

BLUGLASS (ASX:BLG)

Investor Presentation

December 2020



2020

FORWARD LOOKING STATEMENTS

This document has been prepared by BluGlass Limited to provide readers with an update of the Company and the Company's technology.

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Information on Service Addressable Markets (SAM) is based on internal BluGlass modelling and assumptions, both of which depend on successful R&D outcomes and results achieved within estimated timetables.

CORPORATE OVERVIEW

**ASX:
BLG**

BluGlass is headquartered in Sydney, Australia and has US operations based out of New Hampshire

**75
PATENTS**

BluGlass' IP portfolio comprises 75 International Patents, awarded in key semiconductor manufacturing jurisdictions

**US \$658m
ADDRESSABLE LD MARKET**

BluGlass is targeting a 6-10% market share of its US \$658m serviceable addressable Laser Diode market by 2025

**\$93m*
MARKET CAP**

*As at 25 November 2020



On track to deliver commercial product and revenues from CY2021

BluGlass has made significant progress in the development of its laser diode products roadmap and is qualifying its manufacturing supply chain. The business remains on track to deliver products to customers and commence product revenues in CY2021



Experienced Board, management & scientific team







BluGlass has a **highly talented and expert team** combining deep research, industry and commercial expertise - including **7 PhDs**.

We also work with world leading industry consultants to drive continuous innovation and commercialisation outcomes.





A PLATFORM TECHNOLOGY WITH MULTIPLE GO-TO-MARKET OPTIONS

BluGlass’ patented RPCVD semiconductor manufacturing technology has demonstrated R&D results, showing competitive advantages with potential application in multiple high-growth market segments

CONTINUING EXPANSION OF IP ACROSS SEGMENTS:

-  **Laser Diodes (Standard & RPCVD TJ)**
-  **HB-LED (green, blue, red, UV)**
-  **Tunnel junctions**
-  **microLED (RGB)**
-  **RPCVD Equipment**
-  **Power electronics**

BLUGLASS WILL GO TO MARKET VIA A COMBINATION OF THE FOLLOWING:

-  **Direct-to-market Laser Diode sales**
-  **EpiBlu RPCVD foundry (wafer) sales**
-  **RPCVD licence fees and royalties**
-  **RPCVD equipment partnerships/licensing**

BLUGLASS' LOW TEMPERATURE TECHNOLOGY – BENEFITS OF RPCVD

RPCVD (Remote Plasma Chemical Vapour Deposition) – A breakthrough alternative for the manufacture of gallium nitride (GaN) semiconductor materials



Lower-temperature manufacturing processes, **several hundred degrees** cooler than the incumbent, MOCVD



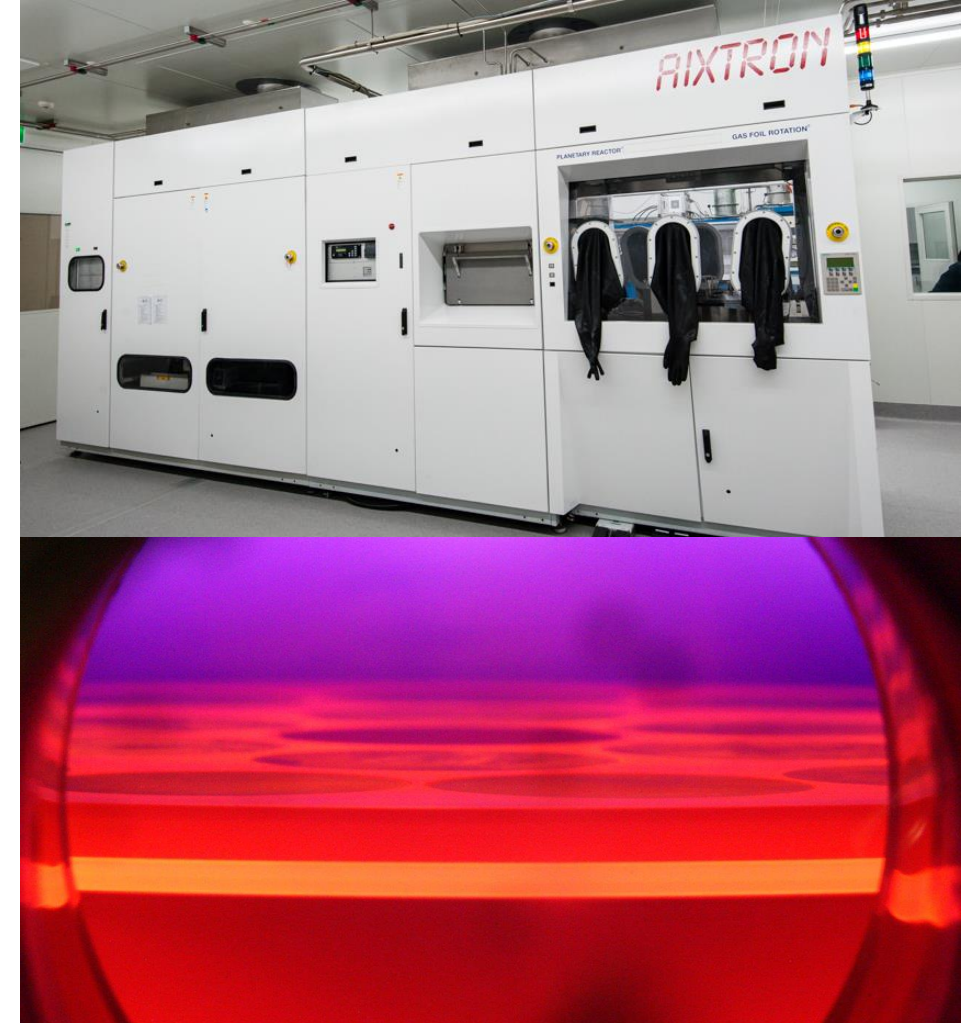
Greater potential for **high-performance devices**, targeting improved light output



