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26 October 2021

# BluGlass September Quarter Activities Update

## Highlights

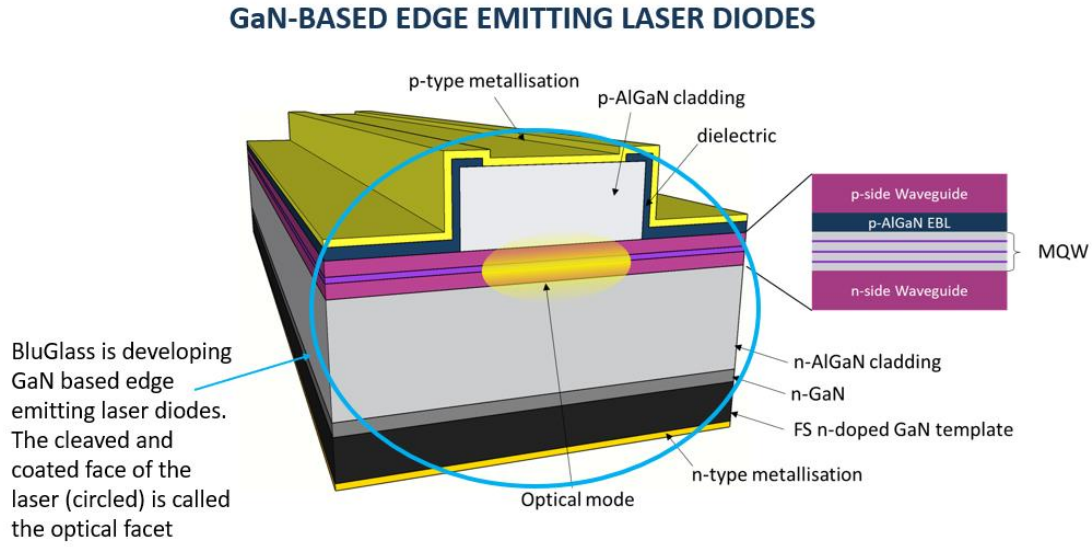
- Expert laser diode executive Jim Haden appointed to lead BluGlass
- Demonstrated working RPCVD tunnel junction laser diodes in a world-first proof-of-concept
- Addressing laser diode reliability issues with multiple fabrication specialists

Australian semiconductor developer BluGlass Limited (**ASX: BLG**) provides the following update and Appendix 4C Quarterly Report for the three months ended 30 September 2021 (Q1 FY22).

## Laser diode progress

BluGlass continues to develop and test multiple iterations of its commercial laser diode prototypes with its technical team and expert fabrication specialists. Iterations include single-mode and multi-mode products in 405nm, 420nm and 450nm wavelengths.

Alongside addressing flaws in the optical facet, BluGlass has also been improving metalisation of the laser diode prototypes. Metalisation is critical to laser diode development as it controls the input of electrical current into the laser as well as the removal of heat from the device. BluGlass is using analytical techniques to focus on failure modes to determine which components and processes within the manufacturing supply chain are causing issues.




Both the optical facet and metalisation are in the post epitaxy production steps, which are currently outsourced to third-party manufacturing suppliers.

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BluGlass is focused on improving the reliability of its laser diodes and has several iterations progressing through the manufacturing supply chain. Since June, the Company has conducted extensive failure analysis and burn-in-testing of multiple development iterations. BluGlass has progressed four legacy iterations to completion that were in the manufacturing pipeline before June 2021. These development efforts have resulted in improved manufacturing processes being implemented at all steps of the supply chain, with a strong focus on improvements to BluGlass' front-end and back-end fabrication steps, and facet coating designs.

BluGlass has implemented two new design iterations following this extensive analysis and new process implementations. Testing of BluGlass' first iterations of new laser diodes, which feature new metalisation and optical facet improvements, will commence in the coming weeks.

The Company is focusing on eliminating variation between manufacturing suppliers, ensuring process and product repeatability - key steps for supply chain readiness ahead of commercial manufacturing.

Jim Haden, BluGlass President, said, "Laser diodes are complex technology and while frustrating, reliability challenges are common within the industry. I have personally experienced and solved many of these development pitfalls for other companies over the past few decades. There are four elements that are key to producing optimal laser diodes: high gain, low loss epitaxy; low resistance metalisation; low loss, passivating facets; and mechanically sound thermal management for packaging. Early prototype testing reassures us that our epitaxy is performing in line with expectations. Alongside our third-party fabrication specialists, the team is focused on optimising the other three key elements and ultimately solving the primary cause of our reliability challenges."

