



ClearVue<sup>PV</sup>

AGM PRESENTATION 2018  
CLEARVUE TECHNOLOGIES LIMITED

Presented by: Victor Rosenberg, Executive Chairman – 30 November 2018

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# Introduction



At ClearVue, we offer a powerful renewable energy solution that incorporates solar energy generation into transparent glass. ClearVue Technologies Limited (ASX: CPV) operates in the Building Integrated Photovoltaic (BIPV) sector which involves the integration of solar technology into building materials, specifically glass and building surfaces to produce localised renewable energy.

ClearVue's glass technology represents an untapped opportunity to use one of the worlds most used building materials for energy generation – clear GLASS

## Our Mission & Motivation

- ❑ Our mission is to capture the energy that surrounds us through the use of innovative building materials. We believe that the future of energy is localised generation – energy generated where it is needed
- ❑ We are driven by green building goals and believe that our technology can assist building owners and developers achieve their own green and sustainability goals - including Net Zero buildings and even carbon negative buildings in some cases.



# ClearVue Highlights



- ❑ Advanced building technology that uses ultra clear glass to convert sunlight into energy
- ❑ Global market opportunity
- ❑ Patented technology – 34 granted patents and 39 patent applications throughout the World
- ❑ Australian Government support – \$1.6m grant from the Australian Federal Government to build a grid-independent greenhouse in early 2019

Key Targets:	Key Specifications:
❑ Agriculture and Horticulture	❑ <b>Ultra clear</b> - up to 70% transparency (VLT/AVT)
❑ Commercial and Residential	❑ <b>Power generating</b> - 30 W/m <sup>2</sup> peak power (anticipated ≈ 50 W/m <sup>2</sup> possible through ongoing R&D)
❑ Public Amenities	❑ <b>Insulating</b> - U-factor 1.26 W/(m <sup>2</sup> °K)

# Corporate Snapshot



- ❑ ClearVue secured \$5m through IPO and listed on the ASX on 25 May 2018
- ❑ High % of company shares are escrowed for 24 months – 39,026,956 million in total
- ❑ Tight free float with top 20 holding 60.5%

ASX Code: CPV	
Ordinary Shares	97,380,300
Options	54,598,024
Performance Shares	13,000,000
Market Capitalisation (Share price \$0.35 as at 16 November 2018)	\$34 million
GICS Classification	Capital goods



# Board and Management



<b>Victor Rosenberg</b>	<b>Jamie Lyford</b>	<b>Kim Harmer</b>	<b>Brett Tucker</b>	<b>Sean Rosenberg</b>	<b>Stuart Carmichael</b>	<b>Ivan Wu</b>
<b>Executive Chairman</b>	<b>General Counsel &amp; Corporate Officer / Director</b>	<b>Chief Technology Officer</b>	<b>Company Secretary</b>	<b>Non-Executive Director</b>	<b>Non-Executive Director</b>	<b>Non-Executive Director</b>
Serial Entrepreneur. Globally recognised for his contributions to glass industry. Extensive business experience in senior management and sales.	IP and licensing lawyer with over 20 years experience. Previously worked in BHP, IT company ATOS and ran Western Australian Government Innovation Centre	Technology commercialization, research and development, production and innovation leadership. Over 20 years working in Schneider Electric in EMEA and Asia Pacific Currently on Advisory Board for IoTStream	Company Secretary to a number of ASX listed and private companies and has been involved in numerous public corporate transactions and acquisitions. A Chartered Accountant with a strong corporate and compliance background.	Member of the Institute of Chartered Accountants with over 10 years professional experience in finance, auditing and accounting of listed corporations	Member of the Institute of Chartered Accountants with over 20 years accounting and corporate finance experience. Currently Non-Executive Chairman of Schrole Limited (ASX:SCL) and Serpentine Limited (ASX:S3R) and Non-executive Director of De.mem Limited (ASX:DEM)	Corporate adviser to various private & ASX listed companies with over 20 years of corporate and commercial experience in the IT, resource and gas industries

# ClearVue's Research Partners



## Edith Cowan University

ClearVue has partnered with Edith Cowan University (ECU) in Perth Western Australia since 2011 to develop the core IP that can convert a pane of glass into energy

ClearVue has entered into an exclusive agreement for contracted R&D for the development of ClearVue's core technologies.



## Nanyang Technological University

ClearVue has signed a collaboration agreement for with Nanyang Technology University (NTU) (Singapore) and Singapore HUI Alliance for Research and Enterprise Ltd research to explore printing of solar PV amongst other things.



