



2015

BluGlass Annual General Meeting

MONDAY 16 NOVEMBER 2015



THE YEAR IN REVIEW

George Venardos, Non-Executive Chairman

CORPORATE OVERVIEW



BOARD

George Venardos
Chairman

Giles Bourne
Managing Director

Bill Johnson
Non Executive Director

Chandra Kantamneni
Non Executive Director

Greg Cornelson
Non Executive Director



CORPORATE

Established

2006

ASX:BLG

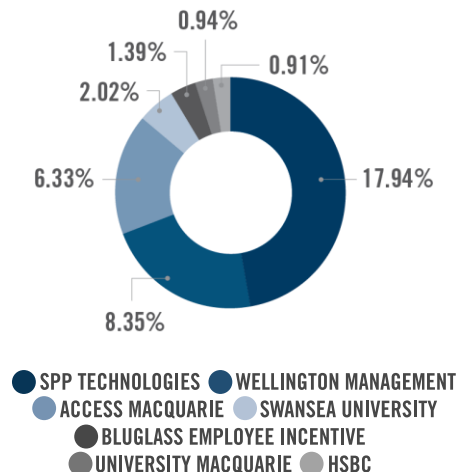
316M

shares issued



TOP SHAREHOLDERS

as at 1 Aug. 2015



AWARDS & GRANTS

2013

Australian Cleantech Competition Winner &
2013 Australian Cleantech Competition
Manufacturing Award

GLOBAL TOP 30

Finalist in GCCA Cleantech Later Stage Award

\$5M

Commercial Ready Grant

\$4.95M

Climate Ready Grant

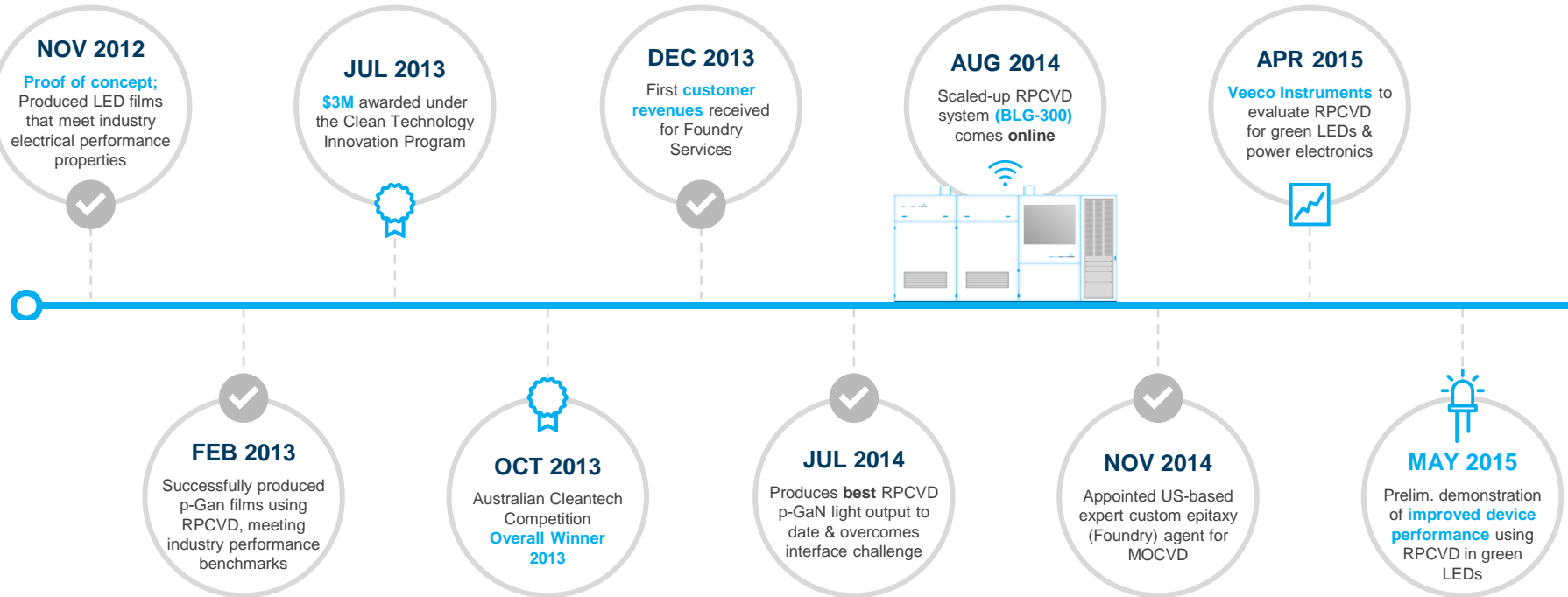
\$3M

Cleantech Innovation Grant



TIMELINE Historical

BluGlass has made significant technical progress in bringing RPCVD towards commercialisation



