

25 July 2023

## June Quarter Activities Update

### Highlights

- Showcased enhanced gallium nitride lasers and a new ultra-violet 397nm alpha product at Laser World of Photonics
- Secured new GaN laser orders for testing in quantum sensing and surgical applications
- Vertical integration nearing completion with downstream processes from four contract manufacturers transferred to BluGlass' Silicon Valley fab
- Demonstrated significant improvements to its GaN Distributed Feedback Lasers

Global semiconductor developer BluGlass Limited (**ASX: BLG**) provides the following update and Appendix 4C Quarterly Report for the three months ended 30 June 2023 (Q4 FY23).

### Showcased enhanced GaN lasers

During the quarter, BluGlass presented enhanced performance data for its gallium nitride (GaN) lasers at leading European industry conference, Laser World of Photonics. Since the launch of its first laser products in January, BluGlass has significantly improved light emission, power conversion efficiencies, and voltage across its violet (405nm and 420nm) and blue (450nm) wavelengths. The Company's 450nm lasers experienced the largest improvement, with power conversion efficiencies for single-mode and multi-mode devices up more than 55% and 42%, respectively. Enhancements broaden target applications to include quantum computing, robotics, and biotechnology.

In addition to improving existing products, BluGlass has expanded its GaN laser portfolio, introducing an ultra-violet 397nm alpha prototype. Ultra-violet lasers offer increased power and precision and are used in a range of advanced applications, such as disinfection technologies, quantum sensing, and medical devices. Higher-power single-mode 405nm and 420nm devices are in development, along with single-mode and multi-mode 450nm and longer-wavelength devices spanning 470nm, 488nm, and 525nm.

"Industry conferences are key to securing new customer orders, increasing awareness of our growing GaN laser portfolio, flexible packaging solutions, and custom manufacturing capability. We continue to engage with potential customers and partners across our target verticals (Quantum, Biotech, Display (AR/VR), Industrial, Defence and R&D), receiving incredibly positive feedback on performance improvements at Laser World. These higher-performing devices enable use in more demanding applications while meeting customer needs for wavelength and form factor flexibility. Discussions with these companies are progressing, and we expect many of these will convert to sales, supported by increased adoption of GaN lasers in advanced applications," said CEO Jim Haden.

### New customer orders

BluGlass continued to grow its customer book during the quarter, securing new purchase orders from a quantum photonics pioneer and a leading medical device manufacturer. Customer orders now encompass BluGlass' entire GaN laser product suite, which are now being tested for eventual deployment in various applications including novel quantum sensing, machine vision, 3D printing, and surgical applications. BluGlass expects to secure new orders this quarter to be shipped in line with industry standard 8–12-week shipping timeframes.

“Customers continue to test, integrate, and qualify BluGlass’ lasers in their own product development and applications. These steps pave the way to securing larger, recurring orders. We are engaged with multiple customers and are working diligently to convert these to long-term agreements while engaging with additional prospective customers and partners.

“We are receiving positive feedback on our laser performance from our collaborative customers, who have been impressed by our momentum, fuelled by both continuous and breakthrough design enhancements. Their valuable feedback is guiding our efforts to improve aspects of our fabrication and packaging to better meet their specific product needs. Progressing agreements from initial discussions through to qualification and full-scale manufacturing often takes multiple months, and sometimes even years for novel, advanced, and high-power applications, but early engagement is necessary to become ‘designed-in’ in our customers’ products.

“Vertical integration further supports qualification and adoption of our GaN lasers, enabling us to provide wavelength and form factor flexibility with emphasis on quality, consistency, and performance,” said CEO Jim Haden.

### **Vertical integration nearing completion**

During the quarter, BluGlass transferred core downstream manufacturing processes from four contract manufacturers to its Silicon Valley production facility. The Company is in the final stages of integrating its remaining contract manufacturer, responsible for thinning, cleaving, and n-metallisation processes.

While creating a new manufacturing supply chain is complex, the Company has successfully transitioned most core processes to Fremont. A few production and repeatability challenges in parts of the fabrication process temporarily impacted availability of BluGlass’ GaN lasers during the quarter. These challenges, which impacted laser consistency, were related to photolithography processes, metallisation, and packaging processes for non-TO Can packages.

Manufacturing equipment component unavailability at Fremont resulted in photolithography equipment for single-mode products, known as a stepper, being offline for an extended period during the quarter. The stepper is back online and preventative measures have now been implemented, including stockpiling spare parts, and securing specialist servicing and maintenance suppliers. New manufacturing processes, including secondary qualification and uniformity calibration, have significantly reduced variability in photolithography steps.

BluGlass is also working with its partners and suppliers to address bonding inconsistencies. Wafers manufactured with improved packaging designs and operational controls will be available in mid-September.