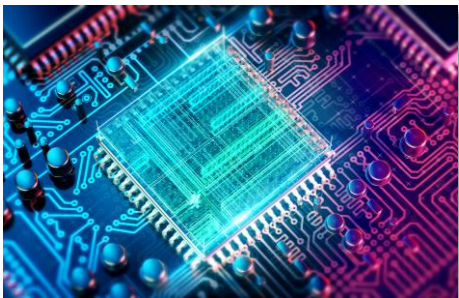
Lower cost inputs replacing expensive ammonia with low-cost nitrogen and low-cost substrates (silicon)



Active nitrogen density, from plasma source independent from **growth temperature**



COMMERCIAL & PARTNER ENGAGEMENTS



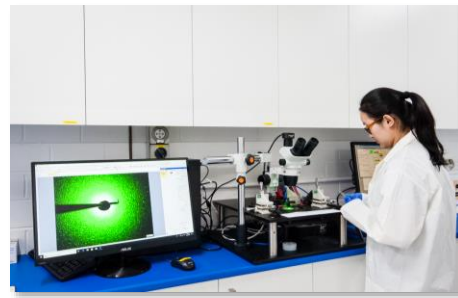
- Paid development program for novel laser diode development
- To combine LDs and PICS in a single device
- DARPA are the US Department of Defense's technology research arm

Developing technology for military & commercial applications (e.g LiDAR)



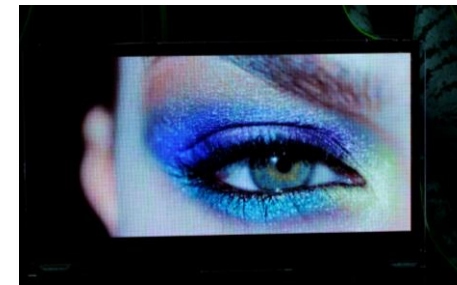
- International leader in LED solutions for the general lighting market
- The partners are jointly investigating cascade LEDs for new applications

\$6.8B general lighting market (packaged LEDs) (2018)



- International leader in LED solutions for projector & display applications
- Projectors require ultra-high efficiency and low heat solutions such as cascade LEDs

\$6.8B general lighting market (packaged LEDs) (2018)



- Formerly X-Celeprint, X-display is a world leader in micro-transfer printing (μ TP) technology
- Using RPCVD to deliver active matrix microLED display prototypes

\$20B microLED market (2024)



- AIXTRON collaborating on scaling RPCVD technology
- AIXTRON evaluating RPCVD equipment

\$1.4B global MOCVD equipment market(2025)

Sources: Strategies Unlimited, Yole Développement & Markets and Markets, Market Study Report LLC

MULTI-PILLARED MARKET APPROACH

LASER DIODE DEVICES – DIRECT TO MARKET

FOUNDRY SERVICES: EPIBLU CUSTOM EPI

LICENSING & COLLABORATION
(microLEDs, cascade LEDs, other)

EQUIPMENT PARTNERSHIP

STRATEGIC FOCUS



BUILD LASER DIODE SUPPLY CHAIN

Secure and qualify manufacturing supply chain (wafer processing through packaging) for product delivery in CY2021



ESTABLISH US TESTING FACILITY & TEAM

Open our Nashua, New Hampshire testing facility and enhance our laser diode test and packaging capabilities



MEET FUTURE CUSTOMER NEEDS

Develop customer engagement to develop bespoke products to meet specific unmet needs