**NANYANG**  
TECHNOLOGICAL  
UNIVERSITY

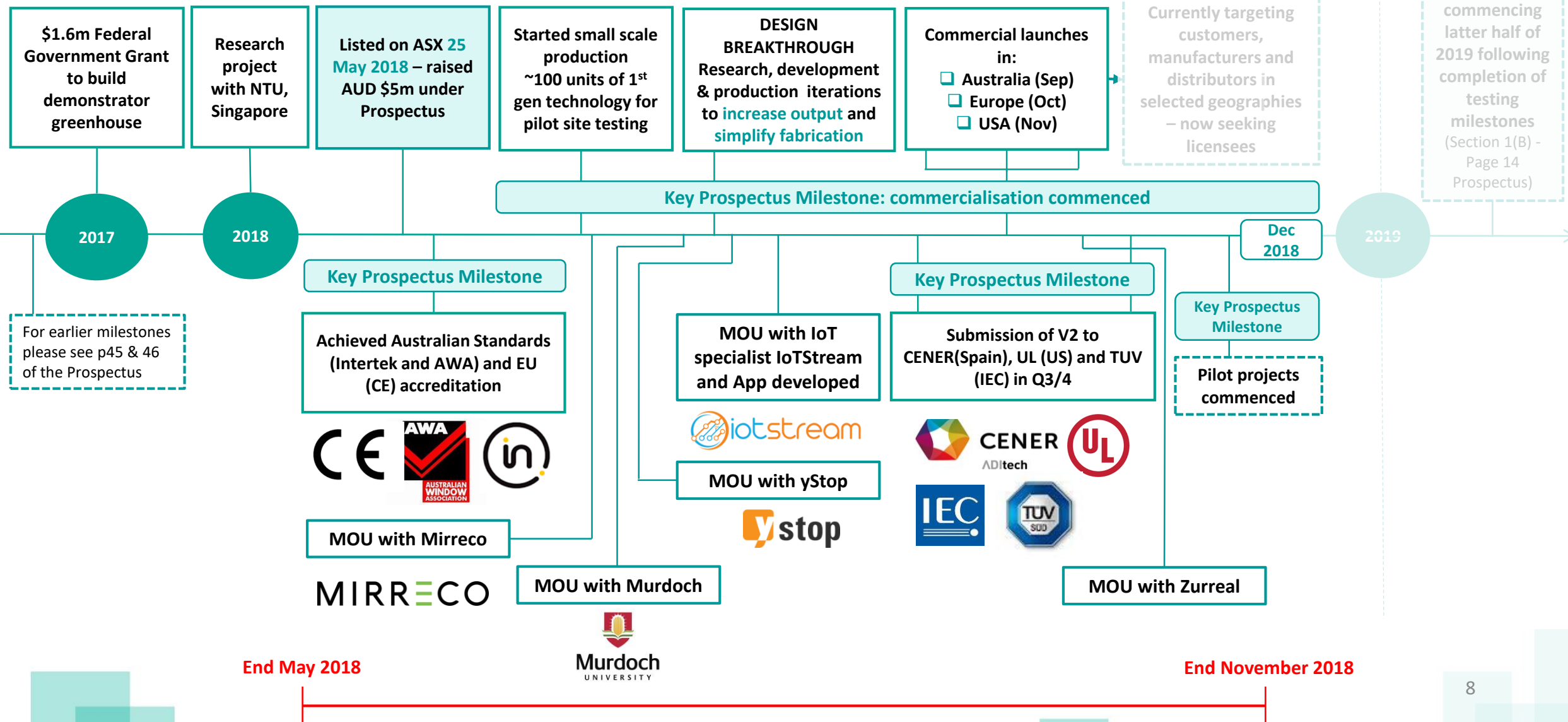


# Company Milestones

Fenestration  
Australia  
2018

25<sup>TH</sup> glasstec  
INTERNATIONAL TRADE FAIR FOR GLASS  
PRODUCTION - PROCESSING - PRODUCTS  
DÜSSELDORF | GERMANY