“While it is common to experience some challenges in vertically integrating manufacturing processes, and converting to a new material class, we have quickly identified and rectified issues as they have arisen. New manufacturing processes and enhanced operational controls are reducing variability, and we are now implementing iterative improvements to enhance the repeatability and performance of our GaN lasers. As we continue to refine our manufacturing supply chain, we are implementing standard cavity lengths and product runs to further enhance consistency and product availability. We have invested in additional engineering team members at Fremont to support these improvement and subsequent mitigation efforts, and have ordered commercial reliability equipment to scale our testing capability and delivery of products to customers.

“Vertical integration provides enormous technical and commercial benefits in both the short and long-term for BluGlass, improving quality and performance of our launched lasers while accelerating learning cycles and development of new and next-generation products. Operational control and manufacturing capability is also critical to establishing ourselves as a partner-of-choice and addressing key customer challenges, such as packaging flexibility and greater GaN laser availability.”

### **Improvements to DFB laser demonstration**

BluGlass progressed its development of visible gallium nitride Distributed Feedback (DFB) Lasers, demonstrating substantial performance improvements with collaboration partner, the University of Santa Barbara California (UCSB). BluGlass demonstrated increased side-mode suppression ratio by more than 50% in its latest DFB development, delivering advanced single frequency performance at 450nm, and using its proprietary RPCVD technology extended to longer-wavelength blue devices up to 478nm.

Visible DFB lasers are not commercially available; however, there is growing need for this highly promising laser technology to provide narrow spectral width and high-spectral purity in more compact form factors to facilitate advanced quantum applications.

### Gallium export restrictions

In July, China announced it will impose new export restrictions on gallium nitride (GaN), commencing 1 August 2023. BluGlass has been in contact with its primary gallium suppliers, who have indicated no short-term impact to supply. The Company is monitoring the situation closely with its suppliers and will update the market should there be any material change.

### Financials

Quarterly customer revenue for the period was \$209k; comprised primarily of foundry services for a European wafer developer and initial payments for laser product orders. Cash at end of June was \$4.26 million, before receipt of the Company's significant FY23 R&D rebates, totalling ~\$7 million, and expected to be received in September. This significant cash injection, combined with our expected business operations will provide an extended cash runway.

BluGlass' Q4 FY23 research and development expenses were \$3.189 million, inclusive of salaries, materials, and fabrication costs. These costs reflect additional resources at BluGlass' Silicon Valley fab as the Company vertically integrates core manufacturing processes, whilst exiting contract manufacturers.

Payments to related parties in Q4 FY23 were \$163k, comprising Chair and Non-Executive Director fees.

Activity Undertaken	Amount paid during the quarter \$'000
Laser Diode product development	\$3.137 million
RPCVD development	\$0.052 million
<b>Total direct expenditure</b>	<b>\$3.189 million</b>

### Outlook

BluGlass enters FY24 fully focused on delivering against its product and commercialisation roadmaps, improving yield and performance, qualifying products in customer applications, onboarding additional customers, and securing larger purchase orders of its GaN lasers. At the same time, the business will complete integration of its external wafer fab contract manufacturers into its Silicon Valley fab and establish regional distribution agreements in key laser jurisdictions including Europe and the US.

"While our priority remains validating our product performance and qualifying BluGlass lasers in customer applications, we are also progressing the development of higher-powered lasers in our core wavelengths (405nm - 450nm) and next-generation products. Ongoing manufacturing refinements will continue to enhance laser performance and yield, enabling us to bring better-quality lasers to market much faster. Our discussions with potential customers have highlighted the genuine need for an agile manufacturing partner to address unmet market needs and deliver brighter, better performing, and longer wavelength devices.

"We are also leveraging our RPCVD technology to bring to market novel solutions with collaboration partners. These include our development of green GaN Vertical Cavity Surface Emitting Lasers with Ganvix and visible DFB lasers with UCSB. These solutions are not commercially available, enabling us to further differentiate ourselves in the GaN laser market.

"Specialising in visible lasers with packaging and manufacturing flexibility, BluGlass' market position is unique. Our recent customer engagement continues to confirm the growing need for an agile and dedicated provider in this

market, and the increasing importance of visible laser diodes to enable future technologies. Our product strategy remains focused on solving customers' challenges and being a GaN laser partner-of-choice" finished Mr Haden.

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

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**About BluGlass**

**BluGlass Limited (ASX:BLG)** is a leading supplier of GaN laser diode products to the global photonics industry, focused on the industrial, defense, bio-medical, and scientific markets.

Listed on the ASX, BluGlass is one of just a handful of end-to-end GaN laser manufacturers globally. Its operations in Australia and the US offer cutting-edge, custom laser diode development and manufacturing, from small-batch custom lasers to medium and high-volume off-the-shelf products.

Its proprietary low temperature, low hydrogen, remote plasma chemical vapour deposition (RPCVD) manufacturing technology and novel device architectures are internationally recognised, and provide the potential to create brighter, better performing lasers to power the devices of tomorrow.

BluGlass' technical innovations are protected by 93 internationally granted patents and 17 trademarks in key semiconductor manufacturing jurisdictions.