HIGHLIGHTS 2015



JUL 2014

Produces **best** RPCVD p-GaN light output to date **10-fold improvement**



AUG 2014

Scaled-up RPCVD system (**BLG-300**) comes **online**



NOV 2014

Received **first trial for RPCVD wafers**



NOV 2014

Appointed an international custom epitaxy (foundry) agent



APR 2015

Evaluation agreement with **industry leader**; Veeco Instruments



MAY 2015

Improved device performance results in **green** LED trials



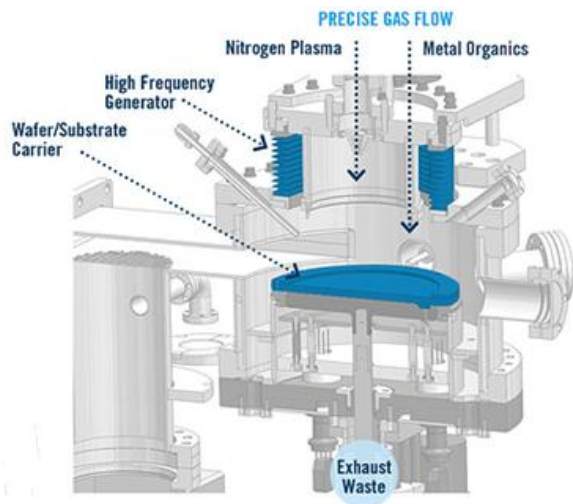
NOV 2015

Commences collaboration with **Top Tier LED company** to test a custom LED application



PATENTS

Hardware & Process Patents



7

PATENT
FAMILIES



40

GRANTED
PATENTS
*in key markets;
China, Japan, USA
& Europe*



18

PATENT
APPLICATIONS



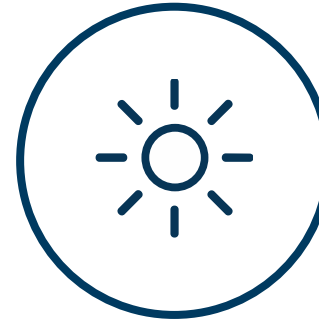


Multiple foundry customers
& a growing pipeline of
new customers

Some customers have
begun to trial RPCVD



BluGlass is now
conducting foundry
and custom epitaxy
services for a variety
of applications
including green and
blue LEDs, power
electronics, and laser
diodes



The foundry business
continues to expose
BluGlass to new and
emerging applications that
could benefit from a low
temperature RPCVD
technology



