



**MAY 2018**

BluGlass Investor Presentation

Giles Bourne, Managing Director & CEO

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# IMPORTANT NOTICE AND DISCLAIMER

## Forward looking statements continued

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## Financial data

All dollar values in this Presentation are in Australian dollars (A\$ or AUD). Investors should note that this Presentation contains pro forma information. The pro forma financial information and past information provided in this Presentation is for illustrative purposes only and is not being represented as being indicative of the Company's views on its future financial condition and or performance. The pro forma financial information has been prepared by the Company in accordance with the measurement and recognition requirements, but not the disclosure requirements, of applicable accounting standards and other reporting requirements in Australia and not in any other jurisdiction, including any other Offer Jurisdiction. The historical information included in this Presentation is, or is based on, information that has been previously released to the market.

## No investment advice

The information in this Presentation is not, does not constitute, and should not be taken to constitute, financial product advice, accounting, legal or tax advice and does not and will not form part of any contract or commitment for the acquisition of New Shares. You should make your own enquiries and investigations regarding all information in this Presentation including but not limited to the assumptions, uncertainties and contingencies which may affect future operations of the Company and the impact that different future outcomes may have on the Company. This Presentation has been prepared without taking account of your, or any other person's individual investment objectives, financial situation or particular needs. Before making an investment decision, prospective investors should consider the appropriateness of the information having regard to their own investment objectives, financial situation and needs and seek legal, accounting and taxation advice appropriate to their jurisdiction. The Company is not licensed to provide financial product advice in respect of the New Shares. Cooling off rights do not apply to any acquisition of New Shares.

## Acknowledgement

You acknowledge and agree that:

- determination of eligibility of investors for the purposes of the Offer is determined by reference to a number of matters, including legal and regulatory requirements, logistical and registry constraints and the discretion of the Company and the Manager Parties; and
- each of the Company and the Manager Parties disclaim any duty or liability (including for negligence) in respect of that determination and the exercise or otherwise of that discretion, to the maximum extent permitted by law.

## No offer

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A large blue industrial machine, likely a vacuum furnace or a similar high-temperature processing unit. It features a large glass-enclosed chamber on the left side, through which four black, flexible, arm-like components are visible, extending from the interior. The machine is mounted on a light-colored floor. To the right of the chamber is a control panel with various instruments, including a digital display showing '826', a pressure gauge, and several smaller digital readouts. Below the main control panel is a rack of electronic modules, some labeled 'ZONE A' and 'ZONE B'.

# BLUGLASS OVERVIEW & PROGRESS UPDATE

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# BLUGLASS VISION

**Accelerate the commercial opportunities for the use of Remote Plasma Chemical Vapour Deposition (RPCVD) technology in the manufacture of high-performance devices, including high brightness (HB)-LEDs, microLEDs and power electronics**

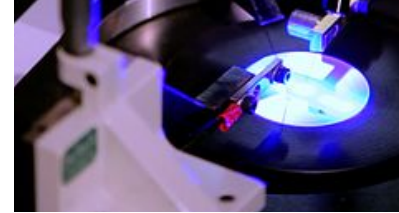
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## OUR VISION



BluGlass' vision is to be a global leader in the development and deployment of RPCVD technology, to enable device manufacturers to exploit its benefits, and adopt it as a preferred manufacturing option.

## OUR OBJECTIVE

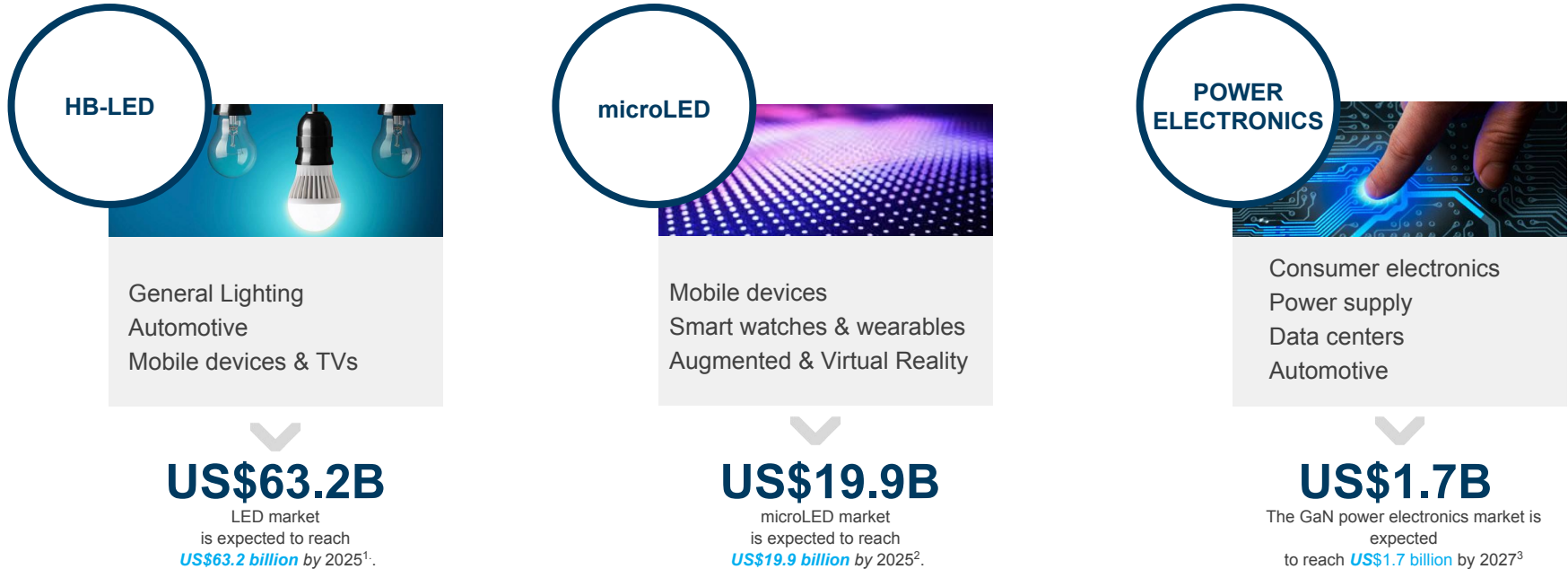


Our objective is to deliver high growth commercial outcomes for the RPCVD technology in the LED and power electronics industries, using a diverse range of go-to-market options.



