

BluGlass

Fund-raising and acquisition

BluGlass has raised A\$3.4m through a placement at A\$0.03/share to purchase a laser diode fabrication facility (fab) in California's Silicon Valley. It intends to raise up to A\$7.5m through an entitlement offer to existing shareholders, also at A\$0.03/share, which closes on 12 April 2022 using the proceeds to convert the fab to GaN laser diode production. The transaction is in line with management's stated aim of bringing third-party processes in-house, but BluGlass is proceeding with this much sooner than originally planned because of the opportunity to purchase a fab for a fraction of the price of building a new one.

Purchase of laser diode fabrication facility

BluGlass is to acquire the facility lease and manufacturing equipment of a full-suite InP (indium phosphide) laser diode front- and back-end fab in California. It intends to use the fab for volume manufacture of blue GaN (gallium nitride) laser diodes, potentially including proprietary tunnel junction diodes made using its patented remote plasma chemical vapour deposition (RPCVD) process, which will potentially be higher power and higher brightness than any currently available.

Accelerating volume ramp-up of laser diodes

Longer term, the proposed transaction will quadruple the volume of laser diodes that BluGlass can sell. BluGlass is one of only four end-to-end GaN laser diode manufacturers globally, so the capacity expansion will potentially enable it to take a larger share of a market that Strategies Unlimited forecasts will reach US\$735m by 2025. Management expects that bringing third-party processes in-house will improve gross margins longer term. Importantly, it will enable BluGlass to complete design iterations more quickly, thus potentially reducing the time it will take to bring the next generation of higher power laser diodes to market and maximising the market opportunity.

Valuation: Acquiring fab for a fraction of the cost of building a new one

Of the A\$10.9m that BluGlass intends to raise, A\$9.3m will be allocated to purchasing the facility and adapting it to GaN laser diode production, with the remainder earmarked for operational expenditure and recruitment. Management estimates that it would cost c US\$40m (A\$54m) to build an equivalent facility.

Historical data

Year end	Revenue (A\$m)	EBITDA (A\$m)	PBT* (A\$m)	EPS* (c)	DPS (c)	P/E (x)
06/18	0.7	(3.8)	(3.8)	(0.97)	0.00	N/A
06/19	0.4	(5.1)	(5.1)	(1.21)	0.00	N/A
06/20	0.7	(3.6)	(4.8)	(1.01)	0.00	N/A
06/21	0.4	(4.6)	(6.8)	(0.94)	0.00	N/A

Source: Company data. *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

Tech hardware & equipment

28 March 2022

Price **A\$0.031**
Market cap **A\$31m**

Share price graph



Share details

Code	BLG
Listing	ASX
Shares in issue (prior to placing)	1,005.2m
Net cash (A\$m) at end December 2021 excluding finance leases	6.2m

Business description

BluGlass is an Australian technology company that is developing and commercialising a breakthrough compound semiconductor technology for the production of high-efficiency GaN laser diodes.

Bull

- Strong demand for GaN laser diodes.
- BluGlass's proprietary technology provides a route to making higher power laser diodes.
- Proposed acquisition represents a highly cost-effective route for bringing processing steps in-house.

Bear

- BluGlass has yet to finish resolving reliability issues with its first-generation laser diodes.
- Higher power RPCVD devices still under development.
- Proposed acquisition substantially increases the cost base for up to 12 months.

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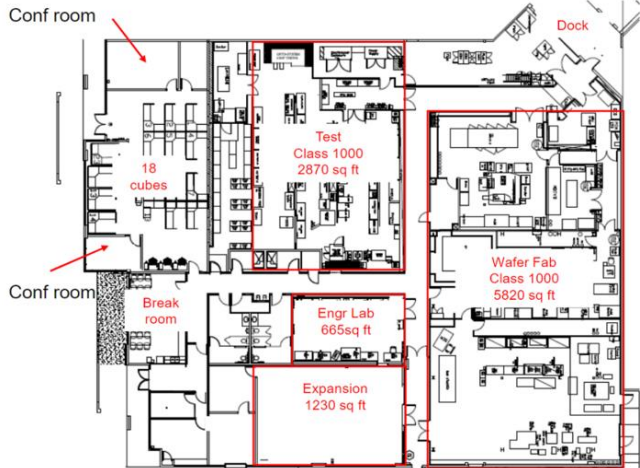
Opportunity to acquire working laser diode fab