GREENBUILD  
INTERNATIONAL CONFERENCE AND EXPO





# Product Launches

Glasstec – Oct 2018  
Dusseldorf



Fenestration - Sept 2018  
Port Douglas



Greenbuild - Nov 2018  
Chicago







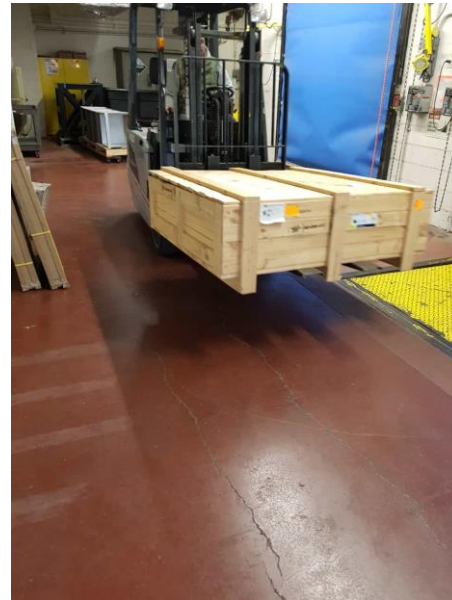








# UL Testing for US Market commenced Q4



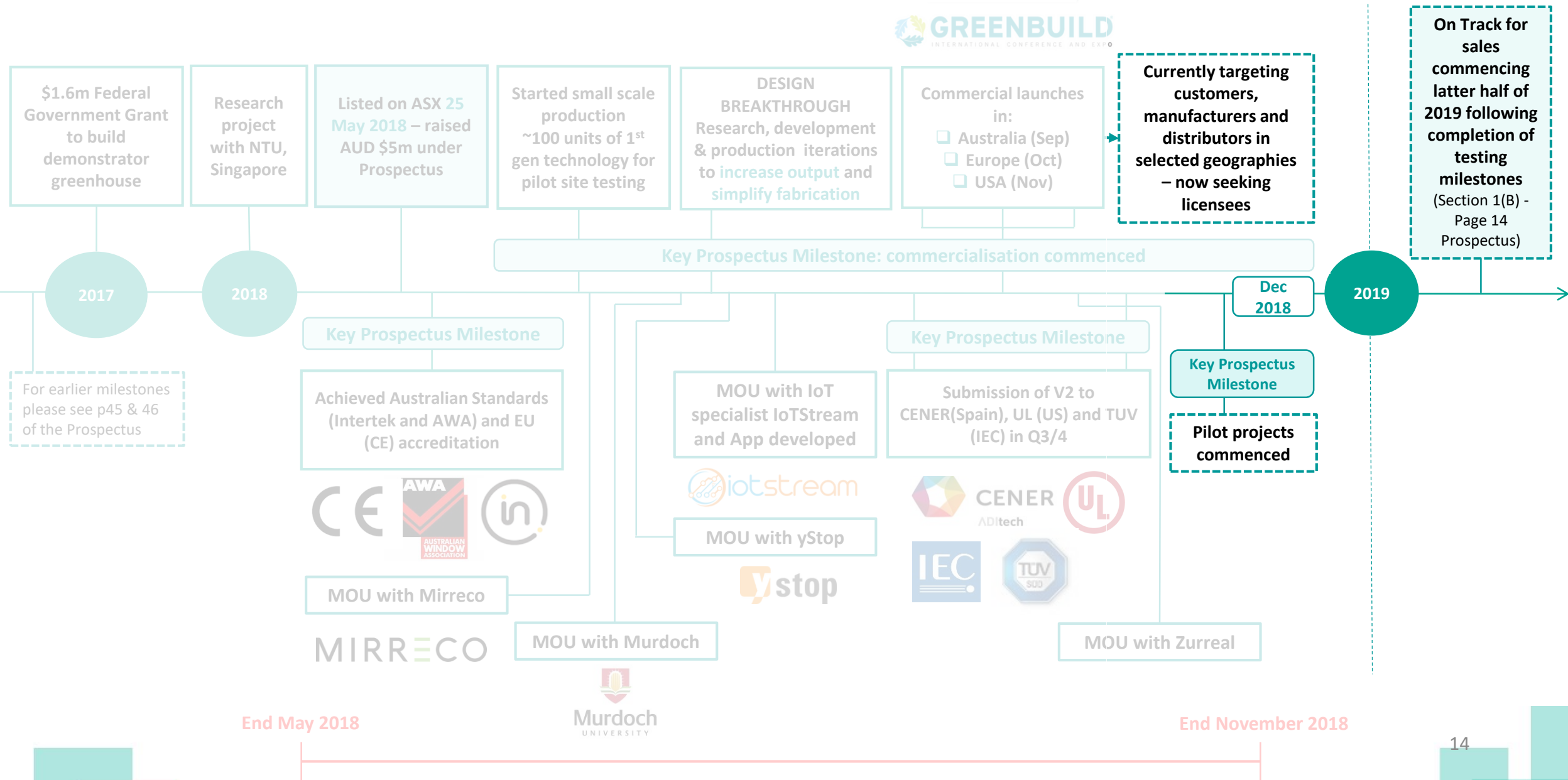


# Company Milestones

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25<sup>th</sup> glasstec  
INTERNATIONAL TRADE FAIR FOR GLASS  
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DUISBURG | GERMANY

GREENBUILD  
INTERNATIONAL CONFERENCE AND EXPO



# Upcoming Milestones

2019

On Track for sales commencing latter half of 2019 following completion of testing milestones  
(Section 1(B) - Page 14 Prospectus)

- ❑ Complete the various demonstration/pilot projects the company has commenced
- ❑ Incorporate ClearVue's technology into a larger commercial building in Australia for the first time
- ❑ Complete and achieve **IEC** and **UL** accreditations by end Q2 2019
- ❑ Continue and complete commercialisation steps during 2019
- ❑ Continue discussions throughout 2019 with potential licensees for manufacture and assembly/distribution worldwide and seek to sign various licensees worldwide flowing from such discussions
- ❑ Continue R&D and product development work to ensure the company is well positioned as a global leader in building integrated photovoltaics and smart building materials