# RPCVD PLATFORM TECHNOLOGY: MARKET OPPORTUNITIES

BluGlass has a diversified development strategy designed to address opportunities in a number of high-performance device categories

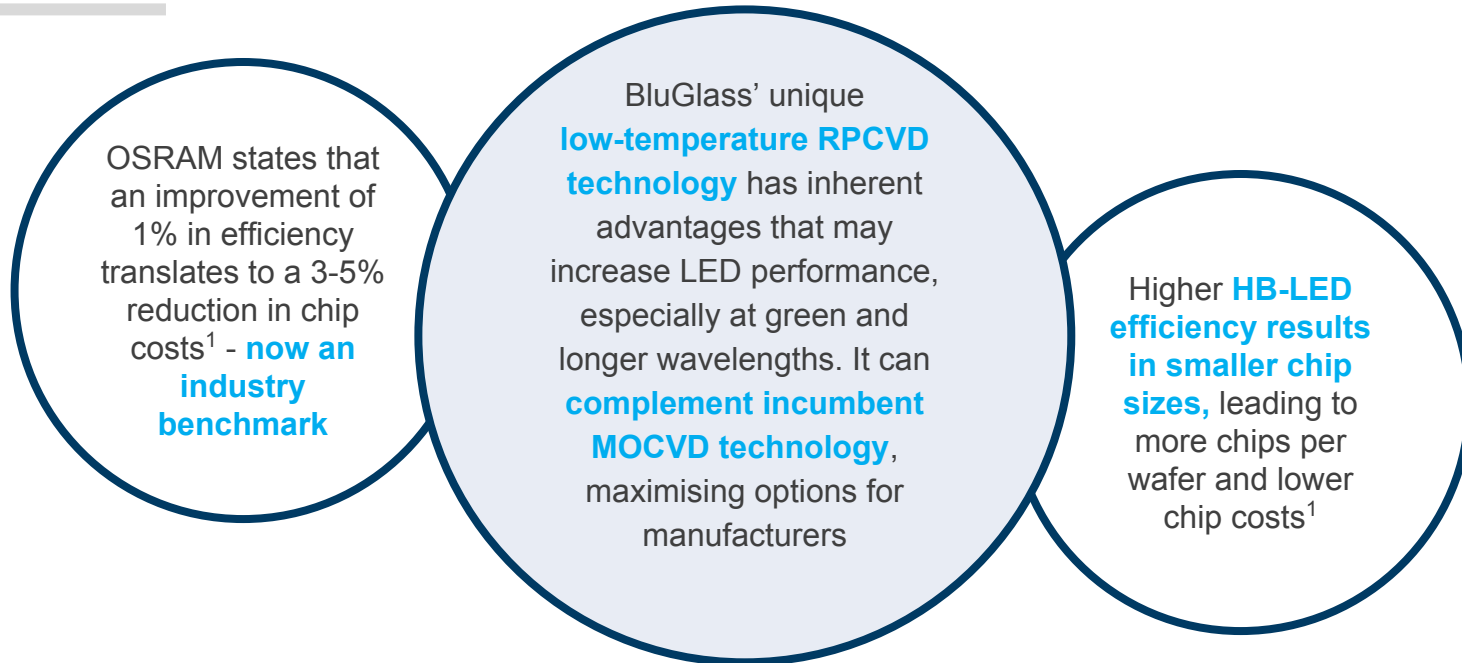


Sources: 1. Research and Markets Report Global Light-Emitting Diodes (LED) Market Analysis & Trends - Industry Forecast to 2025; 2. Navigant Research. [marketsandmarkets.com](https://marketsandmarkets.com), April 2017.  
3. IHS Markets, 'SiC & GaN Power Semiconductors Report - 2018'



## INDUSTRY PERSPECTIVE - KEY INDUSTRY INNOVATION REQUIREMENTS

Competitiveness in the HB-LED industry is largely driven by efficiency (light-output) and manufacturing costs. Efficiency improvements can also lower cost.



Sources: 1. OSRAM Analyst Day 2016 Presentation, January 2016.



# INDUSTRY CHALLENGE: THE CHALLENGES WITH INCUMBENT MOCVD TECHNOLOGY

## MOCVD (Metal Organic Chemical Vapour Deposition) – The Industry Incumbent Technology

### CHALLENGES



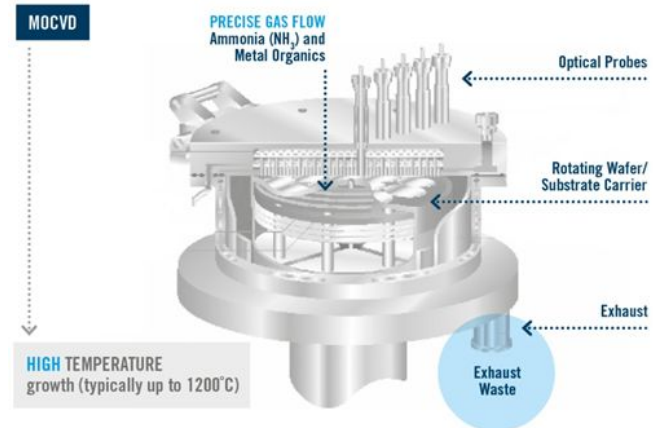
High temperature processes limits **performance** of the critical regions of the LED, microLED and power electronics devices



Uses high volume of expensive **ammonia** as nitrogen source, produces toxic waste, more-difficult and costly to manage



**High** temperature limits the choice of low-cost, larger silicon wafers for power electronics, microLEDs and LEDs





# THE RPCVD SOLUTION: LOWER TEMPERATURE, HIGHER PERFORMANCE

## RPCVD (Remote Plasma Chemical Vapour Deposition) – The Breakthrough Alternative

### OUR SOLUTION



*Lower temperature  
manufacturing processes*



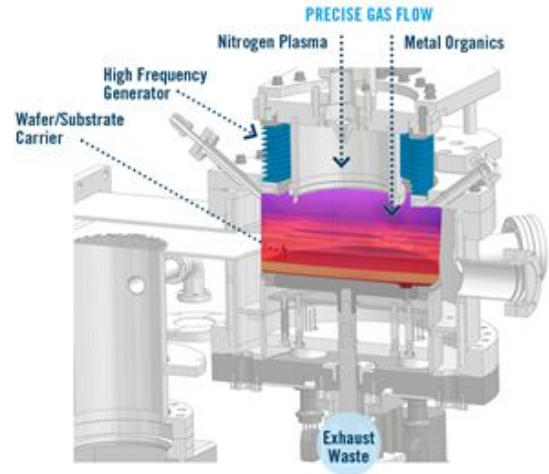
*Lower cost inputs*



*Higher performing devices*



*Environmentally  
friendlier & more-sensitive*



# MARKET STRATEGY: DIVERSE COLLABORATION AGREEMENTS

**Established collaboration agreements with industry leaders across multiple market segments in HB-LED, microLED and power electronics applications and segments**

## GAIN INDUSTRY ACCEPTANCE

- Demonstrate applications in key segments
- Improve device performance
- Complete industry evaluation with multiple partners in the LED value chain (including Equipment and device segments)

## DRIVE COMMERCIALISATION

- Continuously evaluate commercialisation options for RPCVD: JVs, partnerships, licensing, foundry, customer sales







## GROW EPIBLU BUSINESS

- Continue to work with MOCVD & RPCVD customers to provide custom wafer services & contract R&D and prototyping