Exhibit 1: Compound semiconductor fab in California



Source: BluGlass

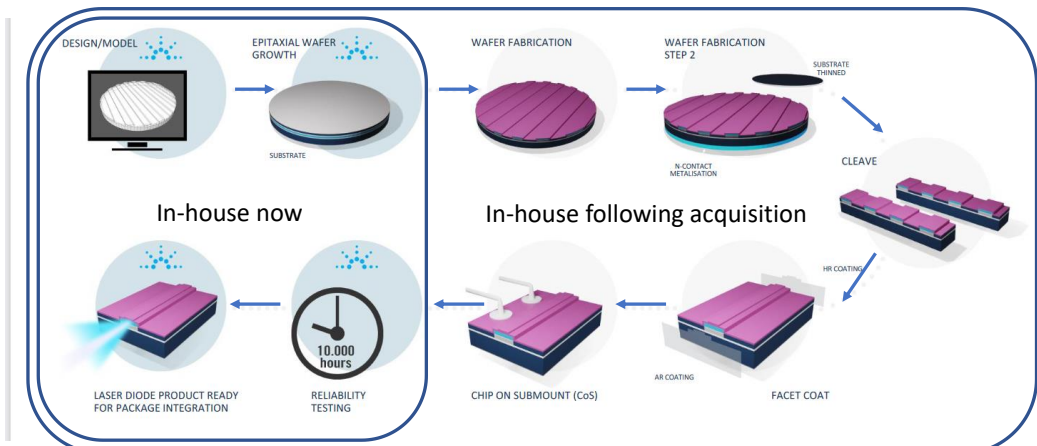
Exhibit 2: Floorplan of compound semiconductor fab



Source: BluGlass

BluGlass has agreed terms to acquire the facility lease and manufacturing equipment of a laser diode fab in Fremont, California. The fab is currently manufacturing indium phosphide (InP) laser diodes for high-speed telecoms/datacoms applications on 2" and 4" diameter wafers (BluGlass's Silverwater facility processes 2" wafers) but the work is being moved to a different location. The fab takes in epitaxial wafers that already have deposited on them the multiple layers of compound semiconductor material forming the active part of laser diodes. The fab then adds the conductive metal layers that are required to complete the laser diode structure to the top of the epitaxial wafer, cuts the wafers into individual die, coats the sides of the die where the laser light is emitted, mounts the die into packages and tests them. The fab therefore has the ability to carry out the processing steps on laser diodes that BluGlass currently has to outsource, and can potentially provide additional capacity for steps such as testing, which BluGlass currently carries out in-house (see Exhibit 3). The Fremont fab already has the infrastructure in place to add additional deposition equipment for future growth.

Exhibit 3: Demonstration of RPCVD-grown RGB LEDs fabricated into devices



Source: BluGlass

BluGlass intends to adapt the Fremont process so it is suitable for making GaN laser diodes rather than InP diodes. It has already made contingent offers to key personnel, including laser fabrication

engineers, wafer processing technicians and facility and maintenance people familiar with the equipment.

The facility lease and manufacturing equipment are being acquired for US\$2.5m (c A\$3.3m) made up of US\$2.0m cash and US\$0.5m in new BluGlass shares. BluGlass expects to spend A\$3.5m, which includes working capital, adapting the facility for GaN laser diode production, which management estimates will take up to six months with an additional US\$1.8m (A\$2.5m) needed for coating equipment and reliability burn-in racks for volume production. Management estimates that it would cost c US\$40m (A\$54m) to build an equivalent facility.

Accelerating strategy

In-house capability speeds up the design of new laser diodes

BluGlass is currently addressing the reliability issues that have delayed the launch of its first blue laser diode products, which were expected to be available in 2021, by around a year. Problems with the third-party processing steps (see Exhibit 3) meant that the performance of the initial laser diodes degraded over time. Since identifying the issue, the company has strengthened its laser diode capability, for example appointing industry expert Jim Haden as President in September 2021, and progressed multiple design and development iterations of devices through the supply chain. As a result of this intensive activity, it has been able to demonstrate significant performance improvements across four prototypes: the 405nm and 420nm laser diodes in both single-mode and multi-mode devices, keeping the company on track to meet its revised goal of launching its first direct-to-market laser diodes in mid-calendar 2022.

The issue has highlighted that the length of time taken for a complete design iteration when relying on third parties means that only four or five full iterations can be carried out in a year (see Exhibit 4). Bringing the third-party processing steps in-house (see Exhibit 3) through the acquisition of the Fremont fab would enable BluGlass to complete up to 48 full iterations in a year. Acquiring the Fremont fab would not change the length of time required to solve the reliability issues with BluGlass's first-generation laser diodes as the company intends to continue to work with its existing contract manufacturers for up to 12 months while the Fremont fab is transitioned to GaN manufacture. However, it would substantially reduce the time it will take to bring the next generation of RPCVD tunnel junction laser diodes to market. BluGlass's next generation laser diodes will potentially be higher power and higher brightness than any currently available from competitors, so management is keen to bring them to market quickly to maximise the market opportunity. Having the in-house capability will also speed-up the development of green and ultra-violet laser diodes and enable BluGlass to progress multiple development programmes in parallel.

