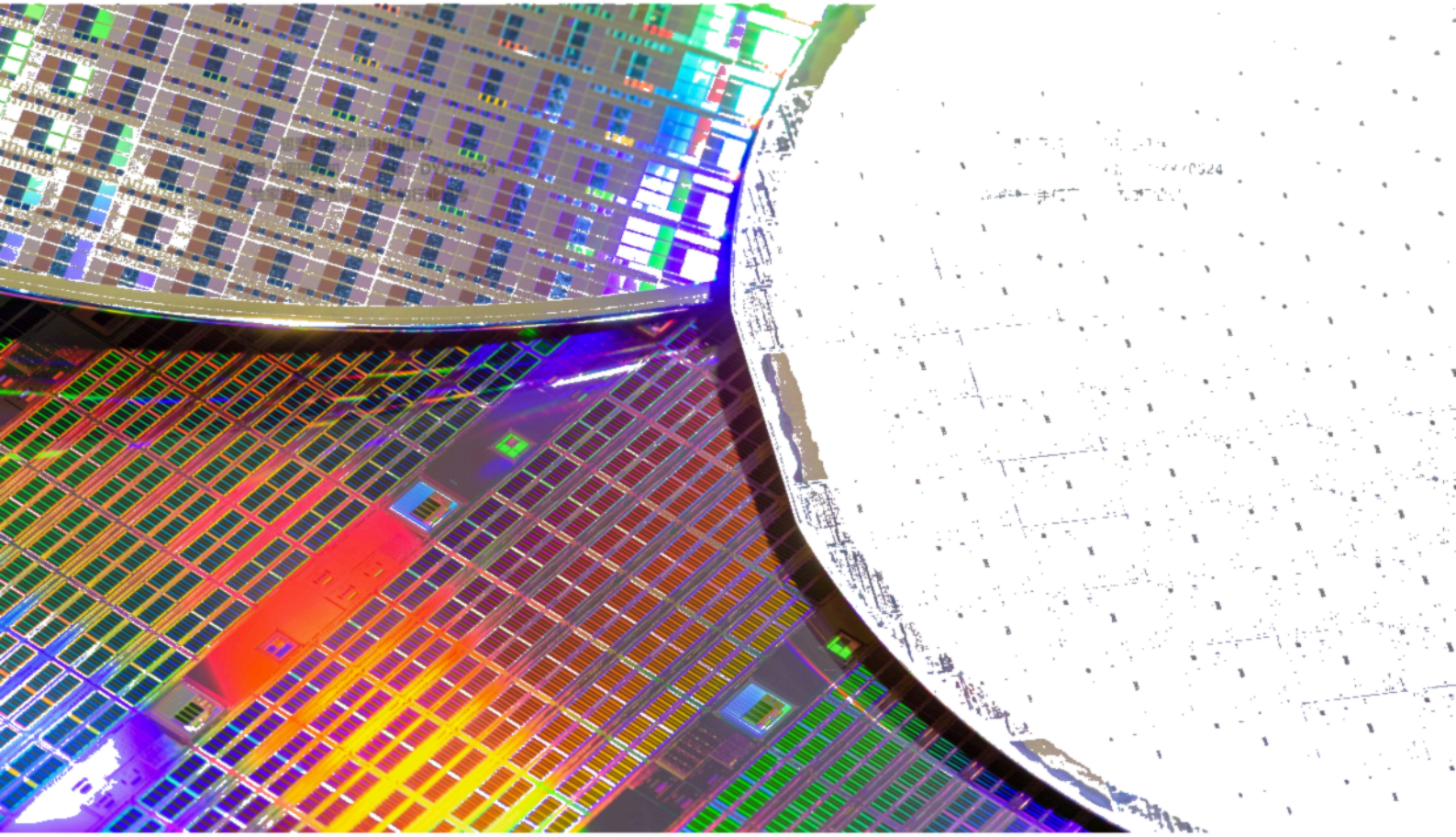
NOMURA
Connecting Markets East & West

ANCHOR REPORT

Global Markets Research

3 November 2026



Global InP market – secular AI networking demand growth

Initiate AXT at Buy: A prominent compound semi material player

We expect the global indium phosphide (InP) substrate market to enjoy favorable demand from the optical communication industry, driven by accelerated adoption of NPO, CPO and high-end transceivers. Despite concerns about oversupply (predominantly from newcomers in China), we believe the high-end InP market will continue to be dominated by three major companies: AXT (AXTI US, Buy), Sumitomo Electric (5802 JP, Buy), and JX Advanced Metal (5016 JP, Buy). We expect global datacom InP substrate supply (3-Inch equivalent) to clock a 70% CAGR over FY26-28F, and bake in a supply gap of 7% for FY28F in optical lasers, which we expect to record 79% CAGR in the same period. We initiate coverage of AXT – a dominant global manufacturer of compound semiconductor materials (InP, GaAs, Ge) – with a Buy rating and DCF-based TP of USD90, considering its strong position in the global AIDC market. Our estimates for AXT pencil in FY26-28F revenue/ earnings CAGRs of 105%/185%.

Key themes and analysis in this Anchor Report include:

- In-depth analysis of the demand-supply dynamics across the global optical communication supply chain, from InP substrates and Epi wafers (upstream), to optical chips (midstream) and optical devices (downstream).
- A deep-dive into the InP market's competitive landscape, technologies, and applications.
- Investment highlights, financial analysis, forecasts and valuation for AXT.

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See Appendix A-1 for analyst certification, important disclosures and the status of non-US analysts.

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Global Markets Research

3 November 2026

AXT INC AXTI.OQ AXTI US

EQUITY: TECHNOLOGY

A key beneficiary of global AI networking upcycle

Strong secular growth in InP/GaAs materials

Initiating coverage at Buy and a TP of USD90, implying 86.7% upside; InP/GaAs demand driven by optical transceivers, NPO and CPO

As one of the leading manufacturers of compound semiconductor materials globally, AXT should be a key beneficiary of the upcycle in the global optical AI networking market. The company is one of the top three global suppliers of InP substrates, which play crucial roles in the optical laser/chip supply chain. Owing to buoyant demand from high-end optical transceivers (i.e. 800G/1.6T), NPO (near-field packaged optics) and CPO (co-packaged optics), we expect AXT's InP substrate business to enjoy secular growth over the next three-five years, with a 134% revenue CAGR over FY26-28F, driven by strong ASP uptick (42% CAGR) and capacity growth (64% CAGR). We estimate 105%/185% revenue/ earnings CAGRs over FY26-28F. We initiate coverage of AXT at Buy with a DCF-based TP of USD90 (assuming a WACC of 14.8% and terminal growth rate of 2.0%), implying 44.6x FY27F EPS of USD2.02. The stock is trading at 23.9x FY27F EPS. Key downside ri sks are further tightening of export control measures, emergence of more qualified InP suppliers from China, and further delay of its subsidiary Tongmei's IPO.

InP substrate market dynamics: supply tightness likely to continue in 2027-28F, driven by buoyant optical communication demand, performance gap, export control

Despite concerns about potential InP oversupply from newcomers (mostly in China), we believe the performance and technology gap, as well as export control measures will limit the InP supply to the global AI market. Moreover, optical communication product demand will likely remain strong, with 800G/1.6T transceivers recording 43%/104% volume CAGRs over FY26-28F (*Fig. 7*), and NPO/CPO to add InP demand (*Fig. 8*). Although we estimate the global datacom InP substrate supply (3-Inch equivalent) to clock a 70% CAGR over FY26-28F, a 7% supply gap is likely in FY28F for the optical laser market, which should record a 79% CAGR over the same period (*Fig. 14*).

AXT likely to maintain its dominant position in InP substrates, despite ambitious plans from newcomers; GaAs/SiGe materials may become new growth drivers

Despite China's export control measures for InP, we think AXT's long-term contracts with global customers such as Lumentum (LITE US, Not rated) and Coherent (COHR US, Not rated), as well as domestic chip makers should help secure its leading market position. We also think that other compound semi materials (GaAs and Ge) could benefit from new opportunities such as VCSEL (vertical-cavity surface-emitting laser) and MiniLED.

Year-end 31 Dec	FY25		FY26F		FY27F		FY28F
Currency (USD)	Actual	Old	New	Old	New	Old	New
Revenue (mn)	88	0	222	0	479	0	932
Reported net profit (mn)	-21	0	40	0	132	0	322
Normalised net profit (mn)	-21	0	40	0	132	0	322
FD normalised EPS	-48.39c		72.45c		2.02		4.90
FD norm. EPS growth (%)	–		–		178.3		143.3
FD normalised P/E (x)	–	–	66.5	–	23.9	–	9.8
EV/EBITDA (x)	–	–	59.2	–	19.2	–	7.6
Price/book (x)	7.7	–	3.8	–	3.2	–	2.4
Dividend yield (%)	–	–	–	–	–	–	–
ROE (%)	-9.3		7.2		14.6		28.4
Net debt/equity (%)	net cash		net cash		net cash		net cash

Source: Company data, Nomura estimates

Rating Starts at	**Buy**
Target price Starts at	**USD 90.00**
Closing price 2 November 2026	**USD 48.20**
Implied upside	**+86.7%**
Market Cap (USD mn)	3,160.6
ADT (USD mn)	680.9

Relative performance chart



Source: LSEG, Nomura

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Key data on AXT INC

Performance

(%)	1M	3M	12M		
Absolute (USD)	-43.9	-20.2	506.3	M cap (USDmn)	3,160.6
Absolute (USD)	-43.9	-20.2	506.3	Free float (%)	95.6
Rel to CSI 300	-36.1	-7.8	519.7	3-mth ADT (USDmn)	680.9

Income statement (USDmn)

Year-end 31 Dec	FY24	FY25	FY26F	FY27F	FY28F
Revenue	99	88	222	479	932
Cost of goods sold	-76	-77	-126	-249	-447
Gross profit	24	11	95	230	485
SG&A	-39	-33	-57	-96	-155
Employee share expense					
Operating profit	-15	-22	39	134	330
EBITDA	-6	-15	45	140	338
Depreciation	-9	-7	-7	-6	-8
Amortisation	0	0	0	0	0
EBIT	-15	-22	39	134	330
Net interest expense	-1	-1	-3	-7	-13
Associates & JCEs	3	1	0	0	0
Other income	2	1	2	5	10
Earnings before tax	-11	-22	38	132	326
Income tax	-1	-2	-3	-10	-25
Net profit after tax	-12	-23	35	122	301
Minority interests	0	2	5	11	20
Other items					
Preferred dividends	0	0	0	0	0
Normalised NPAT	-12	-21	40	132	322
Extraordinary items					
Reported NPAT	-12	-21	40	132	322
Dividends	0	0	0	0	0
Transfer to reserves	-12	-21	40	132	322
Valuations and ratios					
Reported P/E (x)	–	–	66.5	23.9	9.8
Normalised P/E (x)	-178.9	-99.6	66.5	23.9	9.8
FD normalised P/E (x)	–	–	66.5	23.9	9.8
Dividend yield (%)	–	–	–	–	–
Price/cashflow (x)	–	–	–	143.1	19.2
Price/book (x)	10.8	7.7	3.8	3.2	2.4
EV/EBITDA (x)	–	–	59.2	19.2	7.6
EV/EBIT (x)	–	–	69.4	20.1	7.8
Gross margin (%)	24.0	12.7	43.0	48.0	52.0
EBITDA margin (%)	-5.9	-16.4	20.4	29.2	36.3
EBIT margin (%)	-14.9	-24.9	17.4	27.9	35.4
Net margin (%)	-11.7	-24.1	17.9	27.6	34.5
Effective tax rate (%)	–	–	7.7	7.7	7.7
Dividend payout (%)	–	–	0.0	0.0	0.0
ROE (%)	-0.2	-9.3	7.2	14.6	28.4
ROA (pretax %)	0.0	-6.7	10.9	28.0	47.3
Growth (%)					
Revenue	11.4	-11.1	150.9	116.2	94.5
EBITDA	–	–	–	210.2	141.4
Normalised EPS	–	–	–	178.3	143.3
Normalised FDEPS	–	–	–	178.3	143.3

Source: Company data, Nomura estimates

Cashflow statement (USDmn)

Year-end 31 Dec	FY24	FY25	FY26F	FY27F	FY28F
EBITDA	-6	-15	45	140	338
Change in working capital	-12	10	-61	-120	-169
Other operating cashflow	-2	-8	4	2	-5
Cashflow from operations	-20	-13	-11	22	164
Capital expenditure	-6	-6	-15	-33	-63
Free cashflow	-25	-19	-27	-10	101
Reduction in investments					
Net acquisitions	2	0	0	0	0
Dec in other LT assets					
Inc in other LT liabilities					
Adjustments	-1	-1	0	0	0
CF after investing acts	-24	-20	-27	-10	101
Cash dividends					
Equity issue	55	154	581	59	59
Debt issue	6	3	0	0	0
Convertible debt issue	0	0	0	0	0
Others	-64	-40	-62	-59	-59
CF from financial acts	-3	117	519	0	0
Net cashflow	-27	97	493	-10	101
Beginning cash	50	23	120	613	602
Ending cash	23	120	613	602	703
Ending net debt	24	-56	-552	-542	-643

Balance sheet (USDmn)

As at 31 Dec	FY24	FY25	FY26F	FY27F	FY28F
Cash & equivalents	23	120	613	602	703
Marketable securities	0	0	0	0	0
Accounts receivable	26	27	60	116	200
Inventories	85	82	119	208	337
Other current assets	25	18	18	18	18
Total current assets	158	247	810	944	1,258
LT investments	0	0	0	0	0
Fixed assets	160	162	170	196	252
Goodwill	0	0	0	0	0
Other intangible assets	0	0	0	0	0
Other LT assets	21	25	25	25	25
Total assets	339	434	1,005	1,166	1,535
Short-term debt	47	63	63	63	63
Accounts payable	15	15	15	15	15
Other current liabilities	12	13	22	48	92
Total current liabilities	74	91	100	125	169
Long-term debt	2	1	-2	-2	-2
Convertible debt	0	0	0	0	0
Other LT liabilities	8	7	7	7	7
Total liabilities	84	99	105	130	174
Minority interest	62	61	61	61	61
Preferred stock	4	4	4	4	4
Common stock	242	340	866	869	872
Retained earnings	-44	-65	-25	107	429
Proposed dividends					
Other equity and reserves	-9	-5	-5	-5	-5
Total shareholders' equity	193	273	839	974	1,299
Total equity & liabilities	339	434	1,005	1,166	1,535
Liquidity (x)					
Current ratio	2.13	2.72	8.09	7.54	7.43
Interest cover	-11.0	-17.5	12.2	19.6	24.9
Leverage					
Net debt/EBITDA (x)	–	–	net cash	net cash	net cash
Net debt/equity (%)	12.7	net cash	net cash	net cash	net cash
Per share					
Reported EPS (USD)	-26.94c	-48.39c	72.45c	2.02	4.90
Norm EPS (USD)	-26.94c	-48.39c	72.45c	2.02	4.90
FD norm EPS (USD)	-26.94c	-48.39c	72.45c	2.02	4.90
BVPS (USD)	4.47	6.22	12.79	14.86	19.81
DPS (USD)	0.00	0.00	0.00	0.00	0.00
Activity (days)					
Days receivable	74.5	108.5	71.3	67.0	62.1
Days inventory	444.0	394.7	290.4	239.8	222.8
Days payable	39.9	69.5	42.8	21.7	12.1
Cash cycle	478.6	433.7	318.9	285.1	272.9

Source: Company data, Nomura estimates

Company profile

AXT is a global semiconductor material company that develops and manufactures specialty semiconductor substrates, including InP, GaAs, and Ge substrates. Its products support applications in optical communications, data centers, 5G, LEDs, lasers, and advanced sensing, with manufacturing primarily based in China and customers worldwide.

Valuation Methodology

Our target price of USD90.00 is based on a DCF valuation model. We assume a WACC of 14.8% and terminal growth rate of 2.0%. Cash flows are discounted back to end-2026F. Our TP implies 44.6x 2027F P/E ratio. The benchmark index is NASDAQ.

Risks that may impede the achievement of the target price

Downside risks include: 1) delays or denials in obtaining export licences for gallium and germanium products from China; 2) potential failure or further delays of its subsidiary Tongmei's IPO; 3) intensifying competition in the InP market which may lead to pricing pressure and margin compression.

ESG

AXT has been focusing on responsible manufacturing, pollution prevention, waste minimization, energy and greenhouse-gas reduction, and water recycling across its global operations. The company also emphasizes ethical business practices, responsible supply-chain management, employee safety, and strong corporate governance.

InP substrates: the key materials for optical communication supply chain

Indium phosphide (InP) is a III-V compound semiconductor material composed of indium and phosphorus. Its physical properties perfectly match the requirements of low loss and high-frequency communication for telecom and AI data centers, making the InP substrate the core material for optical chips. The preparation of InP substrates is divided into four main stages: high-purity raw material preparation, InP polycrystalline synthesis, single crystal growth, and wafer precision processing (polishing substrate finished products, *Fig. 1*).

Stage one: Purification of high-purity raw materials. InP substrate is an artificially synthesized compound, and the purity of the raw materials (indium and phosphorus) directly determines the substrate quality, such as dislocations and leakage levels. High-purity indium is refined to 6N~7N (99.9999%~99.99999%) through industrial crude indium electrolytic refining and zone melting process. The industrial red phosphorus is distilled at high temperature through gas phase distillation of metal impurities to obtain 6N~7N grade high-purity phosphorus.

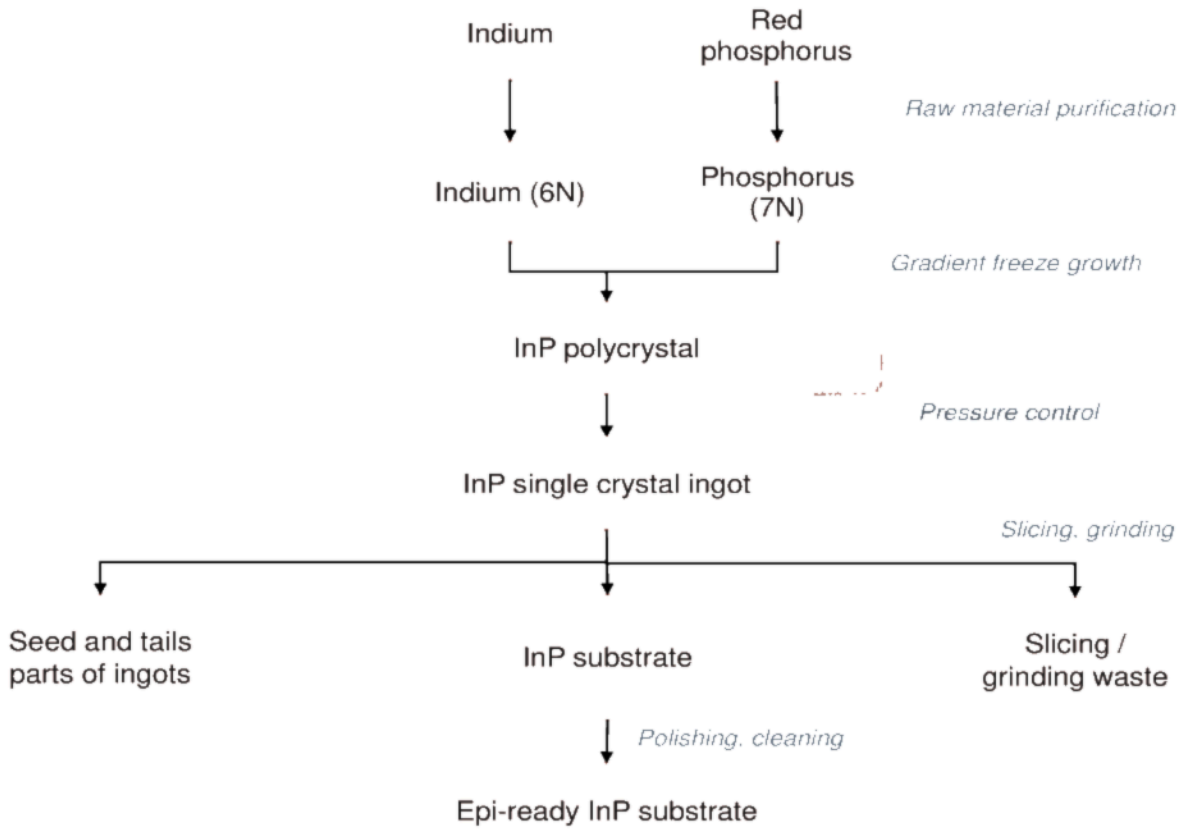
Stage two: Polycrystalline synthesis. The high-purity indium and high-purity red phosphorus are placed in a vacuum-sealed quartz tube, and then heated to trigger a chemical reaction to synthesise polycrystalline InP materials. The main equipment in this step is the high-pressure polycrystalline synthesis furnace, which is used as a reactor for high-purity indium and red phosphorus under high temperature, high pressure, and sealed conditions to produce InP polycrystalline.