## NOTIONAL TIMETABLE



# COLLABORATION MAP: INDUSTRY LED DEVELOPMENT OF RPCVD, MAXIMUM DIVERSITY

	APPLICATIONS	ACTIVITY	STATUS
	LED application	Targeting improved LED efficiency and lower cost benefits of RPCVD	Phase II extended and development expedited
	RPCVD Equipment for multiple applications	Lower temperature manufacturing process (RPCVD)	Ongoing evaluation and collaboration in equipment market
	Electronic applications	Targeting performance improvement for RPCVD nitride films on cREO and silicon substrates	Continuing collaboration
	Multiple LED applications	RPCVD performance improvements of green and blue LEDs	Continuing collaboration
	microLED applications	RPCVD performance improvements of RGB microLEDs	Recently commenced customer development
	Custom wafer services (MOCVD & RPCVD) & contract R&D	Quick prototyping turnaround Low volume manufacturing RPCVD, MOCVD and integrated services	New full-time VP of Business Development Growing pipeline



# THE YEAR AHEAD



Complete industry evaluations and commence commercial discussions with new partners



Continue activities to scale operations for commercialisation and new customers: new facilities, implement RPCVD on commercial scale



Generate and protect more IP

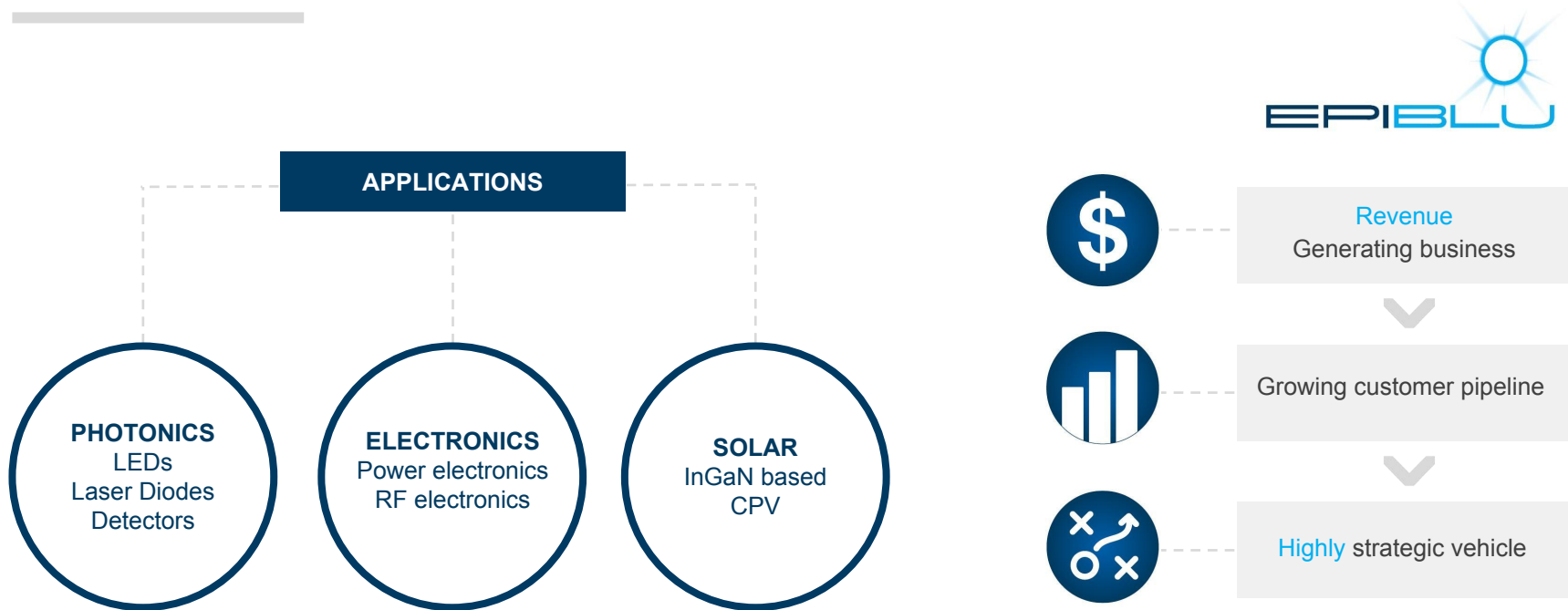


**Achieve commercial outcomes - renewed collaboration with partners to update market**



# EPIBLU: SPECIALIST CUSTOM EPITAXY & CONTRACT R&D SERVICES

BluGlass' service business, EpiBlu, provides custom epitaxy and contract R&D services to the nitrides industry. New global VP Business Development appointed April 2018





The background features a circular frame, similar to a porthole or a lens, through which a blurred, abstract scene is visible. The scene has a strong color gradient, transitioning from a deep red at the bottom to a vibrant purple at the top. In the center of the frame, there are several horizontal, glowing bands of light, suggesting a futuristic or high-tech environment. The overall effect is one of depth and mystery.

# TRANSACTION OVERVIEW

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# CAPITAL RAISING: EQUITY RAISE SUMMARY

OFFER SIZE AND STRUCTURE	<ul style="list-style-type: none"> <li>Capital raising of up to A\$14.2 million consisting of: <ul style="list-style-type: none"> <li>An institutional Placement to raise A\$9.2 million. The Placement was conducted to institutional and professional investors in select jurisdictions</li> <li>A share purchase plan to eligible Australian and New Zealand retail shareholders, which will be capped at A\$5 million</li> </ul> </li> </ul>
OFFER PRICE	<ul style="list-style-type: none"> <li>The Offer price under the Placement is A\$0.370 per New Share. The Offer price represents: <ul style="list-style-type: none"> <li>an 8.6% discount to the last closing price of BLG's shares on Wednesday, 16 May 2018 of A\$0.405</li> <li>an 11.4% discount to the 5-day VWAP to Wednesday, 16 May 2018 of A\$0.417</li> </ul> </li> </ul>
RANKING	<ul style="list-style-type: none"> <li>New Shares issued under the Placement will rank equally with all existing BLG shares from the date of issue</li> </ul>
UNDERWRITING	<ul style="list-style-type: none"> <li>The Offer is not underwritten</li> </ul>
SPP	<ul style="list-style-type: none"> <li>Following the Placement, the Company will offer eligible Australian and New Zealand shareholders the opportunity to acquire up to \$15,000 in New Shares via a share purchase plan ('SPP')</li> <li>The issue price for shares issued under the SPP will be the same as the Institutional Placement</li> <li>The SPP will be capped at A\$5 million</li> <li>Shares issued via the SPP will rank equally with existing BLG shares from the date of issue</li> <li>An SPP Offer Booklet containing further details of the SPP offer will be sent to eligible shareholders in due course</li> </ul>