SUCCESSFULLY SCALE RPCVD TECHNOLOGY TO COMMERCIAL CAPABILITIES

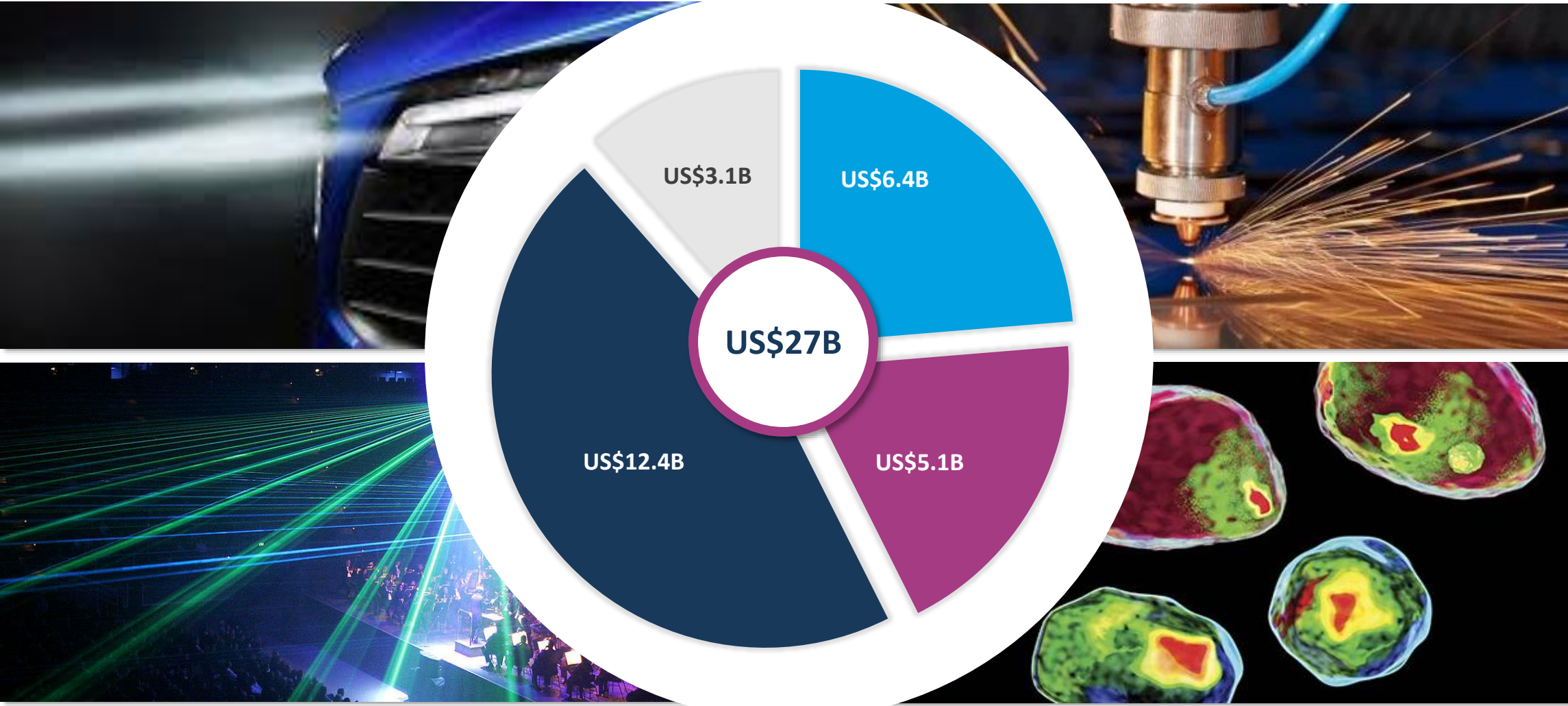
Deliver commercial scale RPCVD platform, the BLG-500 in collaboration with equipment partner, AIXTRON SE



ESTABLISH CONTROL OF COMMERCIALISATION TIMELINES

BluGlass remains on track to deliver products to customers and commence product delivery in CY2021

GLOBAL LASER END-MARKET OPPORTUNITY (FORECAST 2025)

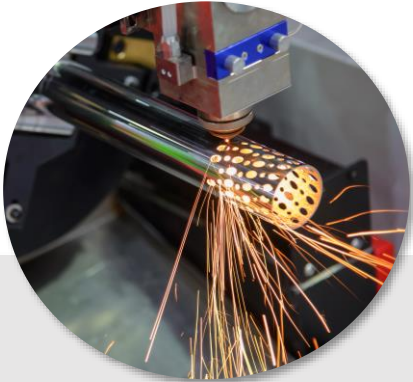


Source: Internal BluGlass modelling based on industry sources

■ Industrial cutting/welding ■ Life sciences ■ Laser display ■ Automotive

PORTFOLIO OF PRODUCTS

Industrial Markets



(405nm, 450nm, 525nm)

Applications:

- Welding cutting
- Machine vision
- Machine sensing
- 3D printing

Display Markets



(450nm, 525nm)

Applications:

- Pico projector
- Business/Cinema projector
- Heads-up display
- Augmented reality/Virtual Reality

Biotech/Life Science Markets

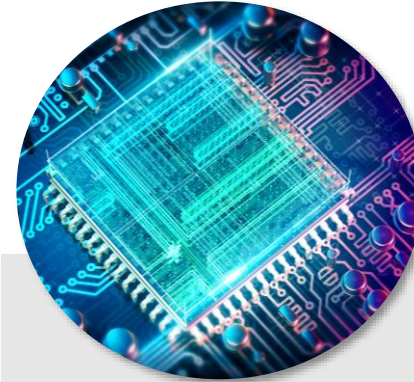


(405nm, 420nm, 450nm, 490, 525nm)

Applications:

- Flow cytometry
- Medical diagnostics
- DNA sequencing
- Endoscopy
- Bio-fluorescence

Scientific Markets



(405nm, 420nm, 450nm, 490, 525nm)

Applications:

- Raman spectroscopy
- Quantum computing
- Confocal fluorescence microscopy
- Optical clocks
- Forensics

Lighting Markets



(450nm)

Applications:

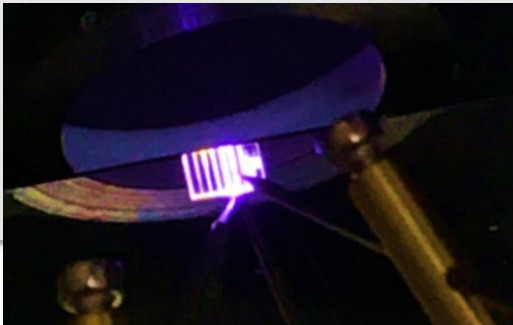
- Automotive
- General lighting
- Spotlight/Torch

PRODUCT DEVELOPMENT PROGRESS

405nm

Industrial & Biotech Applications

- ✓ Good lasing behaviour verified through multiple process steps and vendors
- ✓ Approaching commercial specification and sample products



420nm

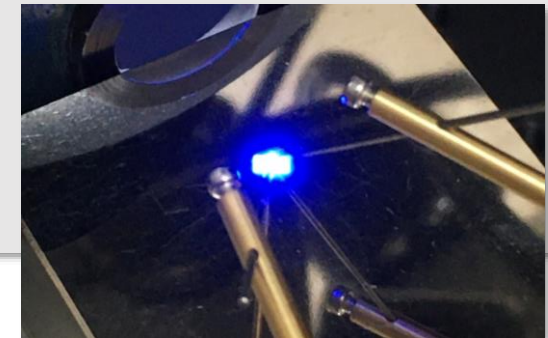
Biotech & Scientific Markets

- ✓ Good lasing behaviour verified through multiple process steps
- ✓ Customers awaiting sample products