Stage three: InP single crystal growth. This is the core process for InP substrate preparation and has the higher technology barrier in the four stages. The polycrystalline material is placed into a single crystal furnace and drawn into cylindrical single crystal rods. The main equipment for this step is the single crystal furnace, and key InP substrate makers use the in-house developed technologies, such as LEC/VGF/VB, to differentiate themselves from competitors, based on their multi-year industry experience and know-how.

Stage four: Finished product processing. After crystal growth, cutting, edge grinding, grinding, polishing, and cleaning are performed to obtain the final InP substrate product. Equipment used at this stage include wire sawing machines, edge grinding chamfering machines, single/double-sided grinding machines, thinning machines, chemical mechanical polishing machines, and ultrasonic cleaning machines.

The InP substrate makers will sell the end products to Epi wafer makers or optical chip makers (which make Epi wafer in-house) for the Epitaxial growth and optical chip making process.

Fig. 1: InP substrate production process



Source: Nomura research

Fig. 2: Key equipment used in InP substrate fabrication

Stage	Equipment	Purpose
High-purity raw material purification	Vacuum distillation purification furnace	Separates impurities in indium by vapor pressure difference
	Zone refining furnace	Repeated zone refining to upgrade 6N indium to 7N
	High-temperature heating system	Provides controlled high temperature
	High-purity phosphorus purification equipment	Distills/sublimes red phosphorus
InP polycrystal synthesis	High-pressure synthesis furnace	Sealed high-temperature/high-pressure reaction of In and P to form InP polycrystal
	Quartz reaction tube/boat	Holds high-purity indium and red phosphorus
	Dual/multi-zone heating system	Independently controls indium zone and phosphorus zone
InP single-crystal growth	High-pressure single-crystal furnace	Provides high-pressure Nitrogen environment to prevent P escape
	pBN crucible	Holds melt and encapsulant, prevents reaction
	VGF temperature-field control device	Establishes axial gradient for directional solidification
InP substrate processing	Wire sawing machine	Slices single-crystal ingot into thin wafers
	Automatic edge grinder	Edge chamfering to prevent chipping
	Double-sided lapping machine	Removes damage layer, improves flatness
	Chemical mechanical polishing (CMP) machine	Chemical-mechanical synergy for mirror surface
	Rough/fine polisher	Stepwise damage removal and atomic-level planarization
	Thinning machines	Used for precise thickness adjustment
	Ultrasonic cleaning equipment	Remove micro-particles and chemical contamination from polishing and processing residues
	Surface inspection equipment	Inspects morphology, flatness, and crystal quality

Source: Nomura research

Comparison of different technologies for single crystal growth

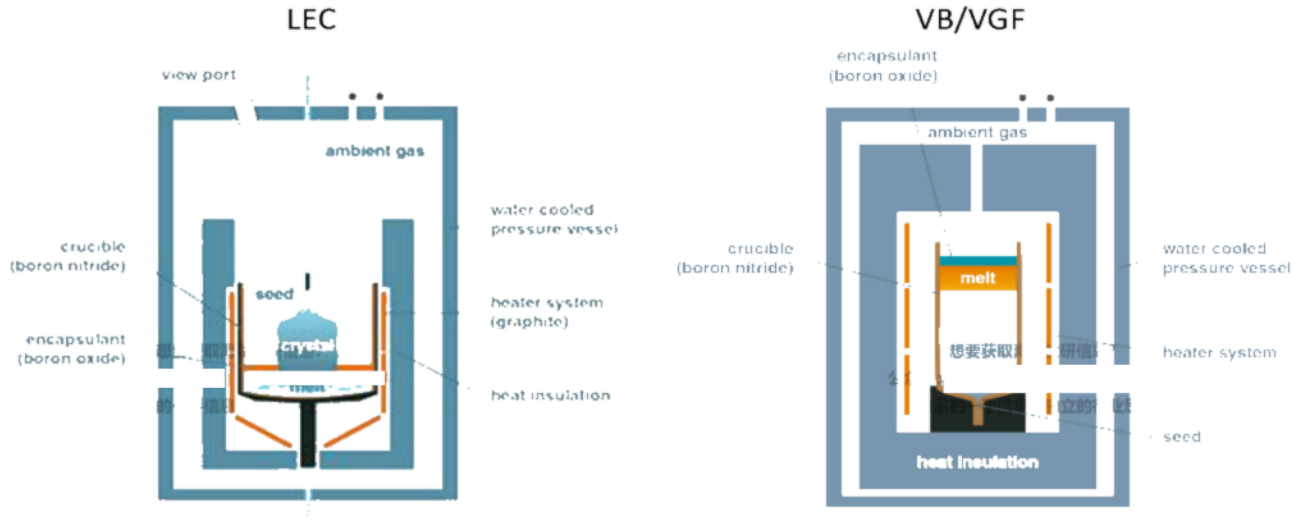
Single crystal growth technologies for making InP substrates include the Vertical Bridgman (VB), Vertical Gradient Freezing (VGF), and Liquid Encapsulation Czochralski (LEC). The core technical barriers in InP substrate fabrication include crystal defect control (measured by Etch Pit Density [EPD]), uniformity control, and surface quality treatment, which varies across the three different technologies. VGF achieves directional solidification by precisely controlling the temperature gradient, resulting in fewer defects and higher yields; LEC can grow larger diameter crystals but has lower thermal conductivity and greater difficulty in temperature control. The VB method is an optimized solution (vs VGF) designed by Sumitomo Electric (5802 JP, Buy, covered by Yuji Matsumoto), offering good electrical performance uniformity, low defect density, and higher yields than VGF/LEC. However, the fixed investment cost of the VB method is usually higher than VGF, as the purchase price of one VB single-crystal furnace is higher than that of VGF, due to more complicated structure of the furnace, and the operating costs are also higher.

Fig. 3: Production capacity plans for key InP substrate players

Company	Expansion project / investment plan	Capacity target
Sumitomo Electric	Early July 2026, Nikkei reported Sumitomo Electric planned to invest about JPY 18 billion to upgrade existing equipment at the Hyogo Prefecture site (no new standalone plant), to supply high-speed optical components for AI data centers.	November 2025 plan: InP capacity to 2.4x FY2023. After the additional investment announced in July 16: InP substrate capacity to 3.1x FY2024 before FY2028.
JX Metals	16 June 2026 company announcement: up to JPY 120 billion over the next four years.	InP substrate capacity up 7–10x.
Coherent	Direct funding of up to USD 50 million under the CHIPS and Science Act, for expansion of the 6-inch InP semiconductor plant in Sherman, Texas.	Expansion of the existing world-leading 6-inch InP fab. No numeric capacity multiple is stated.
AXT (Beijing Tongmei)	2 July 2026 SEC filing: Beijing Tongmei signed a three-year 6-inch InP substrate development and supply agreement with Coherent, effective 25 June. Coherent prepaid USD 22.2885 million to secure supply. AXT will expand the Beijing plant over 2026–2028 to meet that commitment. 20 April 2026 follow-on offering, initially about USD 550 million and about USD 632.5 million after the full greenshoe, mainly for Tongmei InP substrate capacity and R&D.	6-inch InP substrate supply to Coherent; Beijing capacity expansion over 2026–2028. No absolute wafer count is stated.
Yunnan Germanium	Company disclosure: current InP wafer capacity 150,000 wafers/year (2–4 inch); 2025 output 100,100 wafers (2–4 inch); 2026 production plan 180,000 wafers (2–6 inch, mainly 3–4 inch). 3 April 2026: subsidiary Yunnan Xinyao to invest CNY189 million in a high-quality InP single-crystal wafer project, leasing and retrofitting space in the existing site. Construction period 18 months.	New capacity 300,000 wafers/year (4-inch equivalent, including 6,000 six-inch wafers). Total capacity 450,000 wafers/year (4-inch equivalent).
XianDao Microelectronics (Guangdong XianDao)	High-end compound-semiconductor substrate line. total investment CNY2 billion, investment filing completed in Quzhou, Zhejiang. Construction August 2026–August 2029. Fixed-asset investment CNY1.7 billion. Core equipment for crystal growth, precision polishing and defect inspection. Focus on 4–6 inch GaAs and InP single-crystal substrates.	3 million GaAs substrates/year and 3 million InP substrates/year after completion.

Source: Company data. Nomura research

Fig. 4: Crystal growth method: LEC vs VB/VGF

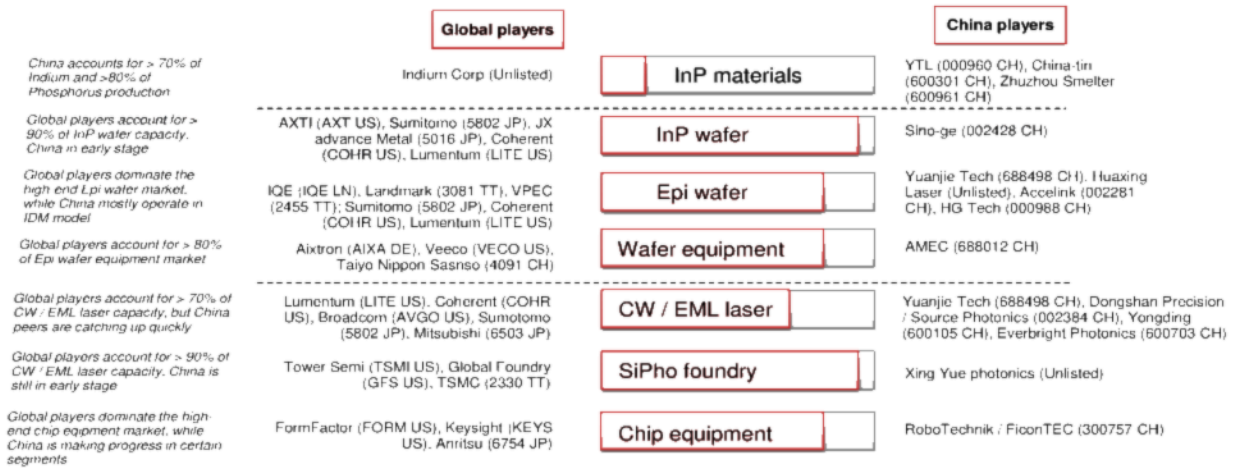


Source: Freiberger, Nomura research

From InP substrate to optical chip supply chain: China vs overseas competitive landscape

In the optical chip supply chain, China owns more than 70% of Indium and 80% of phosphorus materials, based on our estimates, while high content value sectors, such as high-end InP/Epi wafers and laser chips, are still dominated by overseas players, in our view. We think the export licensing mechanism in China could create bottlenecks for supply of InP wafers in the global market, and may bring domestic substitution opportunities for Chinese InP wafer and laser chip players.

Fig. 5: Global optical laser chip ecosystem and competitive landscape



Source: Nomura research

For high-purity indium and phosphorus materials, there are few manufacturers capable of making 7N-level high-purity red phosphorus. Nippon Chemical Industrial (4092 JP, Not rated) is the global leader in terms of electronics-grade red phosphorus, according t oYH Research , followed by RASA Industries (4022 JP, Not rated). In 2026, Japanese companies have tightened their quotas for 7N high-purity red phosphorus to China, resulting in more supply bottlenecks. China manufacturers such as Xingfa Group (600141 CH, Not rated), Guangdong Xiandao (unlisted), and Tuocai Technology (unlisted), have been working on 6N/7N red phosphorus now, but currently they only have limited production capacity.

Global indium supply is highly concentrated, with China holding the world's largest share of indium resources. In 2025, China accounted for 69.1% of the global indium production with 760 tons of output. In terms of capacity, China has an annual capacity of 1,100 tons, accounting for 64.7% of the global total capacity of 1,700 tons. The price of refined indium (≥ 99.99%) in China rose from about an average price of CNY1,950/kg in the beginning of 2024 to CNY5,250/kg as of 8 October 2026, a cumulative increase of about 170%, according to China Nonferrous Metals Network.

Fig. 6: Global indium production and capacity (unit: tons)

Unit: ton	Refinery production		Refinery capacity
	2024	2025	2025
United States	-	-	-
Belgium	19	19	50
Canada	40	40	70
China	760	760	1100
France	21	21	70
Japan	65	65	70
Korea	180	180	310
Russia	5	5	15
Uzbekistan	1	1	NA
Total	**1,090**	**1,100**	**1,700**

Source: USGS. Nomura research

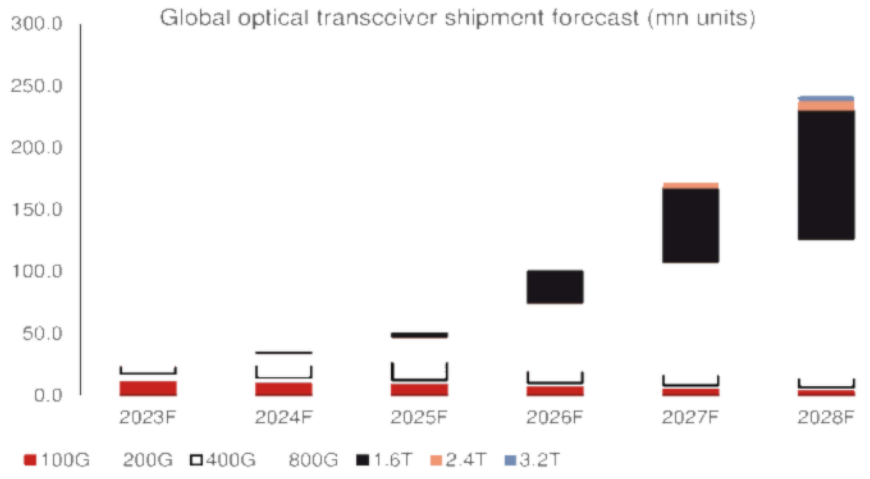
InP substrate and Epi wafer supply-demand outlook – when do we think the oversupply could happen?

InP substrate is one of the key bottlenecks in today's optical communication market, owing to the strong demand uptick for 800G/1.6T transceivers/chips, in our view. Meanwhile, as the InP substrate market is largely dominated by a few suppliers, including Sumitomo Electric (5802 JP, Buy, covered by Yuji Matsumoto), JX Advanced Metals (5016 JP, Buy, covered by Daiki Ban) and AXT (AXTI US, Buy), their capacity expansion plans have not fully caught up with the demand uptick. We think optical communications will remain the key demand driver for InP substrates in the next couple of years, potentially representing 60%~70% of total InP substrate supply in 2026-30F, while telecom/industrial/consumer markets may have relatively stable demand for InP substrates.

InP substrate demand: primarily from 800G/1.6T transceivers in 2026-28F, and NPO/CPO demand might extend beyond 2028F

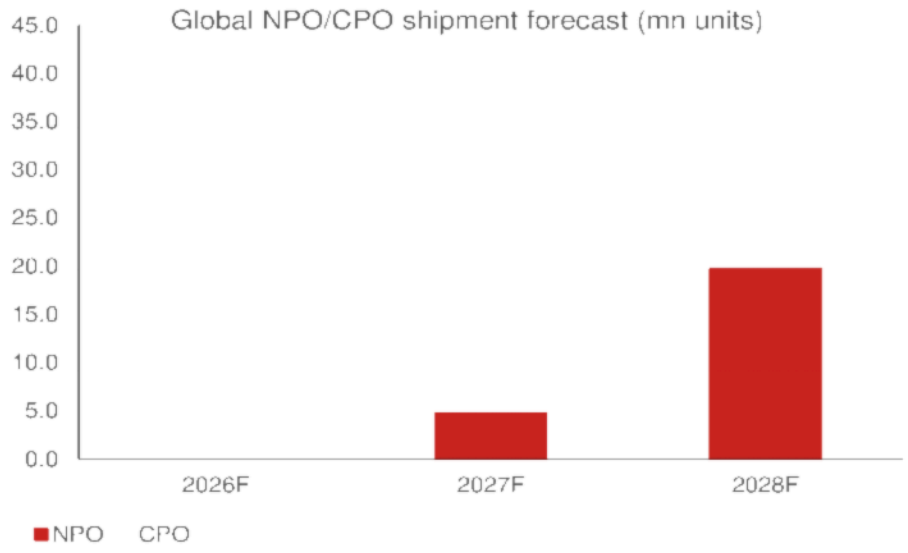
We estimate the **800G/1.6T optical transceiver shipments will grow from 55.0mn/25.1mn units in 2026F to 112.0mn/104.5mn units in 2028F**, which should be the key driver for InP substrates. Moreover, we think small volume shipments of higher-end transceivers, including 2.4T/3.2T transceivers, as well as NPO/CPO products, will start from 2027F, leading to increased consumption of high-end InP substrates and optical laser chips (i.e. 200G EML chips and Ultra high power CW lasers) beyond 2028F.

Fig. 7: Global optical transceiver shipment forecasts (mn units)



Source: Company data, Nomura estimates

Fig. 8: Global NPO/CPO shipment forecasts (mn units)

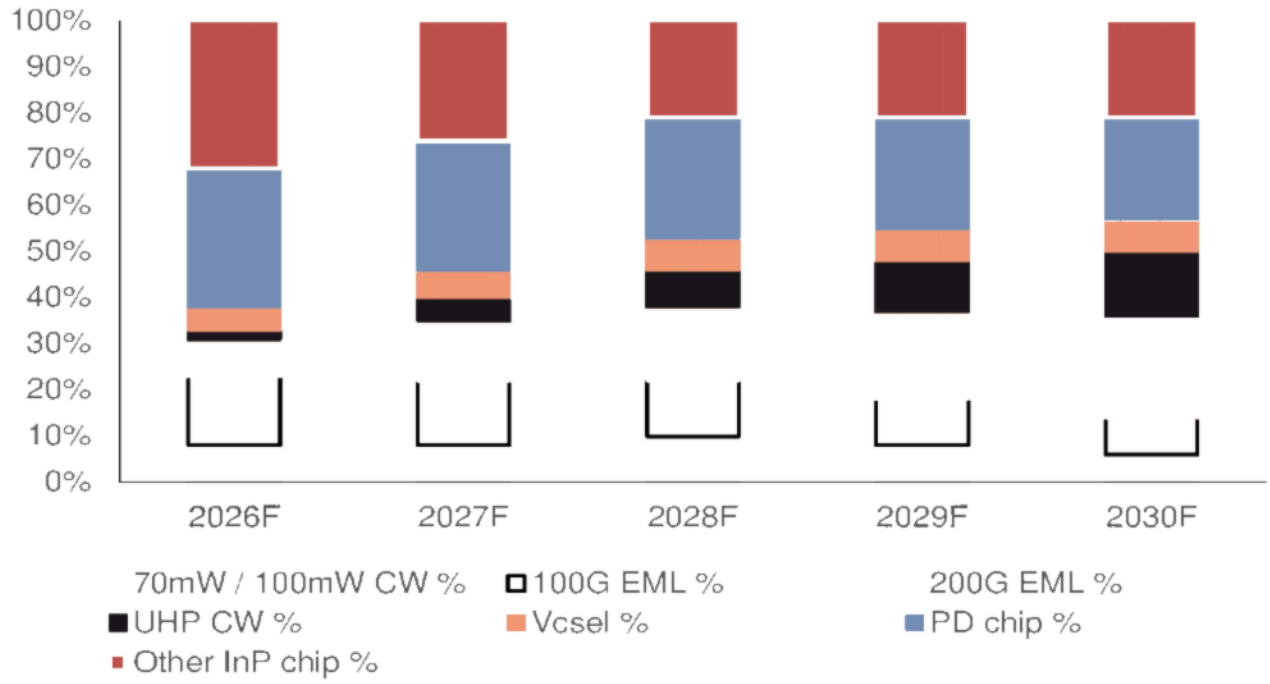


Source: Company data, Nomura estimates

InP substrate and Epi wafer supply: 70% CAGR in datacom InP supply

Based on our estimates, **the data center InP substrate supply should grow from 856k in 2026F to 2.49mn units in 2028F, clocking a 70% CAGR**. 70 and 100 mW CW/100G EML laser chips and PD (Photodiode) chips are the main application to consume InP substrates now, while ultra-high power (UHP) CW laser, 200G EML supply may increase in the future owning to high-end transceivers, and NPO / CPO applications, in our view.

