BLUGLASS (ASX:BLG)

Pitt Street Research Australian Semiconductor Conference

16 May 2019

FORWARD

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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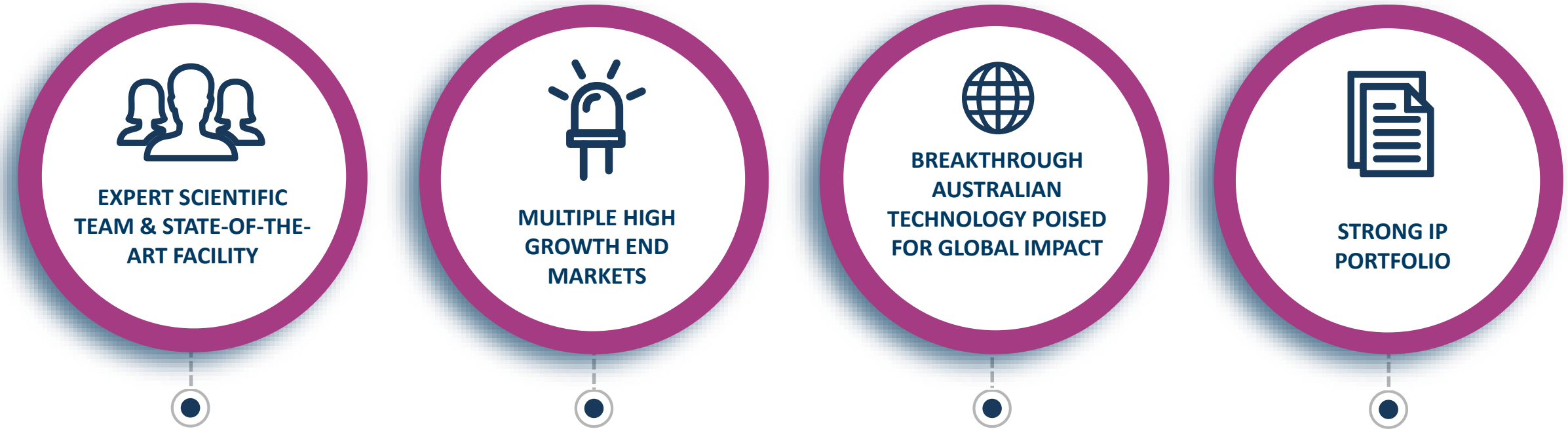
Information on Service Addressable Market (SAM) and Service Obtainable Market (SOM) is based on internal BluGlass modelling and assumptions, both dependent on successful R&D outcomes and results achieved within estimated timetables. BluGlass recommends a cautious interpretation be taken by investors.

BLUGLASS OVERVIEW

CORPORATE OVERVIEW

BluGlass is commercialising a platform semiconductor technology **with multiple high growth markets** and several go-to-market options



ASX: BLG
Est. 2006 to commercialise deposition technology for compound semiconductor manufacture.

World leading scientific & engineering team, including expert global advisors

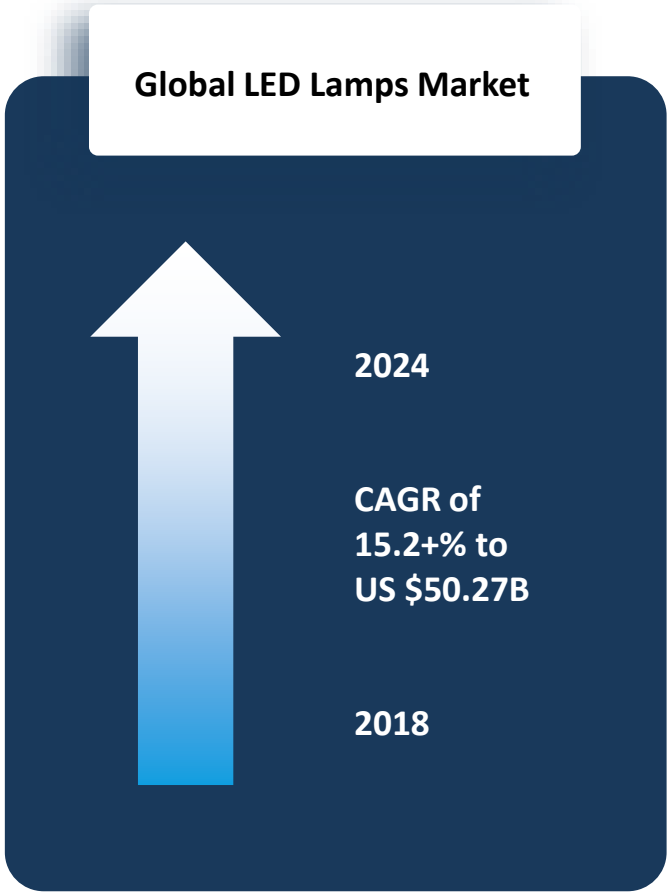
BluGlass' unique low temperature RPCVD technology has demonstrated performance advantages for applications in rapidly growing photonics markets including **the LED, microLED, laser diode** and **power electronics markets**

Demonstrated technology now ready for market entry following intensive research and development in Australia.

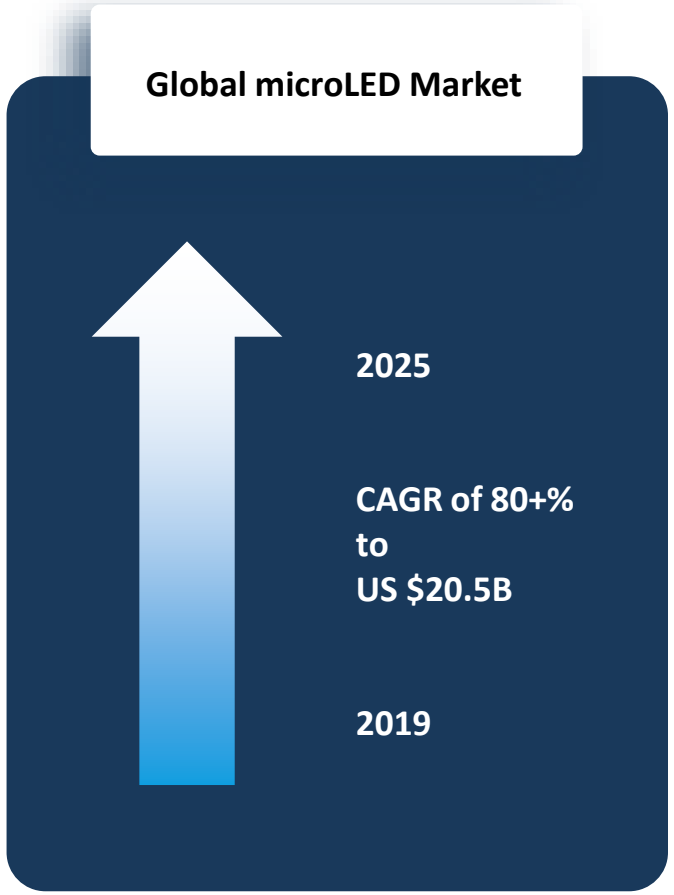
Now working with **a number of global partners & customers** to commercialise RPCVD

63 International Patents granted in key semiconductor markets - underpinning BluGlass' future licensing, royalty, hardware supply and contract manufacturing business models