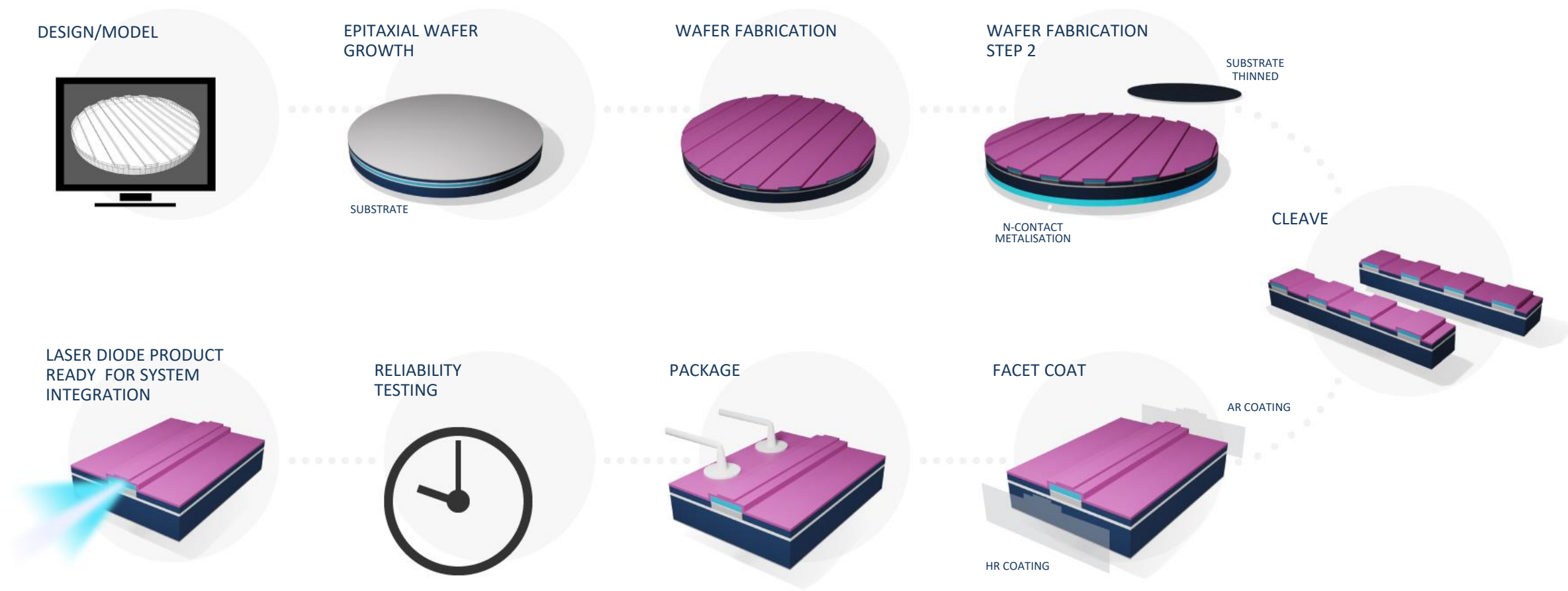
450nm

All Markets

- ✓ High brightness lasing demonstrated
- ✓ Multiple customers awaiting sample products



BLUGLASS LASER DIODE MANUFACTURING STEPS



CUSTOMER SEGMENTS & NEEDS

R&D Institutions

(Universities, Military, Commercial)

- This customer requires highly flexible, bespoke design and development services
- Developing novel devices and applications
- Typically require differentiated designs (e.g. RPCVD and tunnel junction technology advantages)
- First example is our contract with Yale University for DARPA program

Engagement Points: Unprocessed epiwafers, partially processed epiwafers, full products

OEM/ System Integrator

(e.g. Electronics Manufacturer)

- This customer requires high-powered laser diode, and not in the same form factor
Requires greater flexibility from a manufacturing partner in development of products and in developing novel designs

Engagement Points: Partially processed laser products, full products

Distributor

(e.g. Biotech product providers)

- This customer requires high-powered laser diodes, in standard form factors
- Supply a huge variety of products and require broad range of wavelengths and power levels
 - Requires greater flexibility from a manufacturing partner in development of diverse products and in developing novel designs (e.g. biotech applications, machine vision and sensing)

Engagement Points: Full products, completed reliability testing

LASER DIODE UPDATE – FROM R&D TO PRODUCT

Technical Demonstration

Design, build and test LD devices (at different stages of fabrication) to provide initial performance specification to customers

1

Product Launch

Reliability testing of LDs completed. LD product is launched and available for customer orders