Fig. 9: InP substrate supply for optical laser market by chip type



Source: Nomura estimates

Meanwhile, Epi wafer supply for datacom laser chips should increase from 599k in 2026F to 1.74mn units in 2028F, clocking a 70% CAGR. The high-end optical laser chip was largely dominated by global players, and we expect the production volume of InP chips **to grow from 1.39bn units in 2026F to 3.62bn units in 2028F, clocking a 61% CAGR**. Among the InP chips, LD (laser diode) chip supply may record stronger

growth momentum, **clocking an 85% CAGR over 2026F-28F**. Looking beyond 2028F, the accelerated adoption of higher-end optical chips for 3.2T+ transceivers, XPO, NPO and CPO products will continue to bode well for the demand of high-end InP substrates, in our view.

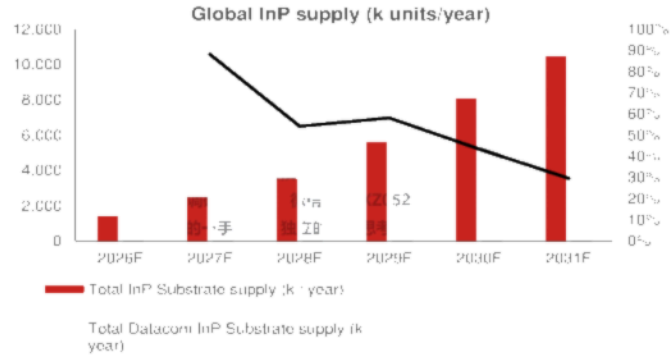
Fig. 10: Epi wafer supply dynamics

(mn units / year)	2026F	2027F	2028F	2029F	2030F	2031F
Assumption: Epi wafer split %						
70mW / 100mW CW %	8%	8%	10%	8%	6%	4%
100G EML %	15%	14%	12%	10%	8%	6%
200G EML %	8%	13%	16%	19%	22%	25%
UHP CW %	2%	5%	8%	11%	14%	17%
Vcsel %	5%	6%	7%	7%	7%	7%
PD chip %	30%	28%	26%	24%	22%	20%
Other InP chip %	32%	26%	21%	21%	21%	21%
Datacom Epi wafer split (k wafer)						
70mW / 100mW CW	48	90	174	220	237	205
100G EML	90	158	209	275	316	308
200G EML	48	147	278	523	870	1,283
UHP CW	12	56	139	303	554	872
Vcsel	30	68	122	193	277	359
PD chip	180	316	452	661	870	1,026
Other InP chip	192	293	365	578	830	1,077
Total	**599**	**1,128**	**1,740**	**2,753**	**3,954**	**5,130**
Laser chip split (mn units)						
70mW / 100mW CW	170	320	618	782	842	728
100G EML	196	344	455	600	689	670
200G EML	49	150	284	534	888	1,309
UHP CW	2	7	18	38	70	111
Vcsel	65	147	265	420	603	782
PD chip	391	688	985	1,439	1,894	2,234
Other InP chip	522	798	995	1,574	2,260	2,933
Total Inp chip supply	**1,394**	**2,454**	**3,619**	**5,386**	**7,246**	**8,767**
Total LD chip supply	***481***	***968***	***1,639***	***2,373***	***3,092***	***3,601***

Source: Nomura estimates

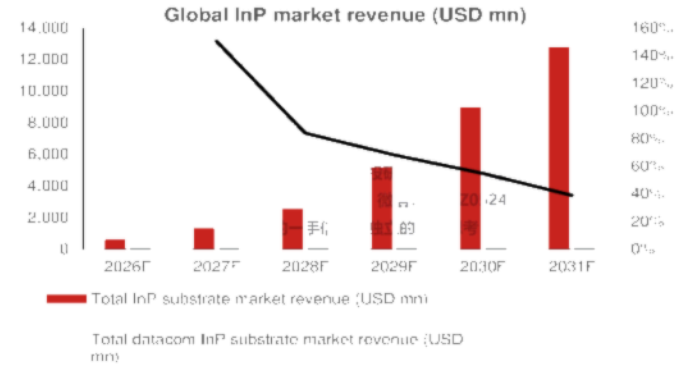
Other than optical communication chips, which may account for 60%~70% of total InP substrate supply in FY26-28F, sectors such as the telecom and datacom market will also consume InP substrate capacity. **We estimate the total global substrate supply (3 Inch equivalent) will increase from 1.4mn units in 2026F to 3.55mn units in 2028F**, and the market size will grow from USD599mn to USD2.5bn in the same period.

Fig. 11: Global InP supply (k units/year)



Source: Nomura estimates

Fig. 12: Global InP market revenue (USD mn)

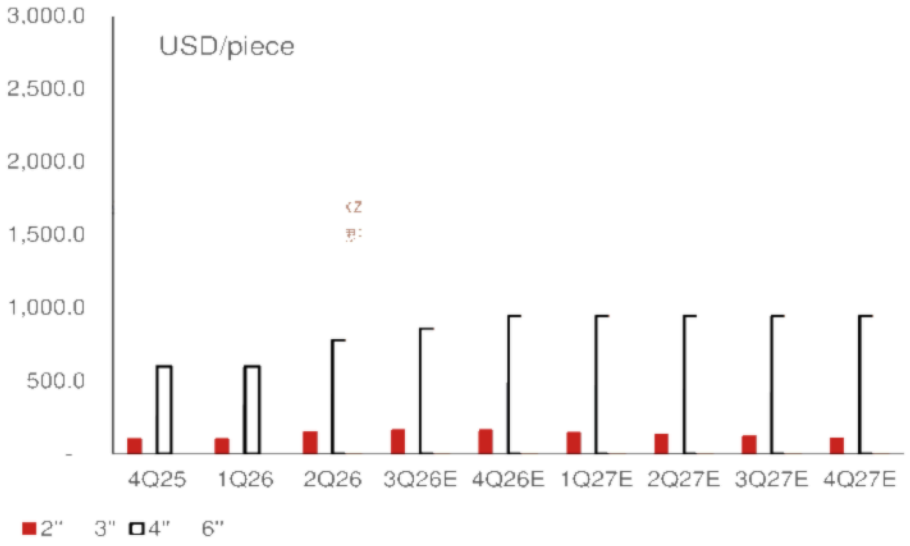


Source: Nomura estimates

China government included indium phosphide in its export control scope in February 2025 and designated indium ore as a strategic resource and imposed export restrictions in 2Q26, leading to tighter supply of InP substrate, and market price hike for higher-end (4-Inch above). We expect the average price of 2-inch InP substrates to increase to

~USD160 by 4Q26F, which might start to decline from 2027F; meanwhile, we expect the average price of 3-inch InP substrates to increase to ~USD480 by 4Q26F and gradually decrease from 2027F. We think the market demand is gradually moving from 2-3 inch to 4-6 inch; however, due to low yield rate and stronger demand, 4-Inch and 6-Inch substrates may enjoy stronger price premium, in our view.

Fig. 13: Global InP wafer price trend forecasts



Source: Company data. Nomura estimates

Estimating the demand-supply gap: still a small 7% supply gap in 2028F for optical laser chips, despite aggressive capacity expansion plans

Thanks to the buoyant demand from optical transceivers/NPO/CPO products in AIDC, **we estimate the optical chip shipments (for 800G+ transceivers/NPO/CPO) will grow from 480mn units in 2026F to 1,542mn units in 2028F**. However, we expect the supply gap to sustain over 2027-28F, largely constrained by InP substrate supply. We expect the **optical chip supply gap to narrow from 17% in 2026F to 7% in 2028F**, owing to: (1) the more aggressive expansion plans from top-tier InP suppliers, as well as second-tier (mostly in China) suppliers; (2) improved production efficiencies and yield rates with larger substrate size (from 2/3 inch to 4/6 inch); and (3) increasingly sufficient supply of raw materials and equipment.

Fig. 14: Optical laser chip shipment and demand forecasts

2025 shipment (mn units)	Lumentum	Broadcom	Mitsubishi	Sumitomo	Others	Total chip shipment by category	Transceiver units (mn)
100G EML	30	20	34	36	5	*125*	15.6
200G EML	6	4	2	0		*12*	1.5
Vcsel	6	4	4	6		*20*	2.5
CW laser	18	12	0	18	15	*63*	15.8
Total	**60**	**40**	**40**	**60**	**20**	***220***	*35.4*

2026 shipment (mn units)	Lumentum	Broadcom	Mitsubishi	Sumitomo	Others	Total chip shipment by category	Transceiver shipment (mn)	Transceiver demand (mn)	Chip demand by category (mn)	Chip supply gap%
100G EML	40	32	30	30	60	*192*	24	29	232	-17%
200G EML	20	8	12	10		*50*	6	11	90	-44%
Vcsel	10	24	18	10	5	*67*	8	8	67	0%
CW laser	30	16	0	50	75	*171*	43	48	191	-10%
Total	100	80	60	100	140	***480***	***81***	***96***	***580***	**-17%**

2027 shipment (mn units)	Lumentum	Broadcom	Mitsubishi	Sumitomo	Others	Total chip shipment by category	Transceiver units (mn)	Transceiver demand (mn)	Chip demand by category (mn)	Chip supply gap%
100G EML	60	43.2	43.2	54.0	120.0	*320*	40	46	368	-13%
200G EML	40	28.8	21.6	36.0	25.0	*151*	19	27	215	-30%
Vcsel	30	21.6	16.2	27.0	50.0	*145*	18	18	145	0%
CW laser	70	50.4	27.0	63.0	130.0	*340*	85	91	364	-7%
Total	200	144	108	180	325.0	***957***	**162**	**182**	**1,093**	**-12%**

2028 shipment (mn units)	Lumentum	Broadcom	Mitsubishi	Sumitomo	Others	Total chip shipment by category	Transceiver units (mn)	Transceiver demand (mn)	Chip demand by category (mn)	Chip supply gap%
100G EML	85	46	52	58	200	441	55	57	457	-4%
200G EML	102	46	43	29	51	271	34	38	303	-11%
Vcsel	68	46	35	29	80	257	32	32	257	0%
CW laser	85	92	43	173	180	573	143	158	633	-9%
Total	340	230	173	288	511	***1,542***	**264**	**285**	**1,650**	**-7%**

Source: Company data. Nomura estimates

InP substrate market competitive landscape

Prominent InP substrate manufacturers such as AXT, JX Metal and Sumitomo Electric have announced expansion plans for InP substrates in 2026, with the expected expansion cycle from 2026E to 2028E, or even beyond 2028E, owing to the company's positive views about the demand upside. Due to export control of raw materials (i.e. indium) or licence control of the InP substrate products, we think effective supply of InP substrate will not be as strong as the market fears. Currently, leading global InP substrates manufacturers are upgrading toward 4-inch and 6-inch platforms, while the new entrants (mostly domestic manufacturers) still mainly focus on 3-inch and below, as they still lag global peers in technology capability, as well as yield rate control for key steps such as single crystal processing. Meanwhile, domestic manufacturers still need to rely on imports for high-purity red phosphorus and high-purity indium, but the more stringent control of export quotas from Japan has resulted in tighter supply of high-purity red phosphorus and high-purity indium in the China market.

Currently, the InP substrate industry is dominated by Sumitomo Electric, AXT, JX Metal, and there are a few other smaller players in both China and overseas, including Freiberger (unlisted), InPACT (unlisted), Guangdong Xiandao (unlisted), and Yunnan Germanium (002428 CH, Not rated). We expect **AXT's InP substrate capacity to grow from ~400k in 2026F to ~2,000k in 2030F, and has 28%~31% global market share over 2026F-28F**. Meanwhile, we think China could represent a bigger portion in terms of the InP substrate market capacity, as Chinese manufacturers, such as Yunnan Germanium, Guangdong Xiandao and Zhuhai DT Wafer-tech (unlisted) could expand aggressively (*Fig. 3*) due to the buoyant demand from the optical transceiver market, and the well established optical communication supply chain in China. With the proactive capacity expansion of Chinese manufacturers, **we expect their share of global effective capacity to grow from 24% in 2026F to 31% by 2028F**. Looking beyond 2028F, we note that China InP suppliers' global market shares might be capped due to the de-coupling trend in the global AI market, as well as the export control measures announced.

Fig. 15: Global InP substrate supply breakdown

(k / year)	2026F	2027F	2028F	2029F	2030F	2031F
AXTI	406	782	1,095	1,533	1,993	2,391
Other global players	683	983	1,366	2,354	3,707	5,060
China new comers	337	713	1,090	1,733	2,370	3,019
Total InP substrate (3 Inch equivalent)	**1,426**	**2,478**	**3,551**	**5,619**	**8,069**	**10,470**
AXTI %	*28%*	*32%*	*31%*	*27%*	*25%*	*23%*
Other global players %	*48%*	*40%*	*38%*	*42%*	*46%*	*48%*
China new comers %	*24%*	*29%*	*31%*	*31%*	*29%*	*29%*

Source: Nomura estimates

One of the key obstacles for newcomers to qualify their products in the global InP market is the know-how of key technologies, including VB, VGF, and LEC processes. Global key names such as Sumitomo Electric can use all the mainstream technologies to produce crystals. Its in-house developed VB equipment offers more complex operation while delivering more stable performance and rates vs VGF and LEC equipment. Meanwhile, crystals growth by the VB process has low dislocation density and good uniformity, giving it competitive advantages in the high-end product segment. JX Metal's LEC process grows crystal faster, but the crystals produced often have higher dislocation density, which adversely affects crystal performance and reliability. AXT mainly uses the VGF method, which has low dislocation density and good uniformity.

On the diameter of single crystals, VGF method and VB method may reach 8 inches at the maximum, and the crystals are even with a low dislocation density. Although the maximum diameter of single crystals by LEC process can reach as high as 12 inches, the equipment is more expensive, and the crystals are uneven with a large dislocation density.

Fig. 16: Process technologies comparison

Method	VB	LEC	VGF
Process characteristics	Slow temperature gradient, low-stress growth	Fast, scalable but higher-dislocation crystals	Programmed temperature-gradient descent for low-dislocation crystals at very slow speed
Mechanical movement	The crucible moves very slowly downward	seed shaft rotates and lifts upward	No mechanical movement
Temperature control	Physically passes through a fixed temperature field	Strong longitudinal temperature gradient	Computer-controlled thermal field slow down
Defects/dislocations	Relatively low	High	Lowest
Crystal growth speed	Slow	Fast	Very slow
Product specification	3/4/6 inch	2/3/4 inch	2/3/4/6 inch

Source: Nomura research

We believe there are more than ten China domestic players currently engaged in the InP substrate business, while Yunnan Germanium (002428 CH, Not rated) and Guangdong Xiandao (Unlisted) are in the camp that have taken a lead in this space. Most Chinese InP substrate makers use the VGF process, but the yield of processing single crystal and substrate still lags overseas manufacturers. The growth processes of VB and VGF methods are invisible, and a single furnace processing cycle may take about 15 days; it may take a long time for the new entrants to improve the product quality and yield rate, in our view. Currently, domestic manufacturers mainly produce 2-3 inch products, and we expect dominant domestic manufacturers to achieve volume production of 6-inch InP substrates in 2028F.

We think the key bottlenecks in upgrading from small-sized substrates to large-size ones include: (1) raw material purity – high-purity indium (above 6N grade) and high-purity red phosphorus (above 7N) are difficult to purify without sufficient industry knowhow; (2) single crystal growth capability – thermal field control, dislocation density control, and crystal integrity are extremely difficult to maintain; (3) sub-optimal yield rate – due to the extremely complex process, production yields are generally low across the industry for

large-sized (6-inch) InP substrate. Currently, 6-inch substrate production is mainly dominated by global manufacturers such as Coherent, Sumitomo, and AXT, while domestic manufacturers still face yield issues. We believe that 6-inch InP substrates could significantly raise the technical threshold, with higher requirements for technical parameters and equipment selection. Therefore, slow yield ramp-up will also result in slower expansion compared to small-size substrates.