# USE OF PROCEEDS

## Objective of capital raising:

- to provide sufficient capital to accelerate existing collaboration agreements
- demonstrate applications with equipment manufacturers
- additional resources to capitalise on new collaborations and market opportunities

ITEM	SUM	STATUS	OBJECTIVES
<b>Acquisition of equipment</b>	<b>AU\$4.5 million</b>	Discussions under way with equipment manufacturers to purchase new MOCVD equipment and componentry.	<ul style="list-style-type: none"><li>• Allow BluGlass to build and demonstrate applications by retrofitting MOCVD equipment with RPCVD on commercial platforms</li><li>• Establish path to market through new and existing collaboration partnerships</li><li>• Trials to demonstrate proof of performance required for future retrofit sales opportunities</li><li>• Demonstrate scalability of RPCVD</li></ul>
<b>Facilities expansion and infrastructure upgrade</b>	<b>AU\$3.5 million</b>	Design and planning of new cleanroom and complex gas supply systems and supporting infrastructure under way.	<ul style="list-style-type: none"><li>• Infrastructure expansion and upgrade essential to accelerate RPCVD manufacturing development</li><li>• Expand prototype manufacturing capabilities</li></ul>



# USE OF PROCEEDS

## Objective of capital raising:

- to provide sufficient capital to accelerate existing collaboration agreements
- demonstrate applications with equipment manufacturers
- additional resources to capitalise on new collaborations and market opportunities

ITEM	SUM	STATUS	OBJECTIVES
Operational expenditure for expanded activities	AU\$1.0 million		<ul style="list-style-type: none"><li>• Accelerate increase in patent applications to support and protect IP, including appointment of international patent firm</li><li>• Provide additional resources to pursue new collaborations and execute new commercial agreements with existing partners</li><li>• Accelerate activity and commercialisation of existing collaborations where possible</li></ul>
Strengthen balance sheet	Up to AU\$5.2 million <sup>1</sup>	Additional capital to support future initiatives, increased access to new market opportunities.	<ul style="list-style-type: none"><li>• Ensure capital exists to exploit market opportunities</li></ul>
TOTAL	Up to AU\$14.2 million <sup>1</sup>		

1. Subject to take-up in the SPP



## CAPITAL RAISING: EQUITY RAISE TIMETABLE

INSTITUTIONAL PLACEMENT	DATE
<ul style="list-style-type: none"> <li>Trading Halt (pre-market open)</li> </ul>	Thursday, 17 May 2018
<ul style="list-style-type: none"> <li>Bookbuild opens</li> </ul>	Thursday, 17 May 2018
<ul style="list-style-type: none"> <li>ASX Announcement of Offer completion, investor presentation lodged</li> </ul>	Monday, 21 May 2018
<ul style="list-style-type: none"> <li>Trading Halt lifted (pre-market open)</li> </ul>	Monday, 21 May 2018
<ul style="list-style-type: none"> <li>Expected settlement of new shares issued under the Placement</li> </ul>	Thursday, 24 May 2018
SPP	DATE
<ul style="list-style-type: none"> <li>SPP Record Date</li> </ul>	7pm Friday, 18 May 2018
<ul style="list-style-type: none"> <li>SPP offer opens, Offer materials despatched to shareholders</li> </ul>	Tuesday, 22 May 2018
<ul style="list-style-type: none"> <li>SPP offer closes</li> </ul>	7pm Tuesday, 12 June 2018
<ul style="list-style-type: none"> <li>Announce SPP results, settlement of funds under the SPP offer</li> </ul>	Tuesday, 19 June 2018
<ul style="list-style-type: none"> <li>Allotment of new shares issued under the SPP</li> </ul>	Wednesday, 20 June 2018





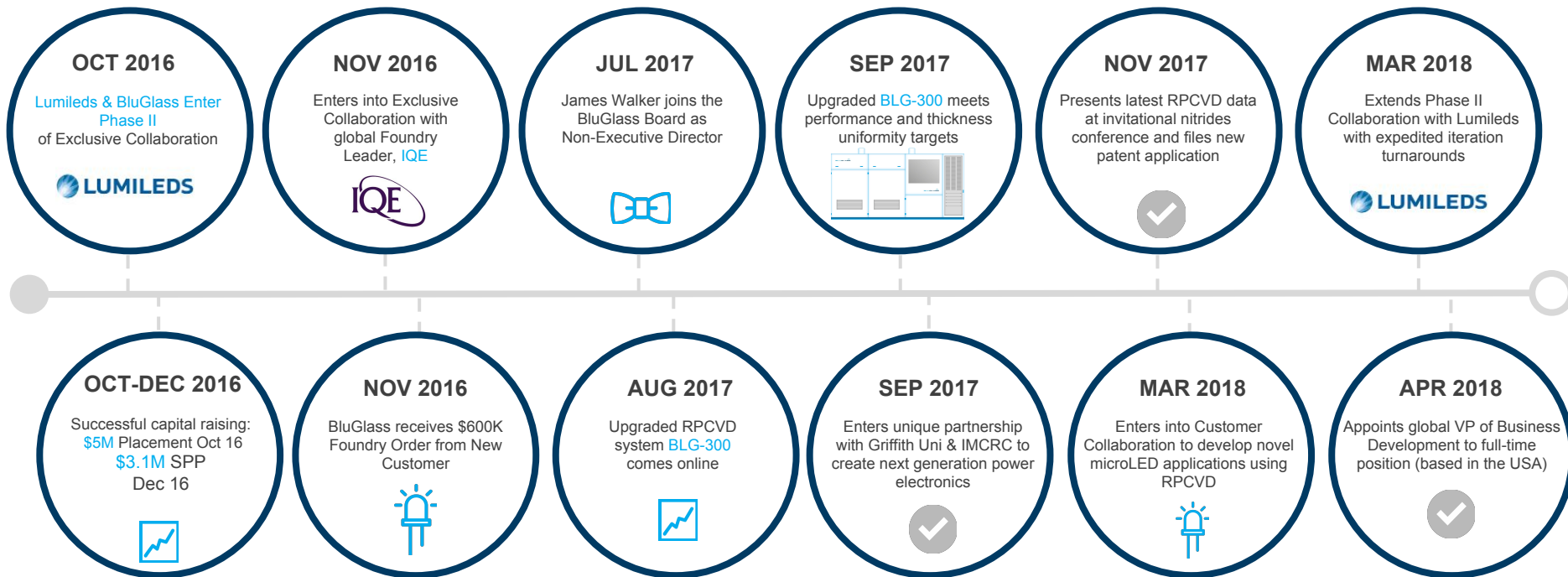


SENIOR MANAGEMENT, BOARD & KEY  
MILESTONES DELIVERED

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# KEY MILESTONES DELIVERED

BluGlass continues to deliver technology breakthroughs, towards bringing RPCVD towards commercialisation



## CORPORATE OVERVIEW: SENIOR TEAM



**GILES BOURNE**

*Managing Director & Chief Executive Officer*



Appointed to Board in 2014, CEO in 2008.