3

Product Samples

Small volume of fully fabricated LDs available to customers for evaluation

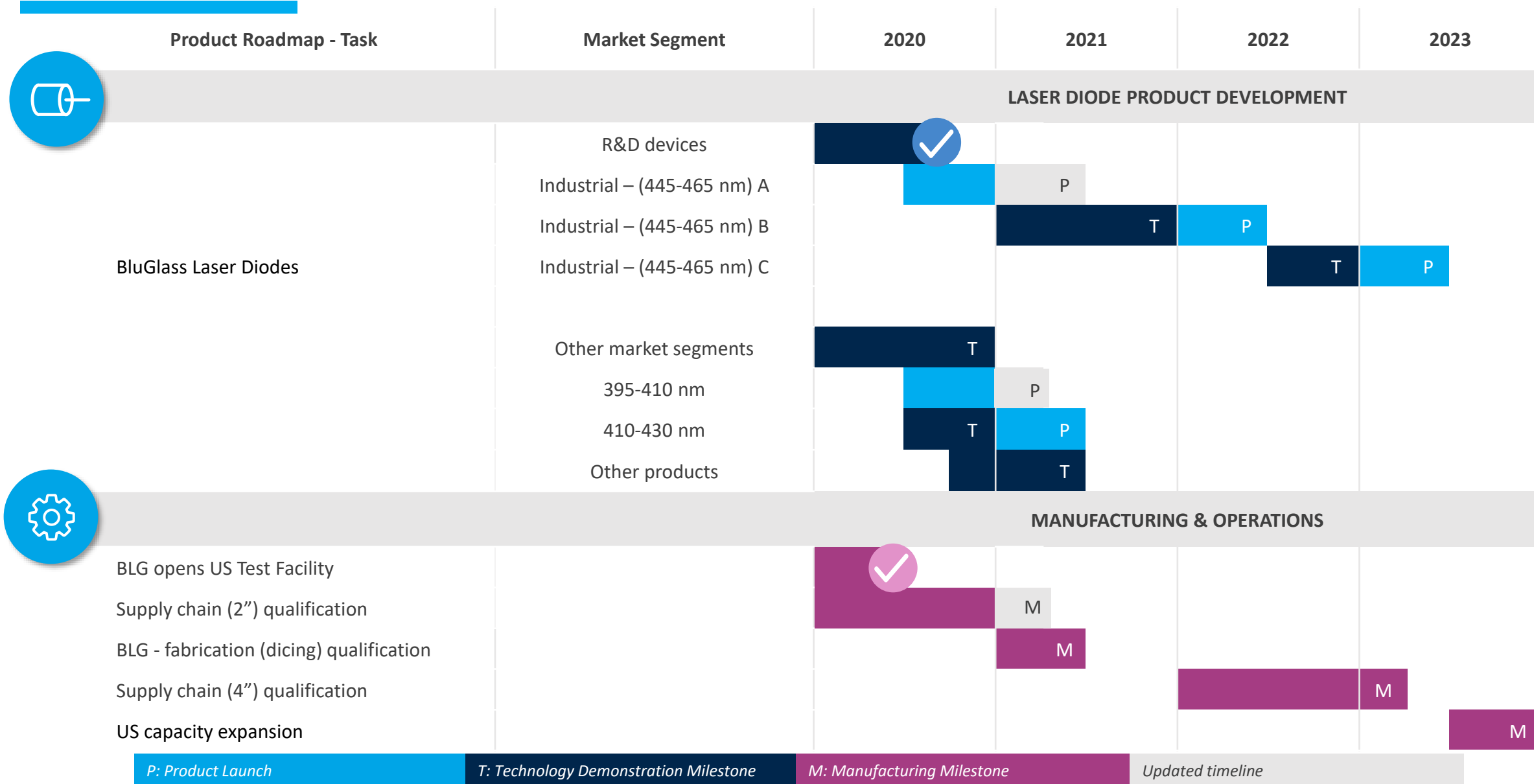
2

Enhanced Products

Enhanced performance via new LD designs, including **RPCVD Tunnel Junction laser diodes**/ custom devices for specific customer applications

4

BLUGLASS LASER DIODE PRODUCT: SUPPLY ROADMAP & TIMETABLE



ECONOMIC SCENARIOS - BLUGLASS TARGET MARKET REVENUES

Target revenue is based on the timely achievement of technical milestones.