Lessons from Japan

Sumitomo Electric (5802 JP, Buy, covered by Yuji Matsumoto)

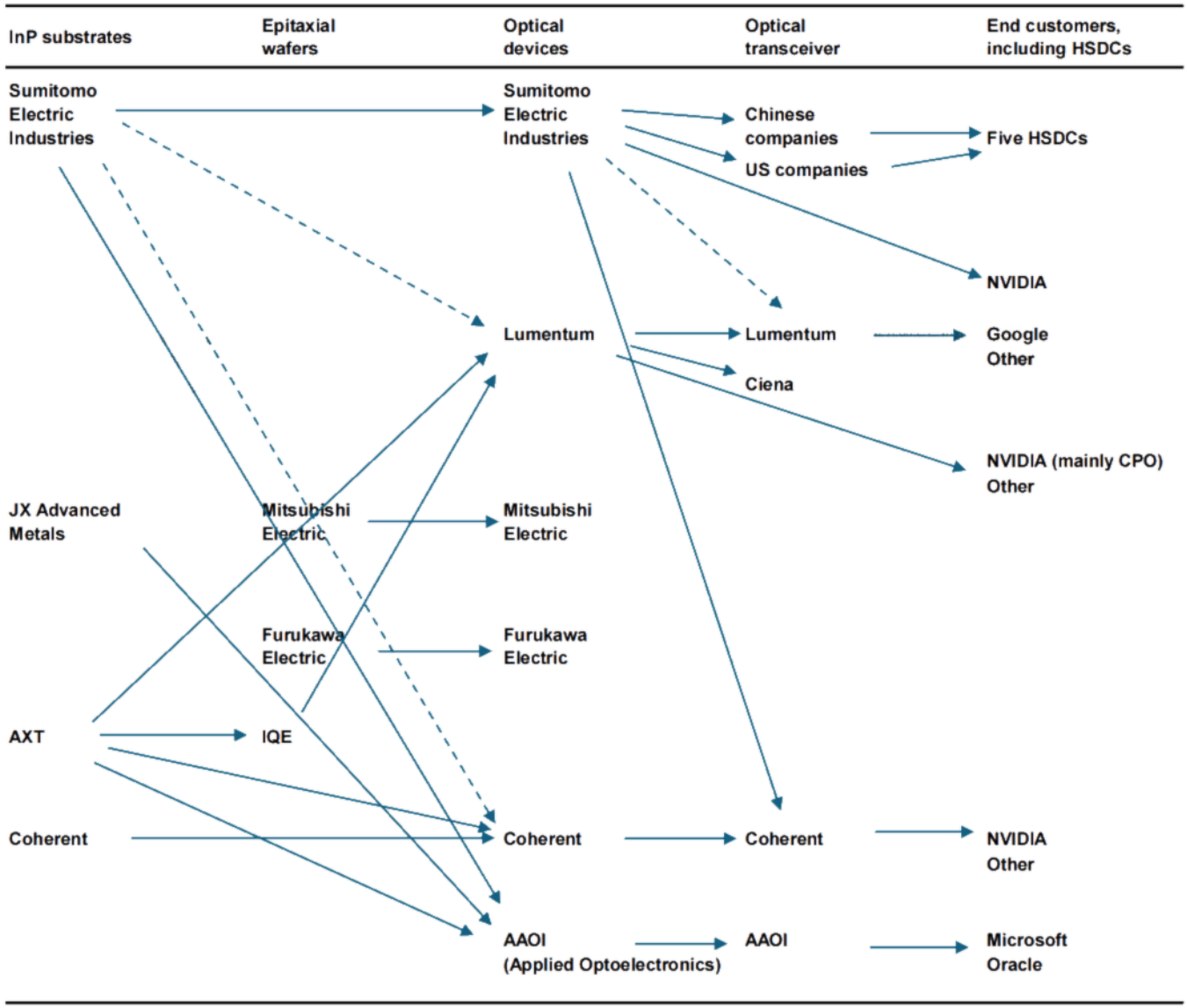
Sumitomo Electric is currently the world's largest producer of indium phosphide (InP) substrates (source: company website, *link*), which are now the key bottlenecks for optical communication devices. While supply-demand conditions for optical fiber are tight, InP substrate output has been unstable in the industry as a whole, and we think the company will be able to achieve growth in excess of the industry average by leveraging its technological strengths in high-end products and its ability to supply InP substrates. We, therefore, raise our operating profit forecasts for these operations.

Fig. 17: Main products in Sumitomo Electric Industries' infocommunications segment

	Sales (25/3)	Share (%)	Competitors	Other
Undersea optical fiber	NA	40	Corning, Furukawa Electric, YOFC	The company has held the world record for low losses on optical fiber for over 30 years (since 1988)
Multi-core optical fiber	NA	NA	Furukawa Electric, Fujikura	World's first company to achieve mass-production, in October 2023
High-density optical cable	NA	2nd	Fujikura, Furukawa Electric	Largest producer of slotted cables
Optical connectors	NA	30% (2nd)	Fujikura, Furukawa Electric	Top share of high-density MMC, by our estimate
EML	35–40% of optical devices	20	Mitsubishi Electric, Lumentum	Mitsubishi Electric is the leading company. Mass production of 200Gbps chips has already been achieved.
CW-LD	35–40% of optical devices	Just over 50	Lumentum, Furukawa Electric, Broadcom	Developed a 350–400mW high-output system for CPO
Micro ITLA (micro-integrable tunable laser assemblies)	25% of optical devices	50	Lumentum, Furukawa Electric	Used for DCI (data center interconnect)
GaN devices	NA	Over 50 (telecom applications)	Wolfspeed、qorvo	Used as a power amplifier in mobile phone base stations; SiC substrates
GaAs (gallium arsenide) substrates	Around 10	Top class	AXT、Freiberger	NA
Indium phosphide (InP) substrates	5-10	Top share of production (including internal consumption)	JX Advanced Metals, AXT	Production for large 4–6-inch wafers, for both internal consumption and sales to external customers

Note: (1) At briefing on 11 November 2025, the company said combined sales weighting of EML and CW-LD is three times that for ITLA, and sales weighting for EMLs and CW-LDs is roughly same for EMLs and CW-LDs. Our estimates for the breakdown of optical device sales are based on this. (2) According to Japan Society of Newer Metals, shipments from Japan of InP came to ¥9.5bn and of GaAs came to ¥17.4bn. We estimate sales based on industrywide data and the company's market share. (3) EML stands for electro-absorption modulated laser and CW-LD refers to continuous wave-laser diode.
Source: Nomura research, based on data disclosed by each company, Japan Society of Newer Metals

Fig. 18: Supply chain for optical devices (1)



Note: (1) Nomura estimates, based on briefings and press releases.. (2) HSDC = hyperscaler. (3) According to Lumentum Holdings, it has a long-term agreement for InP substrates with one Japanese company. This is either Sumitomo Electric Industries or JX Advanced Metals. At its 3 February 2026 results information session, Sumitomo Electric Industries commented that it had contracts ranging from three years to a maximum of seven years in its infocommunications segment, though it did not disclose the specific product groups. Lumentum Holdings also said that it had signed a seven-year InP substrate procurement agreement with one supplier in Japan. A seven-year long-term agreement is not very common (see our 31 March 2026 report Sumitomo Electric Industries [5802]). Given this, and that a 10 April 2026 Bloomberg interview with Lumentum Holdings' Michael Hurlston cited Fujikura and Sumitomo Electric Industries as Japanese companies with strengths in InP substrates, optical fiber materials, and silicon photonics, we surmise that Sumitomo Electric Industries is the likely party to the seven-year agreement. (4) Solid lines show actual links based on company announcements and briefing comments, dotted lines show Nomura estimates for highly likely connections.
Source: Nomura research, based on data disclosed by each company and Bloomberg data

JX Advanced Metal (5016 JP, Buy, covered by Daiki Ban)

JX Advanced Metals produces single crystal substrates made of indium phosphide (InP), a compound semiconductor. The company initially announced in July 2025 that it planned to increase production capacity by 20%, but it subsequently increased this to a 50% in October 2025 and a three-fold increase in February 2026. It then announced plans for an increase of up to 7–10-fold in June 2026, and we think it is building out a production setup that can meet strong demand.

JX Advanced Metals is investing a total of ¥150bn to increase InP substrate production capacity, vs. 26/3 sales of just ¥6.0bn. We think an easing of export permits by China or production increases at rivals could pose the risk of oversupply of InP substrates before the company completes capex in 2030. That said, we have recently seen a string of announcements of long-term contracts in the optical device supply chain (including between Nvidia and Lumentum/Coherent, between Coherent and AXT, and between Lumentum and IQE). We think that JX Advanced Metals may have decided to undertake this massive capex program based on discussions with customers about long-term contracts, although it has not made any official announcements about such contracts. We also note the risk of an increase in supply from Chinese rivals from the Chinese

government giving priority to local InP substrate manufacturers in issuing export permits. That said, Chinese rivals have lower yields and lower production capacity than JX Advanced Metals. Moreover, even if these companies gain priority export permits, there remains the risk that of the Chinese government clamping down again as it increases controls on strategic products. Moreover, it takes a year or two for customers to certify new suppliers when they switch InP substrate suppliers. Given these factors, we do not see any strong likelihood that non-Chinese optical device manufacturers will switch back to procuring InP substrates from China. We also think that any increase in InP substrate production by non-Chinese companies such as Sumitomo Electric Industries [5802] (Buy) is unlikely to give them any great scope to divert production to the open market given the sharp rise in demand for use in their own devices.

Fig. 19: List of main products



As of May 2026

Segment	Subsegment	Main products	Main applications	End uses
Focus Businesses — Semiconductor Materials	Thin Film Materials	Sputtering targets for OEM	Formation of thin metal film on semiconductor wafers	Semiconductors, data centers, PCs, smartphones
		Sputtering targets for magnetic devices	Formation of thin metal film on magnetic recording media	HDD, data centers, magnetic sensors
		InP substrates	Optical to electricity conversion or light receiving and light emitting elements	Optical communication, data centers
		CdZnTe substrates	Infrared detection, radiation detection	Defense systems, CT scan
		GaAs, AlGaAs materials	Wafers for semiconductors	Semiconductors, data centers, PCs, smartphones
	Tantalum and Niobium	Tantalum powder for sputtering targets	Materials for sputtering targets for semiconductors	Semiconductors, data centers, PCs, smartphones
		Tantalum powder for capacitors	Materials for tantalum capacitors	Tantalum capacitors, data centers, PCs
Focus Businesses — ICT Materials	Functional Materials	Rolled annealed copper foil	Materials for FPC, flexible printed circuits	Smartphones, wearable devices, robots, medical cameras
		Copper titanium alloys	Connector materials, spring materials for camera modules	Connectors for servers, data centers, camera modules
	Toho Titanium, TATSUTA Electric Wire and Cable	Toho Titanium: Titanium sponge	Aircraft engine parts, fuselage materials	Aircraft, chemical, power plants
		Chemical products: ultra fine nickel powder	Materials for internal electrodes of multi layer ceramic capacitors (MLCC)	Multi layer ceramic capacitors
		THC catalysts	Catalysts for manufacture of polypropylene, polyolefin	Automotive, interiors and exteriors, home appliances, packaging materials
	TATSUTA	Wires for infrastructure and industrial equipment	Electric wires	Electric wires and cables for power plants and other plants
		EMI shielding films	Protection for internal circuits of mobile electronic devices	Smartphones
Base Businesses	Mineral Resources	Copper concentrate, electrolytic copper, molybdenum concentrate		
		Ownership interest: Caserones Copper Mine 29%, Los Pelambres Copper Mine 12.52%, Escondida Copper Mine 2%		
	Metals & Recycling	Electrolytic copper, cast copper, precious metals, sulfuric acid		
		Ownership interest: Pan Pacific Copper 47.7%		

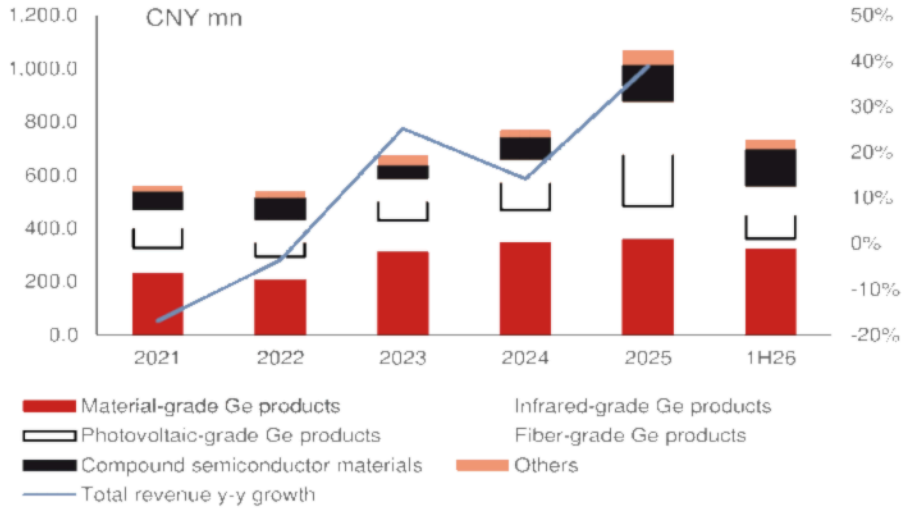
Source: FY2025 (Fiscal Year Ending March 31, 2026) Financial Results Presentation Materials of JX Advanced Metals

Yunnan Germanium (002428 CH, Not rated)

Yunnan Lincang Xinyuan Germanium Industry was established in 1998 and listed on the Shenzhen Stock Exchange in 2010, with the most complete germanium industry chain in the China market. The actual operating entity of its indium phosphide business is Yunnan Xinyao Semiconductor Materials, established in September 2013. Yunnan Germanium Industry is currently the only listed company in China with mass production capability for 6-inch InP substrates. The company produced 101k pieces of InP wafers (2-4 inch total) in 2025, and 91.8k pieces of InP wafers (2-4 inch total) in 1Q26. The company plans to invest CNY189mn to add production capacity of 300k/year pieces of InP wafers (equivalent to 4 inch, including 6,000 pieces of 6-inch wafers), with a total capacity of 450k wafers per year (4 inches equivalent) after reaching full production, with a construction period of 18 months.

On 23 July 2026, Yunnan Xinyao signed an InP wafer supply agreement with a customer, with a value range of CNY570-855mn (including tax), with a performance period from 1 August 2026, to 31 December 2027. The compound semiconductor material revenue accounted for 12.93% of Yunnan Germanium's total revenue in 2025, and we think this new order will drive a significant increase in InP business revenue for the company. Yunnan Germanium stated that the company's suppliers for high-purity red phosphorus and high-purity indium are currently mainly domestic manufacturers.

Fig. 20: Yunnan Germanium – revenue trend

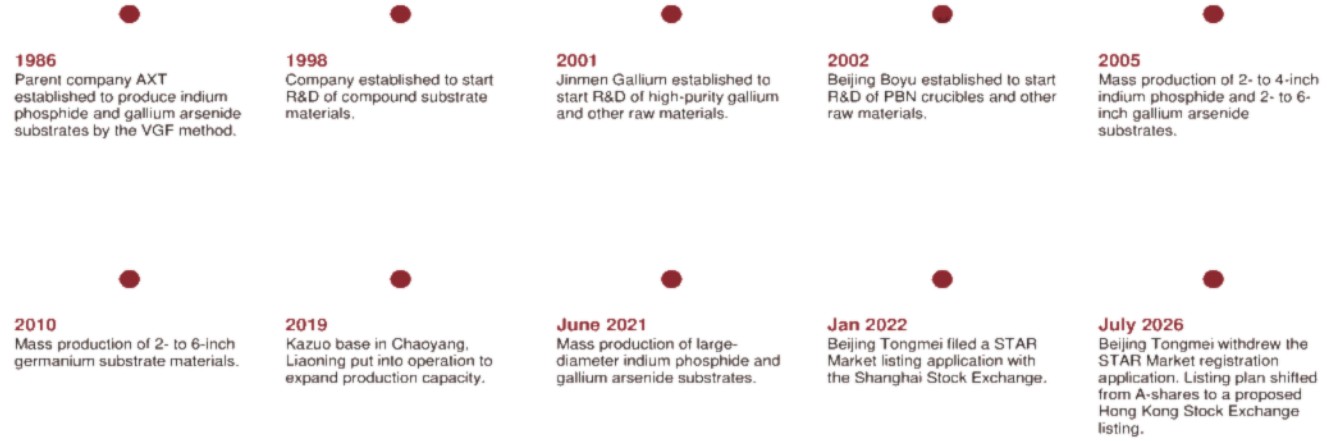


Source: Company data, Nomura research

Company introduction – AXT

AXT was established in 1986 in California and was publicly listed in 1998. The company is engaged in the R&D, production, and sales of III-V compound semiconductor (including InP and GaAs) substrates since its establishment. In 1998, AXT established Beijing Tongmei (unlisted), gradually migrated its production and R&D to Beijing Tongmei. In 2022, Beijing Tongmei filed for IPO in Shanghai STAR board, and in 2026, the company withdrew its IPO in Shanghai and turned to HKEx for listing. In addition, Beijing Tongmei has entered into a definitive agreement for private-equity financing by selling its own shares, in order to increase capacity at its raw-material companies in China, with a maximum amount of ~USD545mn, according to the company. AXT will maintain control of Tongmei with ~73.4% ownership, down 12.1% following the completion of the transaction.

Fig. 21: AXT – development history



Source: Company data. Nomura research

The company's core products are III-V compound semiconductor substrates. Meanwhile, it is expanding the business to upstream PBN materials and high-purity materials. AXT have two product lines: specialty material substrates and raw materials (which can be used to make substrates). Specialty material substrates include InP substrate, GaAs substrate, and germanium substrate products, while raw materials include high-purity gallium, gallium-magnesium alloys, indium-magnesium alloys and PBN materials (PBN crucibles, PBN plates, PBN coatings, etc.). The InP substrate, GaAs substrate, and germanium substrate products of the company can be used to produce RF devices, optical transceivers, LEDs (mini LEDs and micro LEDs), lasers, detectors, sensors, space solar cell and other devices, which have a wide range of applications including telecommunications, data centers, display, artificial intelligence, unmanned driving, wearable device, aerospace, etc. The PBN materials and other high-purity materials products of the company guarantee the high-quality supply of upstream materials for the company's semiconductor substrates.

Fig. 22: AXT – product mix

Product	Wafer Diameter	Application device/product use	Downstream applications
Substrate Group			
Indium Phosphide (InP)	2/3/4/6 inch	Mainly used in the production of laser and detector chips in optical modules, and in the production of laser devices, wearable devices, and other device products for health monitoring	5G communications/data centers, Wearable devices
Gallium Arsenide (GaAs - semi-insulating)	1/2/3/4/5/6 inch	Mainly used in RF device products, laser devices, sensors, high-brightness light emitting diodes (HBLED) device products that are often used to backlight mobile phone and liquid crystal display (LCD) TVs, and light emitting diode device products in automotive panels, signage, display, and lighting application scenarios	Mobile phones and computers, Communication base stations, Unmanned driving, New generation display (mini LED, micro LED), Industrial lasers, VCSEL facial recognition
Gallium Arsenide (GaAs - semi-conducting)	1/2/3/4/5/6/8 inch		
Germanium (Ge)	2/4/6 inch	Mainly used in solar cells and high-performance light emitting diode device products for aerospace	Solar cells for space satellites
Raw Materials Group			
6N+ and 7N+ purified gallium	-	Mainly used in the production of compound semiconductor substrates, magnetic materials, high-temperature thermometers, single crystal ingots, including gallium arsenide, gallium oxide, gallium nitride, gallium antimonide, and gallium phosphide ingots, and other materials and alloys	Crystal growth
Gallium-Magnesium alloy/ Indium-magnesium alloy	-	Used as raw materials in the production of MO sources. MO sources are important materials for the production of gallium arsenide and gallium nitride compound semiconductor devices, microwave devices, optical devices, and photoelectric devices	MO sources
pyrolytic boron nitride (pBN) crucibles	-	Mainly used in the single-crystal growth of compound semiconductors, molecular beam epitaxial growth, and OLED evaporation source	Crystal growth of compound semiconductors, Molecular beam epitaxy (MBE) equipment, OLED evaporation source
pBN insulating parts	-	Used in parts of various high-end semiconductor devices	High-end semiconductor device parts

Source: Company data, Nomura research

Core technology, process and capacity

AXT has developed core technologies in-house, including synthesis of GaAs poly-crystals, VGF growth of GaAs/Ge/InP single crystals and related technologies such as doping control, partial crystallization at longitudinal temperature gradients, chemical vapor deposition of PBN, etc. AXT is one of the pioneers in the world to successfully apply the VGF method for the commercial production of GaAs substrates and extends this technology and process to InP substrates. VGF growth requires precise control of temperature gradients, solid-liquid interface positions, and cooling curves; even slight gradient differences can alter defect distribution and stress states, resulting in significant differences in yield and reliability. Therefore, we believe AXT's long history of developing the VGF technology in InP and GaAs substrate markets established strong moat for the company in this industry.

AXT's VGF technology know-how also extends to the entire value chain, including raw material purity management, crucible and crystal size design, cutting and grinding, as well as polishing and cleaning processes. These processes determine the substrate's key performance features such as orientation accuracy, warpage level, and surface roughness, thereby affecting epitaxial growth and component manufacturing yield. AXT can provide relatively stable electrical and mechanical properties at specific doping concentrations and thickness combinations, making it one of the few companies capable of producing 8-inch GaAs substrate and 6-inch InP substrate. Additionally, AXT's in-house produced PBN materials and other high-purity material products ensure high-quality semiconductor substrate supply from the source.