Improving revenues and profits from laser diodes

Exhibit 4: Financial benefits of proposed transaction

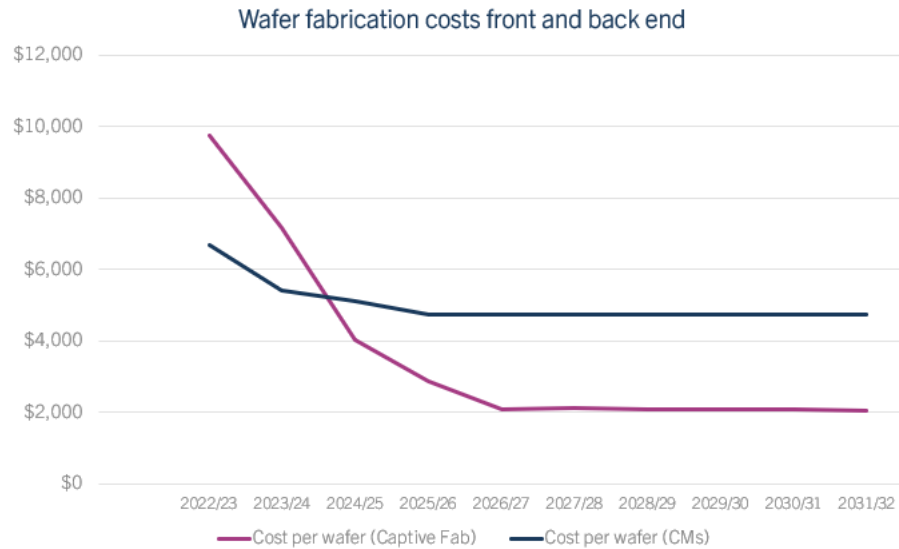
Metric	Contract manufacturer model	Owned-fab model
Annual epitaxial wafer capacity (Silverwater, Australia)	c 10,000 wafers	c 10,000 wafers
Annual wafer capacity	c 2,500 wafers	c 10,000 wafers
Annual development iteration capacity	c 4–5 full iterations +10s of short loops	<48 full iterations +100s of short loops
Annual revenue	c US\$40m	c US\$160m
Estimated gross margin	c 30%	c 45%
Cash flow positive		Year ending June 2025 (FY25)

Source: Company data.

Longer-term, bringing the third-party steps in-house would potentially have a highly beneficial impact on revenues and profits, quadrupling revenues and halving wafer production costs as BluGlass would not be sharing profits with contract manufacturers. The potential impact is summarised in Exhibit 4. Initially the additional cost associated with operating the Fremont facility

would increase the cost per complete wafer, but the cost/wafer ratio will reduce as production scales. Management estimates that the production cost crossover would be reached in calendar 2024 (see Exhibit 5). As discussed in [our initiation report](#), management has previously stated its intention of bringing processes in-house to improve margins, so the proposed acquisition is accelerating this aspect of its strategy.

Exhibit 5: Wafer fabrication costs



Source: BluGlass

Location in Silicon Valley

The acquisition potentially gives BluGlass an operating site in Silicon Valley, complementing its epitaxial wafer manufacturing facility in Australia and its testing facility in the Boston area of the US. Having a GaN manufacturing facility in the United States puts BluGlass in a much better position for winning US defence and government contracts and takes it closer to potential customers in key target markets such as miniaturised medical diagnostic devices, LiDAR and augmented reality/virtual reality. These applications and others are reviewed in our thematic report, [Laser diodes – may the force be with you](#). Being in Silicon Valley will give BluGlass access to an exceptional talent pool including highly specialist engineers with laser diode expertise as well as better access to potential investors with in-depth understanding of the semiconductor sector.

Financing the proposed acquisition

Exhibit 6: Timeline

Event	Date
Offer announced	24 March 2022
Record date	29 March 2022
Entitlement offer opens	1 April 2022
Entitlement offer closes	5pm AEST, 12 April 2022
Allotment of new shares	29 April 2022

Source: Company data. Note: AEST = Australian Eastern Standard Time.