FINANCIAL PERFORMANCE

\$4.1M

CASH
POSITION AT
END OF SEP

\$2.4M

RAISED IN
SPP &
PLACEMENT

\$412K

BURN RATE/MONTH
DOWN FROM \$450K
MONTH IN 2014

\$2.1M

R&D TAX REBATE
RECEIVED IN 2015

\$300K

FOUNDRY REVENUE
FORECAST FROM A
SINGLE CUSTOMER
OVER THE NEXT 6
MONTHS





THE YEAR AHEAD

Giles Bourne, Managing Director



Worlds largest MOCVD
equipment manufacturer

NASDAQ: VECO

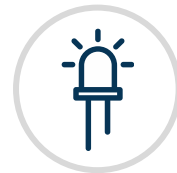
\$806M

Market cap

RPCVD Evaluation

STATUS

LED



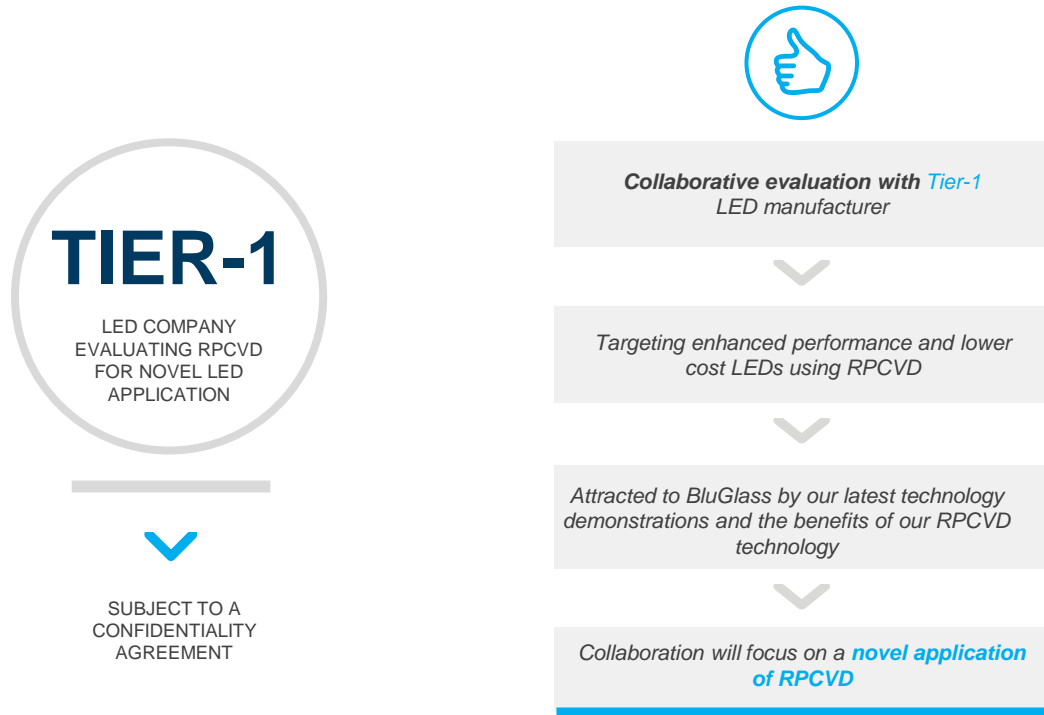
/ Positive initial 2 inch trials for
green LEDs
/ Now progressing to 4 inch trials and
greater collaboration

Power
Electronics



/ Initial materials evaluation of p-GaN
for power electronics has also shown
that p-GaN has the potential for
significant performance advantage





RPCVD A Platform Technology

BluGlass is targeting the rapidly expanding LED, PV, and Power Electronics markets



Lighting
Mobile devices & TVs
Green & yellow LEDs
UV LEDs






Consumer electronics
Power Supply
Data centers
Auto



Focus on industrial
scale solar power
*(concentrated
photovoltaics)*



COMMERCIALISATION PATHS

	LIKELY PATHS	STATUS
LED 	<ul style="list-style-type: none">/ License RPCVD technology/ Partner with LED device or equipment manufacturer	<ul style="list-style-type: none">/ In discussion with equipment & device manufacturers/ Evaluation in progress
Power Electronics 	<ul style="list-style-type: none">/ License RPCVD technology/ Foundry — wafer sales/ Partner with Power Electronics player or equipment manufacturer	<ul style="list-style-type: none">/ In discussion with potential partner(s)/ Evaluation in progress
Solar 	<ul style="list-style-type: none">/ Partner with solar CPV player/ Manufacture and sell high performance PV wafers	<ul style="list-style-type: none">/ Considering JV options & partners



DEMONSTRATE KEY APPLICATIONS

Improve device performance combining RPCVD with MOVCD

GROW FOUNDRY BUSINESS

Continue to work with MOCVD & RPCVD customers at the leading edge of technology innovation to grow revenue & reputation in the industry

GAIN INDUSTRY ACCEPTANCE

Complete industry evaluation with multiple partners in the value chain (e.g. equipment & device manufacturers)

DRIVE COMMERCIALISATION

BluGlass is evaluating a number of commercialisation options for RPCVD (inc. JV, Strategic Partner, Licensing & Foundry)