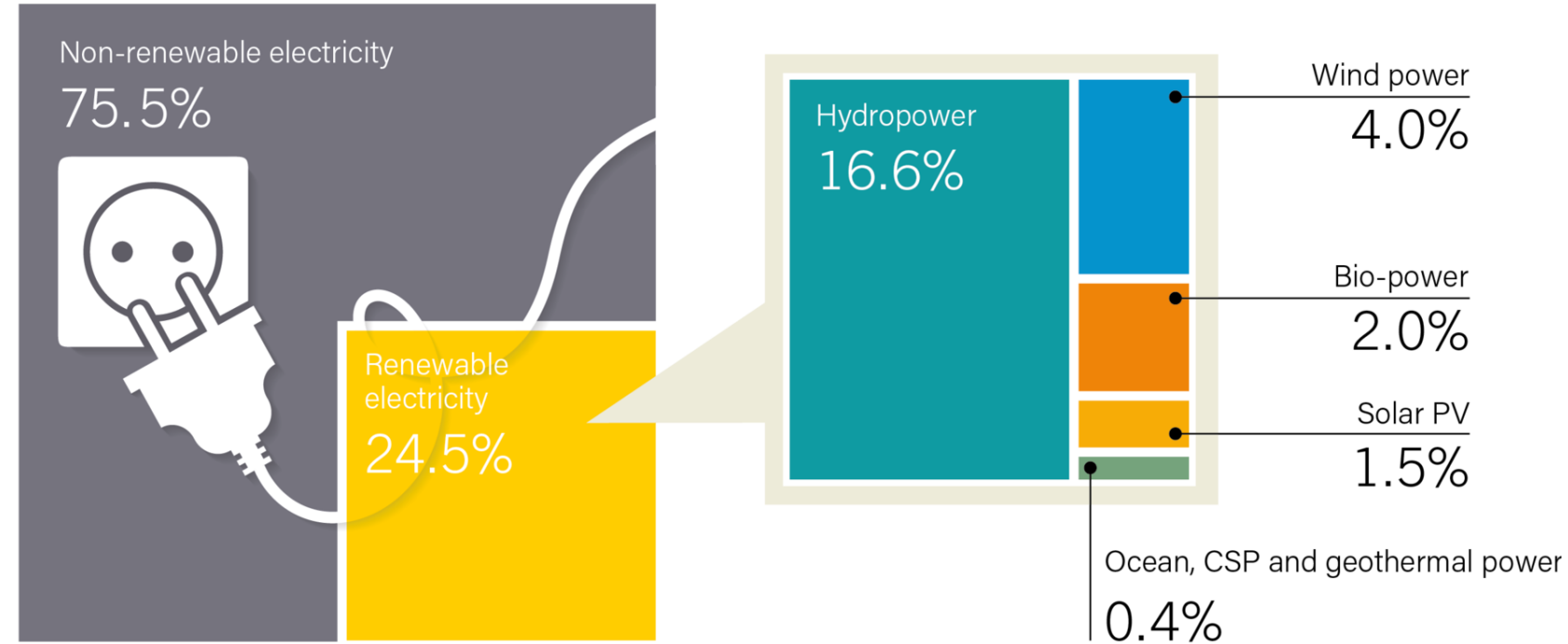


# Worldwide Energy Generation

The sun's potential for power generation far exceeds that of all other renewable energy sources. However, solar power barely registers in the world's renewable energy portfolio with only 23,322 terawatt-hours (TWh) of a potential **≈750,000 TWh** available from solar\*.

Presently solar generation accounts for only a fraction of a percent of total electrical output – much less than hydropower or wind energy, which until recently have been cheaper to produce.

