

28 January 2022

December Quarter Activities Update

Highlights

- **Laser diode progress:**
 - Demonstrated performance improvements on 405nm and 420nm single-mode and multi-mode devices
 - Continued progress towards delivering four key components needed for reliable laser diodes
 - Exhibited latest laser diode performance data at leading industry conference, Photonics West
- Secured six-month epitaxy foundry agreement with European wafer developer for power electronics applications

Australian semiconductor developer BluGlass Limited (**ASX: BLG**) provides the following update and Appendix 4C Quarterly Report for the three months ended 31 December 2021 (Q2 FY22).

Laser diode progress

BluGlass continues to optimise the four key components for reliable laser diodes – epitaxy, metals, facets, and bonds - to solve its reliability challenges and launch its first commercial products in the 405nm, 420nm and 450nm wavelengths.

During the quarter, BluGlass demonstrated significant performance improvements across four laser diode prototypes: the 405nm and 420nm laser diodes in both single-mode and multi-mode devices. These laser diode prototypes are benefitting from improvements with front and back-end manufacturing processes, including improved cleave processes (creating the laser facets) and improved bonding. Efficient thermal mechanical bonds are critical to reliability, to enable heat dissipation away from the device and enabling long-term high performance.

Reliability testing of these prototype devices is ongoing. In parallel, multiple design and development iterations with further improved epitaxy, metals, facets and bonding designs are progressing through BluGlass' manufacturing supply chain. Featuring improvements to metals, AR and HR coatings, bonds and packaging. These iterations are undergoing extensive analysis, including short-loop development cycles, to speed prototyping and validate and refine each component before reliability testing of these improved device designs can commence.

In addition to better performing laser diodes, improvements to BluGlass' manufacturing processes and supply chain are delivering higher manufacturing yields.

Jim Haden, BluGlass President, said, "We have made significant technical progress during the quarter and continue to work towards qualifying the four key elements needed to launch commercial laser diodes with good reliability performance. The strong performance of our latest prototypes is very encouraging, demonstrating that we are progressing towards commercialisation with high quality products to meet our customer expectations. As we continue to iron out downstream production challenges, we are also further improving our laser diode product design, processing, yield and product variations. We are utilising shorter feedback loops with in-line metrics to fast-track iteration testing with our contract manufacturers while qualifying and preparing our supply chain for volume manufacturing."

Latest laser diode performance data released at Photonics West

In January, BluGlass released the latest performance data for four of its laser diode products at the 2022 SPIE Photonics West conference in San Francisco, USA. Photonics West is the leading global event for the photonics and laser industries, generally attracting 22,000 specialist attendees from across the laser, biomedical optics, and optoelectronics sectors.

BluGlass showcased its 405nm 250mW single-mode, 405nm 1W multi-mode and 420nm 250mW single-mode laser diodes as well as preliminary data for its 420nm 3W multi-mode laser diode (pulsed results), all of which are demonstrating commercial light-output results.

“While reliability testing of our initial product suite is ongoing, feedback from potential customers at Photonics West has been very positive on both our development progress and the underserved market potential. We look forward to progressing these discussions over the coming months, as we launch sample products ahead of commercialisation,” said BluGlass President Jim Haden.

Commercialisation strategy

BluGlass is one of a handful of end-to-end gallium nitride (GaN) laser diode manufacturers globally, operating in a market forecast to reach US\$2.5 billion by 2025. Within the GaN laser diode market, BluGlass is targeting the industrial, scientific and biotech verticals which spans applications such as industrial cutting and welding, 3D printing, quantum computing and medical diagnostics. These three verticals are expected to account for US\$735 million of the broader GaN laser market by 2025. BluGlass’ existing epitaxy capacity can currently address a quarter of this market.

In the short-term, BluGlass remains focused on launching its first direct-to-market laser diodes in the in-demand and underserved 405nm, 420nm and 450nm wavelengths. BluGlass aims to increase market share over the long-term by providing the industry’s easiest-to-use laser light, offering unique form factors and integrated packages that significantly reduce customer integration costs. BluGlass’ proposition solves a key customer challenge as existing large players do not provide flexible form factors, requiring customers to undertake significant customisation and post-purchase packaging. BluGlass will also develop novel laser architectures, including multi-chip modules and its proprietary RPCVD-enhanced lasers, to achieve brighter, higher efficiency and higher power laser light.

Laser Diode Product Pipeline

	Demonstrated	In Development	Next Generation
Violet	405nm MM - 1W SM - 100-200mW	MM - 1.2W SM - 250mW	
	420nm MM - 1W SM - 100-200mW	SM - 250mW	MM - 1.8W
Blue	450nm	MM - 1.6W SM - 100-250mW	MM - 3.5W MM - 5W
	470nm		MM - 2W
	488nm		
Green	525nm	SM - 100-200mW	MM - 1.5 - 2W SM - 100-200mW

MM: Multi Mode
SM: Single Mode

Foundry contract

BluGlass has recently commenced MOCVD epitaxy foundry services for a European wafer developer to develop custom power electronics applications. The paid R&D development contract will generate foundry revenue for BluGlass over the next two quarters, commencing January 2022. This contract has the potential to grow to significant revenue and become a commercial manufacturing agreement on the achievement of program milestones and growing customer demand for the power electronic and other applications.