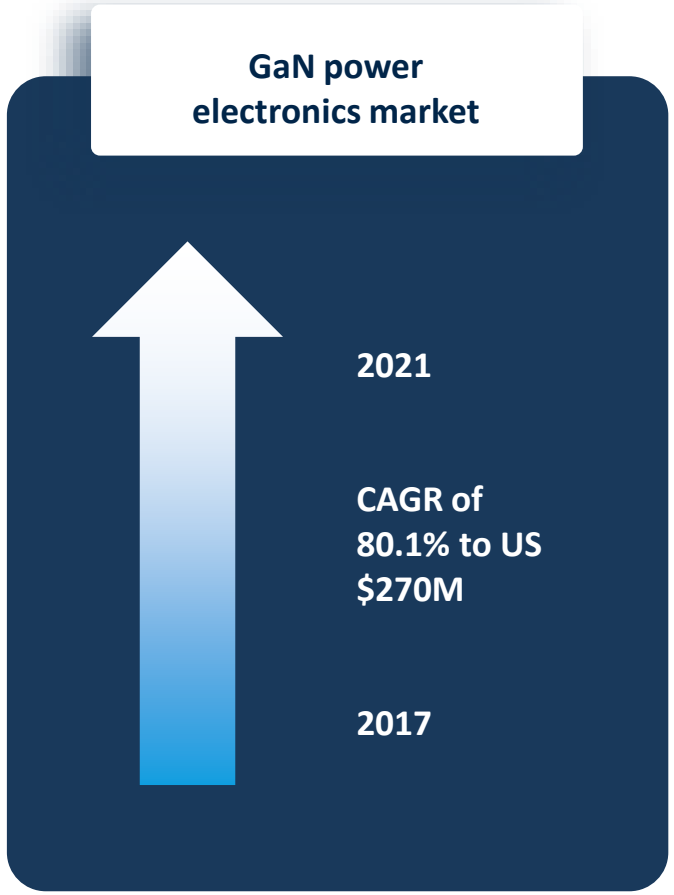
HIGH-GROWTH MARKET OPPORTUNITIES



Source: Allied Market Research



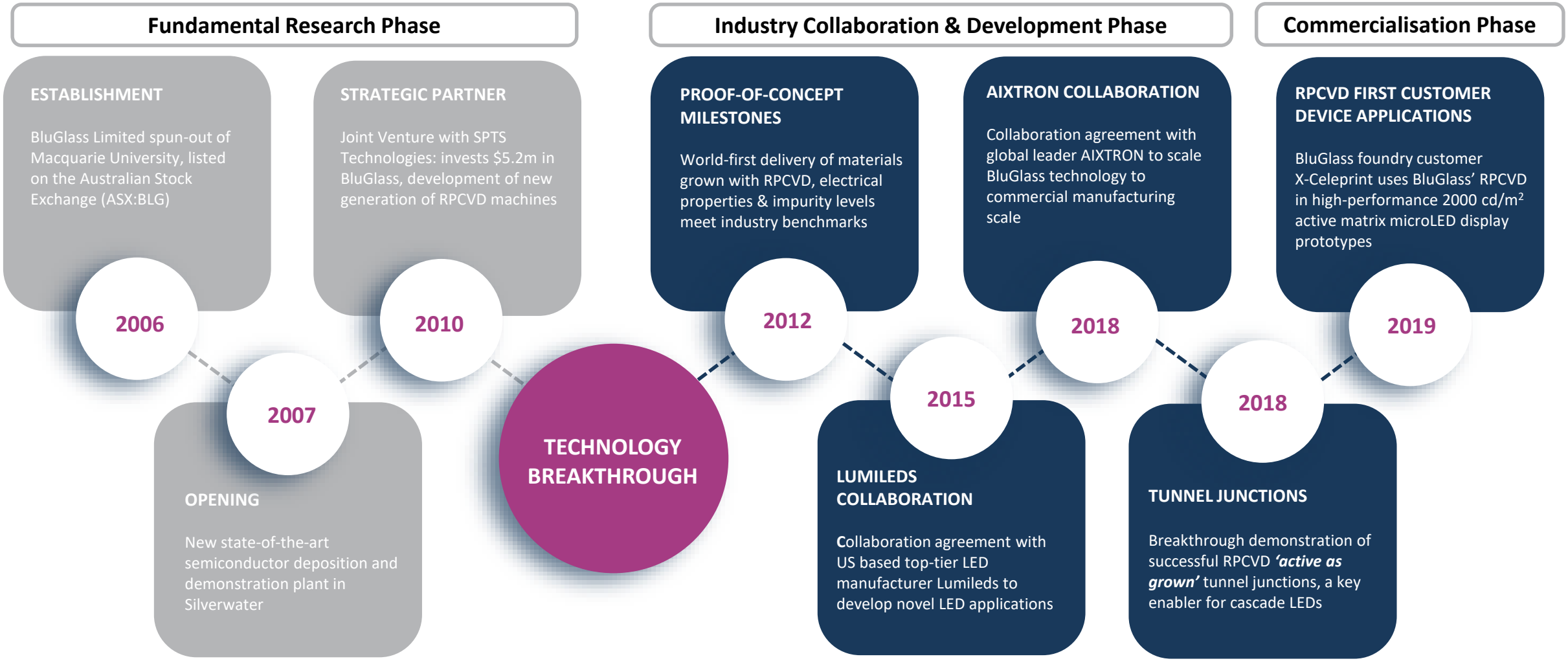
Source: Yole Developpement, and Markets and Markets



Source: Yole Developpement

COMPANY TIMELINE

BluGlass has **developed, protected and matured the RPCVD technology** and is now working towards delivering significant commercial outcomes

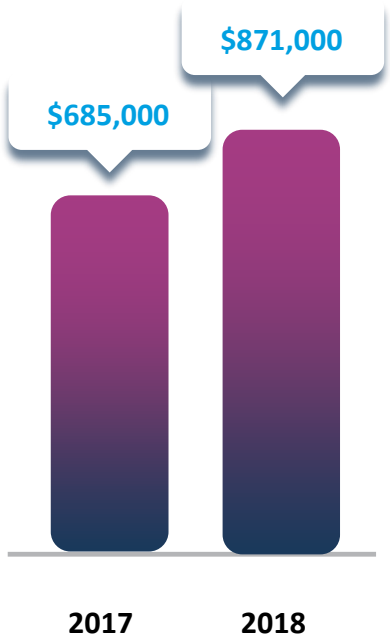


INTELLECTUAL PROPERTY UPDATE

- Our Intellectual Property portfolio is a critical foundation for our future commercial success and underpins our licensing-based business model
- During the year we made significant investments to further expand and strengthen our portfolio
- In 2018 **15 patents** granted bringing our internationally granted patent portfolio to a total of **63 patents** in key semiconductor jurisdictions
- With a further **14** applications
- Across **8** patent families

FINANCIAL SUMMARY

REVENUE



BURN RATE/MONTH

*Burn rate increased in 2018 due to additional IP expenditure and technology staff

R&D TAX REBATE

*2019 R&D tax rebate is expected to be higher due to increased research expenditure

CASH POSITION

CORPORATE OVERVIEW: KEY PEOPLE

GILES BOURNE
Managing Director & Chief Executive Officer

DR IAN MANN
Chief Operations & Technology Officer

BRAD SISKAVICH
Vice President of Business Development

STEFANIE WINWOOD
Corporate Communications & Investor Relations Manager

IZZAT SHADID
Financial Controller

DR SATYA BARIK
Director of Materials Engineering and IP

DR JOSH BROWN
Head of Custom Epitaxy & Services

DENIS TIMONEY
Head of Hardware & Facility

DR MARIE WINTREBERT
Chief Scientist

CORPORATE OVERVIEW: BOARD OF DIRECTORS

WILLIAM JOHNSON
Chairman

Appointed to Chair in 2017, Board in 2010. Deep global industry experience in the high-technology and semiconductor manufacturing sectors, covering M&A, operations. Former President & CEO, SPTS Technologies.