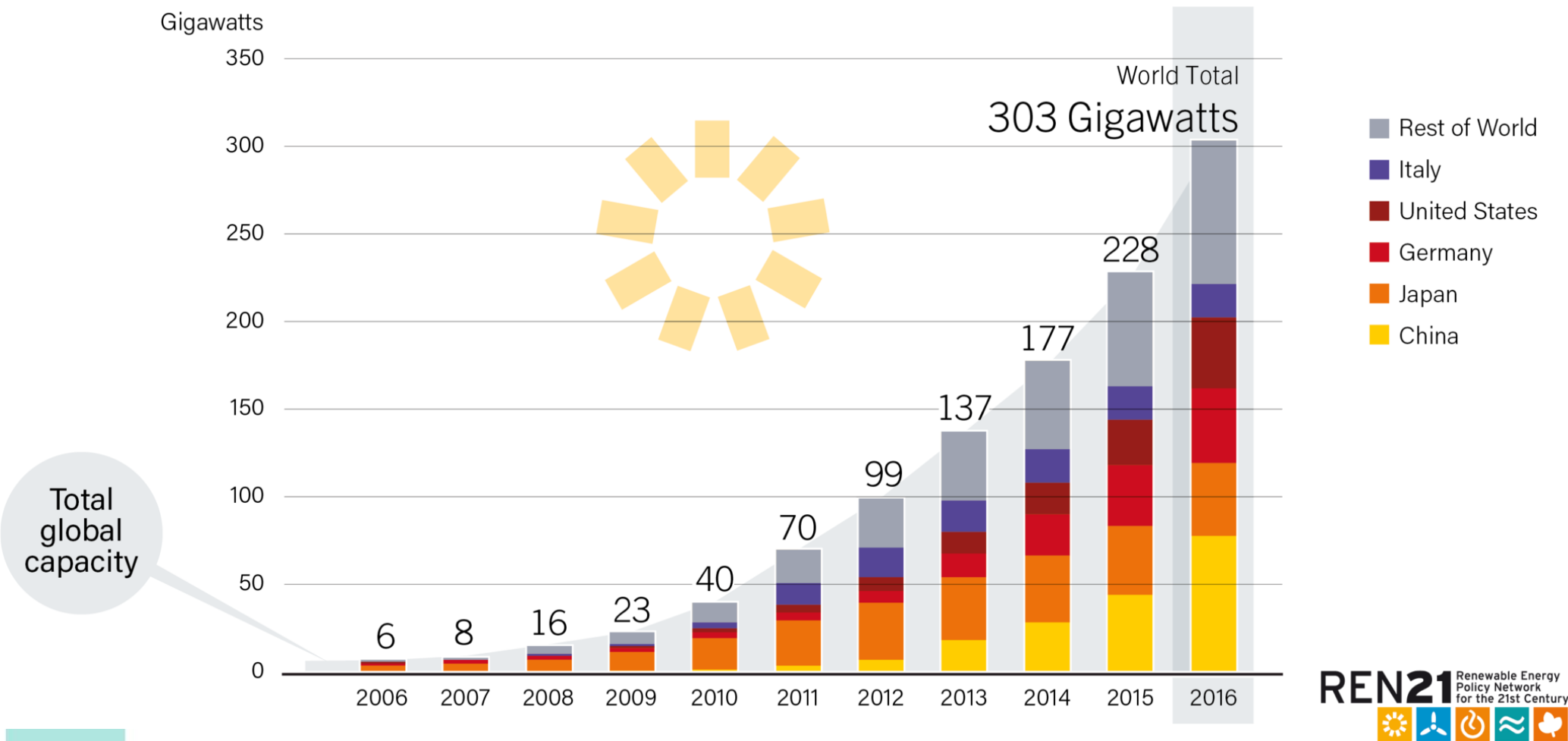
## Estimated Renewable Energy Share of Global Electricity Production, End of 2016#



\* As at 2008 see: [https://en.wikipedia.org/wiki/Electricity\\_generation#Production\\_by\\_country](https://en.wikipedia.org/wiki/Electricity_generation#Production_by_country)

# See: REN21 Renewables 2017 Global Status Report

# Solar PV Global Capacity\*



\*by country and region 2006 – 2016 –see: REN21 *Renewables 2017 Global Status Report*