END MARKETS LED

45%

The LED lighting market is anticipated to *grow 45%* per year through 2020

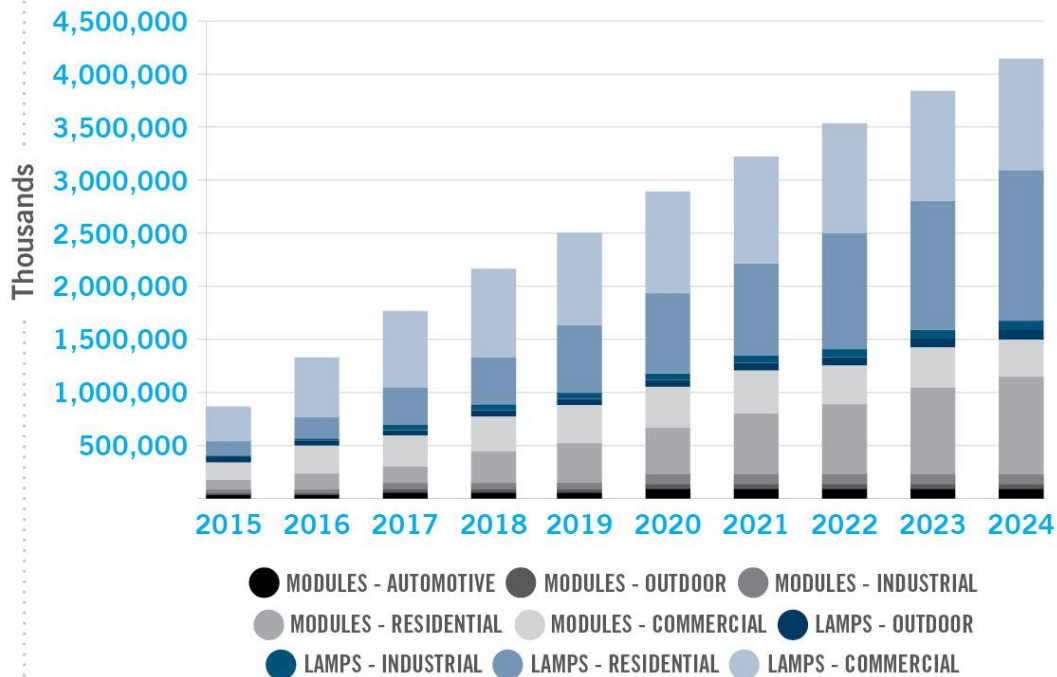


\$216B

Global revenue from LED lighting systems is expected to total *\$216 billion* through to 2024

Source: Navigant Research

UNIT SHIPMENTS OF LED LAMPS & MODULES BY END USE, WORLD MARKETS: 2015-2024



SOURCE: Navigant Research, *LED Lighting: Global Outlook Report September 2015*

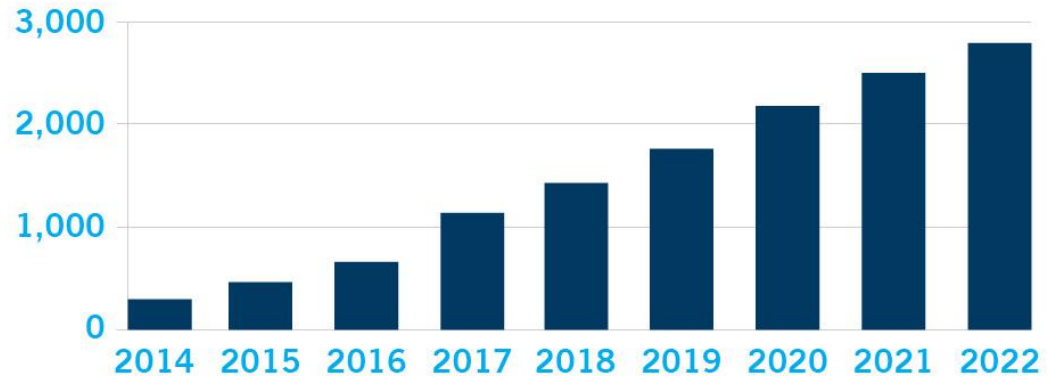


The Power Electronics markets also presents a growing opportunity for the RPCVD technology



The emerging global market for SiC and GaN power electronics is expected to grow **17-fold** over the 10 years from 2013 through to 2023

IHS IMS RESEARCH FIGURE: GLOBAL MARKET FORECAST FOR SiC & GaN POWER SEMICONDUCTOR DEVICES (Revenue in Millions of US Dollars)