Financials

BluGlass' total expenditure in Q2 FY22 was \$2,515k. Research and development expenses, including materials and fabrication costs, accounted for \$1,943k while non-R&D related staff costs totalled \$190k. Payments to related parties in Q2 FY22 were \$99k, comprising Executive Chair and Non-Executive Director fees. Cash at the end of the quarter was \$6.246 million.

Activity Undertaken	Amount paid during the Quarter \$'000
Laser Diode product development	\$1,856k
Micro LED and LED research and development	\$13k
RPCVD equipment development	\$74k
Total direct expenditure	\$1,943

Outlook

In Q3 FY22, BluGlass will continue to optimise its laser diodes development and solve its reliability challenges ahead of launching the Company's first commercial laser diode products. There is significant unmet demand in the market and the Company has confirmed strong customer interest with prospective customers and collaborative partners.

"Our technical priorities are the validation of our laser diode products and supply chain processes ahead of delivering reliable laser diodes to market.

"Longer term, we have a clear growth strategy built around brighter, better performing and easier-to-use laser light. Our differentiated product offering, manufacturing flexibility, and novel device architectures will enable us to not only compete with the large incumbent players but to gain market share. Improvements to our supply chain management are already underway and over time we will bring key operational processes in-house to increase our competitive advantages and reduce reliance on third-party suppliers," said President Jim Haden.

This announcement has been approved for release by the BluGlass Board.

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About BluGlass

Developing leading-edge semiconductor manufacturing technology and devices for more than a decade, **BluGlass Limited (ASX:BLG)** is a provider to the global GaN photonics industries, delivering cutting-edge, custom **laser diode** and LED development across the industrial, defence, display, and scientific markets.

Listed on the ASX, we are an Australian public company established to power the smarter, cleaner, more efficient photonics of tomorrow with our proprietary low temperature, low hydrogen, **remote plasma chemical vapour deposition** (RPCVD) manufacturing technology.

Backed by an extensive network of supply-chain partners, BluGlass is developing a suite of laser diode products, from small batch custom lasers through to high-volume and off the shelf products.

Appendix 4C

Quarterly cash flow report for entities subject to Listing Rule 4.7B

Name of entity

BluGlass Limited

ABN

20 116 825 793

Quarter ended ("current quarter")

December 2021

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (6 months) \$A'000
1. Cash flows from operating activities		
1.1 Receipts from customers	72	116
1.2 Payments for		
(a) research and development	(1,129)	(2,320)
(b) product manufacturing and operating costs	-	-
(c) advertising and marketing	(1)	(4)
(d) leased assets	(122)	(230)
(e) staff costs	(1,111)	(2,536)
(f) administration and corporate costs	(152)	(343)
1.3 Dividends received (see note 3)		
1.4 Interest received	-	-
1.5 Interest and other costs of finance paid	-	(32)
1.6 Income taxes paid	-	-
1.7 Government grants and tax incentives	3,423	3,648
1.8 Other (provide details if material)	-	-
1.9 Net cash from / (used in) operating activities	980	(1,701)
2. Cash flows from investing activities		
2.1 Payments to acquire or for:		
(a) entities	-	-
(b) businesses	-	-
(c) property, plant and equipment	(367)	(393)
(d) investments	-	-
(e) intellectual property	-	-
(f) other non-current assets	-	-

Consolidated statement of cash flows		Current quarter \$A'000	Year to date (6 months) \$A'000
2.2	Proceeds from disposal of:		
	(a) entities	-	-
	(b) businesses	-	-
	(c) property, plant and equipment	-	-
	(d) investments	-	-
	(e) intellectual property	-	-
	(f) other non-current assets	-	-
2.3	Cash flows from loans to other entities	-	-
2.4	Dividends received (see note 3)	-	-
2.5	Other (provide details if material)	-	-
2.6	Net cash from / (used in) investing activities	(367)	(393)

3.	Cash flows from financing activities		
3.1	Proceeds from issues of equity securities (excluding convertible debt securities)	-	6,410
3.2	Proceeds from issue of convertible debt securities	-	-
3.3	Proceeds from exercise of options	-	-
3.4	Transaction costs related to issues of equity securities or convertible debt securities	-	(271)
3.5	Proceeds from borrowings	-	-
3.6	Repayment of borrowings	-	(1,953)
3.7	Transaction costs related to loans and borrowings	-	-
3.8	Dividends paid	-	-
3.9	Other (provide details if material)	-	-
3.10	Net cash from / (used in) financing activities	-	4,186

4.	Net increase / (decrease) in cash and cash equivalents for the period		
4.1	Cash and cash equivalents at beginning of period	5,647	4,176
4.2	Net cash from / (used in) operating activities (item 1.9 above)	980	(1,701)
4.3	Net cash from / (used in) investing activities (item 2.6 above)	(367)	(393)