# Market Opportunity

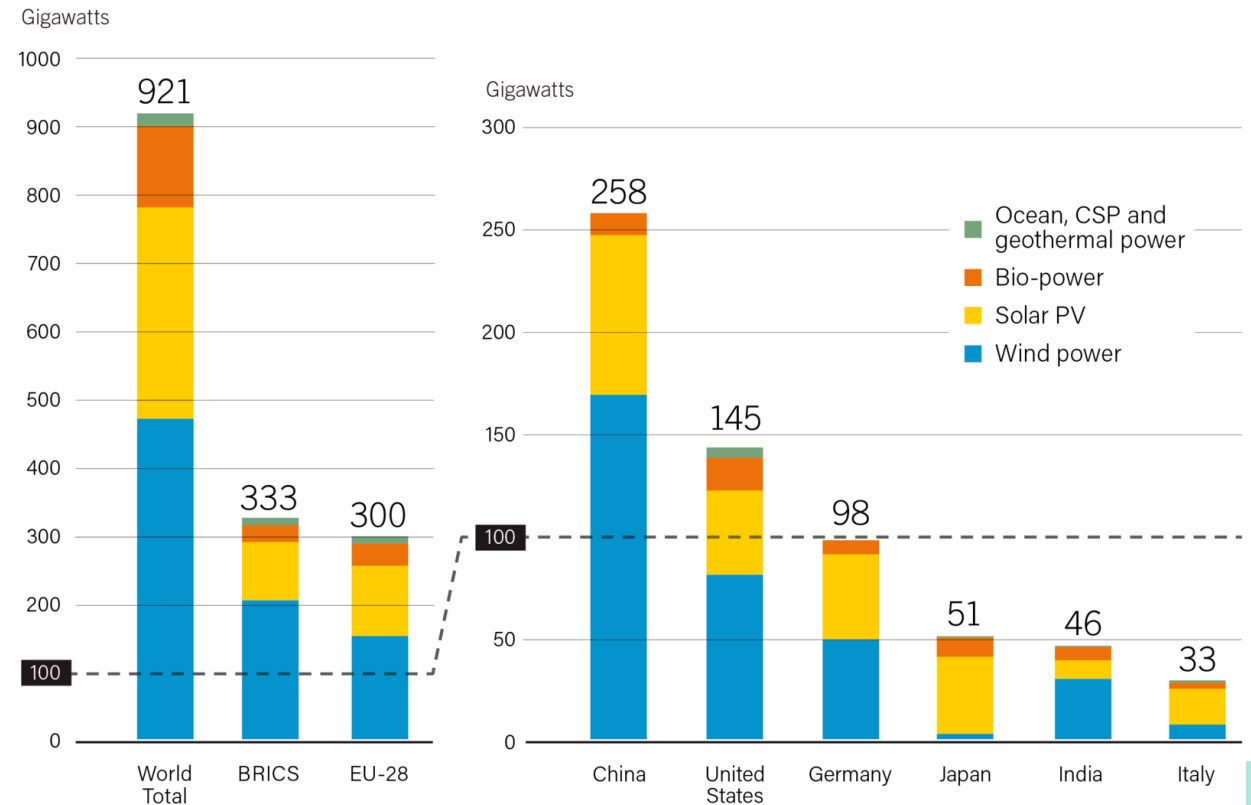
## Traditional Roof Solar and PV Array Opportunity

- Worldwide growth of traditional photovoltaics has averaged 40% per year from 2000 to 2013
- Total installed PV capacity reached **303 GW at the end of 2016** with China having the most cumulative installations (78 GW)
- According to the latest “Global Solar Demand Monitor” from GTM Research, installations in 2018 will reach 82.5 gigawatts#. After that, annual installations are predicted to exceed 100 gigawatts each year until at least 2022.

**All of these figures (and the stats on earlier slides) largely ignore the impact of BIPV!**

#(originally forecast at 104 gigawatts but downgraded due to reduced activity in China)  
\* BRICS – the emerging national economies of Brazil, Russia, India, China and South Africa.

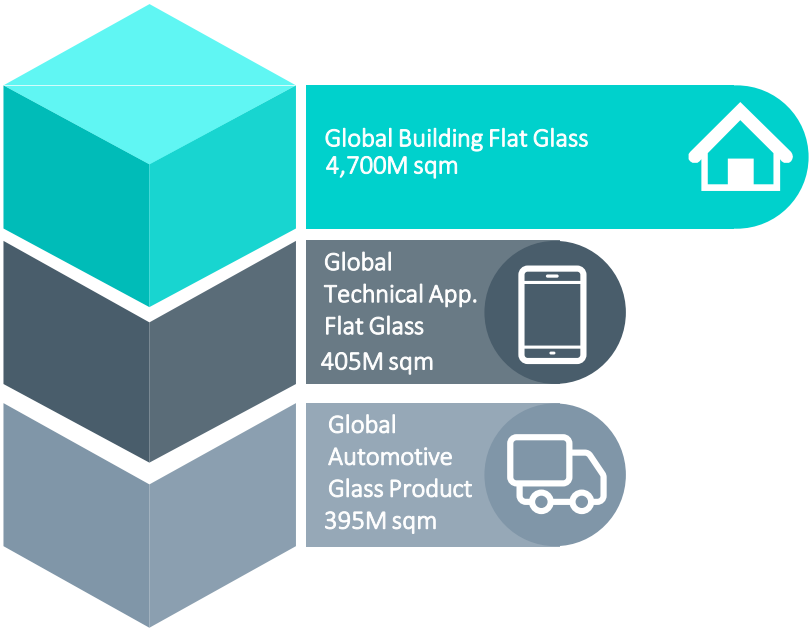
Renewable Power Capacities in World, BRICS\*, EU-28 and Top 6 Countries - 2016





# Market Opportunity

## Global Glass Market



- ❑ Total Glass Market Size 5,500 sqm pa in 2011 (NSG Group and the Flat Glass Industry Report 2011).
- ❑ The construction glass industry is predicted to reach **USD \$111 Billion** by 2020 (Technavio)
- ❑ Global green building expected to double by 2018 (World Green Building Council)

