

24 November 2014
The Manager
Company Announcements Platform
ASX Limited

BLUGLASS 2014 AGM MANAGING DIRECTOR'S ADDRESS

Thank-you George, good morning, my name is Giles Bourne and I am the Managing Director of BluGlass and I'd like to add my thanks to those of you who have joined us here today and also to those of you who are joining us online.

George has provided you with an overview of our achievements during the year, including the significant facilities and equipment upgrades that were undertaken to provide us with additional capacity which has also enabled us to commence generating revenue by establishing a custom epitaxy (foundry) business. What I would like to focus on today is some of the challenges of the past year and importantly the path ahead for the Company; in particular looking at the wide ranging markets and applications for our unique low temperature RPCVD technology, and how we plan to enter these markets.

PERFORMANCE CARD

At the 2013 AGM we announced that our focus would be on the key technology milestones such as the p-GaN LED performance improvement, our **Brighter LEDs** milestone and exploring other applications for our low temperature GaN deposition technology. We have made significant progress on the p-GaN milestone and have demonstrated a substantial improvement in light output by overcoming some of the major technology barriers. We will be continuing to focus our efforts on this milestone as well as addressing some of the other major technology paths now that we have an increased research capacity.

It is becoming increasingly apparent that our platform technology has the potential to offer some major performance advantages for other market applications. Recently we have directed our research efforts to these areas through our increased research capacity, in particular GaN on silicon, InGaN and our custom epitaxy (foundry) business.

**BRIGHTER
FUTURE LOWER
TEMPERATURE**

74 ASQUITH STREET
SILVERWATER NSW 2128
P + 61 (0)2 9334 2300
F + 61 (0)2 9748 2122

WWW.BLUGLASS.COM.AU

With the improving technical results we have been able to connect with tier 1 and 2 players and our custom epitaxy business has helped us to establish commercial relationships with the broader nitrides community.

IP PORTFOLIO

The IP portfolio continues to grow and strengthen, which is of critical importance for BluGlass as we take our RPCVD technology to market. During the year we had 14 additional international patents granted along with a number of provisional patents converting to the PCT phase applications. The IP Committee continues to evaluate the competitive landscape and provide strategic guidance for the management of our IP.

RPCVD APPLICATION OVERVIEW

As you are all aware, BluGlass is bringing to market a semiconductor growth technology which has a number of competitive advantages over standard MOCVD technology. Today I want to provide some greater insight into the many applications that we believe RPCVD will have. Gallium nitride continues to demonstrate that it is the most important semiconductor material since silicon.

The applications for the RPCVD technology include many of the nitride applications, such as;

- High brightness LEDs (HB-LED)
- Ultra-violet LEDs (UV-LED) (e.g. for water treatment)
- Green and yellow LEDs (e.g. for yellow LEDs to replace phosphor coatings in white LEDs)
- Power electronics (e.g. for electric cars for power conversion, or for DC/DC converters for mobile devices etc.)
- Concentrated photovoltaics
- Laser diodes (e.g. for portable projectors and for CD/DVD/Blu-ray reading and recording etc.)
- Aluminum nitride (AlN) templates
- Custom epitaxy business

RPCVD COMMERCIALISATION OPTIONS

The main elements for commercialisation of the RPCVD technology include;

- *Demonstrating the technical advantages* – since the major breakthrough in late 2012 where we solved some of the key issues in growing high quality crystalline GaN we have gone on to demonstrate improved RPCVD grown p-GaN and we continue to see major advancements in the technology, not only for the LED industry, but also for other applications
- *Custom epitaxy* – I will talk about this in more detail later, however it is important to note that this is providing us with access to new customers and potential applications for RPCVD

- *Industry acceptance* – critical to all the research paths, is the need to gain industry acceptance and validate the technology and competitive advantages of RPCVD. BluGlass has invested significant time interacting with the main players across the nitrides community to re-affirm the applicability of the chosen research paths for our technology and the commercialisation opportunities. It is essential that the industry is involved in the RPCVD technology roadmap process and that the platform being developed by BluGlass will meet our potential customer's expectations and address their specific needs
- *Strategic partner* – following on from a very successful partnership with SPTS (who remain a registered shareholder in BluGlass), BluGlass is evaluating its different commercialisation options and part of this involves potentially engaging a suitable industry partner. The pool of strategic partners includes established industry players and companies who are new entrants to these markets. We are reaching out to these partners not only for their ability to influence our research, but also for their market access, engineering and sales reach.