GILES BOURNE
Managing Director & CEO

Appointed to Board in 2014, CEO in 2008. Twenty years experience in cleantech & manufacturing. Business development & commercialisation specialist.

VIVEK RAO
Non-Executive Director

Appointed in 2016. Semiconductor capital equipment specialist with more than 23 years experience in the global industry. Technology leadership specialist. President and COO of SPT Microtechnologies.

JAMES WALKER
Non-Executive Director

Appointed in 2017. Experienced executive with track record in successfully commercialising cutting-edge technology in emerging global markets. Finance, M&A, IPO and strategic management specialist.

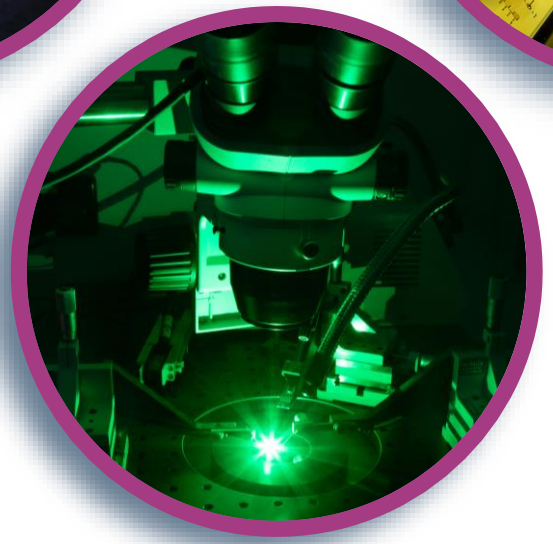
STEPHE WILKS
Non-Executive Director

Appointed in 2018. Professional company director and executive. Led successful global technology companies in high growth and disruptive industries. Extensive tech leadership, strategic finance, M&A and governance expertise.

THE BLUGLASS RPCVD TECHNOLOGY

THE TECHNOLOGY

BluGlass is developing **process and hardware Intellectual Property** and provides revenue generating specialised services to the photonics industry



BLUGLASS RPCVD TECHNOLOGY

RPCVD (Remote Plasma Chemical Vapour Deposition) – A Breakthrough Alternative for the Manufacture of Semiconductor Materials

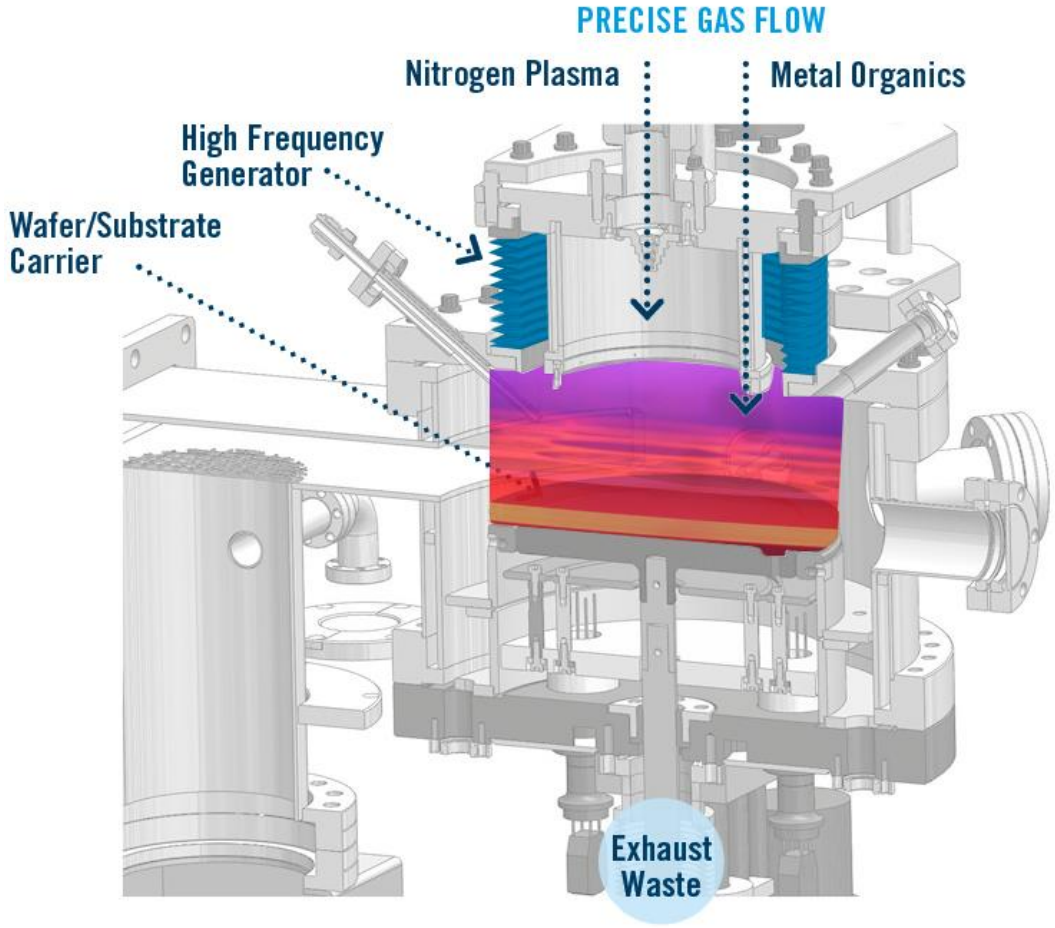
Lower-temperature manufacturing processes, **several hundred degrees** cooler than the incumbent, MOCVD

Higher-performing devices, **targeting greater than 10% improvement in light output**

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

N_2

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



TARGETING A PERFORMANCE IMPROVEMENT OF GREATER THAN 10%

LED industry competitiveness, market share and product innovation is largely driven by improving light performance (lumens) per dollar of cost:

LUMENS

DOLLAR

BluGlass, with its recent **RPCVD breakthrough in tunnel junctions for cascade LEDs,** is targeting:

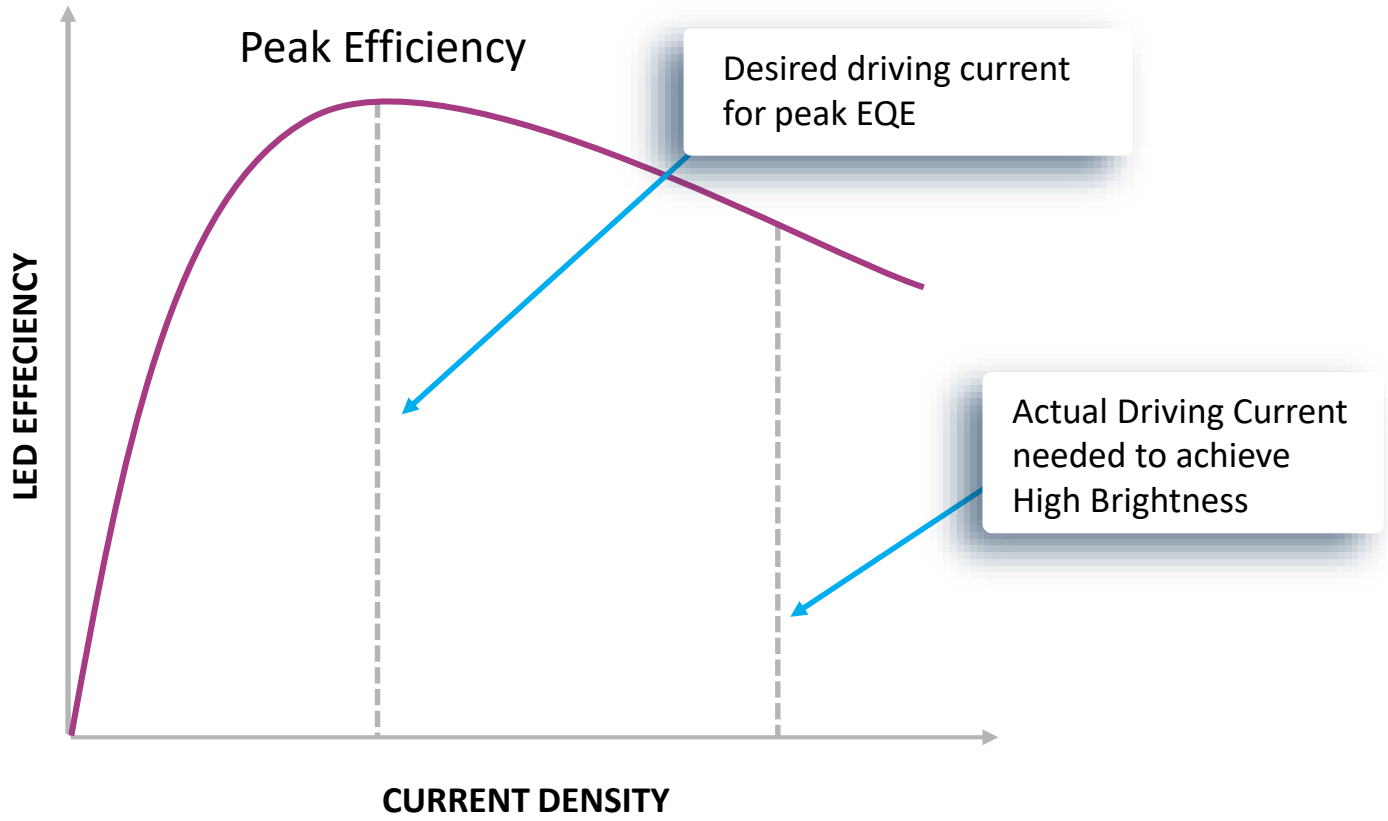
AN IMPROVEMENT IN LIGHT OUTPUT OF GREATER THAN 10%

This would translate to a target of

A REDUTION ON COST OF GREATER THAN 10%

ADDRESSING ONE OF THE BIGGEST LED INDUSTRY CHALLENGES

Efficiency droop is a major issue for High Brightness LED applications



RPCVD ***'Active as-grown' (AAG)*** tunnel junctions are a potential solution to address efficiency droop in high-brightness LED applications

X-CELEPRINT MANUFACTURES ACTIVE MATRIX MICROLED DISPLAY WITH RPCVD

BluGlass' foundry customer **X-Celeprint** deploys **RPCVD** to deliver active matrix **microLED display prototype (pictured),** showing good colour uniformity, quantum efficiency and forward voltage, equalling existing high-performance commercial applications of 2000cd/m^2

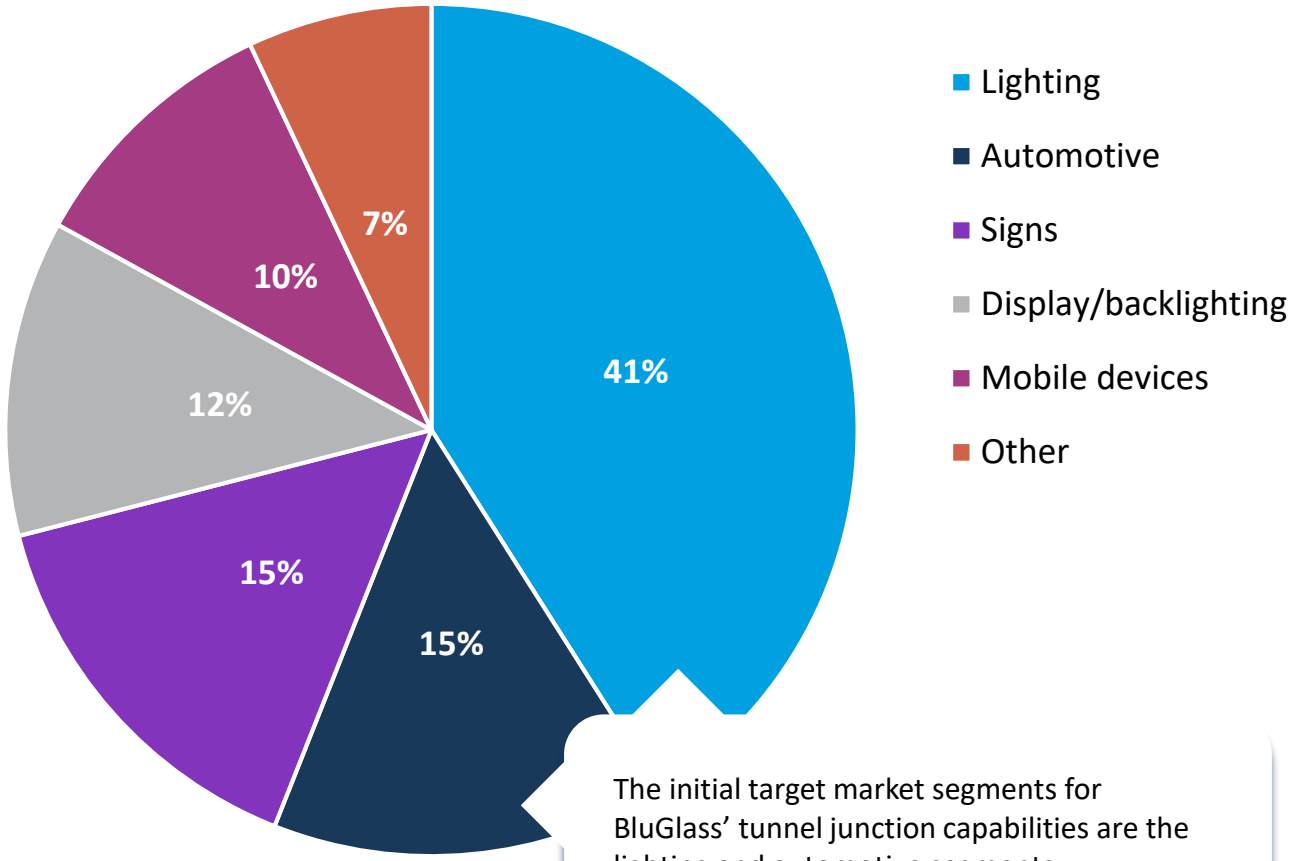
X-Celeprint is a world leader in micro-transfer printing (µTP) technology - a scalable manufacturing platform for integrating microscale devices such as lasers, LEDs or integrated circuits onto non-native substrates

microLEDs are an emerging display technology, predicted to become one of the fastest growing LED market segments, with applications in wearables (watches), mobile displays, next generation TV displays, virtual reality (VR) and augmented reality (AR)