Twenty years' experience in cleantech & manufacturing

Business development & commercialisation specialist.



**DR. IAN MANN**

*Chief Operations & Technology Officer*



Appointed in 2009.

Twenty years' experience in product development, tech team management, materials sciences and photonics.

Former CEO of Bandwidth Foundry.



**DR. MARIE WINTREBERT**

*Chief Scientist*



Founding scientist and co-inventor of the BluGlass RPCVD process.

Device design, fabrication, modeling and measurement expert.



**BRAD SISKAVICH**

*Vice President of Business Development*



Appointed in 2018.

Twenty years' experience in developing and commercialising new technologies in start-up and high-growth companies in the compound semiconductor, PV and opto-electronics industries.



**STEFANIE WINWOOD**

*Investor Relations and Marketing Manager*



Appointed in 2009.

Strategic marketing and communications professional.

Fifteen years' experience in technical communications & brand management.



## CORPORATE OVERVIEW: BOARD RENEWAL IN 2018

**Renewal of board commenced March 2018 to position BluGlass for next phase of growth. Expected to complete this process May-June 2018.**

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Expertise being added to board include capital markets, licensing, commercialisation, corporate governance, and finance, to provide guidance on:

- Renewed and new collaboration agreements
- New commercialisation opportunities, including services
- Direction on R&D
- Capital raising to accelerate the opportunities around RPCVD in high-performance LEDs, microLEDs and power electronics



## CORPORATE OVERVIEW: BOARD



**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.



**CHANDRA  
KANTAMNENI**  
*Non-Executive Director*



Appointed in 2006.

Over 30 years' experience in global semiconductor sector, including managing the Australian subsidiary of semiconductor manufacturing business Peregrine.



**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.





## KEY RISKS (SPECIFIC)

BluGlass operates in the semiconductor industry, is in the development phase and has not yet commercialised its operations. Any investment in such a development company is considered high-risk.

Set out below is a summary of the potential material risks associated with the business of the Company and the industry in which the Company operates and the risks associated with any investment in shares in the Company, including any New Shares. The Company is subject to a number of risks both specific to its business activities and of a general nature, which may either individually or in combination adversely impact the Company's future operating and financial performance, the Company's investment returns and the value of the Company's shares. The occurrence or consequences of some of the risks described below are partially or completely outside of the Company's control or the control of the Company's directors and management team.

### SPECIFIC RISKS

**Development company:** BluGlass is currently in development phase and has not yet commercialised its operations. The performance, growth prospects and success of the Company is dependent on its ability to successfully develop and commercialise its existing products and technologies, including its remote plasma chemical vapour deposition (RPCVD) technology. A failure to successfully develop and commercialise this technology could lead to a loss of opportunities and adversely impact on the Company's operating results and financial position.

**Partnership and collaborations:** The Company relies, and intends to rely, upon partnerships and collaborations with corporate partners to market, and in some cases, to finalise development and registration of its products and technologies on its behalf. There are significant risks in establishing and maintaining these relationships, including that the manner in which the Company's corporate partners execute and perform their obligations under their partnership and collaboration arrangements and agreements is largely outside the control of the Company. Any failure to execute or perform their obligations under these arrangements or agreements, or any other adverse conduct or actions of the Company's corporate partners, or their affiliates, related bodies corporate, directors, officers or employees, including conduct or actions unrelated to the partnership or collaboration with the Company, has the capacity to materially adversely impact the performance, growth prospects, success and/or reputation of the Company. The Company has established a number of important partnerships and collaborations with corporate partners. The breakdown in any of these, or any future relationships with corporate partners, may significantly adversely affect the operating results of the Company and the Company's potential growth opportunities and prospects, including the time that it may take to commercialise the Company's RPCVD and other technologies.



## KEY RISKS (SPECIFIC)

**Technology rights / patents:** Securing rights to the RPCVD and other technologies of the Company, and in particular, patents, is an integral part of securing potential product value in the outcomes of semiconductor research and development. Competition in retaining and sustaining protection of the RPCVD and other technologies and the complex nature of these technologies can lead to expensive and lengthy patent disputes for which there can be no guaranteed outcome. Filing of a patent application does not guarantee that the patent will be granted. Furthermore, where a patent is granted, the scope of protection provided by the granted patent may be less than that originally sought in the patent application on which the patent was granted. The granting of a patent does not guarantee that the rights of others are not infringed nor that competitors will not develop competing technology that circumvents such patents. The Company's success depends, in part, on its ability to obtain patents, maintain trade secret protection and operate without infringing the proprietary rights of third parties. Because the patent positions of semiconductor companies can be highly uncertain and frequently involve complex legal and scientific evaluation, neither the breadth of claims allowed in semiconductor patents nor their enforceability can be predicted. There can be no assurance that any patents the Company may own or control or licence now and in the future will afford the Company commercially significant protection of the RPCVD and other technologies, nor that any of the projects that may arise from these technologies will have commercial application.

Although the Company is not aware of any third party interest in relation to the technology rights of its RPCVD technology and other technologies, and has taken steps to protect and confirm its interest in these rights, there is always a risk of third parties claiming involvement in technological discoveries, and if any disputes arise, they could adversely affect the Company. Although the Company will implement all reasonable endeavours to protect the RPCVD technology, there can be no assurance that these measures have been, or will be sufficient.

**Research and development:** The Company currently conducts, and intends to continue conduct, significant research and development (R&D) activities. These activities are, and may be, partly funded under competitive grants, R&D tax rebates and other incentive programs. At this stage, a significant proportion of the Company's revenue is derived from R&D tax rebates. There is no certainty that any grants, R&D tax rebates or any other incentive programs will continue to be available to the Company in the future, and any changes in government policy may reduce their applicability. Any such changes or reductions has the capacity to significantly increase the current cash 'burn rate' of the Company. The outcomes of the Company's R&D activities is inherently uncertain. Accordingly, the Company can make no representation or warranty that any of its research into or development of the RPCVD technology or any other technologies will be successful, that any development milestones will be achieved, or that its technologies will be developed into products that are commercially exploitable.



## KEY RISKS (SPECIFIC)

**Research and development (continued):** There are many risks inherent in the development of technology products, particularly where the products are in the early stages of development. Projects can be delayed or fail to demonstrate any benefit, or research may cease to be viable for a range of scientific and commercial reasons.

**Product liability:** Through its business, the Company is and may be exposed to potential product liability risks, which are inherent in the research and development, manufacturing, marketing and use of its products or products developed with future corporate partners. The Company may not be able to maintain insurance for product or service liability on reasonable terms in the future and, in addition, the Company's insurance may not be sufficient to cover large claims, or the insurer could disclaim coverage on claims.

