geography
Tianjin Huatian Technology Co., Ltd.	A leading provider of semiconductor packaging and testing services in China.	Testing & packaging services: c.100%	China: 65%, Asia ex-China: 30%, Americas: 5%
TongFu Microelectronics Co., Ltd.	A leading provider of integrated circuit (IC) packaging and testing services in China.	Testing & packaging services: c.100%	China: 30%, RoW: 70%
ASE Technology Holding Co., Ltd.	A leading provider of semiconductor packaging and testing services in the world.	Manufacturing: 50%, Packaging: 46%, Testing: 8%	Taiwan: 45%, China: 30%, Rest of Asia: 15%, Americas: 10%
Powertech Technology Inc.	A leading provider of semiconductor packaging and testing services in Taiwan.	Testing & packaging services: 100%	Taiwan: 90%
JCET Group Co., Ltd.	A leading provider of semiconductor packaging and testing services in China.	Testing & packaging services: 100%	China: 90%, Other Asia: 8%, Americas: 2%
China Wafer Level CSP Co., Ltd.	A leading provider of wafer level chip scale packaging (WLCSP) services in China.	Testing & packaging services: 100%	China: 100%
King Yuan Electronics Co., Ltd.	A leading provider of semiconductor packaging and testing services in Taiwan.	Testing & packaging services: 100%	Taiwan: 90%
ChipMOS Technologies Inc.	A leading provider of semiconductor packaging and testing services in Taiwan.	Assembly: 29%, Testing: 22%	Taiwan: 90%
Chipbond Technology Corp	A leading provider of semiconductor packaging and testing services in China.	Testing & assembly services: 100%	Taiwan: 55%, China: 25%, Rest of Asia: 15%, Americas: 5%
Forehope Electronic Ningbo Co., Ltd.	A leading provider of semiconductor packaging and testing services in China.	Testing & assembly services: 100%	China: 95%

Appendix – Multiples of Comparable Trading Companies

Ticker	Name	MC in USDmn	EV 2022A	P/E(x) 2023E	2024E	2022A	EV/EBITDA(x) 2023E	2024E
688303 CH Equity	Xinjiang Daqo New Energy Co Ltd	12,097	8,290	4.3x	7.4x	14.2x	2.4x	4.1x
600438 CH Equity	Tongwei Co Ltd	21,643	24,379	5.2x	7.6x	9.1x	3.7x	4.9x
WCH GY Equity	Wacker Chemie AG	8,059	7,685	6.1x	16.9x	14.9x	3.4x	6.6x
3800 HK Equity	GCL Technology Holdings Ltd	5,566	6,275	2.5x	2.9x	4.3x	2.3x	2.5x
1799 HK Equity	Xinte Energy Co Ltd	2,696	5,950	1.5x	1.9x	3.4x	0.3x	2.5x
010060 KS Equity	OCI Holdings Co Ltd	1,464	1,327	2.3x	2.8x	2.6x	1.5x	1.9x
	Median			3.4x	5.1x	6.7x	2.3x	3.3x
	Mean			3.7x	6.6x	8.1x	2.3x	3.7x
Ticker	Name	MC in USDmn	EV 2022A	P/E(x) 2023E	2024E	2022A	EV/EBITDA(x) 2023E	2024E
002185 CH Equity	Tianshui Huatian Technology Co Ltd	4,343	5,131	27.8x	91.4x	39.9x	10.7x	14.2x
3711 TT Equity	ASE Technology Holding Co Ltd	15,923	20,098	7.8x	13.7x	10.2x	4.4x	5.9x
600584 CH equity	JCET Group Co Ltd	8,520	8,561	18.7x	28.4x	19.3x	8.4x	10.8x
002156 CH equity	TongFu Microelectronics Co Ltd	4,959	6,264	48.2x	85.8x	38.0x	11.9x	12.2x
6239 TT Equity	Powertech Technology Inc	2,677	3,497	9.2x	14.2x	11.2x	3.8x	4.8x
2449 TT Equity	King Yuan Electronics Co Ltd	2,442	2,859	11.2x	13.8x	11.5x	4.8x	5.4x
688362 CH Equity	Forehope Electronic Ningbo Co Ltd	2,263	2,825	n.a.	64.3x	37.7x	n.a.	n.a.
603005 CH Equity	China Wafer Level CSP Co Ltd	2,144	1,834	58.2x	50.5x	31.7x	35.7x	n.a.
6147 TT Equity	Chipbond Technology Corp	1,572	1,464	8.0x	12.2x	9.8x	4.8x	5.4x
8150 TT Equity	ChipMOS Technologies Inc	821	960	7.2x	12.5x	7.7x	3.7x	4.3x
	Median			11.2x	21.3x	15.4x	4.8x	5.7x
	Mean			21.8x	38.7x	21.7x	9.8x	7.9x

Appendix – China Journey on Pursuing Self-Reliance in Semiconductor Industry

In the fast-evolving world of technology, semiconductors have emerged as a critical strategic asset, driving intense competition between global powerhouses. At the heart of this escalating US-China technology rivalry lies the semiconductor value chain, which involves key players such as the United States, Taiwan, South Korea, Japan, Europe, and increasingly, China.