Consolidated statement of cash flows		Current quarter \$A'000	Year to date (6 months) \$A'000
4.4	Net cash from / (used in) financing activities (item 3.10 above)	-	4,186
4.5	Effect of movement in exchange rates on cash held	(14)	(22)
4.6	Cash and cash equivalents at end of period	6,246	6,246

5.	Reconciliation of cash and cash equivalents at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	Current quarter \$A'000	Previous quarter \$A'000
5.1	Bank balances	267	174
5.2	Call deposits	5,979	5,473
5.3	Bank overdrafts	-	-
5.4	Other (provide details)	-	-
5.5	Cash and cash equivalents at end of quarter (should equal item 4.6 above)	6,246	5,647

6.	Payments to related parties of the entity and their associates	Current quarter \$A'000
6.1	Aggregate amount of payments to related parties and their associates included in item 1	99
6.2	Aggregate amount of payments to related parties and their associates included in item 2	-
<i>Note: if any amounts are shown in items 6.1 or 6.2, your quarterly activity report must include a description of, and an explanation for, such payments.</i>		

Quarterly cash flow report for entities subject to Listing Rule 4.7B

7. Financing facilities	Total facility amount at quarter end \$A'000	Amount drawn at quarter end \$A'000
<i>Note: the term "facility" includes all forms of financing arrangements available to the entity.</i>		
<i>Add notes as necessary for an understanding of the sources of finance available to the entity.</i>		
7.1 Loan facilities	-	-
7.2 Credit standby arrangements	-	-
7.3 Other (please specify)	-	-
7.4 Total financing facilities	-	-
7.5 Unused financing facilities available at quarter end		-
7.6 Include in the box below a description of each facility above, including the lender, interest rate, maturity date and whether it is secured or unsecured. If any additional financing facilities have been entered into or are proposed to be entered into after quarter end, include a note providing details of those facilities as well.		

8. Estimated cash available for future operating activities	\$A'000
8.1 Net cash from / (used in) operating activities (item 1.9)	980
8.2 Cash and cash equivalents at quarter end (item 4.6)	6,246
8.3 Unused finance facilities available at quarter end (item 7.5)	-
8.4 Total available funding (item 8.2 + item 8.3)	6,246
8.5 Estimated quarters of funding available (item 8.4 divided by item 8.1)	N/A
<i>Note: if the entity has reported positive net operating cash flows in item 1.9, answer item 8.5 as "N/A". Otherwise, a figure for the estimated quarters of funding available must be included in item 8.5.</i>	
8.6 If item 8.5 is less than 2 quarters, please provide answers to the following questions:	
8.6.1 Does the entity expect that it will continue to have the current level of net operating cash flows for the time being and, if not, why not?	
Answer: N/A	
8.6.2 Has the entity taken any steps, or does it propose to take any steps, to raise further cash to fund its operations and, if so, what are those steps and how likely does it believe that they will be successful?	
Answer: N/A	
8.6.3 Does the entity expect to be able to continue its operations and to meet its business objectives and, if so, on what basis?	
Answer: N/A	
<i>Note: where item 8.5 is less than 2 quarters, all of questions 8.6.1, 8.6.2 and 8.6.3 above must be answered.</i>	

Compliance statement

- 1 This statement has been prepared in accordance with accounting standards and policies which comply with Listing Rule 19.11A.
- 2 This statement gives a true and fair view of the matters disclosed.

Date: 28 January 2022

Authorised by: By the board
(Name of body or officer authorising release – see note 4)

Notes

1. This quarterly cash flow report and the accompanying activity report provide a basis for informing the market about the entity's activities for the past quarter, how they have been financed and the effect this has had on its cash position. An entity that wishes to disclose additional information over and above the minimum required under the Listing Rules is encouraged to do so.
2. If this quarterly cash flow report has been prepared in accordance with Australian Accounting Standards, the definitions in, and provisions of, *AASB 107: Statement of Cash Flows* apply to this report. If this quarterly cash flow report has been prepared in accordance with other accounting standards agreed by ASX pursuant to Listing Rule 19.11A, the corresponding equivalent standard applies to this report.
3. Dividends received may be classified either as cash flows from operating activities or cash flows from investing activities, depending on the accounting policy of the entity.
4. If this report has been authorised for release to the market by your board of directors, you can insert here: "By the board". If it has been authorised for release to the market by a committee of your board of directors, you can insert here: "By the [name of board committee – eg Audit and Risk Committee]". If it has been authorised for release to the market by a disclosure committee, you can insert here: "By the Disclosure Committee".
5. If this report has been authorised for release to the market by your board of directors and you wish to hold yourself out as complying with recommendation 4.2 of the ASX Corporate Governance Council's *Corporate Governance Principles and Recommendations*, the board should have received a declaration from its CEO and CFO that, in their opinion, the financial records of the entity have been properly maintained, that this report complies with the appropriate accounting standards and gives a true and fair view of the cash flows of the entity, and that their opinion has been formed on the basis of a sound system of risk management and internal control which is operating effectively.