# ClearVue's Opportunity



## Market Drivers

**US\$310 Billion**

investment into clean energy in 2014+ 16%



**5,500 million**  
square metres of glass  
produced each year

**€ \$23 Billion**

Value of the flat glass market



**37%**  
increase in global  
energy demand

### Sources:

United Nations, Climate Spectator, NanoMarkets

Forbes - china-leads-the-world-in-renewable-energy-investment report July 2012

<http://www.climatespectator.com.au/news/uk-track-hit-2020-green-energy-targets-decc>

[http://www.rechargenews.com/business\\_area/politics/article323311.ece](http://www.rechargenews.com/business_area/politics/article323311.ece)

## The Building Integrated Photovoltaics Opportunity

- ❑ Global market for building-integrated photovoltaic (**BIPV**) technologies was USD **\$2.4 billion** in **2016**
- ❑ Market to grow to USD **\$4.3 billion** by **2021** (with a compound annual growth rate (CAGR) of 12.2% for the period 2016 to 2021).

### Source:

<https://www.bccresearch.com/market-research/energy-and-resources/building-integrated-photovoltaics-markets-report-egy072C.html>

# ClearVue's Business Model



ClearVue will derive revenues from:

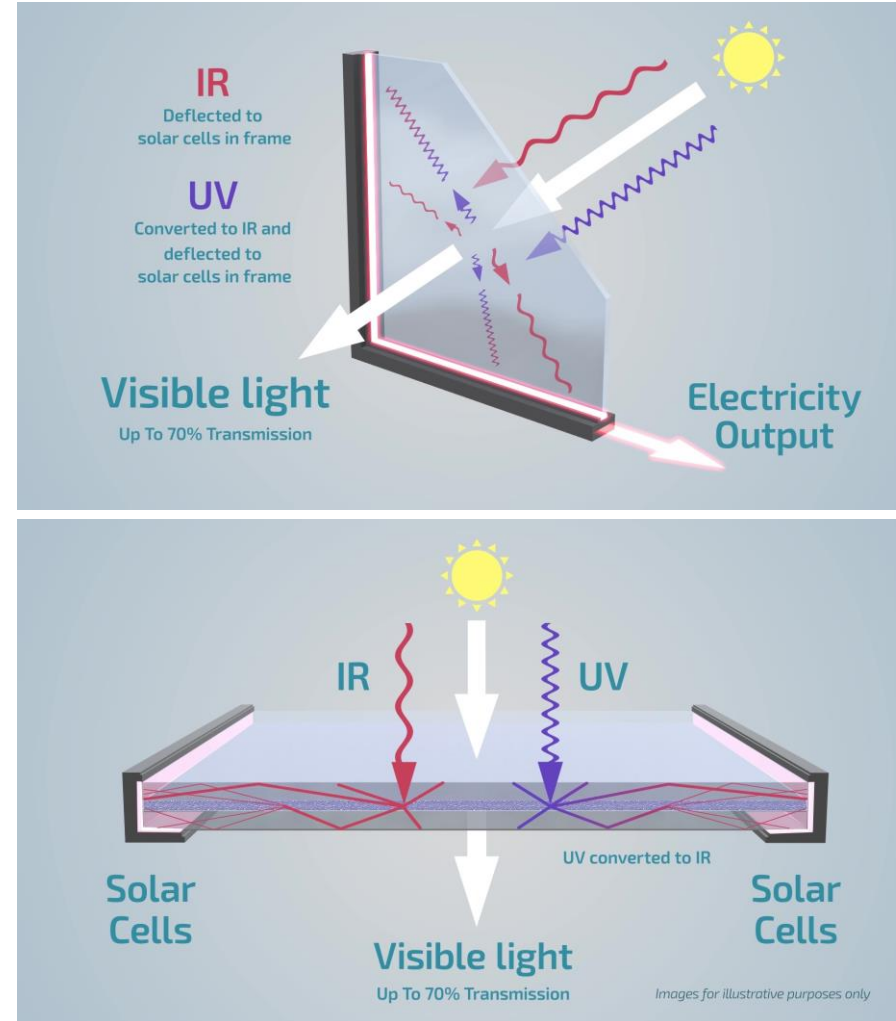
- ❑ **Direct sales** (initially) – by sale and supply of the Company's assembled products direct to distributors and licensed channel partners worldwide. The company will also continue to sell technology/product components to its licensees;
- ❑ **Licences** - the Company intends to charge a fee to manufacturers and distributors for the right to manufacture or distribute and sell the ClearVue product; and
- ❑ **Royalty payments** - the Company intends to charge a flat royalty fee per sqm of ClearVue glass/technology sold by a manufacturer or distributor business, with the rate to be determined.