AXT's substrate and raw material products are currently manufactured in China, with the production bases in Beijing, Dingxing (Hebei province) and Chaoyang (Liaoning province). According to the company, it will expand InP capacity at the Beijing production base between 2026 and 2028 to fulfil the rising demand from both China and overseas customers.

Fig. 23: AXT – historical capacity

Item	2021	2020	2019
GaAs substrates (equivalent to 2-inch)			
Production capacity (10,000 pieces)	313.64	232.25	190.50
Output (10,000 pieces)	306.68	205.83	178.90
Utilization of production capacity	97.78%	88.63%	93.91%
Sales volume (10,000 pieces)	263.94	202.46	175.95
Output/sales ratio	86.06%	98.36%	98.35%
InP substrates (equivalent to 2-inch)			
Production capacity (10,000 pieces)	40.78	30.70	26.70
Output (10,000 pieces)	39.26	28.32	23.32
Utilization of production capacity	96.27%	92.24%	87.34%
Sales volume (10,000 pieces)	35.70	27.07	23.33
Output/sales ratio	90.94%	95.60%	100.05%
Germanium substrates (equivalent to 2-inch)			
Production capacity (10,000 pieces)	143.30	122.00	122.00
Output (10,000 pieces)	141.82	112.73	92.43
Utilization of production capacity	98.97%	92.41%	75.76%
Sales volume (10,000 pieces)	127.90	103.77	80.20
Output/sales ratio	90.18%	92.05%	86.77%

Source: Company data, Nomura research

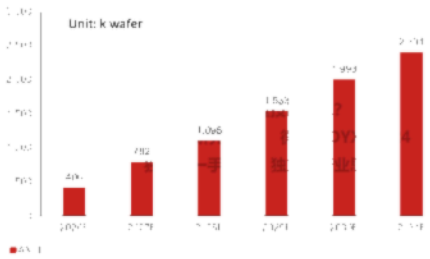
Fig. 24: Historical average selling prices by products

Product category	Unit	2021		2020		2019
		Amount	Change	Amount	Change	Amount
InP substrates	CNY/piece	1,196.06	74.98%	683.54	-9.09%	751.87
GaAs substrates	CNY/piece	437.68	-6.14%	466.33	23.20%	378.50
Germanium substrates	CNY/piece	287.74	-14.57%	336.81	-4.06%	351.05
PBN crucibles	CNY/piece	5,342.20	-5.47%	5,651.35	12.62%	5,018.27
High-purity metals and compounds	CNY10,000/ton	148.07	55.91%	94.97	17.62%	80.74

Source: Company data, Nomura research

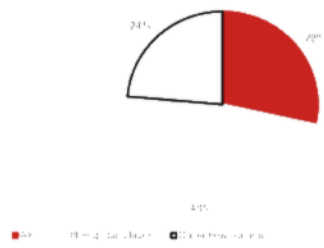
In the 2Q26 earnings call, management revised up its capacity guidance, and noted the company's InP substrate capacity would increase to **USD60-65mn (previously guided at USD30-35mn) in 4Q26E, and double in 4Q27E to ~USD130mn**. We estimate AXT's InP substrate capacity to **grow from 406k in 2026F to 2,391k in 2031F, and its market share to grow from 28% in 2026F to 31% in 2028F**.

Fig. 25: AXT's InP substrate capacity growth



Source: Nomura estimates

Fig. 26: AXT's InP substrate market share in 2026F



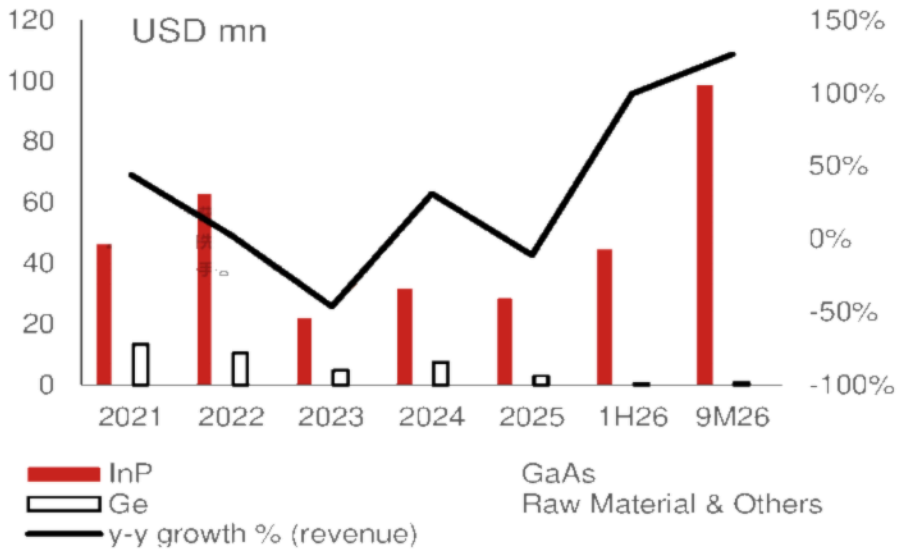
Source: Nomura estimates

Operating performance

AXT's revenue increased 127% y-y to USD147.9mn in 9M26, likely driven by the robust demand for InP substrates, in our view. Substrate revenue increased by 176% y-y in 9M26, primarily due to the higher demand for InP wafer substrates used for data center applications and in optical networks. Raw materials sales increased 26.4% y-y to USD27.4mn in 9M26. The increase in raw materials' revenue in 9M26 was primarily due

to an increase in the sales of refined gallium and pBN crucibles resulting from stronger market demand. Revenue increased 162.6% y-y to USD73.4mn in 3Q26. The substrate revenue increased by 199.7% y-y, while raw materials sales increased 44.9% y-y in 3Q26.

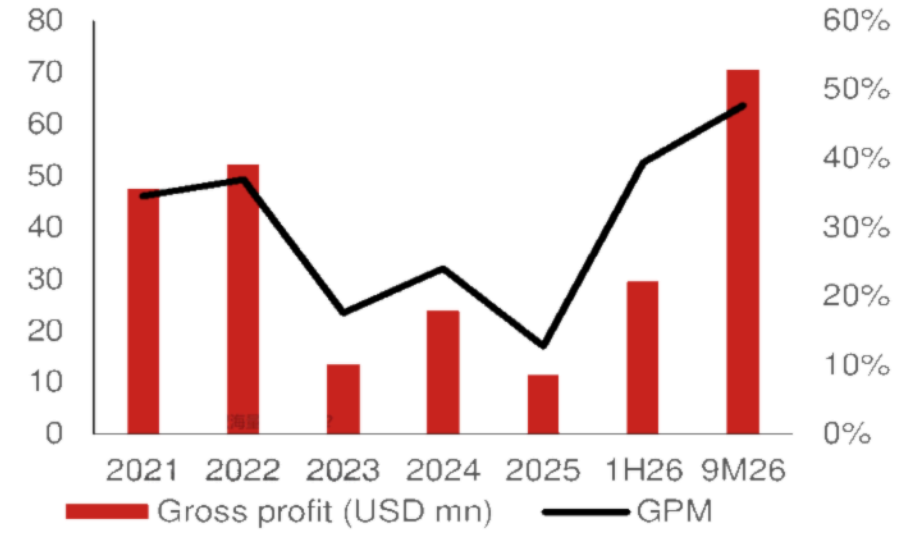
Fig. 27: Revenue breakdown and revenue trend



Source: Company data, Nomura research

The company's gross profit increased by 997.9% y-y to USD70.4mn in 9M26 and up 560% y-y in 3Q26, due to higher revenue resulting in fixed costs being spread over more units and a favorable change in the product mix. Gross margin increased by 37.8pp and 33.7pp, respectively, in 9M26 and 3Q26, likely due to scale effect and an increase in ASP, in our view.

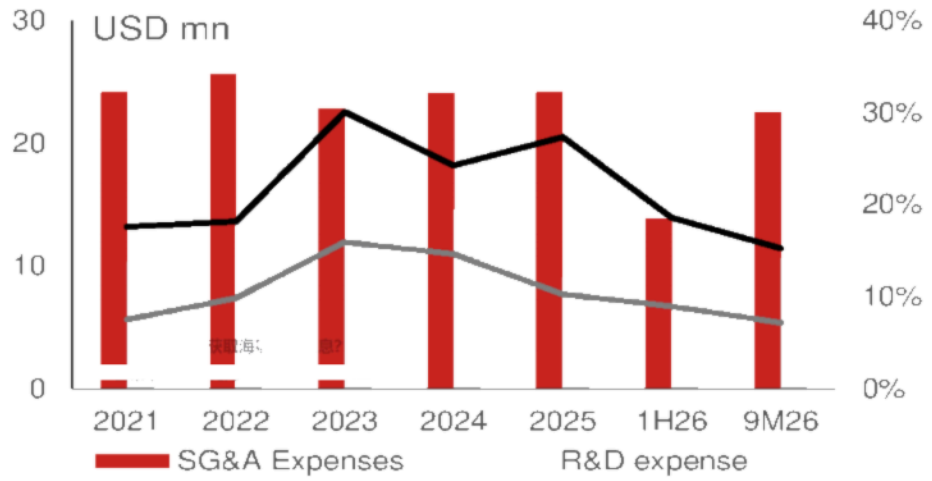
Fig. 28: Gross profit and gross margin trend



Source: Company data, Nomura research

AXT's R&D expenses increased by 59.3% y-y to USD11mn in 9M26, primarily due to increased usage of certain materials for new product development and compensation-related costs.

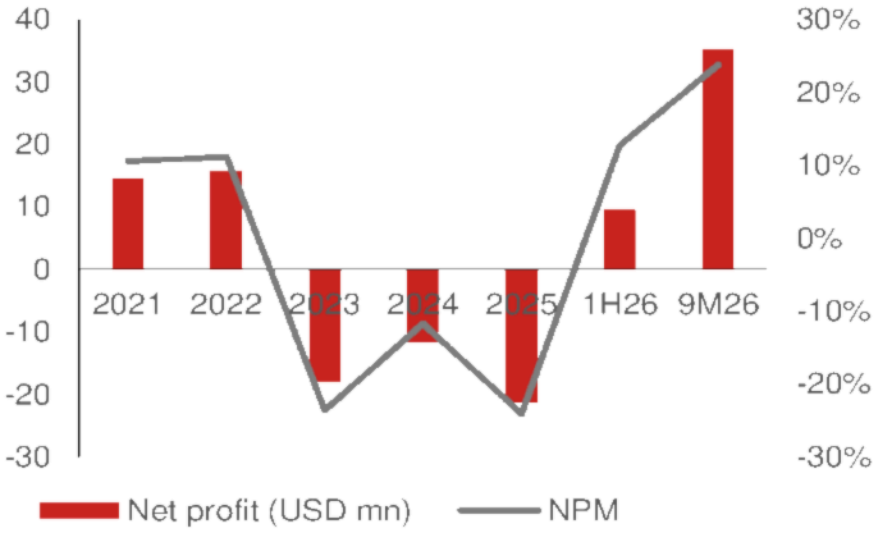
Fig. 29: R&D/S&A expenses trend



Source: Company data. Nomura research

AXT's net income attributable to noncontrolling interests and redeemable noncontrolling interests increased from a loss of USD17.7mn in 9M25 to a profit of USD35.2mn 9M26, primarily due to higher profitability from China subsidiaries as sales increased.

Fig. 30: Net profit and net margin trend



Source: Company data. Nomura research

Customers and suppliers

Since its establishment, AXT has expanded its business relationships with top-tiered customers in the US, Europe, China mainland, and Taiwan, including Osram (AMS SW, Not rated), IQE (IQE LN, not rated), II-VI (unlisted), Meta (META US, not rated), Qorvo (unlisted), IPG (IPGP US, not rated), Skyworks (SWKS US, not rated), Broadcom (AVGO US, not rated), Taiwan Win Semiconductor (3105 TT, Neutral, Covered by Aaron Jeng), Landmark (3081 TT, not rated), VPEC (2455 TT, not rated), Sanan Optoelectronics (600703 CH, not rated), Everbright (688048 CH, not rated), and other specialized epitaxial manufacturers, foundries, chip and device manufacturers. Top five customers represented 25%/30%/29% of AXT's total revenue in FY23/FY24/FY25.

Recently, the company reached a long-term supply commitment with key optical chip makers such as Lumentum (LITE US, not rated) and Coherent (COHR US, not rated), which should be able to lock in its future capacities, in our view. AXT has partial ownership in more than 10 raw material companies in China that form the backbone of its supply chain model. These companies generally provide products including gallium,

gallium alloys, indium phosphide poly-crystal, high-purity arsenic, germanium, germanium dioxide, PBN and boron oxide.

Fig. 31: Major customers of AXT

Application area	Major customers
Semiconductor substrate materials	
5G/data center/optical fiber communication	Landmark, Win Semiconductor, IQE, Broadcom, Qorvo, Skyworks
New-generation display (Mini LED, Micro LED)	Osram, Broadcom, Taiwan Epistar, Sanan Optoelectronics
AI/unmanned driving	Landmark, Win Semiconductor, VPEC, Meta
Wearable devices	Masimo, Alta Devices
Aerospace	SolAero, Azur Space, Nanchang Kaixun
Industrial laser	IPG, Trumpf, nLight Photonics, Excelitas, Everbright
PBN crucible	
Crystal growth crucible	Sumitomo, Freiberger, Guangdong Xiandao, Yunnan Germanium
OLED crucible	BOE, Tianma Microelectronics, China Star Optoelectronics, Visionox
High purity materials	
Metal Oganic Source	Anhui Argosun, Jiangxi Jiayin

Source: Company data. Nomura research

Fig. 32: Long-term agreements with key optical communication players

Company	Industry chain segment	Agreement details	Amount (USD mn)	Disclose date
Nanjing Casela	Wafer/Epi/Components	AXT agreed to reserve production capacity and raw-material allocation for Casela, in exchange for Casela's binding commitment to purchase a fixed aggregate quantity of InP wafer substrates in 2027	25.4	11-Jun-26
Coherent	Wafer/Epi/Components/Modules	AXT agreed to increase the manufacturing capacity of 6-inch InP wafer at Beijing facility in 2026 through 2028 and deliver agreed capacity to Coherent	22.3	26-Jun-26
Lumentum	Wafer/Epi/Components/Modules	AXT agreed for supply and capacity reservation of InP wafer substrates, with two deposits (USD43.5mn each) paid during 2026-28	87.0	26-Jul-26

Source: Company data. Nomura research

Investment thesis

Investment Highlight # 1: Advanced technology platforms ensure AXT holds strong market position and top-tier customers

As one of the pioneers in the III-V compound semiconductor material market, AXT has developed all the core technologies for InP and GaAs substrate. The company has mastered core technologies such as gallium arsenide polycrystalline synthesis, high-quality indium phosphide single crystal vertical gradient condensation growth and doping control, longitudinal temperature gradient partial crystallization, and pyrolysis of boron nitride chemical vapor deposition. Based on these technologies, we believe the company is able to achieve high yields and produce advanced products such as 6-inch InP substrates and 8-inch GaAs substrates.

AXT uses a two-stage wafer manufacturing process. In the first stage, it uses VGF technology for the crystal growth of single element or compound element ingots with proprietary process technology, and the growth process occurs in high temperature furnaces which is built with Tongmei's proprietary designs. The second stage includes slicing or sawing the ingot into substrates, then processing each substrate to strict specifications, including grinding to reduce the thickness, beveling the edges, and then polishing and cleaning each substrate.

Currently, the mainstream InP substrate products are still mainly 4-6 inch GaAs substrates and 3-4 inch InP substrates. AXT's products feature in low dislocation density and high flatness, indicating better performance (*Fig. 33*). In addition, the company has been constantly optimizing the process of single crystal growth, PBN crucibles, and production process control, and continuously increasing the growth length of large-diameter single crystals, which help AXT reduce production costs, and improve manufacturing efficiencies.

Fig. 33: Four-inch InP substrate (semi-insulating type) product comparison with peers

Parameter	Sumitomo	JX Metals	AXT
Resistivity (Ω.cm)	≥1×10^{7}	≥1×10^{6}	≥0.5×10^{7}
Electron mobility ($cm^2/v.s$)	≥2×10^{3}	N/A	≥1000
Average dislocation density (cm^{-2})	≤5×10^{3}	≤5×10^{4}	1500-5000
Thickness (um)	625±25	625±20	350±25/625±25
Total thickness fluctuation value (P/P) um	≤5	≤8	≤5
Warp degree (um)	≤10	≤15	≤10
Surface granularity	<30@>1.2um	N/A	<50@>0.3um

Source: Company data, Nomura research

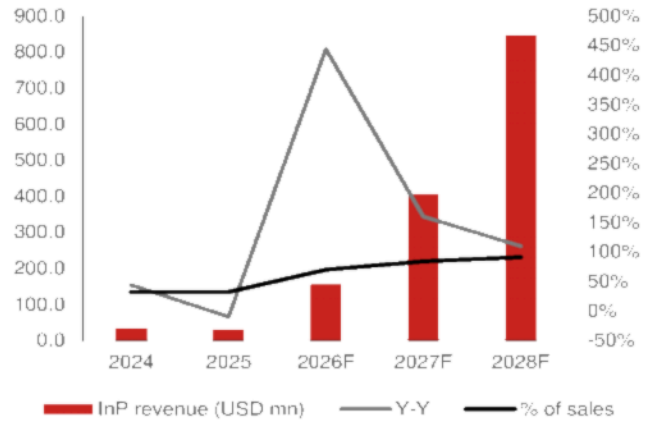
As crystal size increases, the requirements for temperature and pressure control also increase meaningfully for the crystal equipment, and it is difficult to simply replicate small-size crystal growth technology for large-size processes. Therefore, upgrading crystal growth technology and processes becomes tougher, raising the technological barriers for the production of 6-inch InP and 8-inch GaAs substrates. For 6-inch InP crystals, the company has already developed equipment for large-size crystal growth, including large autoclaves, high-power heaters, precision temperature control and robotic arm operation. It has also developed and improved crystal growth processes, including furnace temperature monitoring and program settings, and crystal demolding technology and post-processing for crystals, as well as precision directional cutting of large-size crystals. Meanwhile, the company has developed multi-wire cutting processes for InP substrates with high angular accuracy, high flatness, and low surface damage, as well as grinding and polishing processes with high flatness and low surface defects. In addition, to achieve mass production of 8-inch GaAs substrates, AXT participates in the process of designing the equipment for grinding and polishing, and it meets the requirements of 8-inch GaAs. In terms of inspection, the company has developed in-house high-precision electrical

performance measurement systems, automatic detection technologies for defects such as crystal dislocations, trace impurity detection on wafer surfaces, and particle size detection technologies on wafer surfaces.

Management expects quarterly InP substrate capacity to reach USD60mn by the end of 2026E and over USD130mn by the end of 2027E, which still could not fully fulfil the buoyant demand in the optical communication market. We think AXT's revenue visibility has improved with strong backlogs and long-term agreements (LTAs) (*Fig. 32*). The agreement with Lumentum, totaling up to USD87mn, is valid until 31 December 2031, and it locks in-future InP substrate capacity. Additionally, AXT has signed a 6-inch InP capacity agreement with Coherent for a USD22.3mn upfront payment, and signed a substrate supply agreement with Casela for approximately USD25.4mn.