BLUGLASS ADDRESSABLE MARKETS

BLUGLASS' ADDRESSABLE MARKET FOR RPCVD TUNNEL JUNCTIONS

- The global addressable LED market (packaged LEDs) was worth **US$16.7** billion in 2018
- 60% of this revenue comes from the top 10 manufacturers (in order):
    1. Nichia
    2. Osram
    3. Lumileds
    4. Seoul Semiconductor
    5. Samsung
    6. Mulinsen (MLS)
    7. LG Innotek
    8. Cree
    9. Everlight
    10. Lumens

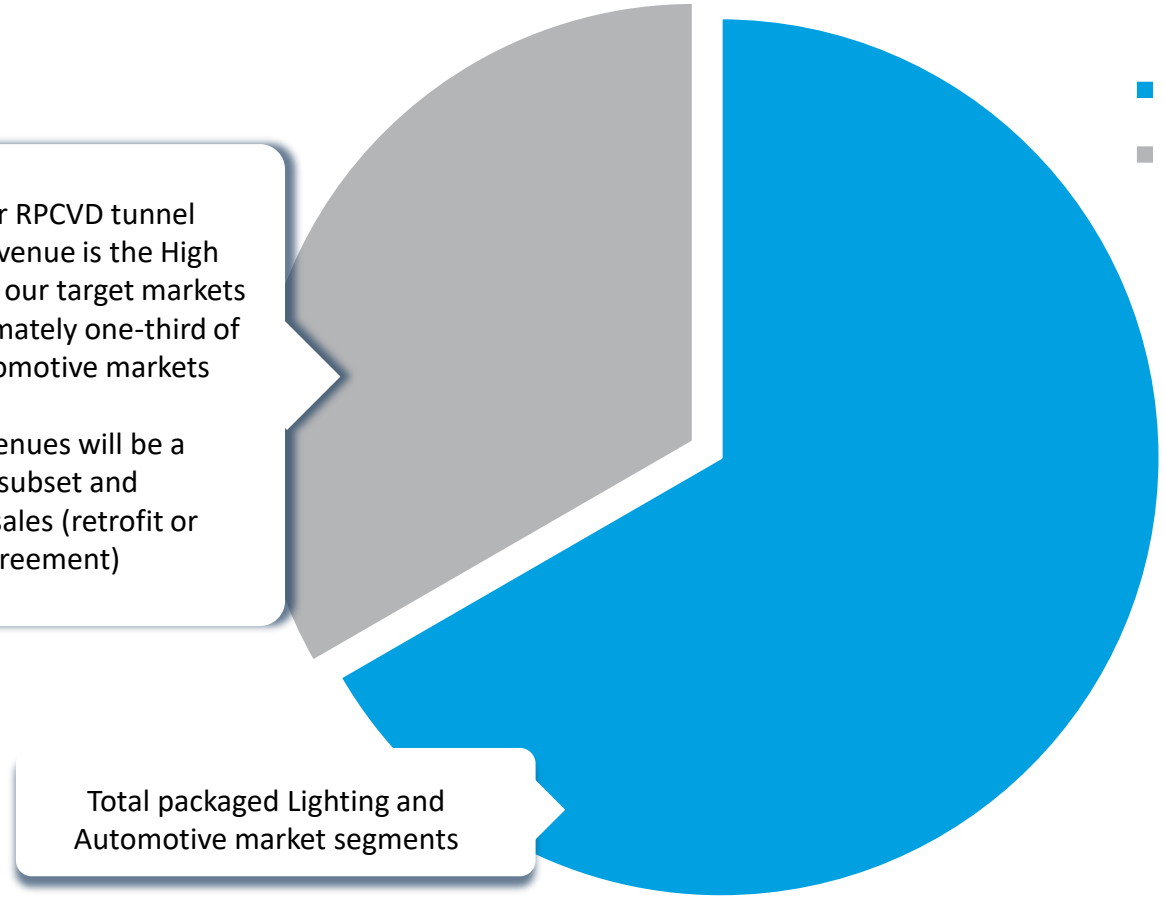


The initial target market segments for BluGlass' tunnel junction capabilities are the lighting and automotive segments - specifically the high-power segments of these markets which equate to one-third of the total lighting and automotive segments

*Source: Strategies Unlimited, Strategies in Light Conference February 2019

BLUGLASS' TARGET MARKET FOR RPCVD TUNNEL JUNCTIONS

- BluGlass' target market for RPCVD tunnel junction royalty licence revenue is the High Power market segment of our target markets which represents approximately one-third of the total Lighting and Automotive markets
- Licensing and foundry revenues will be a proportion of this market subset and supported by equipment sales (retrofit or equipment partnership agreement)



*Source: Strategies Unlimited, Strategies in Light Conference February 2019 and BluGlass internal modelling

EPIBLU – REVENUE GENERATING STRATEGIC BUSINESS

Revenue Generating Service Arm

STRATEGIC VALUE OF EPIBLU

- Enables BluGlass to expand our library of technology capability
- Opens new commercialisation opportunities for RPCVD
- While also creating early revenue drivers for BluGlass
- High value, specialised applications present a large growth opportunity for epiblu

Key Market Opportunities epiblu will leverage include:

- High Power LEDs (General Lighting & Automotive)
- Laser Diodes (Industrial Laser Market, Cutting, Marking & Welding)
- microLED (Displays and AR/VR/MR)
- DUV LED (Biological & Water Purification)