China's heavy reliance on US-origin semiconductor technologies has put it in a vulnerable position, with the US government leveraging its export control regime to curb technological advancements of Chinese companies. This has been especially effective due to strong interdependencies and divisions of labor within the semiconductor value chain.

To reduce its dependence on foreign technology, particularly from the US, China has set ambitious goals to achieve self-reliance in the semiconductor sector. As the world's largest importer of semiconductors, surpassing even crude oil imports, China has recognized the significance of technological independence for its economic and national security interests.

The US government's widening application of export control measures has only strengthened China's resolve to bolster its domestic semiconductor industry. In response to these challenges, China has made substantial investments over the past few decades to strengthen its own semiconductor capabilities.

Amidst this high-stakes geopolitical landscape, both countries view control over semiconductors as a critical factor in shaping technological dominance. The semiconductor industry's importance reaches far beyond economic considerations, extending its influence to various aspects of technology and national security.

As China strives to achieve self-reliance in semiconductors, tensions continue to rise in the global technological arena, making it a pivotal point in the US-China technology rivalry.

Appendix – Industry dynamics of Polysilicon Manufacturing

The polysilicon industry faces significant barriers to entry, making it a challenging sector to penetrate. Key factors contributing to these barriers include high capital requirements for plant construction, access to affordable energy for the energy-intensive purification process, and long lead times to add capacity. Companies seeking to establish themselves in this industry must invest substantial amounts, ranging from \$500 million to \$1 billion, in building plants and ensuring a stable energy supply. For instance, companies like Wacker Chemie utilize hydro power and co-generation units to secure cheap energy for their operations, adding a cost advantage.

The purification process alone, a crucial step in polysilicon processing, demands approximately 85% of the energy input for the entire module production. This underscores the significance of affordable energy sources in maintaining competitive operations. Additionally, fully integrated chemical plants benefit from synergies that yield cost advantages over pure-play silicon producers. However, trade barriers, such as import duties on poly-silicon from the U.S. into China, have hindered the expansion of silicon production in the United States.

Upstream in the supply chain, polysilicon producers rely on non-differentiated supply prices set by the market. The input material, metallurgical grade silicon, with approximately 98.5% purity, is a traded commodity on international exchanges like the London Metals Exchange. Costs for metallurgical grade silicon have fluctuated, reaching \$1,700 per ton in 2009, down from \$2,500 per ton in 2008. Suppliers of this material generally do not engage in forward integration into polysilicon production.

Downstream, the polysilicon market operates under an oligopoly structure. Approximately 90% of the market is governed by fixed supply agreements, typically lasting 6 to 10 years. To secure these contracts, buyers are often required to make pre-payments, which can pose challenges for less well-capitalized companies. As a means to fulfill payment obligations, some companies have resorted to selling equity or entering into strategic partnerships. For example, DC Chemicals acquired 15% of Evergreen Solar stock in exchange for 1GW of polysilicon, while MEMC received a 4.9% share in SunTech through a warrant agreement.

Despite these challenges, the threat of substitution for polysilicon remains relatively low. The only alternative comes in the form of thin-film technologies. However, thin-film technologies typically exhibit lower module efficiencies, making them less suitable, especially in scenarios where space is limited. Moreover, switching from crystalline-based polysilicon manufacturing processes to thin-film methods incurs very high costs due to the significant differences in production techniques. As a result, high purity polysilicon continues to be irreplaceable in the electronics market.

Appendix – China’s Dominant Presence in Polysilicon Manufacturing

80%

of the current global polysilicon capacity and virtually all of the projects under construction or planned is accounted by China

Source:Bloomberg

95%

global polysilicon, ingot, and wafer production is anticipated to be produced by China based on Manufacturing Capacity under construction

Source: International Energy Agency

7

Out of top 10 companies producing Polysilicon are from China, including all the top 3

Source: Bloomberg

Policies

Industrial policies heavily investing into Polysilicon as it is the supply chain of Solar power.

Tax break and subsidies have been issued to Polysilicon manufacturing incubators.