BluGlass President Jim Haden will provide an update on laser diode development at the Company's Annual General Meeting in November.

### World-first tunnel junction laser diodes

In August, BluGlass successfully demonstrated working tunnel junction laser diodes in a world-first proof-of-concept using its proprietary remote plasma chemical vapour deposition (RPCVD) technology.

The RPCVD tunnel junction prototypes have demonstrated good lasing behaviour, confirming the potential of these enhanced designs to address the 50 per cent performance loss presently suffered by GaN laser diodes due to excess heat. BluGlass' innovative laser diode designs replace the magnesium-containing layers which cause optical and performance loss with an RPCVD tunnel junction and second n-type cladding layer – called a dual n-wave laser diode.

BluGlass Executive Chair James Walker said, "Our RPCVD tunnel junction laser diodes are designed to significantly improve GaN laser diode performance. This will enable higher power, brighter and more efficient lasers for commercial applications, including advanced 3D printing applications for automotive, defence and aerospace manufacturing as well as industrial welding for electronics, battery and automotive manufacturing. This successful proof-of-concept is an important technical and commercial validation. It demonstrates the capability of our RPCVD epitaxy to create brighter and better performing blue GaN laser diodes to support future applications and new wavelengths, providing a significant long-term growth opportunity for the business."

### Leadership changes

In September, BluGlass appointed US-based expert laser diode executive Jim Haden as President to lead the Company to profitability. Highly qualified, Mr Haden has more than 30 years' laser industry expertise gained in senior leadership roles at several of BluGlass' prospective customers and competitors, including Kyocera SLD, nLight and Coherent. He has proven experience solving technical challenges, delivering products to market, and driving transformational revenue growth for advanced technology businesses.

Executive Chair James Walker remains in the role to ensure a seamless transition, supporting BluGlass' financial and governance functions as the Company nears commercialisation and profitability.

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Commenting on Mr Haden's appointment, James Walker said, "Jim's wealth of gallium nitride (GaN) laser expertise and commercialisation experience will be instrumental in our transition to a global provider of next-generation laser diode products. While laser diode reliability issues are new to BluGlass, Jim has encountered and solved similar technical and operational challenges many times before. He has a deep understanding of this domain with hands-on experience improving laser diode performance and building market share in underserved segments.

"Jim's appointment further enhances our Board and senior management bench strength, complementing the industry expertise of Jean-Michel and preparing BluGlass for its next growth phase. The calibre of the talent we are now attracting reflects our truly disruptive technology and significant market opportunity."

The Company recorded an interactive "Meet the President" Shareholder session in October which is available to stream from the Company's website here: www.bluglass.com.au/watch-meet-the-president-shareholder-session/

## Financials

BluGlass expects to receive its R&D rebate of approximately $3.3 million by the end of October 2021. Cash at end of the quarter was $5.65 million.

Total expenditure for the quarter was $2,918,000. Notable cash flow items over the quarter included research and development expenses, largely materials and fabrication costs of $1,923,000. Non R&D related staff costs totalled $695,000.

In accordance with ASX LR 4.7C.3 payments to related parties in Q1 FY22 were $118,000, comprising Executive Chair and Non-Executive Director fees.

| Activity Undertaken | Amount paid during the Quarter $'000 |
|---|---|
| Laser Diode product development | 1,848 |
| Micro LED and LED research and development | 7 |
| RPCVD equipment development | 68 |
| **Total direct expenditure** | **1,923** |

## Additional annual report information – listing rule 4.10.8

The number of shareholders holding less than a marketable parcel of the Company's shares as at 31 August 2021 were 2,842.

## Outlook

BluGlass remains focused on solving its reliability issues ahead of launching its direct-to-market laser diode products and securing first customer orders.

"We have had a productive start to FY22 and are now well-equipped to deliver on our growth strategy. Under Jim's leadership, we are well-positioned to resolve our reliability challenges and optimise the performance of our first direct-to-market laser diodes. Our initial products will include the in-demand and underserved 405nm, 420nm and 450nm wavelengths, where we have collaborative customers with confirmed interest. While the majority of our focus is on the initial product range, we are also progressing the development of our novel RPCVD enhanced tunnel junction laser diodes, which will offer more efficient and brighter, higher-performing blue GaN laser diodes and open the door to new applications and markets," said Executive Chair James Walker.