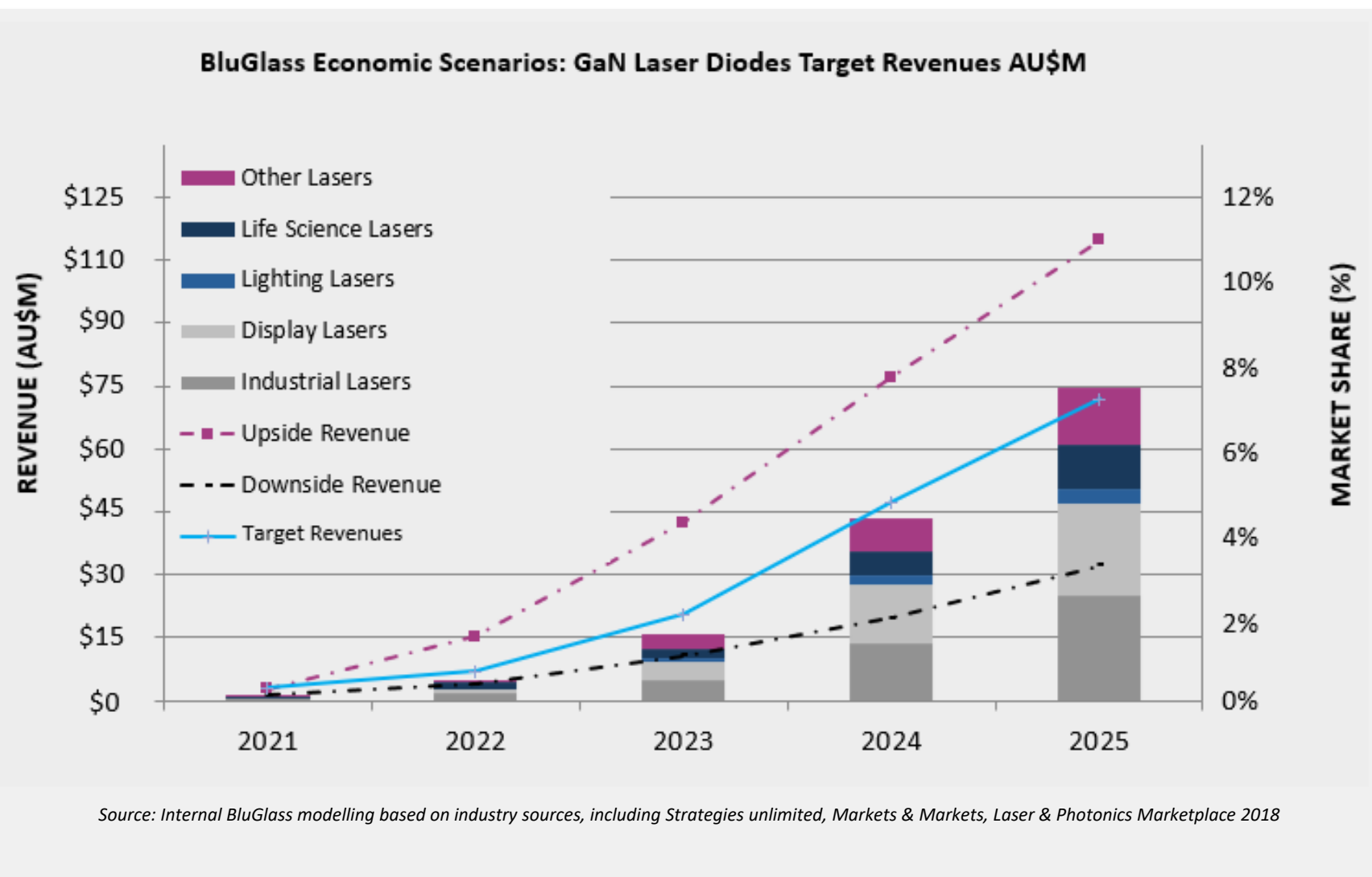
Upside revenue is based on the timely achievement of BluGlass' technical milestones and accelerated customer demand and market growth.

Downside revenue is based on a delay in the attainment of certain technical milestones that reduces the number of laser diode products for sale or slower customer demand and market growth.

Assumptions used in creating these scenarios:

BluGlass' economic scenarios rely on key technology (including RPCVD & tunnel junction performance), financing, supply chain and market penetration assumptions.

Any failure to achieve the assumed outcomes will have a material affect on the economic scenarios outlined here. In particular, BluGlass has not yet manufactured its initial laser diode product, and any target market revenues outlined should be considered speculative until proven.



microLED AND TUNNEL JUNCTION LED UPDATE

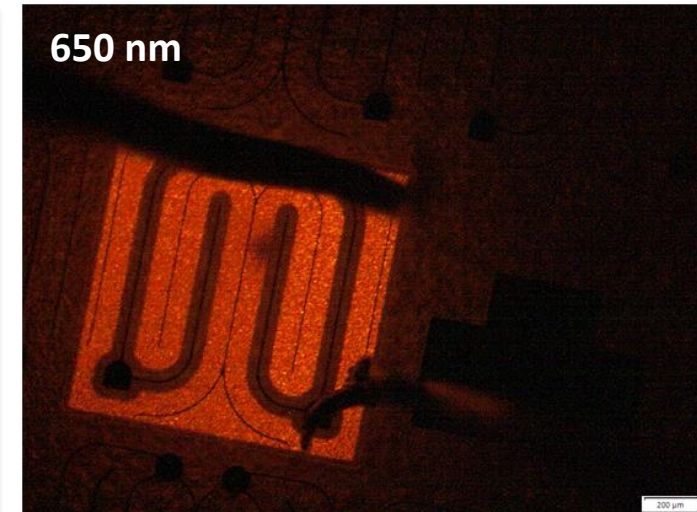
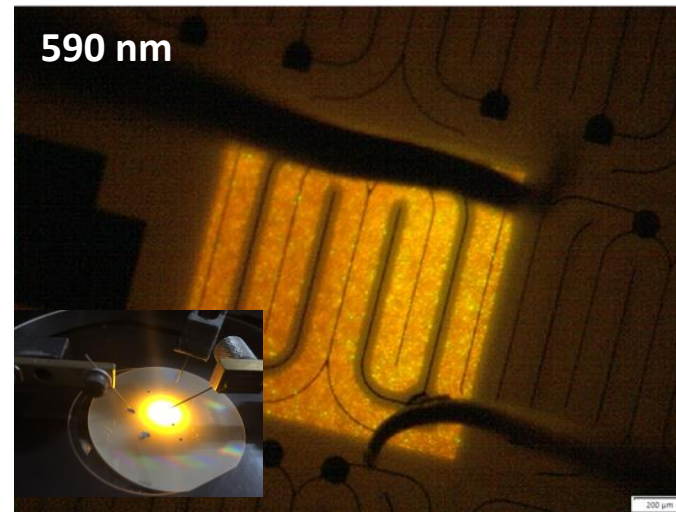
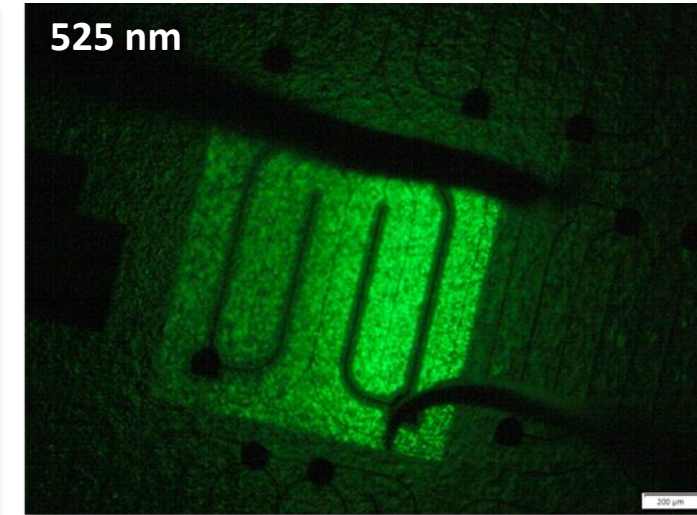
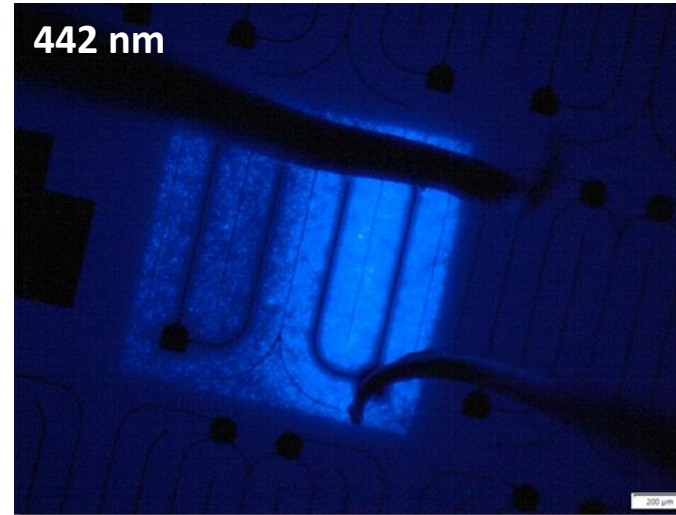
microLED update