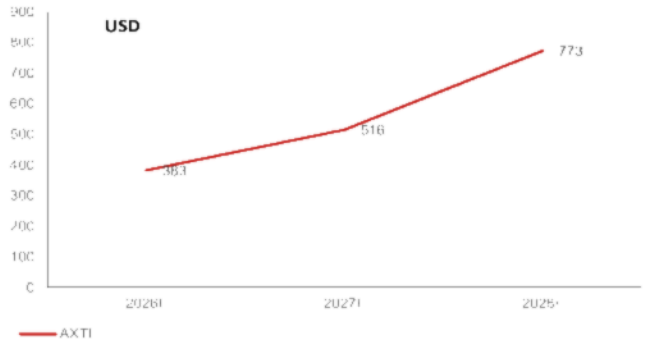
We think the export control from Ministry of Commerce of China is an overhang for the shipment of InP substrate from Beijing Tongmei. For InP substrate exports, Beijing Tongmei has to get a licence from the Ministry of Commerce of China, which will review each application and approve on a case-by-case basis. At the 3Q26 earnings call, management said the backlog of orders had exceeded USD500mn, increasing from USD100mn as of April 2026.

Fig. 34: AXT's InP substrate revenue growth (2024-2028F)



Source: Company data, Nomura estimates

Fig. 35: AXT's InP substrate pricing trend

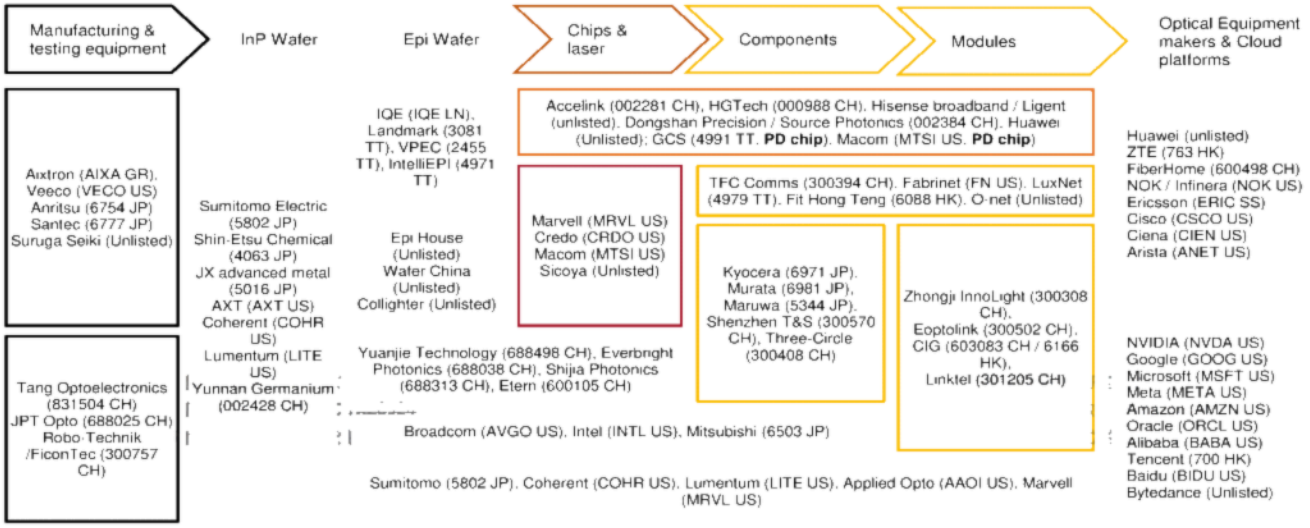


Source: Nomura estimates

Investment Highlight #2: Geopolitical factors have placed AXT at a supply bottleneck position, while the comprehensive domestic optical communication industry chain should enable AXT stand at the forefront of optical communication upgrades

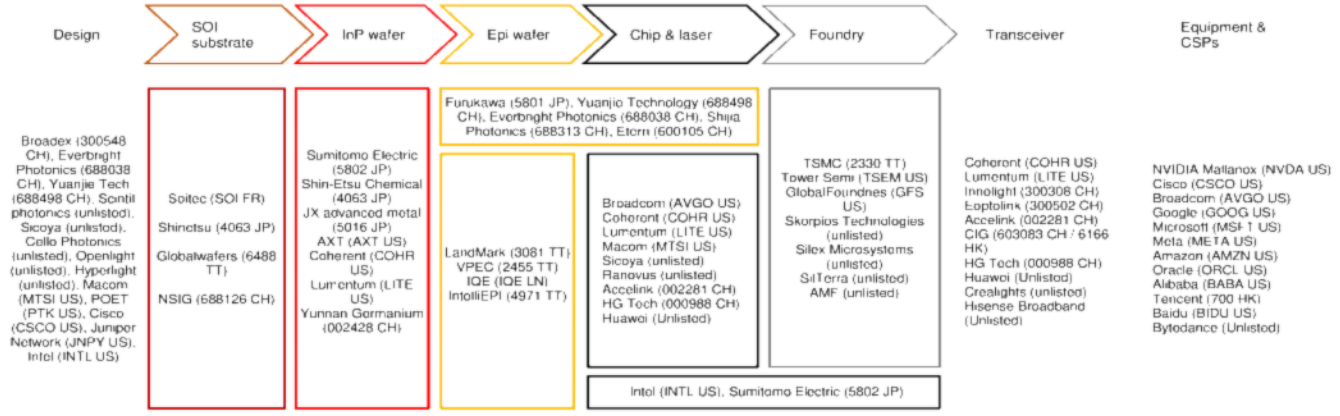
InP substrates are the key upstream materials for producing optical communication devices such as LD (Laser diode, i.e EML and CW-DFB lasers) and PD (Photodiode), which play a crucial role in the AIDC network. Currently, AXT, Sumitomo, and JX Metals dominate the global InP substrate supply for high-end optical transceiver and devices. We think the geopolitical tensions have tightened the effective supply of InP substrates from Japan to China and vice versa, and Beijing Tongmei is a major supplier in the domestic optical transceiver industry chain. Moreover, AXT remains as an important supplier to key global optical communication manufacturers i.e. Lumentum and Coherent.

Fig. 36: EML-based optical transceiver industry value chain



Source: Nomura research

Fig. 37: Silicon Photonics industry value chain

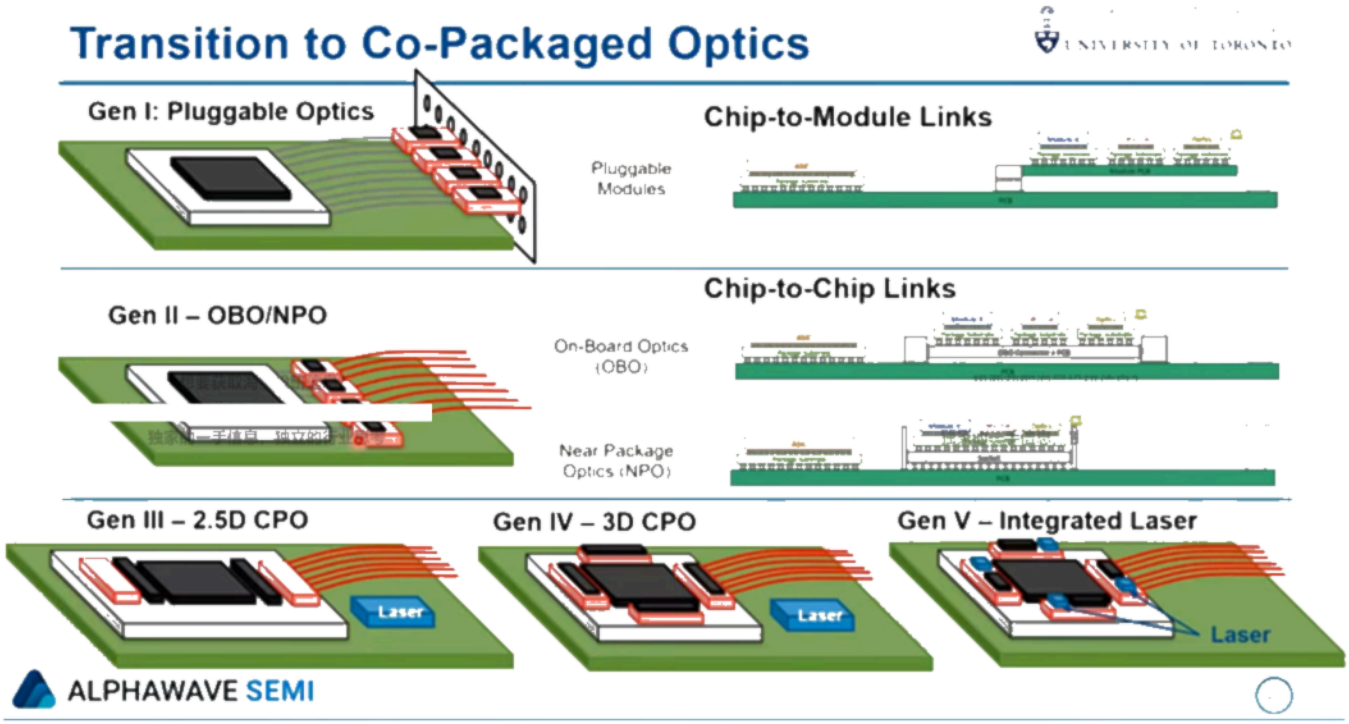


Source: Nomura research

On 4 February 2025, the Ministry of Commerce of China started the export control of indium and indium phosphide technologies and products. In February 2026, China added 20 Japanese entities to the export control list for indium-related items. In June 2026, China customs tightened the export approval process for metallic indium and high-purity indium raw materials. Due to China's export controls on indium and InP products, global optical players are striving to find diversified sources of supply. However, the effective supply may be limited due to the long capacity expansion, testing and qualification process, in our view. Meanwhile, Chinese players are accelerating technological investments and capacity expansion for InP materials, which could enjoy the demand upcycle in China, in our view.

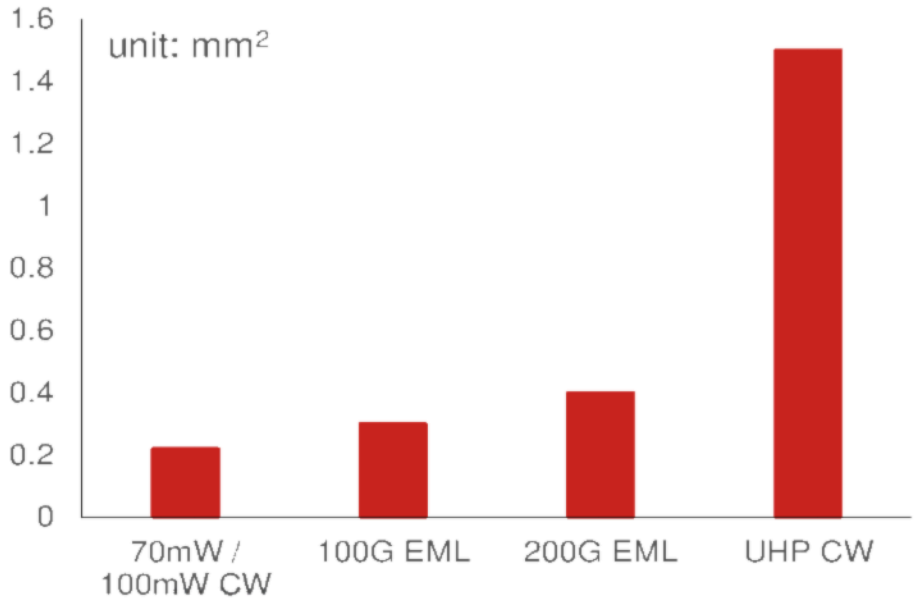
The technology upgrade from pluggable transceivers to NPO and CPO is a positive catalyst for AXT's InP substrate business, in our view, as NPO and CPO require high-power or ultra high-power lasers, which consume much bigger sizes of InP substrate. For instance, the high-power CW laser required for CPO could have a die size 3-5 times of a 70mW CW laser or 100G EML laser, consuming much more InP substrates. Moreover, the power upgrades may significantly reduce laser tolerance for material defects, and increase difficulty in controlling substrate thickness uniformity (TTV) and warpage (Bow/Warp), leading to lower yields of Epi wafer and laser production. Therefore, InP manufacturers need to improve growth and grinding processes to enhance the yield for high power lasers. AXT has already developed large-size, high-quality InP substrate growth processes, as well as grinding and thinning processes, which could strengthen its competitive edge in the future NPO / CPO market.

Fig. 38: Transceiver vs NPO vs CPO



Source: University of Toronto, Alphawave Semi, Nomura research

Fig. 39: Die size of different InP lasers



Source: Nomura estimates

Beijing Tongmei, an AXT holding company, has nine holding subsidiaries and two associate companies, covering crystal growth, substrate processing, and high-purity raw materials. The production bases are mainly located in Beijing, Dingxing (定兴) Hebei, and Kazuo (喀左) Liaoning. In 2Q26 earnings call, AXT management said it expects production value to reach **USD60-65mn in 4Q26E, and double in 4Q27E to ~USD130mn,** with revenue opportunity moving from 3 to 4 inch and some 6 inch. In addition, management expects the capex for 2026E to approximate USD50mn, used for the renovation of production facilities and expansion of production capacity.

Beijing Tongmei initially planned its IPO on the Shanghai STAR market in 2022, but the company withdrew and turned to HKEx for listing in 2026. A Hong Kong listing could help

to accelerate the company's capacity expansion of InP substrates in high-speed optical transmission and AI data centers, rather than focusing on GaAs capacity (from the original A-share IPO), in our view.

Fig. 40: Subsidiary product positioning of AXT

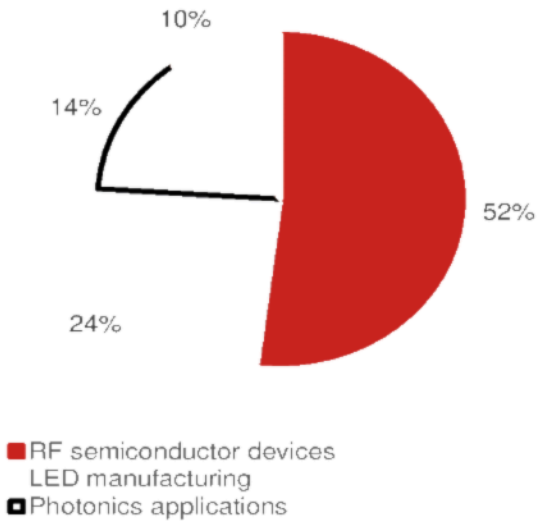
Subsidiary	Relationship	Main products
Beijing Tongmei	85.51% shareholding	Production of InP/GaAs/Ge wafer
Baoding Tongmei and Chaoyang Tongmei	Wholly-owned	Design and production of InP/GaAs/Ge wafer
Nanjing Jinmei and Chaoyang Jinmei	Wholly-owned	Production of high purity Ga/Gallium Oxide/Indium and InP crystals
Beijing Boyu	Wholly-owned	Production of semiconductor process vessels such as PBN crucible
Others	Wholly-owned	Multiple raw materials

Source: Company data. Nomura research

Investment Highlight #3: GaAs + Ge – may become the second growth curve

According to Business Research Insights, RF semiconductor devices represent the largest application area in the GaAs wafer market, accounting for 52% of global wafer consumption, vs LED manufacturing at about 24%, Photonics applications at about 14%, and Photovoltaic applications at 10%. The main global GaAs wafer manufacturers include Freiberger, Sumitomo, AXT, Guangdong Xiandao and Yunnan Xinyuan Germanium.

Fig. 41: Breakdown of GaAs substrate application market, 2025



Source: Business Research Insights, Nomura research

As a semiconductor material, GaAs features superior properties such as high frequency, high electron mobility, high output power, low noise, and good linearity, making it one of the most important supporting materials in the optoelectronics and microelectronics industries. Semiconductor devices manufactured using GaAs substrates feature high power density, low energy consumption, high temperature resistance, high luminous efficiency, radiation resistance, and high breakdown voltage. Therefore, GaAs substrates are widely used in the production of LED, RF devices, lasers, and other device products. In the future, we think the market size of GaAs substrates will gradually expand, driven by emerging market demand from next-generation displays (Mini LED, Micro LED), short-distance communication (i.e. VCSEL for smartphone 3D sensing, autonomous driving / LiDAR), IoT, autonomous driving, AI, space photovoltaics, etc. The key disadvantage of GaAs is the lower optical integration at long wavelength, which limits its application to short-distance optical communication, while InP is the current mainstream material for

longer distance optical communication (including scale-out and scale-across networks). However, with the emergence of scale-up network, and rising adoption of NPO / CPO solutions in the scale-up network, we think GaAs materials could play a more important role in the future, leading to better demand for AXT's GaAs material business line.

Fig. 42: Comparison between InP and GaAs

Property	GaAs	InP
Bandgap (eV)	~1.42	~1.34
Electron mobility (cm2/v.s)	~8500	~5400
Saturation Electron Velocity (cm/s)	2.0×10^{7}	2.5×10^{7}
Thermal Conductivity (W/m·K)	~55	~68
Primary Strength	Mature RF infrastructure, low noise up to ~100GHz	Ultra-high speed (>100 GHz), long-wavelength optics
Primary Weakness	Lower optical integration at long wavelengths	Higher cost, brittle, smaller substrate sizes

Source: Nomura research

Since 2010, with the buoyant demand of LEDs and smartphones, the GaAs substrate market has entered a large-scale application cycle. In 2017, the iPhone X first introduced VCSELs for facial recognition; in 2021, smartphone manufacturers such as Apple (AAPL US, not rated), Samsung (005930 KS, Buy), LG Corp (003550 KS, Not rated), and TCL (000100 CH, Not rated) entered the Mini LED market, driving higher demand for GaAs substrates. Since 2025, leading industry players are developing MicroLED technology for optical communication solutions. If MicroLED arrays can replace traditional lasers as light sources, it can achieve ultra-high bandwidth density through multi-channel parallel transmission, in our view. MicroLED offers low power consumption (1-2pJ/bit level or even lower), significantly reducing the power consumption compared to traditional optical engine solutions, according to Trendforce.

MicroLED and VCSEL optical interconnect technology are mainly aimed at short-range communication, suitable for scale-up interconnection scenarios between chips and between boards. Additionally, GaAs-based optoelectronic integration technology can achieve chip-level optical interconnects, improving data transmission rates within AI chips and alleviating the "memory wall" problem. For example, ultra-high-speed optical interconnect modules can be constructed by integrating GaAs-based VCSEL arrays with silicon-based optical paths, supporting large-scale parallel computing in AI training clusters. According to AXT, many of its key customers are showcasing slow and wide VCSEL lasers for data center applications, which could become a potential incremental market for AXT's GaAs substrate.

GaAs-based RF devices are also widely used in wireless connection modules such as 5G millimeter-wave communication and Wi-Fi 6E/7 RF front-ends due to high electron mobility and low noise characteristics.

In the 6G communication network, the wireless transmission is expected to operate on extremely high frequency band such as 100 GHz - 1 THz band to achieve Tbps-level ultra-high-speed communication. GaAs HBT (Heterojunction Bipolar Transistor) and HEMT (High-Electron-Mobility Transistor) devices have excellent high-frequency response capabilities, and some industry players have already achieved oscillation frequencies exceeding 300 GHz in laboratories, providing critical device support for 6G terminals and base stations. Additionally, GaAs-based MMICs (monolithic microwave integrated circuits) can be used to build terahertz modules, supporting ultra-high-speed wireless access and ultra-high-definition holographic communication. Compared to silicon-based technology, GaAs offers greater power efficiency and noise performance in the millimeter wave to terahertz bands; therefore, we think it could play an important role in 6G infrastructure construction.

GaAs can also be used in solar cells, which absorb full-spectrum sunlight through multi-layer bandgap-matched semiconductor stacks (single-junction/double-junction/triple-junction/quadru-junction), making them the ideal commercial high-efficiency photovoltaic solution in the aerospace field. Currently, GaAs, P-type heterojunction (HJT), and P-type

HJT/perovskite tandems are the three main technical solutions for solar sales. Although the GaAs technology route faces cost challenges, its stronger overall performance and proven reliability in extreme environments make it one of the preferred solutions for current high-value, high-reliability commercial space missions.