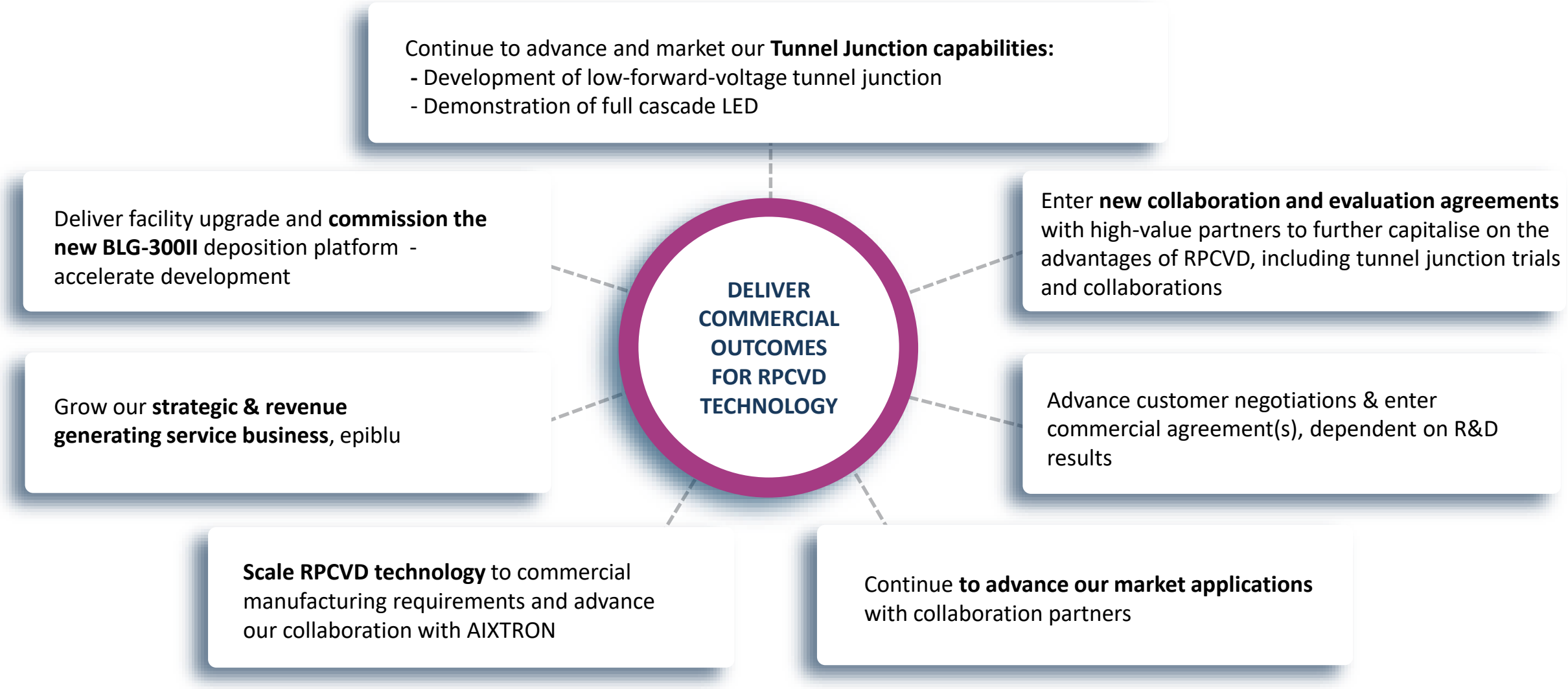
SUMMARY AND OUTLOOK

SUMMARY

Since listing, BluGlass has focused on:

- establishing, proving, developing and de-risking our patented RPCVD technology
- collaborating with industry leaders across multiple market segments in HB-LED, microLED and power electronics applications and segments
- demonstrating applications in key segments
- improving device performance
- building a foundry and epitaxy services adjunct business (epiblu)
- building out our patent portfolio
- positioning the business and its value offering for commercialisation

KEY FUTURE MILESTONES



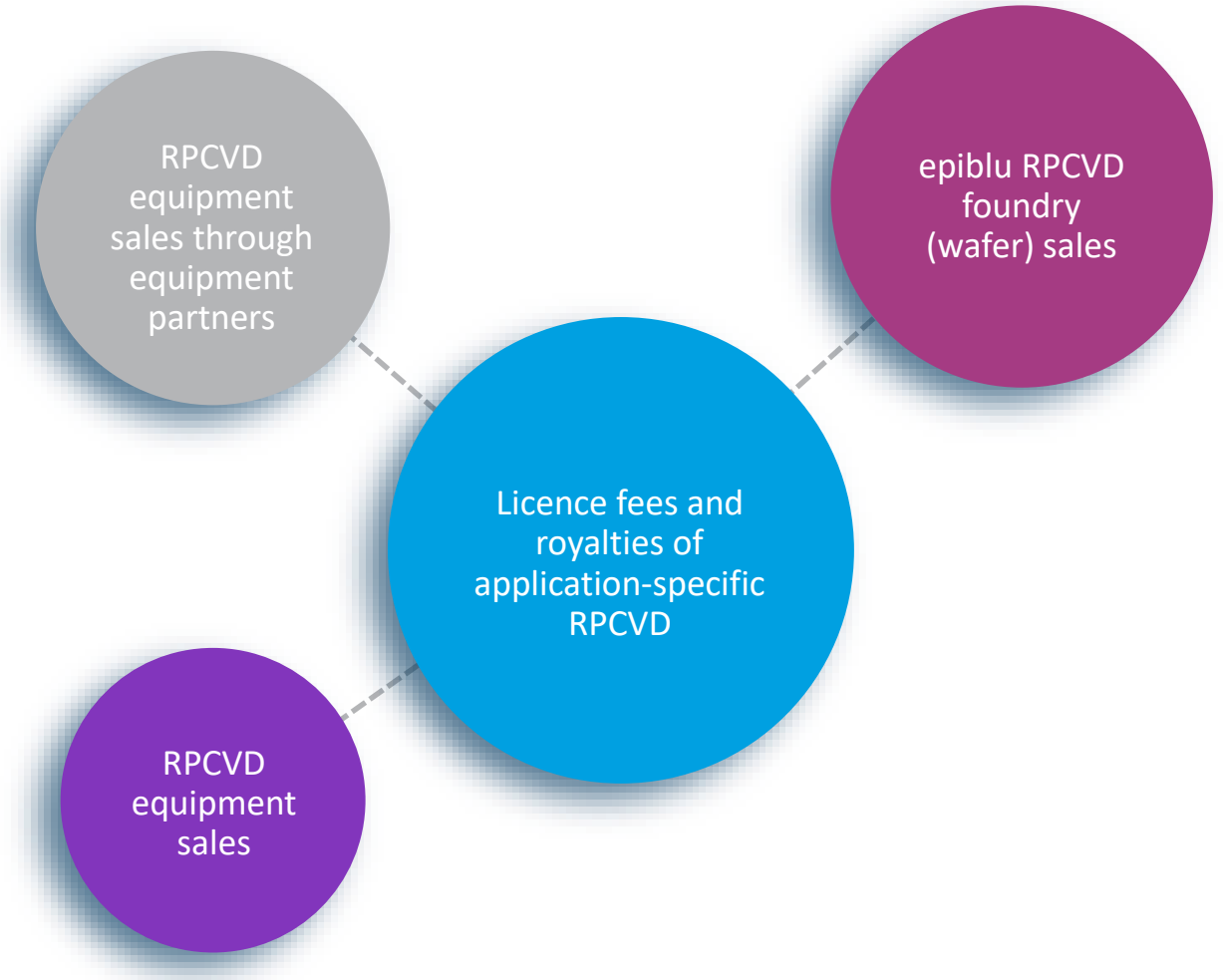
PATHS TO MARKET FOR RPCVD

RPCVD IP Portfolio

CONTINUING EXPANSION OF IP ACROSS SEGMENTS

- HB-LED (green, blue)
- microLED (RGB)
- Power electronics
- Laser diodes
- UV LED
- Solar

BluGlass will generate RPCVD revenues through a combination of the following:



HOW BLUGLASS ADDRESSES THE MARKET

BluGlass will target business opportunities in the global photonics industries as follows:

RPCVD Licence Fees and Royalties

- Large opportunity: potential to negotiate multiple licensing **agreements** with a range of terms across a range of manufacturers
- Scalable: licence IP, complemented by support (consulting) and additional services

epiblu RPCVD foundry (wafer) sales

- Higher margin, lower volume opportunity
- Ability to focus on high-value specialised opportunities and high-value prototyping and R&D services to customers
- Scalable business model, complemented by consulting and additional services