BluGlass intends to raise up to A\$10.9m (gross) to finance the transaction. As noted above, A\$9.3m of this will be allocated to purchasing the facility and adapting it to GaN laser diode production. It has also identified US\$2.5m (A\$3.3m) required for operational expenditure and recruitment. BluGlass has raised A\$3.4m at A\$0.03/share through a placing of 114.2m new shares to existing and new sophisticated and institutional investors, including institutional investors in both Australia

and the US. In addition, it intends to raise up to A\$7.5m (gross) through a non-renounceable 1:4 entitlement offer to eligible BluGlass shareholders, which will close on 12 April 2022 (see Exhibit 6), also at A\$0.03/share. This will potentially result in the issue of 251.3m new shares. BluGlass also intends to carry out a pro-rata bonus options issue once the entitlement offer has completed. All eligible shareholders will receive one free listed bonus option for every eight shares they hold on the bonus options record date, with a strike price of \$0.03.

Exhibit 7: Financial summary

	A\$'000s	2018	2019	2020	2021
		AASB	AASB	AASB	AASB
30-June					
INCOME STATEMENT					
Revenue		714	425	656	364
Cost of Sales (excluding direct labour)		(1,158)	(1,745)	(1,898)	(3,070)
Gross Profit		(444)	(1,320)	(1,242)	(2,707)
EBITDA		(3,750)	(5,109)	(3,616)	(4,624)
Operating profit (before amort. and excepts.)		(3,941)	(5,287)	(4,687)	(6,757)
Amortisation of acquired intangibles		0	0	0	0
Exceptionals		0	(8,695)	0	0
Share-based payments		(56)	(674)	(1,237)	536
Reported operating profit		(3,997)	(14,656)	(5,925)	(6,221)
Net Interest		157	236	(69)	(78)
Profit Before Tax (norm)		(3,784)	(5,052)	(4,757)	(6,835)
Profit Before Tax (reported)		(3,840)	(14,421)	(5,994)	(6,298)
Reported tax		0	0	0	0
Profit After Tax (norm)		(3,784)	(5,052)	(4,757)	(6,835)
Profit After Tax (reported)		(3,840)	(14,421)	(5,994)	(6,298)
Average Number of Shares Outstanding (m)		389.4	418.3	473.1	724.6
EPS - normalised (c)		(0.97)	(1.21)	(1.01)	(0.94)
EPS - normalised fully diluted (c)		(0.97)	(1.21)	(1.01)	(0.94)
EPS - basic reported (c)		(0.99)	(3.45)	(1.27)	(0.87)
Dividend (c)		0.00	0.00	0.00	0.00
Revenue growth (%)		29.8%	-40.5%	54.5%	-44.6%
EBITDA Margin (%)		N/A	N/A	N/A	N/A
Normalised Operating Margin		N/A	N/A	N/A	N/A
BALANCE SHEET					
Fixed Assets		8,954	5,395	7,883	5,840
Intangible Assets		8,695	0	0	0
Tangible Assets		259	5,395	7,883	5,840
Investments & other		0	0	0	0
Current Assets		17,716	8,558	8,547	7,718
Stocks		54	137	140	131
Debtors		2,253	2,262	2,919	3,351
Cash & cash equivalents		15,354	6,116	5,430	4,176
Other		55	43	58	59
Current Liabilities		(963)	(1,003)	(1,154)	(3,378)
Creditors		(530)	(473)	(408)	(566)
Lease liabilities		0	0	(168)	(184)
Short term borrowings (excluding lease liabilities)		0	0	0	(1,954)
Provisions		(433)	(530)	(578)	(674)
Long Term Liabilities		(318)	(1,306)	(2,882)	(2,670)
Long term borrowings (excluding lease liabilities)		0	0	0	0
Provisions and lease liabilities		(318)	(1,306)	(2,882)	(2,670)
Net Assets		25,389	11,644	12,393	7,509
Minority interests		0	0	0	0
Shareholders' equity		25,389	11,644	12,393	7,509
CASH FLOW					
Operating Cash Flow		(3,514)	(4,931)	(4,348)	(4,809)
Capex		(114)	(4,308)	(1,681)	(90)
Acquisitions/disposals		0	0	0	0
Net interest		0	0	(9)	0
Equity financing		10,471	1	5,507	1,859
Dividends		0	0	0	0
Other		0	0	0	0
Net Cash Flow		6,843	(9,237)	(532)	(3,040)
Opening net debt/(cash)		(8,511)	(15,354)	(6,116)	(5,430)
FX		0	0	0	0
Other non-cash movements		0	0	(154)	(168)
Closing net debt/(cash)		(15,354)	(6,116)	(5,430)	(2,222)

Source: Company accounts

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