The path to commercialisation for BluGlass as a whole is to demonstrate the value proposition for the various applications and access the market either directly (retrofit systems / foundry), or with a relevant strategic partner.

Note; retrofitting equipment means taking existing semiconductor equipment, usually MOCVD and converting it to the BluGlass technology by installing a BluGlass RPCVD deposition chamber.

BluGlass is actively investigating a number of potential strategic partnership options following the Company's recent technical achievements. This approach is focused on actively finding a partner that can help BluGlass accelerate its technology programme and also provide access to the market in the form of either licensing the technology, or by establishing a joint venture / joint development agreement to develop the RPCVD technology to a saleable product. The potential strategic partners could come from a wide range of companies, including:

- Device manufacturers
- Established foundries
- MOCVD or other semiconductor equipment manufacturers
- Companies from related fields

In conjunction with seeking a suitable strategic partner, BluGlass is also evaluating the direct approach to the market via a foundry business or by selling retrofitted systems, or a combination of these options.

HB LED PATH TO MARKET

To date the principal market that we have been focusing on with the one RPCVD tool (BLG-180) is the high brightness LEDs (HB-LED) and we will continue to work towards demonstrating the value proposition to enter into this market with a better performing device.

This market has recently recovered and is seeing growth coming from the high performance market leading to increasing equipment sales. This is largely driven by the LED lighting market, which according to IHS Research has increased 25% to reach \$5Billion this year. The number of MOCVD units shipped in 2014 is expected to be between 186-228 tools growing to 500 tools by 2017.

UV LEDS MARKET

The low temperature RPCVD process should enable increased efficiency for UV-LEDs by growing low temperature, higher concentration aluminum rich p-AlGaIn and AlGaIn multi quantum wells (MQW). This market is dominated by mercury tubes, however nitride based UV-LEDs have many advantages such as size, performance, cost, higher efficiency and a smaller form factor. The size of the market for GaN based UV-LEDs is predicted to grow from \$45M now to \$270M by 2017 providing a good opportunity for RPCVD with our potential performance advantages over the conventional MOCVD technology.

GREEN AND YELLOW LEDS MARKET

Early RPCVD trials involving green and yellow LEDs have commenced. Again the value proposition for RPCVD is similar to that of HB LEDs with the low temperature process offering performance advantages; however the value proposition is even greater for this market opportunity, green, yellow (and red) LEDs which require a high indium content and therefore benefit from a lower temperature growth process. Low temperature p-GaN growth enables both less degradation of the InGaIn MQW and low temperature can enable high indium concentration InGaIn essential for green or yellow LEDs. The biggest opportunity for Green LEDs would be for the use in RGB (Red, Green, Blue) LED applications, which combines a red, green and blue LED in a single device creating a light with total colour control including white light for general lighting applications. Yellow LEDs are a compelling technology alternative to using yellow phosphor coatings that are currently used today in combination with blue LEDs to make white LEDs for general lighting.

CONCENTRATED PHOTOVOLTAICS (CPV) PATH TO MARKET & MARKET OPPORTUNITY

As a result of the federal government's Climate Ready Grant a few years ago we commenced research into InGaIn CPV which has a direct band gap with wide tunability. RPCVD has potential to grow higher concentration indium rich InGaIn when compared to MOCVD due to its low temperature process. This allows more energy to be converted to power from the solar spectrum.

CPV is a growing PV market which is expected to reach 4.75GW by 2020 and CPV continues to emerge as the most effective method to deliver large scale, cost effective renewable energy from the sun.