"We are preparing our supply chain for scale while also increasing our in-house production capability and expertise. This end-to-end capability enables us to meet unmet industry demand for small custom batches as well as volume production."

*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

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| **Name of entity** | |
|---|---|
| BluGlass Limited | |
| **ABN** | **Quarter ended ("current quarter")** |
| 20 116 825 793 | September 2021 |

| **Consolidated statement of cash flows** | | **Current quarter $A'000** | **Year to date (3 months) $A'000** |
|---|---|---|---|
| **1.** | **Cash flows from operating activities** | | |
| 1.1 | Receipts from customers | 44 | 44 |
| 1.2 | Payments for | | |
| | (a) research and development | (1,191) | (1,191) |
| | (b) product manufacturing and operating costs | - | - |
| | (c) advertising and marketing | (3) | (3) |
| | (d) leased assets | (108) | (108) |
| | (e) staff costs | (1,425) | (1,425) |
| | (f) administration and corporate costs | (191) | (191) |
| 1.3 | Dividends received (see note 3) | | |
| 1.4 | Interest received | - | - |
| 1.5 | Interest and other costs of finance paid | (32) | (32) |
| 1.6 | Income taxes paid | - | - |
| 1.7 | Government grants and tax incentives | 225 | 225 |
| 1.8 | Other (provide details if material) | - | - |
| **1.9** | **Net cash from / (used in) operating activities** | **(2,681)** | **(2,681)** |

| | | | |
|---|---|---|---|
| **2.** | **Cash flows from investing activities** | | |
| 2.1 | Payments to acquire or for: | | |
| | (a) entities | - | - |
| | (b) businesses | - | - |
| | (c) property, plant and equipment | (26) | (26) |
| | (d) investments | - | - |
| | (e) intellectual property | - | - |
| | (f) other non-current assets | - | - |

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| Consolidated statement of cash flows | | Current quarter $A'000 | Year to date (3 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** | **(26)** | **(26)** |

| **3.** | **Cash flows from financing activities** | | |
|---|---|---|---|
| 3.1 | Proceeds from issues of equity securities (excluding convertible debt securities) | 6,410 | 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) | (271) |
| 3.5 | Proceeds from borrowings | - | - |
| 3.6 | Repayment of borrowings | (1,953) | (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** | **4,186** |

| **4.** | **Net increase / (decrease) in cash and cash equivalents for the period** | | |
|---|---|---|---|
| 4.1 | Cash and cash equivalents at beginning of period | 4,176 | 4,176 |
| 4.2 | Net cash from / (used in) operating activities (item 1.9 above) | (2,681) | (2,681) |
| 4.3 | Net cash from / (used in) investing activities (item 2.6 above) | (26) | (26) |

| Consolidated statement of cash flows | | Current quarter $A'000 | Year to date (3 months) $A'000 |
|---|---|---|---|
| 4.4 | Net cash from / (used in) financing activities (item 3.10 above) | 4,186 | 4,186 |
| 4.5 | Effect of movement in exchange rates on cash held | (8) | (8) |
| **4.6** | **Cash and cash equivalents at end of period** | **5,647** | **5,647** |

| 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 | 174 | 48 |
| 5.2 | Call deposits | 5,473 | 4,128 |
| 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)** | **5,647** | **4,176** |

| 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 | 118 |
| 6.2 | Aggregate amount of payments to related parties and their associates included in item 2 | - |

*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.*

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| 7. | **Financing facilities**<br>*Note: the term "facility' includes all forms of financing arrangements available to the entity.*<br>*Add notes as necessary for an understanding of the sources of finance available to the entity.* | **Total facility amount at quarter end $A'000** | **Amount drawn at quarter end $A'000** |
|---|---|---|---|
| 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) | (2,681) |
| 8.2 | Cash and cash equivalents at quarter end (item 4.6) | 5,647 |
| 8.3 | Unused finance facilities available at quarter end (item 7.5) | - |
| 8.4 | Total available funding (item 8.2 + item 8.3) | 3,626 |
| 8.5 | **Estimated quarters of funding available (item 8.4 divided by item 8.1)** | 2.1 |

*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.*

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 |

*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.*

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## 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: 26 October 2021

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.

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