RPCVD Equipment Partnership

- Higher-volume equipment production opportunity to provide RPCVD equipment to the market at scale with an equipment partner – e.g. such as in conjunction with our collaboration partner AIXTRON

RPCVD Retrofit Equipment Sales

- A preferred option for some manufacturers
- Smaller opportunity: limited number of companies will consider hardware retrofit
- Complementary revenue to licensing strategy to supply early equipment sales

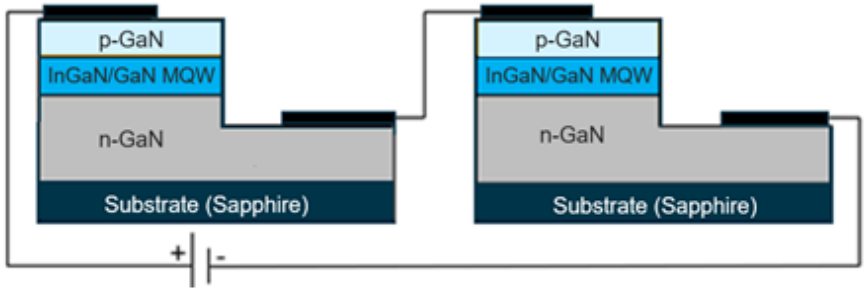
BluGlass' target market focus remains the general lighting, automotive, microLED and laser diode market segments

COMPETITIVE ADVANTAGES OF RPCVD

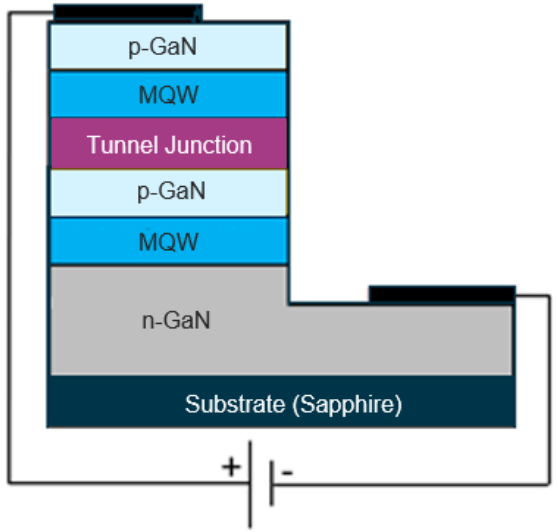
TECHNOLOGY BREAKTHROUGH – RPCVD TUNNEL JUNCTIONS

BluGlass has demonstrated successful RPCVD tunnel junctions which can enable cascade LEDs

- A cascade LED is a device where two or more LEDs are grown in a continuous vertical stack using a tunnel junction to interconnect multiple LEDs in a single chip – **offering the advantages of multiple LEDs in a single, smaller form factor, higher performing, lower cost solution**
- A cascade LED addresses the fundamental challenge of 'efficiency droop' in GaN-based LEDs by decreasing the required electrical current while increasing the light output
- Cascade LEDs have not been commercially available to date



SIDE-BY-SIDE LEDs

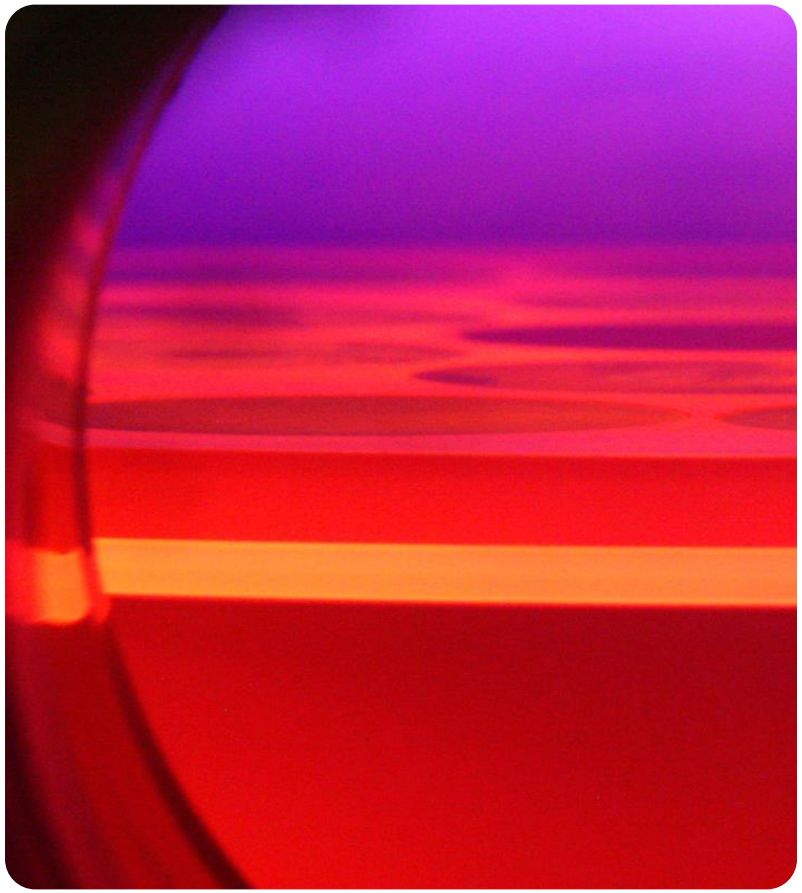


CASCADED LED

RPCVD FOR TUNNEL JUNCTIONS

Standard n^{++} GaN/p^{++} GaN Tunnel Junction Requirements:

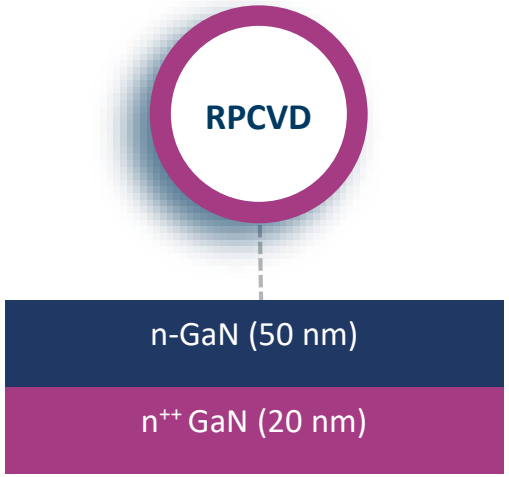
- Buried activated p-GaN (difficult to achieve with MOCVD without additional costly fabrication steps)
- **High doping capability** for both p^{++} GaN and n^{++} GaN
- **Sharp Mg dopant profile at tunnel junction interface** (difficult to achieve with MOCVD)
- **RPCVD has advantages for each of these key requirements** including our **'Active-As-Grown'** p-GaN capability for tunnel junctions