SOURCE: IHC Inc, *The World Market for SiC & GaN Power Semiconductors, 2014*



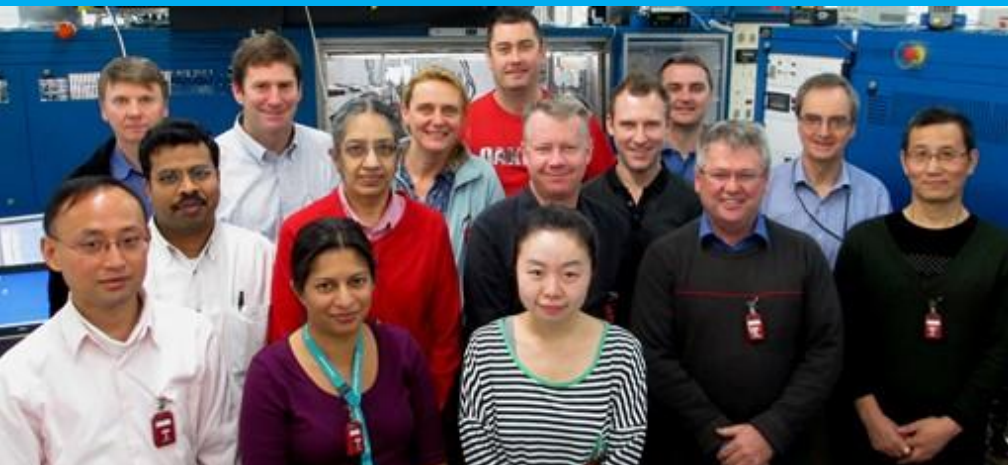
TECHNOLOGIES



A wholly owned subsidiary of *Sumitomo
Precision Products* (TSE:6355)



FACILITY & WORLD LEADING TEAM



1,200m²

FACILITY
in Sydney, Australia

12

Process
Hardware &
Device Team
9PhDs



Currently
generating **REVENUE**
from custom epitaxy
& contract R&D



CONCLUSION Investment Highlights



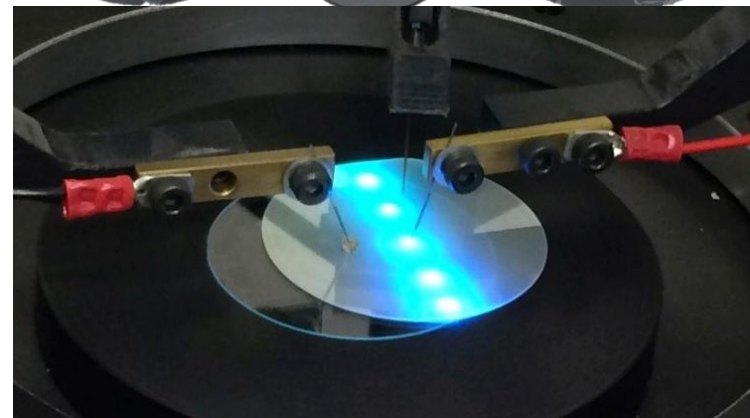
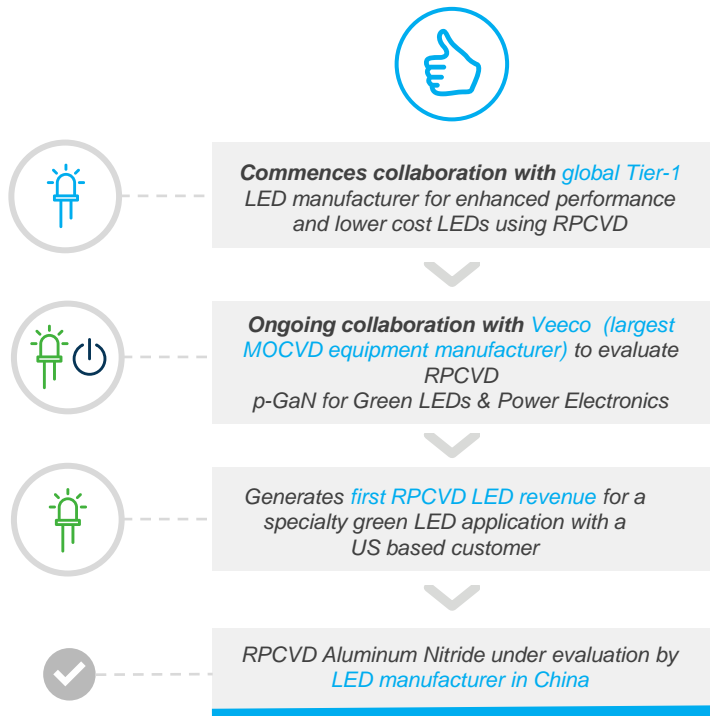


TECHNOLOGY REVIEW

DR IAN MANN, CHIEF OPERATIONS & TECHNOLOGY OFFICER

KEY TECHNICAL HIGHLIGHTS

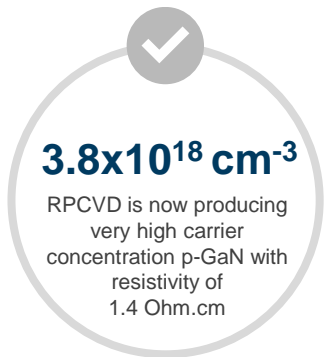
RPCVD for 3rd Party Applications — Industry driven development