Export restrictions encouraging local self-sufficiency.

60%

Increase in Solar Power generating capacity for China in 2022

Source: Mizuho Securities

63.4%

YoY increase in demand to install solar power equipment

Source: Mizuho Securities

2025

Renewable energy power output exceed coal-fired power production

Source: Mizuho Securities

Support

From The National Development and Reform Commission to promote construction of wind,solar, Hydropower and nuclear power stations, with pledge to encourage use of green energy.

Source: Mizuho Securities

Appendix – Daqo’s Share Price Trend



Anticipated Breakout

- Low trading volume and low price volatility imply neutral/speculative view on 688303.SS
- Earnings report to be announced on 04 Aug 23
- In technical analysis, a “pennant” has formed and trend is predicted to break either side upon convergence

Source: TradingView

Appendix – Daqo's Products

参数 (Parameter)	数值 (Value)	单位 (Unit)	参数 (Parameter)	数值 (Value)	单位 (Unit)
材料类型 (Material type)	多晶/铸造法 (Multi-crystalline Silicon/Casting)		材料类型 (Material type)	单晶 (CZ Mono-crystalline Silicon)	
外型 (Geometry)	方型 (Square wafer)		外型 (Geometry)	准方型 (Pseudo square wafer)	
导电类型 (Conductivity type)	P型 (P-type)		晶圆方向 (Wafer orientation)	(1-0-0) ±2	Degree
边长 (Dimension)	156 x 156 ±0.5	mm	导电类型 (Conductivity type)	P型 (P-type)	
倒角 (Corner)	2.0 ±0.5	mm	直径 (Diameter)	150±0.5, 165±0.5	mm
掺杂物 (Dopant)	B		尺寸 (Dimension)	125 x 125±0.5	mm
电阻率 (Resistivity)	0.5 – 3.0	Ω·cm	掺杂物 (Dopant)	B	
氧含量 (Oxygen content)	≤8E ¹⁷	atom/cm ³	电阻率 (Resistivity)	0.5 – 3.0	Ω·cm
碳含量 (Carbon content)	≤ 9E ¹⁷	atom/cm ³	氧含量 (Oxygen content)	≤ 1E ¹⁸	atom/cm ³
少子寿命 (Lifetime)	≥2	μs	碳含量 (Carbon content)	≤ 5E ¹⁶	atom/cm ³
方正度 (Square angle)	90±0.5	degree	少子寿命 (Lifetime)	≥10	μs
厚度 (Thickness)	200±20	μm	方正度 (Square angle)	90±0.5	degree
厚度变化 (TTV)	≤30	μm	厚度 (Thickness)	200±20	μm
弯曲度 (Bow/Warp)	≤75	μm	厚度变化 (TTV)	≤ 25	μm
表面 (Surface)	线切, 表面洁净 (As-cut, cleaned)		弯曲度 (Bow/Warp)	≤ 50	μm
表面损伤 (Surface damage)	切痕 (Saw mark) ≤ 15	μm	表面 (Surface)	线切, 表面洁净 (As-cut, cleaned)	
表面质量 (Surface quality)	不允许有裂纹, 明显刀痕, 手感不明显, 无沾污和异常斑点 (No crack, no obvious saw mark, no obvious tactility, no abnormal spot, no stain)		表面损伤 (Surface damage)	切痕 (Saw mark) ≤ 15	μm
晶界走向 (Grain boundary direction)	晶界走向与硅片表面垂直 (Vertical to wafer surface)		表面质量 (Surface quality)	不允许有裂纹, 明显刀痕, 手感不明显, 无沾污和异常斑点 (No crack, no obvious saw mark, no obvious tactility, no abnormal spot, no stain)	
边缘缺陷 (Edge defect)	深度<0.5mm, 无尖锐边缘 (Depth≤0.5mm, total length≤2.0mm, ≤2/w, no sharp edge)		边缘缺陷 (Edge defect)	切深≤0.5mm, 无尖锐边缘 (Depth≤0.5mm, total length≤2.0mm, ≤2/w, no sharp edge)	

Description

Medium to extra large solar-grade polysilicon chunks made from dedicated Siemens reactor runs. Breaking into chunks and packaging are performed in clean room environment and care is taken to minimize introduction of surface contamination during the breaking/packaging processes.

Small amount of pop-corn surface is allowed.