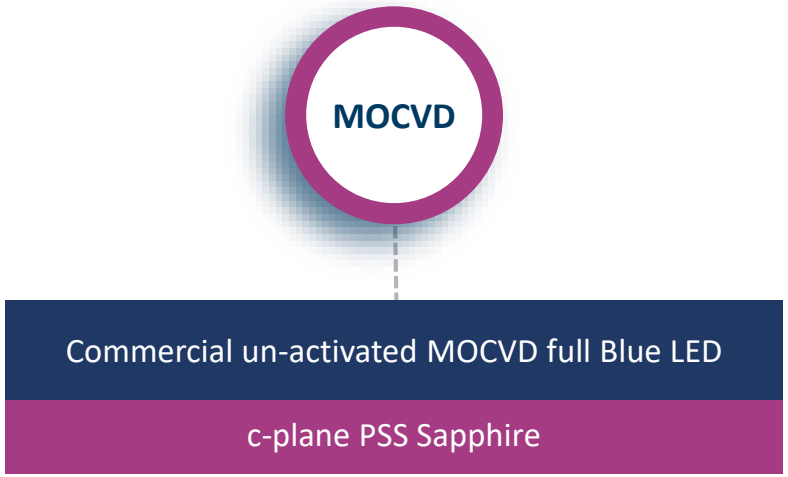


RPCVD FOR TUNNEL JUNCTIONS

BluGlass has shown working RPCVD tunnel junction LEDs with improved light output, however we need to reduce the voltage further for commercial LED applications

Structure	EL (packaged) data at 26 A/cm^2			
	LOP (mW)	ΔLOP (%)	V_f (V)	ΔV_f (V)
LED with hybrid RPCVD TJ	**618**	**+4.4**	**4.06**	**+0.68**
MOCVD LED with ITO	592	-	3.38	-





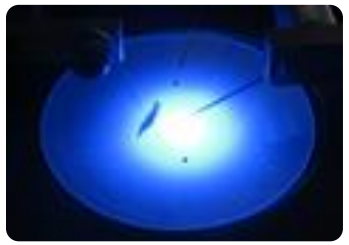
LED PROCESSING DETAILS

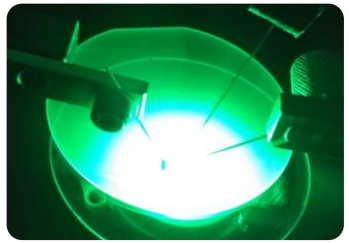
- ITO thickness: 100 nm on full LED & none on LED with Tunnel Junction
- Metallisation: Cr/Al/Pt/Au alloy
- Pad size: 100 ± 5 μm
- Chip size: 1140 x 1140 (± 25) μm^2

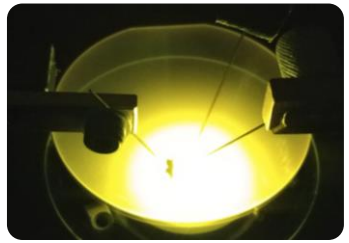
MICROLED & OTHER LED APPLICATIONS

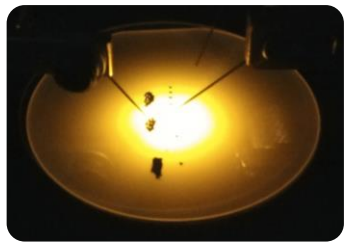
BluGlass continues to improve performance of its longer wavelength LEDs – critical for RGB microLED demonstrations for customers

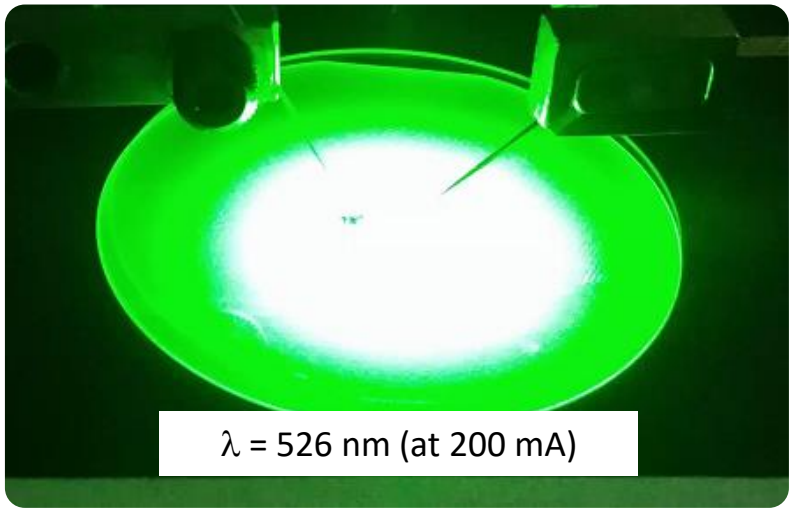
- Low temperature RPCVD p-GaN has **significant potential to improve device performance in long wavelength LEDs** – by overgrowing RPCVD p-GaN on indium-rich InGaN multi-quantum wells (MQWs)
- BluGlass is now developing capabilities and validating the **RPCVD performance potential in multiple building blocks of the LED device**, including the critical light emitting layers, the multi-quantum wells

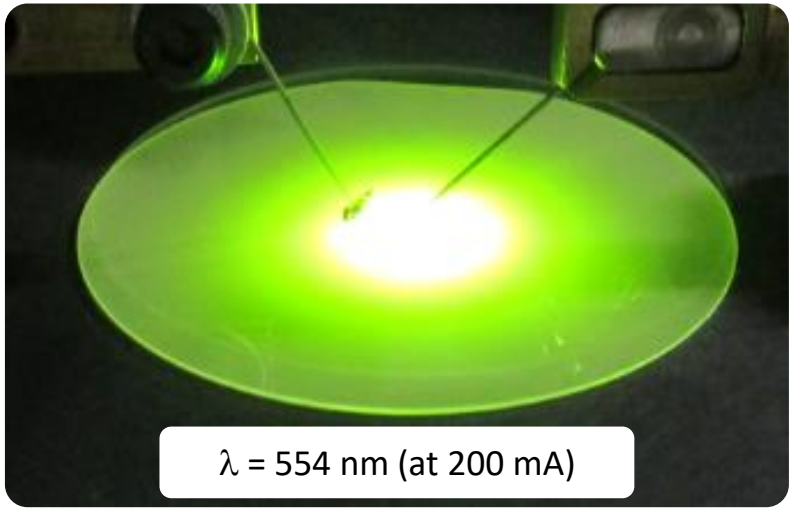












SUMMARY: INVESTMENT HIGHLIGHTS

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

High-brightness and general LED

Automotive

microLED

Laser diodes

UV LEDs

Power electronics

The manufacturing and process advantages of RPCVD (lower-temperature, low hydrogen manufacturing process, ability to scale to commercial levels, use of molecular nitrogen over toxic and expensive ammonia) are established and protected with a strong patent portfolio

Industry interest in RPCVD continues, in particular into our proven ability to manufacture tunnel junctions, an enabling technology for cascade LEDs using RPCVD, to help address the industry-wide challenge of efficiency droop, and improving the lumens/dollar ratio

Multiple go-to-market options of IP licensing, equipment retrofit and contract manufacturing de-risk further the commercial deployment of RPCVD

epiblu value-added epitaxy services and contract manufacturing subsidiary business well-placed to complement the mainstream BluGlass focus on RPCVD, continues to generate short-term revenue, positions the company in the industry as a global leader in compound semiconductor epitaxy R&D and commercialisation

THANK YOU

Giles Bourne, Managing Director
BluGlass Limited (ASX:BLG)
admin@bluglass.com.au

www.bluglass.com.au