BluGlass is working with partners to advance microLEDs for red-green-blue (RGB) applications with good progress in demonstrating RPCVD grown orange and red LEDs and microLEDs for customers.

microLED customer foundry orders were impacted during the year by COVID-19 shutdowns in Europe and the USA. Customer orders have now recommenced with the majority of our customers.

Tunnel Junction and Cascade LED update

- Efforts in the last several months devoted to tunnel junction development for laser diodes
- LED development will exploit LD TJ development work once completed
- There is a strong synergy on the design of the TJ and RPCVD growths across all applications
- The main difference is the fabrication steps required for laser diodes



RPCVD SCALING MILESTONE



The BLG-500, BluGlass' commercial scale RPCVD platform completed in collaboration with AIXTRON SE has successfully completed its performance testing and demonstrated working tunnel junction wafers



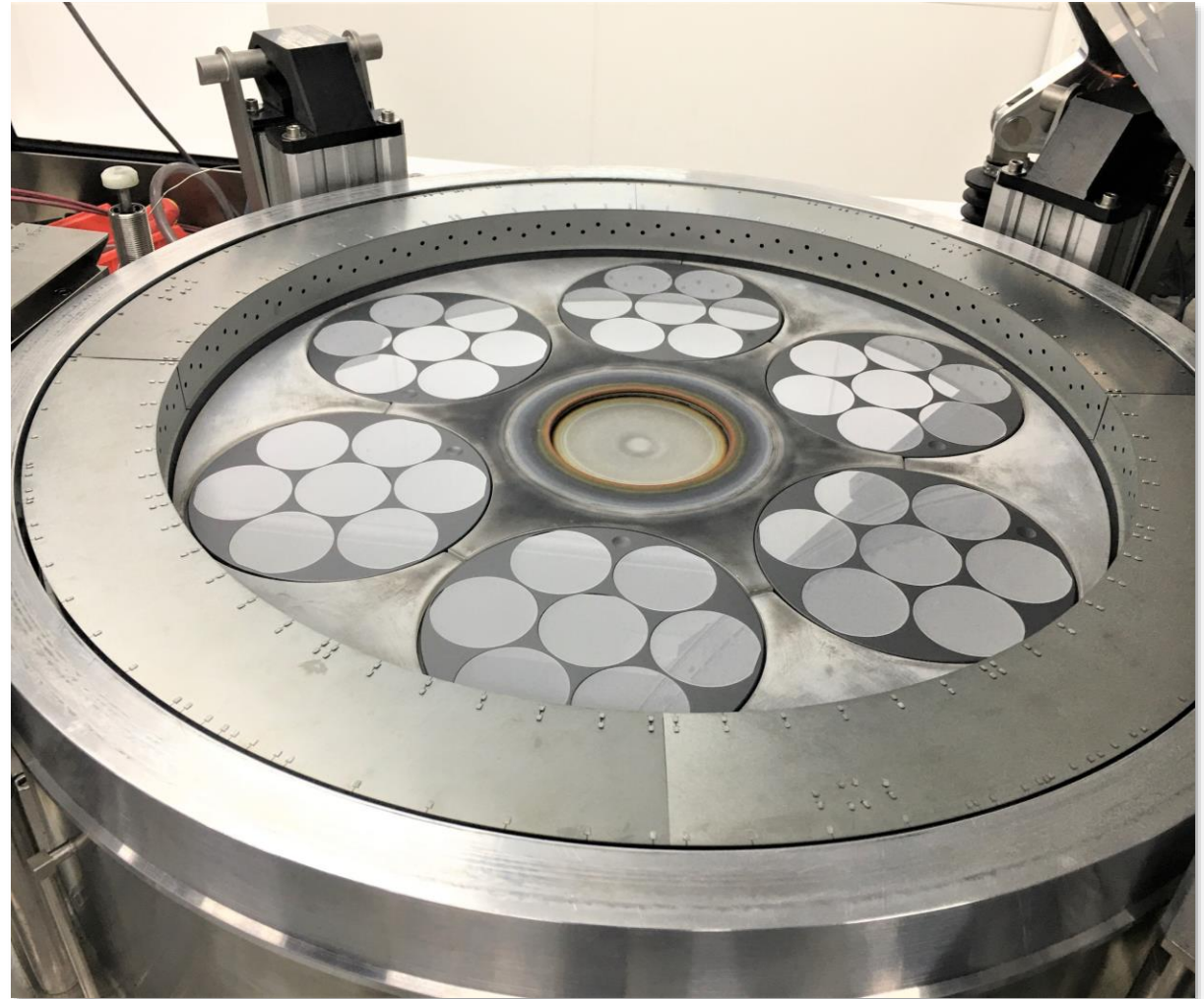
Demonstrated good uniformity over a 6" wafer size equivalent area compared to the BLG-300