POWER ELECTRONICS PATH TO MARKET & MARKET OPPORTUNITY

With the installation of the new BLG-300, work has commenced in growing GaN on silicon. MOCVD GaN on silicon is prone to cracking and bowing due to the large lattice & thermal mismatch. Low temperature RPCVD has the potential to reduce bowing and reduce GaN cracking when grown on silicon.

The opportunity for GaN on silicon is not only for LEDs, but also for the growing GaN power electronics device market. GaN for power electronics is relatively small today, however it is forecast to have a CAGR of 63.7% reaching \$1.75BN by 2022 representing an enormous potential opportunity for RPCVD.

Much like the LED opportunity, BluGlass will be looking to show an improved GaN on silicon technology on larger area wafers to gain acceptance by the industry, potentially working with a strategic partner in the development and commercialisation of this technology offering.

LASER DIODES MARKET OPPORTUNITY

According to a new market report published by Transparency Market Research “Laser Diode Market - Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2014 - 2020,” the global laser diode market was valued at US \$4.6B in 2013, with a CAGR of 12.6% from 2014 to 2020. The global Laser Diode market is estimated to reach US \$10.26B in 2020.

This is being propelled by the number of beneficial features offered by laser diodes over conventional technologies. This is also driven by the rising number of government regulations for mandatory use of laser technology in the marking and engraving of products, coupled with rapidly growing applications of laser products in medical surgeries and devices.

The same value proposition that exists for low temperature p-GaN in LEDs is applicable for the Laser Diode market.

ALUMINUM NITRIDE (ALN) TEMPLATES RPCVD has the potential to produce lower defect density AlN compared to MOCVD grown AlN which can lead to significantly improved device efficiency and performance output for power electronic and LED applications (including UV LEDs). The initial R&D work on AlN has commenced.

CUSTOM EPITAXY (FOUNDRY) PATH TO MARKET & MARKET OPPORTUNITY

As has already been discussed, the newly established custom epitaxy business represents a unique opportunity for BluGlass to achieve revenue and build a business capitalising on our MOCVD capability providing fast prototyping by our leading edge staff. The business is built on a phased approach initially that utilises our current MOCVD capacity and then moves towards increasing this capacity and also utilising RPCVD. BluGlass now has multiple customers and growing revenue generation and has engaged xVI Technologies (USA) as a distribution partner for MOCVD custom epitaxy. Our current revenue run rate is \$30K/month with a target of \$80k/month or \$1M p.a. over the coming months.

The custom epitaxy business represents a very good opportunity for the Company to not only grow our revenue, but also to connect with the industry and demonstrate the capability of our technology. There is growing interest from a diverse range of companies in the nitride community in our custom epitaxy capability and ultimately our RPCVD technology.

In conclusion, the market opportunity for the RPCVD platform technology continues to grow and expand, as the team works to deliver on our technical and commercial milestones. We expect 2015 to be a year in which we gain industry acceptance for our technology and continue to grow our revenue opportunities, thereby building a positive future for the business and our shareholders.

I will now hand you over to our Chief Technology Officer, Dr. Ian Mann who will give you an update on the BluGlass technology progress and he will explain in more detail the technology applications.

Thank you.

About BluGlass: BluGlass Limited is an Australian green technology company formed to commercialise a breakthrough in the Semiconductor Industry. BluGlass has invented a new process using Remote Plasma Chemical Vapour Deposition (RPCVD) to grow semiconductor materials such as gallium nitride (GaN) and indium gallium nitride (InGaN), crucial to the production of high efficiency devices such as next generation lighting technology Light Emitting Diodes (LEDs) with advanced low cost potential.

The RPCVD technology, because of its low temperature and highly flexible nature, offers many potential benefits over existing technologies including higher efficiency, lower cost and.

Contact: Stefanie Winwood +61 2 9334 2302, +61 433 307 853 swinwood@bluglass.com.au