## Appendix 4C

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

**Name of entity**

BluGlass Limited

**ABN**

20 116 625 793

**Quarter ended ("current quarter")**

30 June 2023

<b>Consolidated statement of cash flows</b>	<b>Current quarter \$A'000</b>	<b>Year to date (12 months) \$A'000</b>
<b>1. Cash flows from operating activities</b>		
1.1 Receipts from customers	209	1,140
1.2 Payments for		
(a) research and development	(2,193)	(8,141)
(b) product manufacturing and operating costs		
(c) advertising and marketing	(45)	(170)
(d) leased assets	(33)	(525)
(e) staff costs	(1,681)	(6,955)
(f) administration and corporate costs	(392)	(1,627)
1.3 Dividends received (see note 3)		
1.4 Interest received		
1.5 Interest and other costs of finance paid	(52)	(243)
1.6 Income taxes paid		
1.7 Government grants and tax incentives	3	4,104
1.8 Other (provide details if material)		
<b>1.9 Net cash from / (used in) operating activities</b>	<b>(4,184)</b>	<b>(12,417)</b>
<b>2. Cash flows from investing activities</b>		
2.1 Payments to acquire or for:		
(a) entities		
(b) businesses		
(c) property, plant and equipment	(147)	(599)
(d) investments		
(e) intellectual property		

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (12 months) \$A'000
(f) other non-current assets (security deposits)	(16)	(83)
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)		
<b>2.6 Net cash from / (used in) investing activities</b>	<b>(163)</b>	<b>(682)</b>

<b>3. Cash flows from financing activities</b>		
3.1 Proceeds from issues of equity securities (excluding convertible debt securities)	510	12,624
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		
3.5 Proceeds from borrowings		
3.6 Repayment of borrowings		
3.7 Transaction costs related to loans and borrowings	(19)	(630)
3.8 Dividends paid		
3.9 Other (provide details if material)		
<b>3.10 Net cash from / (used in) financing activities</b>	<b>491</b>	<b>11,994</b>

<b>4. Net increase / (decrease) in cash and cash equivalents for the period</b>		
4.1 Cash and cash equivalents at beginning of period	8,111	5,352
4.2 Net cash from / (used in) operating activities (item 1.9 above)	(4,184)	(12,417)

Appendix 4C  
Quarterly cash flow report for entities subject to Listing Rule 4.7B

<b>Consolidated statement of cash flows</b>		<b>Current quarter \$A'000</b>	<b>Year to date (12 months) \$A'000</b>
4.3	Net cash from / (used in) investing activities (item 2.6 above)	(163)	(682)
4.4	Net cash from / (used in) financing activities (item 3.10 above)	491	11,994
4.5	Effect of movement in exchange rates on cash held		8
<b>4.6</b>	<b>Cash and cash equivalents at end of period</b>	<b>4,255</b>	<b>4,255</b>

<b>5.</b>	<b>Reconciliation of cash and cash equivalents</b> at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	<b>Current quarter \$A'000</b>	<b>Previous quarter \$A'000</b>
5.1	Bank balances	412	841
5.2	Call deposits	3,843	7,270
5.3	Bank overdrafts		
5.4	Other (provide details)		
<b>5.5</b>	<b>Cash and cash equivalents at end of quarter (should equal item 4.6 above)</b>	<b>4,255</b>	<b>8,111</b>

<b>6.</b>	<b>Payments to related parties of the entity and their associates</b>	<b>Current quarter \$A'000</b>
6.1	Aggregate amount of payments to related parties and their associates included in item 1	163
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>		

<b>7. Financing facilities</b>	<b>Total facility amount at quarter end \$A'000</b>	<b>Amount drawn at quarter end \$A'000</b>
<i>Note: the term "facility" includes all forms of financing arrangements available to the entity. 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 <b>Total financing facilities</b>		
7.5 <b>Unused financing facilities available at quarter end</b>		
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.		

<b>8. Estimated cash available for future operating activities</b>	<b>\$A'000</b>
8.1 Net cash from / (used in) operating activities (item 1.9)	(4,184)
8.2 Cash and cash equivalents at quarter end (item 4.6)	4,255
8.3 Unused finance facilities available at quarter end (item 7.5)	
8.4 Total available funding (item 8.2 + item 8.3)	4,255
8.5 <b>Estimated quarters of funding available (item 8.4 divided by item 8.1)</b>	1.02
<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: The company does expect to have funds to meet its net operating cashflows for the following reasons: 1) It is planned that company will receive its anticipated R&D grant by the end of Qtr 1; 2)The company is planning to generate revenue from products sales; and 3) The company if required will look to raise finance supported by its anticipated R&D grant for the year ended 30 June 2024.	
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: Yes please refer to answer of 8.6.1	



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: Yes - The anticipated product sales and access to R&D Grant and R&D Funding, and its previous success in raising capital, the entity believes it will have sufficient working capital to meet its operational objectives for the next financial year.

*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.*

## 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: 25 July 2023

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.