KEY TECHNICAL HIGHLIGHTS

BLG-300 established **best RPCVD results to date** surpassing the BLG-180

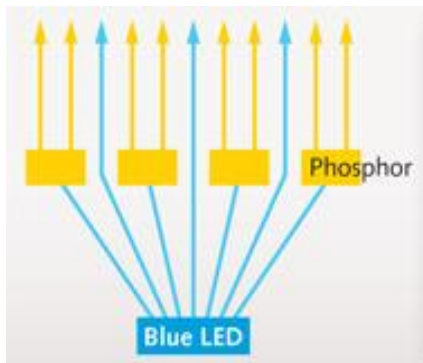
Generated RPCVD awareness with latest p-GaN electrical properties and LED data



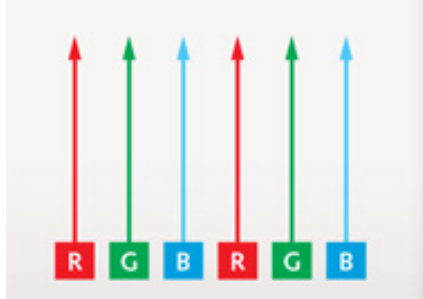
Invited to present the benefits of **RPCVD at SemiCon China, LED China Conference 2015**



GREEN LED APPLICATION



Above: conventional phosphor based white LED
Below: RGB LED



2 KEY

MARKETS FOR GREEN LEDs:
GENERAL LIGHTING
& DISPLAYS
(TVs/MOBILES/
PROJECTORS)

30%

LOSS OF LED EFFICIENCY WHEN USING A PHOSPHOR

An alternative to using a blue LED + yellow phosphor is to use three different LEDs: Red, Green, and Blue (**RGB**) that when mixed can produce both white light, or any colour required (see bottom left image)

However, today's green LEDs grown by MOCVD suffer from relative poor efficiency compared to blue LEDs, in part due to the poorer material quality of green LED structures.

This is where low temperature RPCVD comes in.

SOURCE: Laser Focus World "PHOTONIC FRONTIERS: RGB LEDS FOR ILLUMINATION: Color-tunable RGB LED lighting goes far beyond replacement bulbs", Aug 2013.



RPCVD p-GaN for LED APPLICATIONS (Blue, Green, Yellow)

LED Structure grown using *MOCVD*

p-GaN grown at *INTERMEDIATE to HIGH* temperature

Multi-Quantum-Well (MQW) InGaN layer, the *active region* of an LED – grown at low temperature

n-GaN grown at *high temperature*

GaN grown at *high temperature*

Sapphire Substrate

p-GaN Grown using *RPCVD*

p-GaN grown at *LOW* temperature

Multi-Quantum-Well (MQW) InGaN layer, the *active region* of an LED – grown at low temperature

n-GaN grown at *high temperature*

GaN grown at *high temperature*

Sapphire Substrate

MOCVD

MOCVD

RPCVD



RPCVD p-GaN for LED UPDATE

GREEN LED EL DATA	MOCVD LED	RPCVD LED	% Performance improvement of RPCVD compared to MOCVD
Light Output (mW)	1.3	1.6	+10%
V_f (V)	3.5	3.9	
Peak Wavelength (nm)	525	525	
FWHM (nm)	35	33	

BLUE LED EL DATA	MOCVD LED	RPCVD LED	% Performance improvement of RPCVD compared to MOCVD
Light Output (mW)	3.0	2.8	-4%
V_f (V)	4.0	3.9	
Peak Wavelength (nm)	469	470	
FWHM (nm)	19	21	

*MOCVD & RPCVD LED wafer test at 20mA using indium contacts. Best data point for each wafer used.



BluGlass has demonstrated internal results showing an **improvement in green LED performance** and is now working with Veeco to demonstrate similar performance on their wafers





Key strategy is to attract customers requiring MOCVD initially to test their applications with a path to **incorporate the advantages of low temperature RPCVD** as the technology continues to mature



GROWING NEW CUSTOMER PIPELINE

2 Specialty application LED Companies



1 Laser Diode Company wanting to try hybrid RPCVD/MOCVD Laser Diodes



1 Power Electronics Company





bluglass.com.au