The new platform is now contributing to our key tunnel junction development for the Company's laser diode commercialisation roadmap



This milestone forms a major part of the Company's commercial scaling activities. The BLG-500's large scale will significantly increase BluGlass' RPCVD research and manufacturing capacities



2020 PROGRESS HIGHLIGHTS

July 2019

BluGlass awarded key Tunnel Junction patent by United States Patent and Trademark Office



Aug 2019

BluGlass expands operations and officially opens its upgraded state-of-the-art Silverwater facility, unveiling the Paul Dunnigan Laboratories



Sep 2019

Enters Joint Development Agreement with leading US based LED company, Bridgelux, to develop cascade LEDs for general lighting applications



Oct 2019

BluGlass launches direct-to-market Laser Diode business unit to capture 6-10% of \$658M serviceable market



Dec 2019

Enters cascade LED collaboration with US lighting company, Luminus to develop cascade LEDs for entertainment and projector LED applications



Apr 2020

Raises \$5.8M in well supported Rights Issue and Placement



Jun 2020

Opens BluGlass' Laser Diode test facility in New Hampshire, USA, and establishes US subsidiary, 'BluGlass Inc'



Jul 2020

Wins \$250K government grant to manufacture smarter, more efficient plasma sources with the ANU, AKELA Laser and Objective 3D



Jul 2020

Commissions the largest RPCVD platform to date, the BLG-500 in collaboration with global semiconductor leader, AIXTRON SE

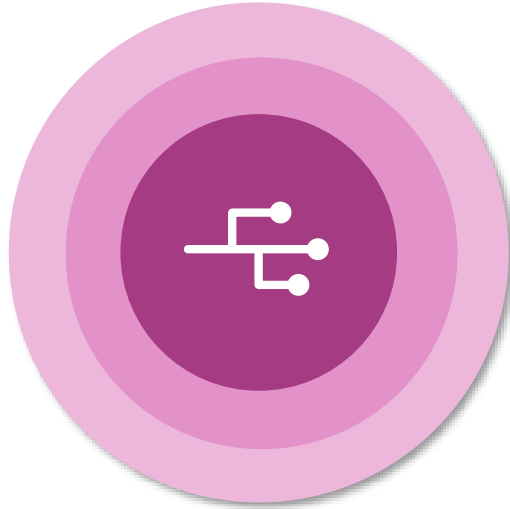


Oct 2020

Wins subaward contract from Yale University to supply laser diode development for US government funded Defense Advanced Research Projects Agency (DARPA) program



LASER DIODE BUSINESS ON TRACK TO DELIVER SIGNIFICANT PRODUCT REVENUES



Several commercialisation paths

- **Direct-to-market Laser Diode business**
- Epitaxy wafer sales (EpiBlu foundry services)
- Licence fees & royalties (LED and other markets)
- Equipment sales with equipment partner(s)



Greater control of commercialisation timelines

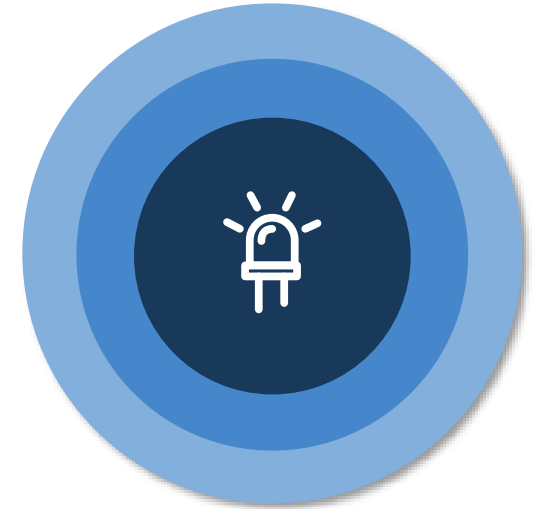
Direct-to-market laser diode business and the securing of the end-to-end manufacturing supply chain will drive significant product revenues and complements BluGlass' existing partnerships and commercial plans



Strong patent portfolio

75 patents granted in key semiconductor markets (USA, Europe, Asia).

Key US Tunnel Junction Patent for multiple applications granted in 2019



Large and growing markets

BluGlass' RPCVD technology has demonstrated performance advantages in a number of large and growing photonics market segments including **laser diodes**, LEDs, microLEDs, & power electronics

THANK YOU

Giles Bourne, Managing Director
BluGlass Limited (ASX:BLG)

www.bluglass.com.au



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