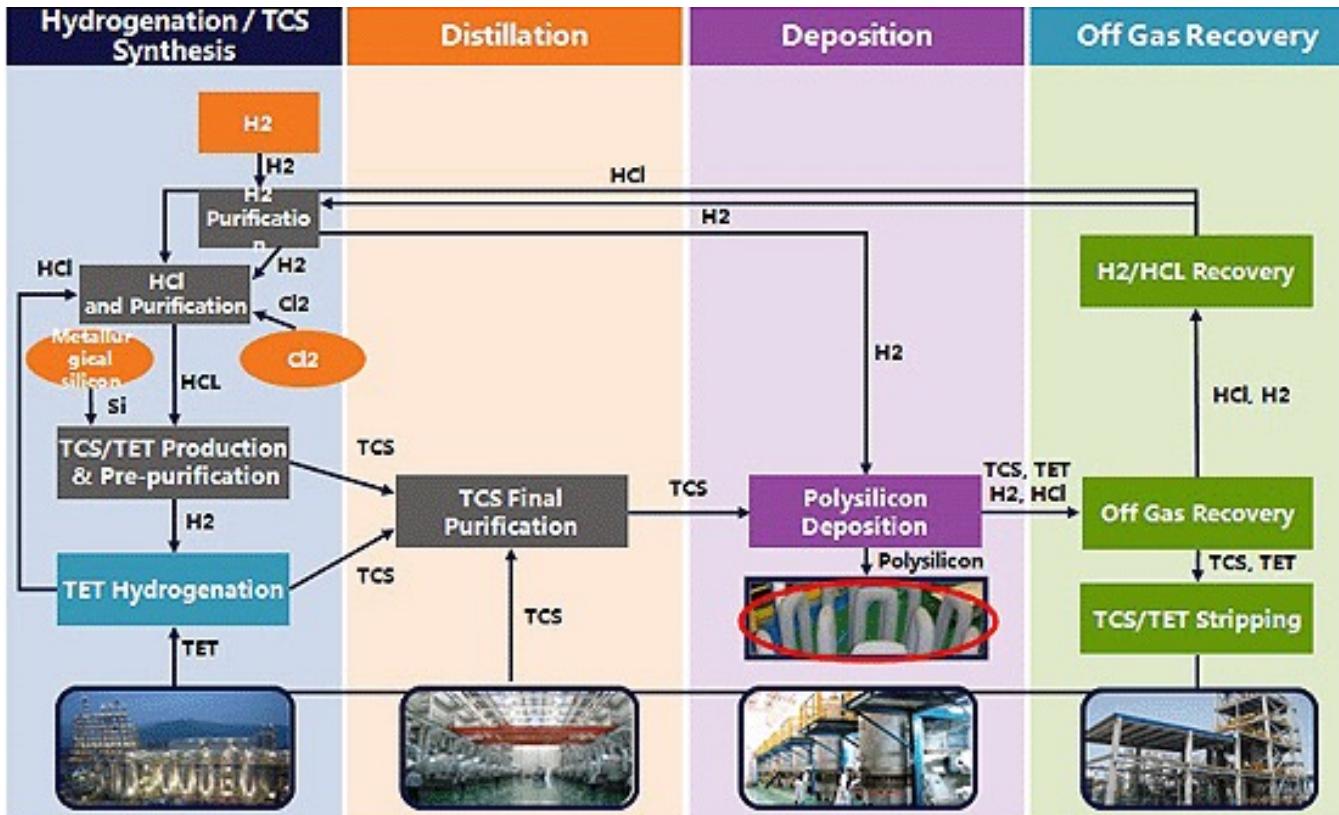
No carbon ends (graphite electrodes) are included.

Specification

Parameter	Super-grade	Ultra-grade	Standard Grade	Test
N-type, Resistivity (Ω·cm) Phosphorous (ppba)	≥100 ≤1.5	≥40 ≤3.76	≥20 ≤7.74	4-Pts LT-FTIR
P-type, Resistivity (Ω·cm) Boron (ppba)	≥500 ≤0.5	≥200 ≤1.3	≥100 ≤2.7	4-Pts LT-FTIR
Surface metals (ppbw)	<10	<50	<500	ICP-MS
Minority Lifetime s)	≥200	≥100	≥50	PCD

Source: Daqo's website

Appendix – Daqo’s Manufacturing Process



Technological Advantages

- Close-loop Modified Siemens Polysilicon Manufacturing Technology
- Fully automatic production line with self developed Distributed Control Systems
- High efficiency and low energy consumption CVD furnaces and STC hydrogenation furnaces
- Heat recycle system / Comprehensive waste treatment system
- Self-developed high voltage start-up system
- Advanced analysis lab / Comprehensive product quality traceability
- High efficient vent gas recovery system
- Experienced engineering team / intellectual properties and patents of innovations

Source: Daqo’s website