Although the Company endeavours to work to rigorous standards, there is still the potential for its products to contain defects that may result in system failures. These defects or problems could result in the loss of or delay in generating revenue, loss of market share, failure to achieve market acceptance, diversion of development resources, injury to the Company's reputation or increased insurance costs. If the Company fails to meet its clients' expectations, the Company's reputation could suffer and it could be liable for damages.

**Additional financing risks:** The Company currently, and since its inception, does not receive sufficient income to cover its operating expenses. Although the proceeds of the Offer are expected to provide sufficient capital resources to enable the Company to conduct its medium-term business objectives, the Company can give no assurances that such objectives will in fact be met without future borrowings or further capital raisings, and if such borrowings or capital raisings are required, that they can be obtained on terms favourable to the Company. In addition, funds raised under the Offer are unlikely to be sufficient to enable the Company to fully commercialise its RPCVD and other technologies. Any additional equity financing will dilute shareholdings and debt financing, if available, may involve restrictions on financing and operating activities. If the Company is unable to obtain additional financing as needed, it may be required to reduce the scope of its operations and scale back its expansion and development programs.



# KEY RISKS (GENERAL)

## GENERAL RISKS

**Regulatory:** The introduction of new legislation or amendments to existing legislation by governments, developments in existing common law or the respective interpretation of the legal requirements in any of the legal jurisdictions that govern the Company's operations or contractual obligations, could impact adversely on the assets, operations and, ultimately, the financial performance of the Company and its shares. In addition, there is a commercial risk that legal action may be taken against the Company in relation to commercial matters.

**Licensing and marketing:** The Company's strategy may be to licence its RPCVD and other technologies in the early phase of its development to licensees that are able to complete commercialisation of the RPCVD and other technologies. The Company may seek to raise additional capital in the future if suitable licensees cannot be identified and the Company seeks to commercialise the RPCVD and other technologies without licensees. The Company is considering the potential of the RPCVD technology to be exploited in the markets of Australia and overseas. There can be no assurance that these markets will be established successfully and the failure to do so could have a material adverse effect on the Company's business, financial condition and results of operations. Furthermore, there is no guarantee that the targeted markets will accept the new technology and use the products developed by the Company.

**Interest rate:** The Company has significant investments in term deposits and bank bills. The Company is exposed to risk that the value of these financial instruments will fluctuate as a result of changes in market interest rates.

**Economic risks:** The Company derives a significant portion of its revenue and other funding in non-Australian dollars. General economic conditions, movements in interest and inflation rates and currency exchange rates may have an adverse effect on the Company's activities as well as on its ability to fund those activities.

**Taxation:** A change to the current taxation regime in Australia or overseas may affect the Company and its shareholders.

**Key management personnel:** The Company depends on the talent and experience of its management and staff. It is essential that appropriately skilled management personnel and staff be available in sufficient numbers. Any departure of key management or staff may have a negative impact on the Company, particularly if the management or staff leave to work for a competitor.



## KEY RISKS (GENERAL)

**Competition:** There is a risk that the Company will not be able to continue to compete profitably in the competitive industry in which it intends to operate. The potential exists for the nature and extent of the competition to change rapidly, which may cause loss to the Company.

**Share market:** Share market conditions may affect the value of the Company's quoted securities regardless of the Company's operating performance. Share market conditions are affected by many factors, such as:

- (a) general economic outlook;
- (b) interest rates and inflation rates;
- (c) currency fluctuations;
- (d) changes in investor sentiment towards particular market sectors;
- (e) the demand for and supply of, capital; and
- (f) terrorism or other hostilities.

**Other risks:** Additional risks and uncertainties not currently known to the Company may also have a material adverse effect of the Company, including the value of the shares of the Company. The information set out above, does not purport to be, nor should it be construed as representing, an exhaustive list of the risks affecting the Company.





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- (b) meets the investment activity criteria specified in clause 38 of Schedule 1 of the FMC Act;
- (c) is large within the meaning of clause 39 of Schedule 1 of the FMC Act; or
- (d) is a government agency within the meaning of clause 40 of Schedule 1 of the FMC Act;

No financial products are being offered to any person who is not a wholesale investor.

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# OFFERING RESTRICTIONS

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Where shares are subscribed or purchased, and if you are an institutional investor as defined under Section 4A(1)(c) of the SFA, a relevant person as defined under Section 275(2) of the SFA or a person to whom an offer is being made under Section 275(1A) of the SFA, you will be subject to restrictions on transferability and resale, and such shares may not be transferred or resold in Singapore except as permitted under the SFA. By accepting this document, you agree to be bound by the disclaimers, limitations and restrictions described herein. In the event that you are not an investor falling within any of the categories set out above, please return this document immediately. No person receiving a copy of this document in Singapore may treat the same as constituting an invitation or offer to him unless such an invitation or offer could lawfully be made to him without compliance with any registration or legal requirements, or where such registration or legal requirements have been complied with.

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# OFFERING RESTRICTIONS

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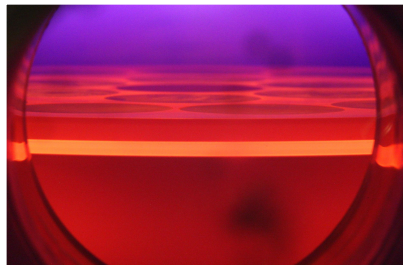
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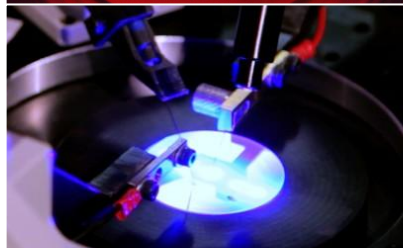


# APPENDIX

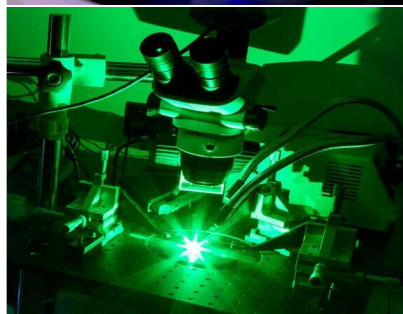
# BLUGLASS VIRTUAL TOUR



Plasma nitrogen source,  
provides low temperature  
manufacturing process



Low temperature process  
has potential for performance  
improvement of active layers  
in devices such as LEDs



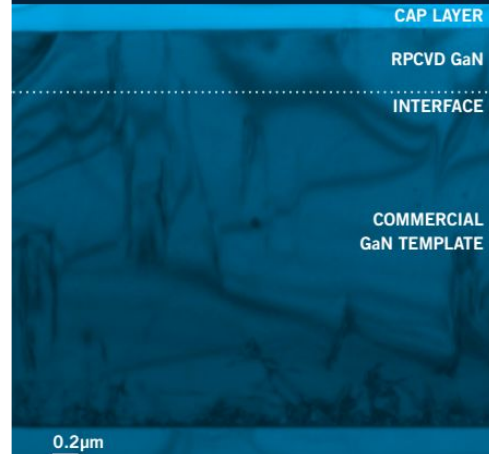
Low temperature process can  
potentially create better  
performing, longer wavelength  
LEDs  
(green, red, yellow)

RPCVD can produce  
high quality  
crystalline material,  
with low defect  
density

FIGURE 1: TEM IMAGE AT INTERMEDIATE MAGNIFICATION



FIGURE 2: TEM IMAGE AT LOW MAGNIFICATION





# RPCVD FOR LEDs: DEMONSTRATED PERFORMANCE IMPROVEMENT

## RPCVD FOR LEDs



Demonstrated advantage:  
Demonstrated **+35% performance improvement**  
with RPCVD p-GaN for green LEDs\*\*



Increased LED efficiency may be achieved by  
reducing the degradation caused by high  
temperature growth of the 'active' layer of the LED



Low temperature RPCVD has the potential to  
**reduce bowing and cracking of large silicon  
wafers** during growth.