AXTI is also actively engaged in the development of Germanium material market. S&P Global expects Germanium demand to grow 3.3% per year between 2026E and 2030E, primarily driven by fiber-optic communications, infrared optics, and satellite-grade solar cells. The rise of compound semiconductor devices, particularly in GaAs and InP heterostructure, continues to drive the demand for high-purity germanium substrates across military, aerospace, and medical imaging applications. Manufacturers of germanium substrates include Umicore (UMI BR, not rated), AXT, China Germanium (unlisted), Yunnan Xinyuan Germanium, and Guangdong Xiandao, among others. Umicore leads the global germanium wafer market, followed by AXT, while Chinese germanium suppliers collectively maintain approximately 38% of global market share, according to Dataintelo.

AXT uses the VGF method to produce GaAs substrates and has mastered core technologies such as polycrystalline synthesis of GaAs, vertical gradient condensation method for semi-insulating gallium arsenide single crystals and carbon doping control, growth and uniform doping control of semiconducting gallium arsenide single crystals by vertical gradient condensation. The company is one of the few companies worldwide to mass produce 8-inch GaAs substrate production. With downstream application fields such as 6G communications, next-generation displays, and MicroLED optical interconnects entering a new investment cycle, customers might switch to larger sizes, and we expect AXT to gain a market advantage in this new industry cycle.

The production process for GaAs is similar to most compound semiconductors, including polycrystalline synthesis, single crystal growth, cutting, grinding, polishing, cleaning, and other steps. Among these, polycrystalline synthesis and single crystal growth are the core processes. Currently, the mainstream growth processes for GaAs crystals include the LEC, VB, and VGF methods. Sumitomo mainly uses the VB method, while Freiberger uses VGF and LEC methods and AXT uses the VGF method. In terms of single crystal quality, the VGF method produces crystals with lower dislocation density and stable production efficiency compared to other methods. In terms of production cost, the LEC method is the most expensive. The VB and VGF methods produce products with similar performance, but the VGF eliminates the mechanical transmission structure, allowing for stable single crystal production at a lower cost.

AXT has mastered core technologies of GaAs crystal production including efficient GaAs polycrystal synthesis, VGF crystal growth furnace manufacturing, semi-insulating GaAs single crystal growth by VGF method, and carbon doping control. Moreover, the company has established a vertically integrated supply chain covering key raw materials and devices such as high-purity gallium (6N/7N), arsenic, germanium, pBN crucibles, and quartz tubes, as well as waste recycling, bringing cost advantages, supply reliability, and more efficient delivery cycles, in our view. The main customers of GaAs substrates include Landmark, Osram, Everbright, Sanan Optoelectronics, VPEC, and IQE, among others. The company's 8-inch GaAs substrate products have successively received certifications from mainstream international semiconductor customers.

Fig. 43: Performance comparison of 6-inch GaAs substrate (semi-insulated) product

Parameter	Sumitomo	JX Metals	AXT
Resistivity (Ω.cm)	≥8×10^{7}	$(1.0\text{-}8.0)\times10^{8}$	≥1×10^{8}
Electron mobility ($cm^2/v.s$)	≥3000	≥4500	≥5000
Dislocation density (cm^{-2})	≤10000	≤10000	1500-5000
Thickness (um)	675±25/550±25	675±25/550±25	675±25/550±25
Total thickness fluctuation value (P/P) um	≤5	≤5	≤4
Warp degree (um)	≤10	≤10	≤10
Surface granularity	<100@>0.4um	<100@>0.3um	<80@>0.3um

Source: Company data, Nomura research

Financial forecasts and valuations

Revenue and earnings forecasts

We estimate the company will deliver 105%/185% revenue/earnings CAGRs in FY26-28F, driven by the robust demand for InP substrates from optical chips, and growing market share in the global InP substrate market. We forecast 220% y-y revenue growth for the substrate segment in 2026F, driven by the surged demand for InP substrate with 444% y-y revenue growth, accounting for 70% (vs. 32% in FY25) of the company's total revenue. Meanwhile, we expect InP/GaAs/Ge substrates to witness CAGRs of 134%/17%/10% in FY26-28F.

Fig. 44: AXT - summary of financial forecasts

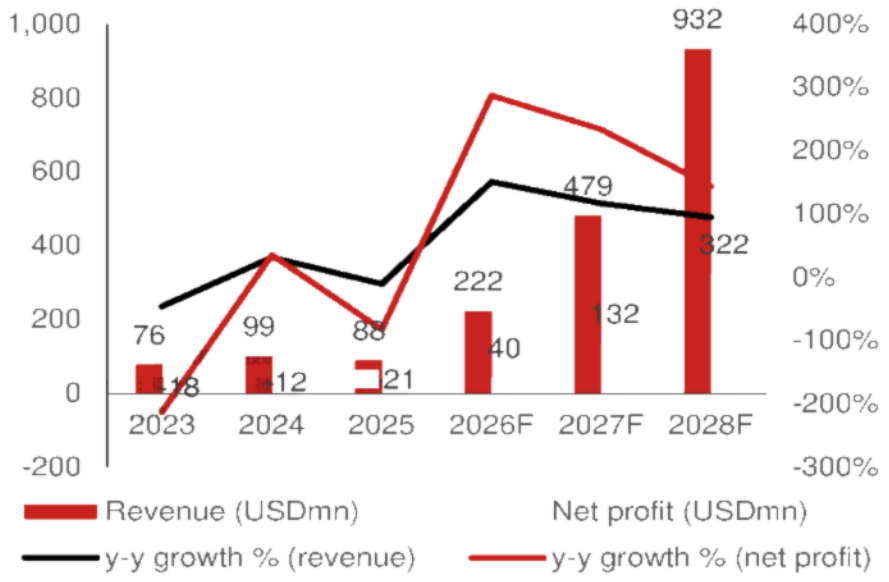
(USD mn)		1Q25 Actual	2Q25 Actual	3Q25 Actual	4Q25 Actual	1Q26 Actual	2Q26 Actual	3Q26 Actual	% change y-y	% change q-q	2024 Actual	2025 Actual	2026F Forecast	2027F Forecast	2028F Forecast
Net revenue		**19.4**	**18.0**	**28.0**	**23.0**	**26.9**	**47.6**	**73.4**	162.6%	54.3%	**99.4**	**88.3**	**221.6**	**479.1**	**931.7**
	y-y	-14.7%	-35.6%	18.2%	-8.2%	39.1%	164.8%	162.6%			*31.1%*	*-11.1%*	*150.9%*	*116.2%*	*94.5%*
COGS		(20.6)	(16.5)	(21.7)	(18.2)	(18.9)	(26.2)	(32.3)	48.7%	23.2%	(75.5)	(77.1)	(126.3)	(249.1)	(447.2)
Gross Profit		**(1.2)**	**1.4**	**6.2**	**4.8**	**8.0**	**21.4**	**41.1**	560.3%	92.3%	**23.8**	**11.2**	**95.3**	**230.0**	**484.5**
	y-y	-120.4%	-81.3%	9.5%	9.5%	-742.9%	1391.3%	560.3%			*79.0%*	*-52.8%*	*747.5%*	*141.4%*	*110.7%*
Selling, General and Administrative Expenses		(5.9)	(5.7)	(6.3)	(6.3)	(6.6)	(7.3)	(8.7)	37.7%	19.7%	(24.1)	(24.2)	(38.5)	(59.2)	(87.2)
R&D Expenses		(3.1)	(2.5)	(1.0)	(2.4)	(3.0)	(3.7)	(3.9)	289.3%	8.1%	(14.5)	(9.0)	(18.3)	(37.1)	(67.5)
Operating profit / (loss)		**(10.3)**	**(6.7)**	**(1.1)**	**(3.8)**	**(1.6)**	**10.4**	**28.4**	n.m	172.6%	**(14.8)**	**(22.0)**	**38.5**	**133.6**	**329.8**
	y-y	*207.0%*	*257.8%*	*-67.0%*	*-37.8%*	*-84.6%*	*-254.6%*	*-2631.3%*			*-31.4%*	*48.5%*	*-275.4%*	*246.7%*	*146.8%*
Profit before taxation		**(9.9)**	**(7.1)**	**(1.2)**	**(3.3)**	**(1.1)**	**15.1**	**34.3**			**(10.7)**	**(21.5)**	**37.7**	**131.8**	**326.2**
Taxation		(0.1)	(0.6)	(0.5)	(0.5)	(0.4)	(2.1)	(4.6)			(1.1)	(1.7)	(2.9)	(10.1)	(25.1)
Non-controlling interest		1.2	0.7	(0.2)	0.3	(0.1)	(1.9)	(4.0)			0.2	1.9	4.9	10.5	20.5
Profit for owners of the company		**(8.8)**	**(7.0)**	**(1.9)**	**(3.5)**	**(1.6)**	**11.1**	**25.7**	n.m	131.1%	**(11.6)**	**(21.3)**	**39.7**	**132.2**	**321.6**
Key ratios															
GPM		-6.4%	8.0%	22.3%	20.9%	29.6%	44.9%	56.0%	33.7pp	11.1pp	24.0%	12.7%	43.0%	48.0%	52.0%
OPEX-to-Sales		46.7%	45.5%	26.3%	37.6%	35.5%	23.0%	17.3%	-9.0pp	-5.7pp	38.9%	37.6%	25.6%	20.1%	16.6%
SG&A		30.6%	31.5%	22.7%	27.2%	24.3%	15.3%	11.9%	-10.8pp	-3.4pp	24.3%	27.4%	17.4%	12.4%	9.4%
R&D expenses		16.1%	14.0%	3.6%	10.4%	11.2%	7.7%	5.4%	1.7pp	-2.3pp	14.6%	10.2%	8.2%	7.7%	7.2%
Capex-to-sales											5.8%	6.8%	6.8%	6.8%	6.8%
Revenue by segment															
Substrate		**11.1**	**11.3**	**21.3**	**15.3**	**19.3**	**37.6**	**63.7**	199.7%	69.6%	**67.7**	**58.9**	**188.6**	**442.7**	**891.8**
	y-y	-34.4%	-42.8%	41.7%	-5.1%	74.0%	232.6%	199.7%			42.7%	-13.1%	220.1%	134.8%	101.4%
InP		3.8	3.6	13.1	8.0	13.6	30.7	54.3	314.3%	76.9%	31.7	28.5	155.1	403.0	846.2
	y-y	-53%	-53%	93%	-12%	259%	748%	314%			43.8%	-9.9%	443.8%	159.8%	110.0%
GaAs		6.7	6.2	7.5	7.0	5.4	6.6	9.1	21.3%	37.9%	28.6	27.4	30.2	36.2	41.6
	y-y	-10%	-32%	13%	30%	-19%	6%	21%			38.9%	-4.1%	10.0%	20.0%	15.0%
Ge		0.6	1.5	0.6	0.2	0.2	0.3	0.3	-46.3%	26.5%	7.5	3.0	3.3	3.6	4.0
	y-y	-57%	-48%	-60%	-86%	-60%	-82%	-46%			58.7%	-60.4%	10.0%	10.0%	10.0%
Raw Material & Others		**8.3**	**6.7**	**6.7**	**7.8**	**7.6**	**10.0**	**9.7**	44.9%	-3.3%	**33.2**	**30.0**	**33.0**	**36.3**	**40.0**
	y-y	43%	-18%	-22%	-14%	-8%	50%	45%			-0.3%	-9.5%	10.0%	10.0%	10.0%

Source: Company data, Nomura estimate

Financial analysis

AXT recorded a -7% revenue CAGR over FY23-25 due to the export control of InP products from the China government since 2025 and weakened demand for both GaAs and Ge substrates, in our view. The company delivered a CAGR of -8% for net profit attributable to shareholders over FY23-25, with net loss of USD21mn in FY25, likely due to declined gross margin led by reduced revenue scale. Driven by the strong demand for optical chips from 800G/1.6T optical transceivers and NPO/CPO, 1H26 revenue increased to USD74.5mn, up 99.6% y-y, and we expect both revenue and earnings growth to accelerate, recording 151%/287% y-y growth in FY26F.

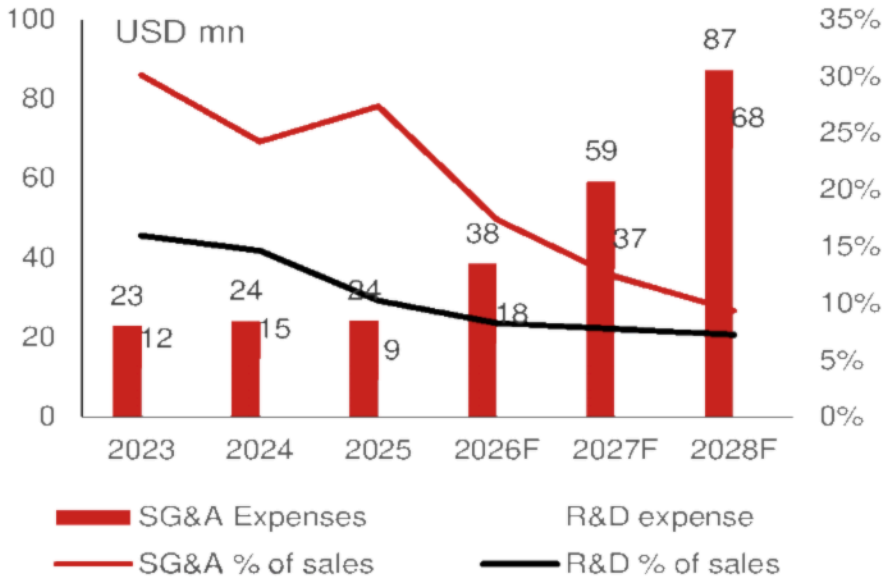
Fig. 45: AXT – revenue/earnings forecasts and growth trend



Source: Company data, Nomura estimates

The company's selling, general and administrative expense ratios declined from 30.1% in FY23 to 15.3% in 2Q26, while its R&D expenses ratio significantly decreased form 15.9% in FY23 to 7.7% in 2Q26, due to a higher revenue growth rate and operating leverage. We estimate both the expense ratios will continue to decline in FY26-28F.

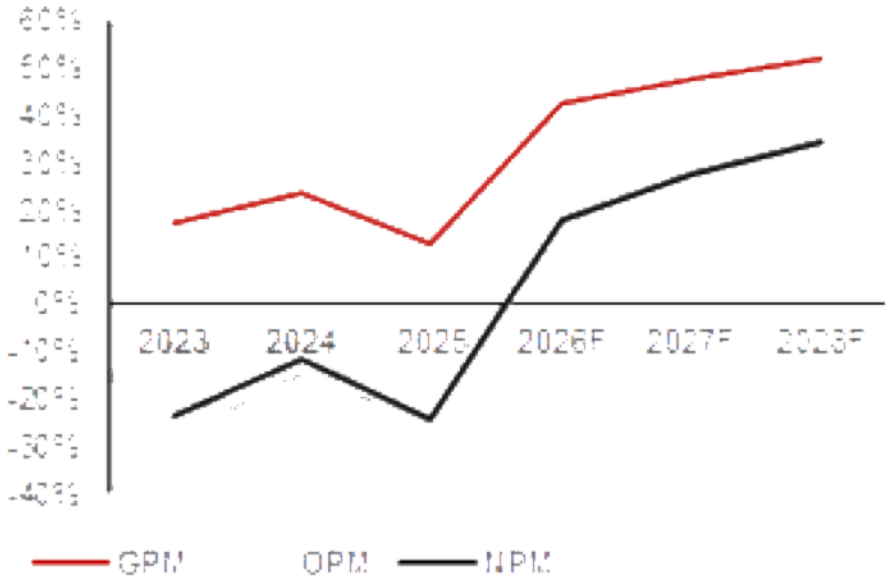
Fig. 46: AXT - expense ratios



Source: Company data, Nomura estimates

The company's blended gross profit margin (GPM) was down in 2025, owing to decreased revenue scale, in our view. However, GPM has improved meaningfully since 2026 due to increased shipment volume and increased contribution from InP substrate with higher margins, in our view. We estimate the company's GPM to continue increasing in FY26-28F, led by: 1) a changing product mix (more contribution from InP substrate); 2) market share gains with ramped-up capacity; and 3) an improving utilization rate driven by improving scale effect. Both operating profit margin (OPM) and net profit margin (NPM) trends have moved in line with the GPM, and we estimate GPM could reach 50% over FY26-28F as its production capacity increases.

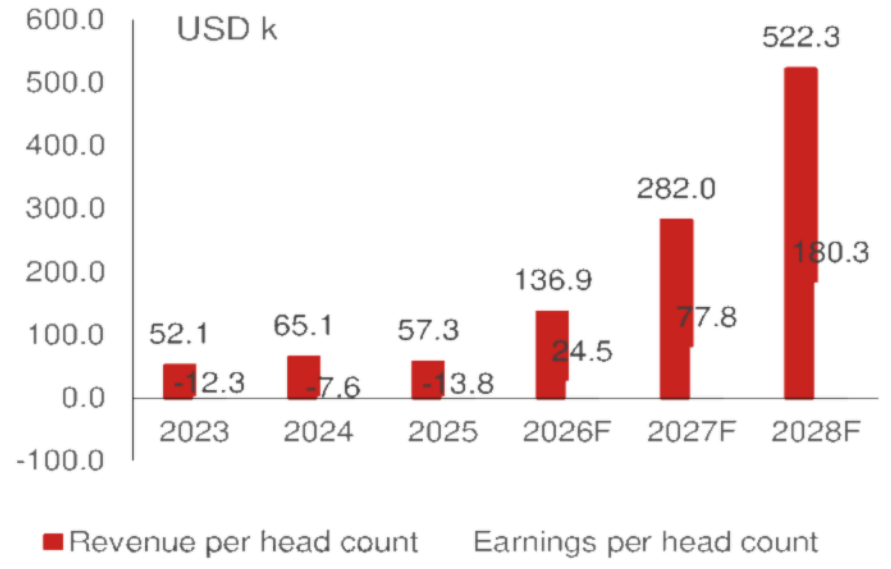
Fig. 47: AXT – GPM, OPM and NPM trends



Source: Company data, Nomura estimates

In terms of operating efficiency, we expect revenue/earnings per headcount to largely improve in FY26-28F due to the accelerated growth of revenue and improved utilization rate. We estimate revenue/earnings per employee to increase to USD0.52mn/USD0.18mn in 2028F.

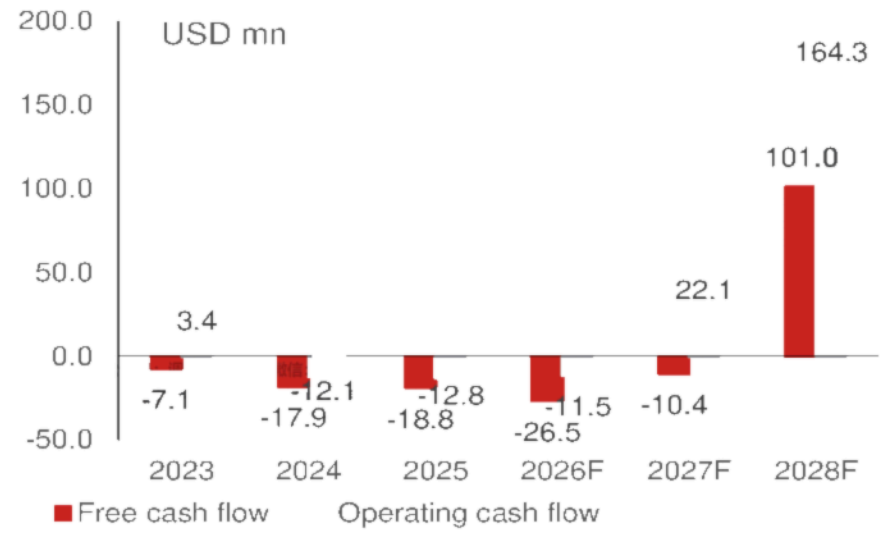
Fig. 48: AXT - revenue and earnings per headcount



Source: Company data, Nomura estimates

The company's operating cash flows decreased during 2023-25 due to declined revenue, and we expect it to turn positive in 2028F. Meanwhile, given the company's large investments to expand production capacity, we expect FCF to remain under pressure in the near-term, and should start registering better ROI from 2028F.