# ClearVue's Technology

An overview of ClearVue's technology

- ❑ Visible light (VIS) passes through the glass
- ❑ Micro & nano particles interact with Ultra Violet (UV) radiation which is down-converted to longer wavelengths and scattered along with Infrared (IR) light to the edges of glass
- ❑ IR is collected by PhotoVoltaic (PV) cells - Produces electricity
- ❑ Reduces heat and blocks damaging UV and IR radiation
- ❑ Insulation properties reduce heating and cooling costs
- ❑ ClearVue has extensive IP protection on its technology and products





# Video: Technology and Product Opportunities Explained

Click on blank  
screen on left to  
play video.

*OR* play from:

<http://www.clearvuepv.com/products-solutions/technology/>

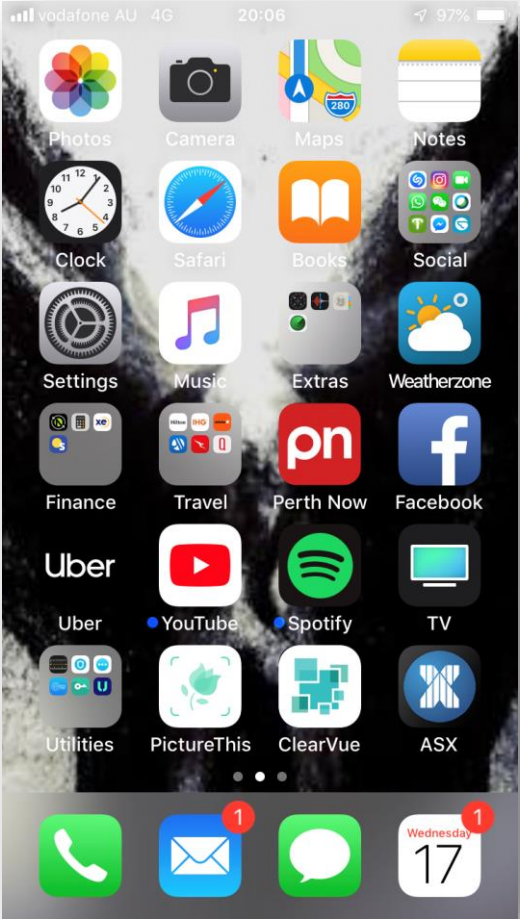


# Product Opportunities



# Smart Window Solutions

(Monitoring, sensors and IoT integrations)



# Commercial & Residential Applications



**large market opportunity** – at the moment demand for BIPV solutions is limited by product characteristics  
- no high energy performing and architecturally accepted transparent colourless products except from ClearVue

- ❑ By 2025 there will be more than 29 mega cities with 10 million plus people\*
- ❑ Buildings can be a significant source of their own energy needs
- ❑ Insulation properties reduce heating and cooling costs
- ❑ Building owners obtain a faster payback from energy generating structures
- ❑ Skylights are the fastest new window market globally

\* Source: UN Report on World Urbanisation & World Energy Outlook Report 2014





# Public Amenities & Agriculture

- ❑ Free energy in public places, e.g. libraries, or charge your mobile phone at a bus stop
- ❑ Provide energy in developing countries in public buildings such as schools without large plots of adjacent land needed for solar arrays
- ❑ Awnings, Atriums, Skylights, Road barriers
- ❑ Waste management services and water purification
- ❑ Powering IoT sensors and building electronics
- ❑ Food and food security is a global multi billion dollar industry. Key markets are China, Europe and USA.
- ❑ Technology presents opportunity for self powering greenhouses



# Summary



**In the **six (6) months** since listing on the ASX on 25 May 2018 the Company has achieved the following:**

- ❑ Australian standards (Intertek) certification testing completed and EU certification (CE) on ClearVue window
- ❑ Design breakthrough to simplify product manufacture and increase market opportunities
- ❑ Product certification commenced for US market (UL) and for EU (IEC)
- ❑ Production commenced on glass units for use in pilot projects and for trade shows
- ❑ MOUs signed with:
  - ❑ Mirreco for supply of glass for use with their hemp-based building system and hemp-based eco mini homes. Demonstration eco mini home progressing;
  - ❑ Murdoch University as a site for the CRC-P funded greenhouse and for working with MU plant science researchers to demonstrate CV greenhouse performance;
  - ❑ yStop for using ClearVue in bus shelters and outdoor advertising opportunities in WA;
  - ❑ IoTStream for integration of IoT solutions with ClearVue's glass – whitelabel app prepared for use with ClearVue product installations; and
  - ❑ Zurreal for integration of ClearVue glass with Zurreal's art glass for niche architectural and advertising applications.
- ❑ Major product launches at trade shows in Australia (Fenestration 2018 – Pt Douglas - Sept), Europe (Glasstec 2018 – Dusseldorf - Oct) and North America (Greenbuild 2018 – Chicago - Nov)
- ❑ Pilot projects commenced
- ❑ Licensing discussions commenced (Worldwide) flowing from the trade shows



# Questions?

Thank you for your attention – any questions?



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