Silicon wafers are significantly cheaper than  
current high temperature capable sapphire wafers



## 2017 GREEN LED DATA

MOCVD EL DATA	20 mA	50 mA	100 mA
Light Output (mW)	1.3	3.3	6.2
$V_f$ (V)	3.1	3.7	4.6
Peak Wavelength (nm)	514	511	508
FWHM (nm)	28	31	33

RPCVD EL DATA	20 mA	50 mA	100 mA
Light Output (mW)	1.9	4.5	8.1
$V_f$ (V)	3.0	3.6	4.5
Peak Wavelength (nm)	515	512	510
FWHM (nm)	30	30	33

% Performance improvement of  
RPCVD compared to MOCVD  
[Light Output / ( $I \times V_f$ )]

**+47%**

**+39%**

**+35%**

\*\* Both RPCVD and MOCVD data obtained from p-GaN overgrown on the same partial LEDs grown by MOCVD up to and including the Electron Blocking Layer (EBL). All measurements taken at wafer level using indium dot contacts. These wafers were not processed.



## RPCVD FOR microLEDs



Low temperature growth of the active layer and top layers of an LED may enable **indium rich InGaN** (the key performance material in the 'active' layers)

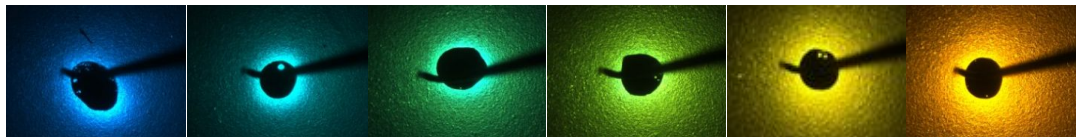
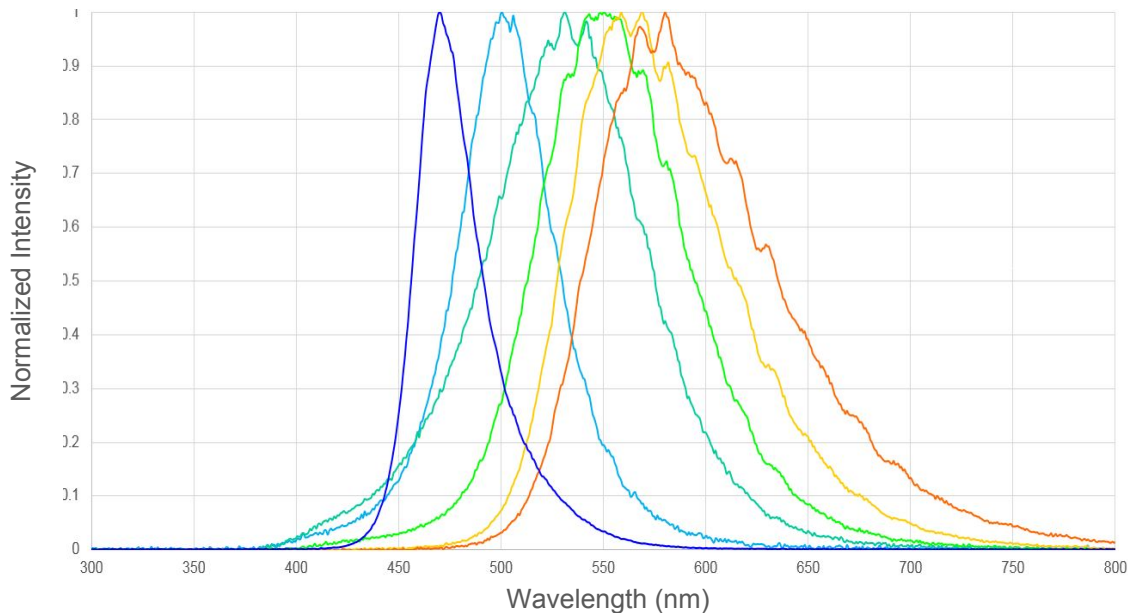


RPCVD's inherently low growth temperature has potential for **high quality** growth of Indium rich InGaN for long wavelength LEDs (yellow, red **and green**)



RPCVD has potential to grow high indium content InGaN with its low temperature advantages for **LEDs and solar applications**

## EL SPECTRA OF LEDs GROWN USING RPCVD MQWS



## RPCVD FOR POWER ELECTRONICS



Low temperature RPCVD p-GaN enables **reduced magnesium diffusion** in high electron mobility transistors (HEMTs), which helps enable normally 'Off' HEMTs

Normally 'Off' HEMTs are **safer, and more commercially desirable** for GaN transistors

Low temperature RPCVD has the potential to **reduce bowing and cracking** of large silicon wafers during nitride growth

RPCVD's inherently low growth temperature has potential to **reduce the complexity** of strain management

Mg DIFFUSION	RPCVD p-GaN	MOCVD p-GaN
Mg Diffusion into AlGaIn - SIMS	11 nm	49 nm
Mg Diffusion and Turn on - SIMS	16 nm	18.5 nm
Total Mg Diffusion Width	27 nm	67.5 nm

## RPCVD VS. MOCVD p-GaN: Mg DIFFUSION IN HEMTs

p-GaN (GaIn:Mg)

Regrowth interface

3 nm GaN cap

$\text{Al}_{0.23}\text{Ga}_{0.77}\text{N}$  Barrier

GaN Channel

GaN Buffer

150 mm Si<111>

RPCVD

Commercial  
150mm  
HEMT on  
Si<111>  
wafer  
(MOCVD)