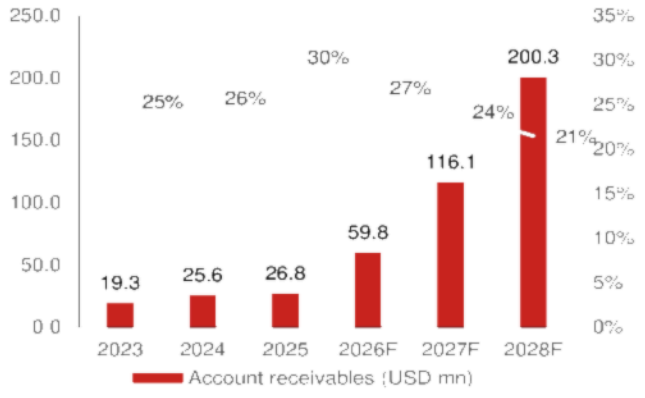
Fig. 49: AXT - OCF and FCF trend



Source: Company data, Nomura estimates

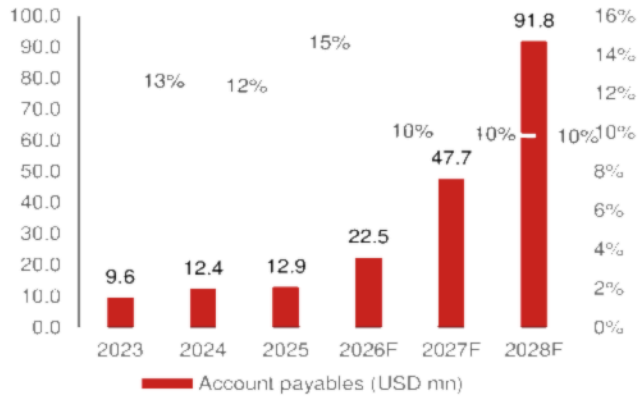
The company's accounts receivable (AR) grew marginally over FY23-25, while AR as a percentage of total assets grew from 25% in 2023 to 30% in 2025. Accounts payable (AP) fluctuated over FY23-25, while AP as a percentage of total revenue increased from 13% in 2023 to 15% in 2025. We expect both the AR-to-sales and AP-to-sales ratios to decrease in line with the company's better liquidity.

Fig. 50: AXT – accounts receivable trend



Source: Company data, Nomura estimates

Fig. 51: AXT – accounts payable trend

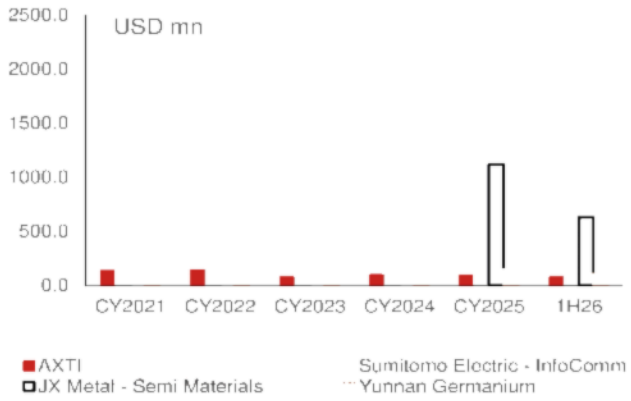


Source: Company data, Nomura estimates

InP substrate sector peer comparison

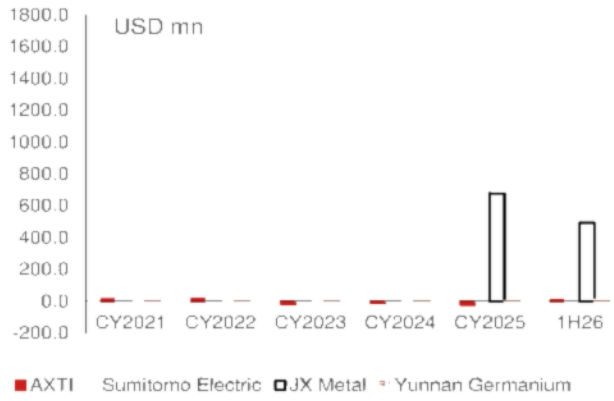
We select Sumitomo Electric, JX Advanced Metals and Yunnan Germanium as peer companies for AXT. We observe that most of these companies' revenues have accelerated since 2026, likely driven by the InP substrate business. We believe net profit grew in line with revenue and AXT's net profit turned positive since 2Q26.

Fig. 52: Peer comparison – revenue trend



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

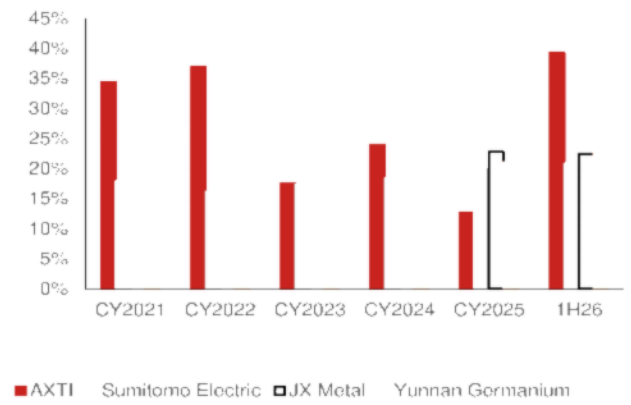
Fig. 53: Peer comparison – net profit trend



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

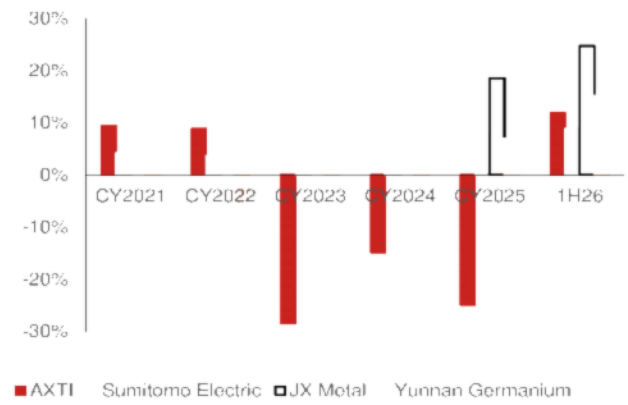
From the perspective of margins, we note that Japanese peers maintain a stable gross margin, while AXT and should record a meaningful improvement in gross margin in 2026F, likely due to the strong demand for high-end InP substrate and increased utilization rate. Thanks to scale effect, most of these companies' operating profit margin also largely increased in 1H26, particularly for AXT and Yunnan Germanium.

Fig. 54: Peer comparison – gross profit margin



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

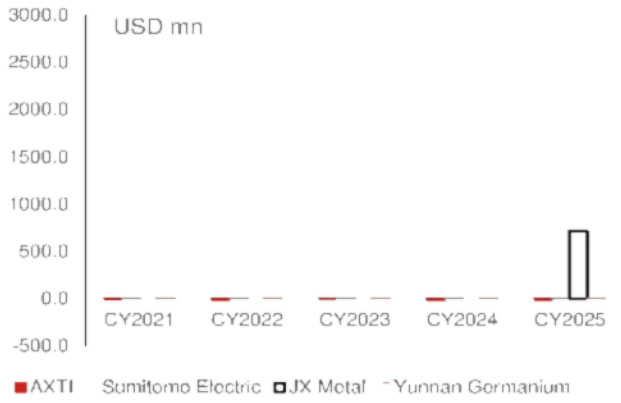
Fig. 55: Peer comparison – operating profit margin



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

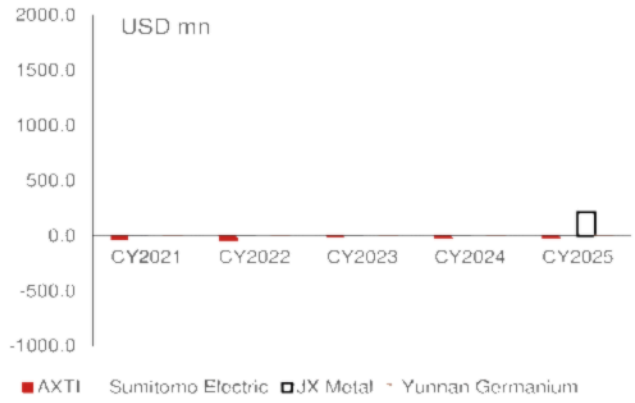
In terms of cash flow, Japanese companies maintained healthy operating cash flows in 1H26, led by their large business scale and dominant position in the InP substrate market, while AXT's OCF largely improved due to high growth in revenue. Additionally, both AXT and Yunnan Germanium recorded negative free cash flow over 2021-25. We think AXT's FCF will continue to be under pressure in 2026-2027F due to proactive capacity expansion.

Fig. 56: Peer comparison – OCF trend



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

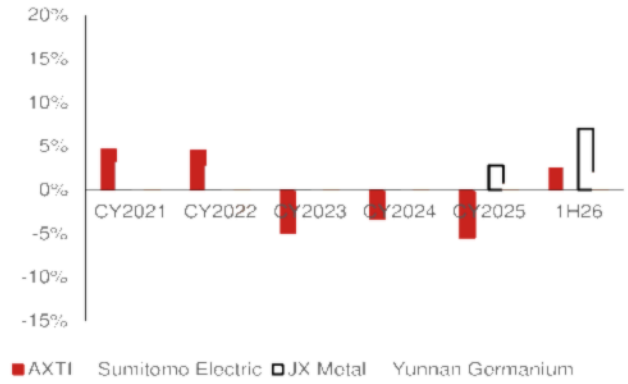
Fig. 57: Peer comparison – FCF trend



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

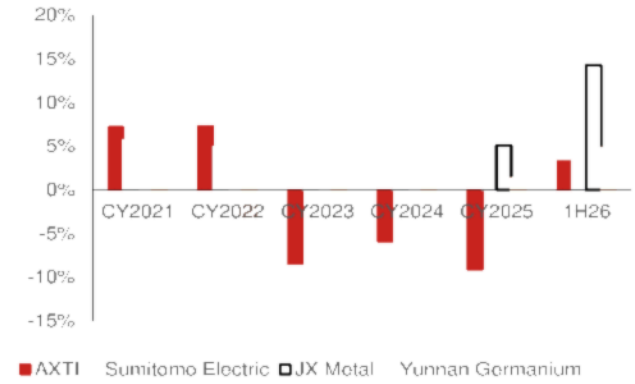
For both ROE and ROA, we think Japanese companies have better shareholder returns, while AXT achieved positive ROA and ROE in 1H26, thanks to better profitability.

Fig. 58: Peer comparison – ROA



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

Fig. 59: Peer comparison – ROE



Note: Japanese companies' fiscal year are ended as March, 31 and financials are adjusted to calendar year
Source: Company data, Nomura research

Valuation and risks

Our TP of USD90 for AXT is based on a DCF model, assuming a WACC of 14.8%, market risk premium of 7.0% and a terminal growth rate of 2.0%, with cash flows discounted back to end-2026F. Our TP implies 44.6x FY27F P/E.

Downside risks include: 1) delays or denials in obtaining export licences for gallium and germanium products from China; 2) potential failure or further delays of its subsidiary Tongmei's IPO; and 3) intensifying competition in the InP market which could lead to pricing pressure and margin compression.

Fig. 60: AXT – DCF valuation

USDmn	2023	2024	2025	2026F	2027F	2028F	2029F	2030F	2031F	2032F	Terminal
Period					1	2	3	4	5	6	
Revenue	76	99	88	222	479	932	1,636	2,511	3,293	3,974	
Profit after tax	(18)	(12)	(21)	40	132	322	610	983	1,350	1,702	
Operating cash flow	3	(12)	(13)	(11)	22	164	305	605	1,029	1,441	
CAPEX	(10)	(6)	(6)	(15)	(33)	(63)	(111)	(170)	(224)	(270)	
FCF	(7)	(18)	(19)	(27)	(10)	101	194	435	805	1,172	9,320
Discount factor					0.87	0.76	0.66	0.58	0.50	0.44	0.44
PV					(9)	77	128	250	403	511	4,067

Assumptions	
Risk-free rate	1.7%
Market risk premium	7.0%
Beta	2.0
Terminal growth rate	2.0%
WACC	14.8%

PV of corporate value		5,427
+ cash		616
- borrowing		(63)
- minority interest		(61)
PV of equity value		5,919
# of ordinary share outstanding		66
Valuation	USD	90

USD
90.0

Source: Company data, Nomura estimates

Our FY26-27F revenue forecasts are in line with Bloomberg consensus, while our FY26-27F earnings forecasts are 25-30% lower than consensus, as we are more conservative on pricing and margin expansion than the market.

Fig. 61: AXT - Nomura vs consensus

USDmn	2025	2026F (NOM)	2026F (CON)	2026F diff	2027F (NOM)	2027F (CON)	2027F diff	2028F (NOM)	2028F (CON)	2028F diff
Revenue	88	222	221.5	0%	479	483	-1%	932	771	21%
Pretax Profit	(22)	38	74	-49%	132	207	-36%	326	363	-10%
Net Profit	(21)	40	57	-30%	132	177	-25%	322	N.A.	
EPS	(0.49)	0.72	0.85	-15%	2.02	2.67	-25%	4.90	6.07	-19%

Source: Bloomberg, Nomura estimates

Sensitivity analysis

We conduct a sensitivity analysis for AXT's FY26-28F financial forecasts. In our bull case scenario, we assume the company could achieve more aggressive market share gains from the substrate sector, delivering 124%/195% revenue/earnings CAGRs in FY26-28F. In the bear case scenario, we assume the company would face more intense competition from globally prominent peers and adverse effect from export control on InP products in China, resulting in slower revenue/ earnings growth in FY26-28F. Moreover, considering the "de-coupling" trend in the US-China AI tech industry, we think the company faces potential risk of global market share erosion with its key global AI customer.

Fig. 62: AXT - sensitivity analysis

	Bear case			Base case			Bull case		
	2026F	2027F	2028F	2026F	2027F	2028F	2026F	2027F	2028F
Sales	204	404	711	222	479	932	239	561	1,196
YtoY	131%	98%	76%	151%	116%	94%	171%	134%	113%
Substrates	177	380	689	189	443	892	200	510	1,130
YtoY	200%	115%	81%	220%	135%	101%	240%	155%	121%
Raw Material & Others	27	24	22	33	36	40	39	51	66
YtoY	-10%	-10%	-10%	10%	10%	10%	30%	30%	30%
Gross Profit	67	154	299	95	230	485	115	297	682
% of sales	33%	38%	42%	43%	48%	52%	48%	53%	57%
Net profit	18	74	180	40	132	322	54	181	468
YtoY	183%	320%	142%	287%	233%	143%	354%	235%	159%
EPS	0.32	1.13	2.74	0.72	2.02	4.90	0.98	2.76	7.14

Source: Company data, Nomura estimates

InP substrate sector peer valuation

Fig. 63: AXT - peers valuation

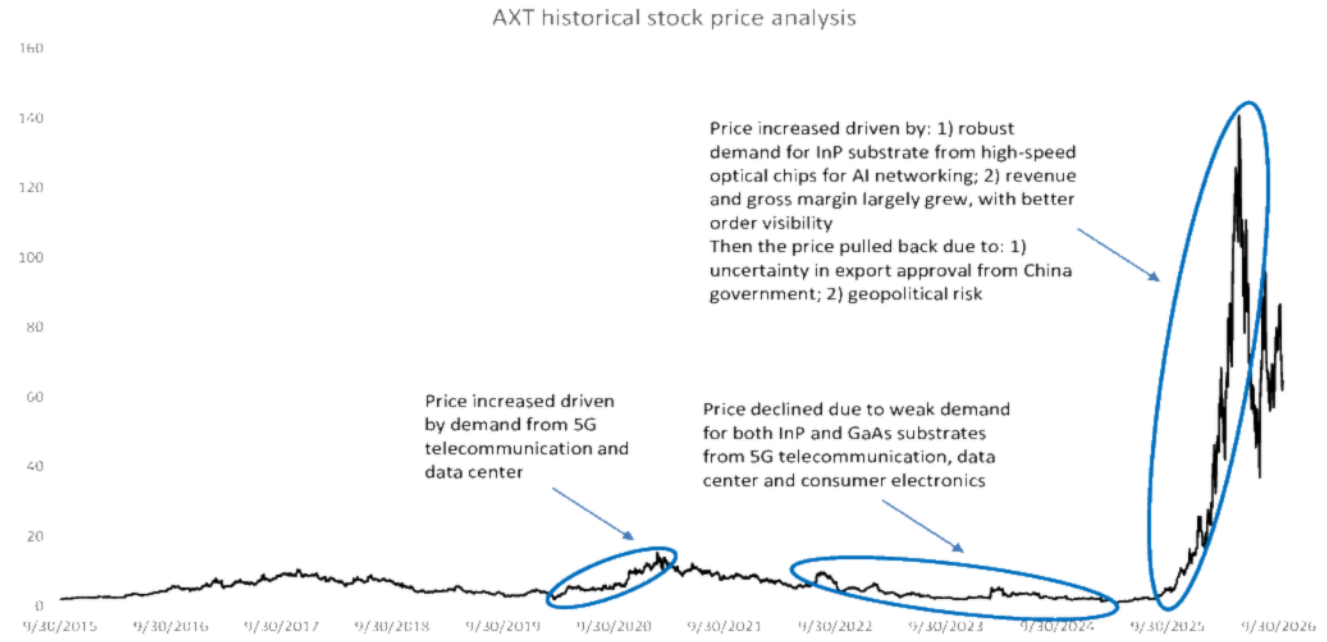
Ticker	Company	Nomura Rating	Price 2-Nov	Target Price	M/Caps USD mn	P/E (x) FY26F	P/E (x) FY27F	P/E (x) FY28F	P/B (x) FY26F	P/B (x) FY27F	ROE FY26F
AXTI US	AXT	Buy	48.2	90.0	3,161	53.4	23.9	9.8	3.7	3.2	9%
5802 JP	Sumitomo Electric	Buy	1,663.0	2,830.0	33,460	14.5	13.1	10.7	1.8	1.7	13%
5016 JP	JX Advanced Metals	Buy	2,926.0	4,800.0	17,595	19.7	16.8	15.3	4.8	3.2	24%
002428 CH	Yunnan Germanium	Not Rated	72.2	-	7,312	224.5	77.5	52.2	29.5	22.7	13%
Global InP substrate sector median						**36.6**	**20.4**	**13.0**	**4.3**	**3.2**	

Source: Company data, Bloomberg L.P. Finance, Nomura estimates. Note: Bloomberg consensus for NR stocks

Historical stock price analysis

AXT was listed on the NASDAQ Market on 21 May 1998. InP and GaAs passed through a short downcycle during 2022-24 due to the weak demand from the telecommunications and consumer electronics segments. The demand for InP substrate started to surge from 2025, driven by the buoyant demand for high-end optical laser chips, leading to AXT's stock price rally of 195% YTD (Nasdaq: +8.3% YTD). The stock price then pulled back 45.6% in the past 60 days (Nasdaq: down 5.7%), due to market concerns about the sustainability of AI investment and geopolitical risks recently, in our view.

Fig. 64: AXT historical stock price analysis



Source: Company data, Nomura research