MOCVD

Experiment conducted on Veeco HEMT wafers and published with their permission



## END MARKETS LED

10.4%

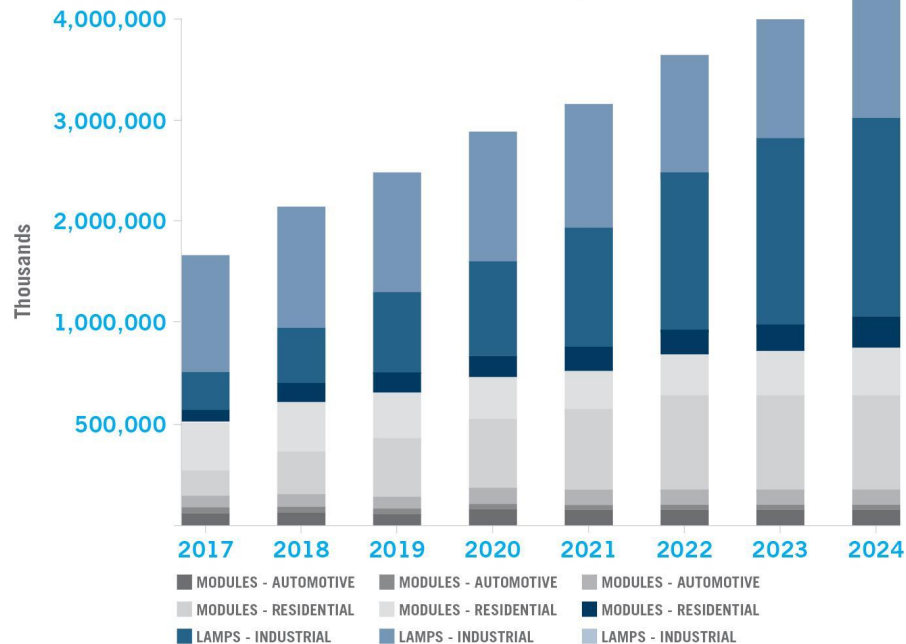
The LED market is expected to experience **CAGR of 10.4%** through to 2025



**\$63.2B**

LED revenues are expected to reach **\$63.2 billion** by 2025

UNIT SHIPMENTS OF LED LAMPS & MODULES BY END USE, WORLD MARKETS: 2017 - 2024



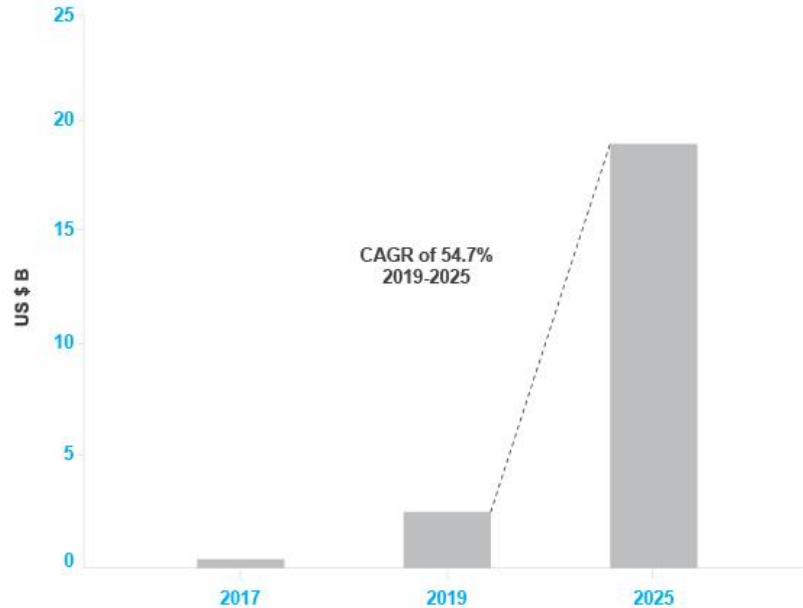
Source: Research and Markets Report Global Light-Emitting Diodes (LED) Market Analysis & Trends - Industry Forecast to 2025; and Navigant Research



# END MARKETS MICROLEDs

Market forecasts for microLED growth vary, but future growth seems assured, and rapid

**US\$19.2B**  
Multiple sources  
predict a market  
growth of 53-54%  
CAGR to 2025



Source: [marketsandmarkets.com](https://www.marketsandmarkets.com), microLED market by offering, April 2017



# END MARKETS POWER ELECTRONICS

The Power Electronics markets also presents a growing opportunity for the RPCVD technology

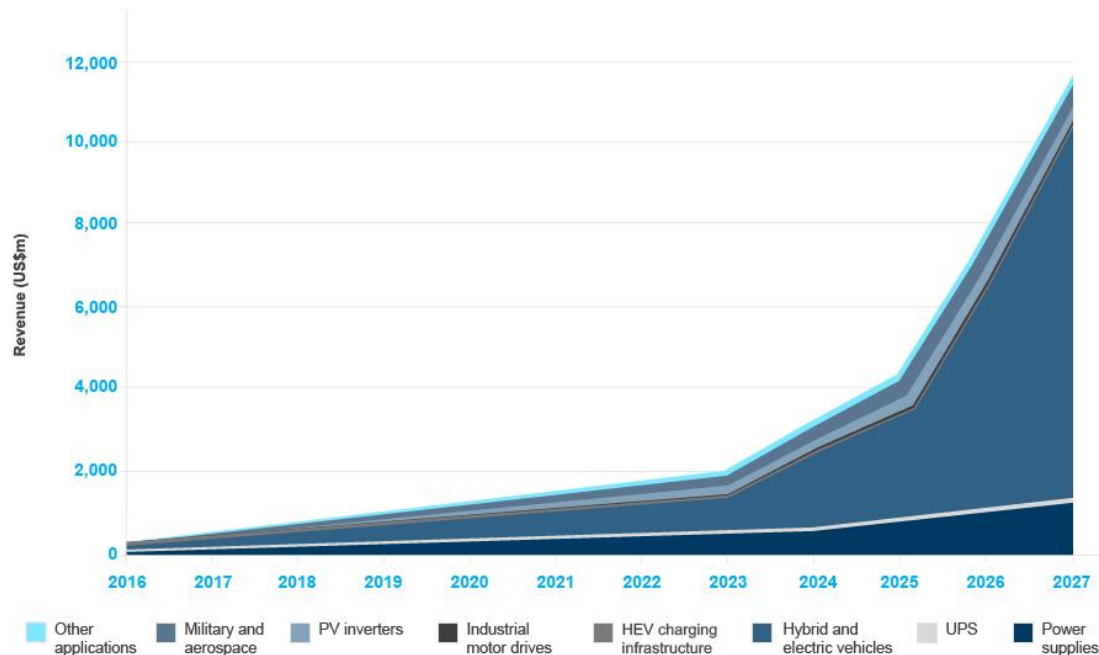
**US\$1.7B**

The GaN power electronics market is expected to reach \$600m in 2024, and climb to over \$1.7bn in 2027

The combined GaN and SiC power electronics market will grow with a **CAGR of 35%** from 2017-2027



The combined market is expected to be worth **US\$10B** by 2027, with GaN increasingly taking market share from 2020



Source: IHS Markets, 'SiC & GaN Power Semiconductors Report - 2018'













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