ClearVue PV

CLEARVUE TECHNOLOGIES LIMITED

AGM 2019 PRESENTATION

29 November 2019

ClearVue's 2020 VISION

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Company Overview

ClearVue Technologies Limited (ASX: CPV) operates in the **Building Integrated Photovoltaics** (BIPV) sector which involves integration of solar PV into building materials, specifically glass windows and building surfaces to produce localised renewable energy.

ClearVue's mission is to **capture the energy that surrounds us** using innovative building materials. The ClearVue team believe that **the future of energy is localised renewable generation** – clean energy generated where it is needed.

The ClearVue product can be used to achieve **significant energy cost savings**, **prevent unwanted solar radiation** (UV and Infrared) from entering a building, and then **converting the unwanted radiation into electricity**.

Clearvue PV is one of few transparent building materials capable of embodied energy / **embodied carbon payback multiple times** during its operational and installed lifetime.

ClearVue's technology and product can assist architects, façade engineers, building owners and developers **achieve sustainability goals** in new building projects and refurbishments - including assisting with **achieving "Net Zero" goals** in buildings – a key driver in modern building design and architecture.

Company Highlights

Australian Government support – **$1.6m grant from the Australian Federal Government to build a grid-independent greenhouse** commenced in 2019.

Recently executed a consultancy agreement with global engineering group **Arup to further develop the Company's Smart Façade panel concepts** that use power from the windows to power localised functionality such as automated blinds or dynamic glass.

Manufacturing partner(s) readying for commercial scale production and sales. Distribution partners preparing for sales in different territories.

ClearVue's glass technology represents **an untapped opportunity to use one of the worlds most used building materials for clean energy generation** – clear glass windows and building façades.

Corporate and Capital Structure

Capital Structure
(as at 27 November 2019)

No debt.	
Ordinary Shares on Issue (39,026,956 shares escrowed for 24 mo. from IPO)	111,153,044
Options on Issue (if exercised options could provide an additional $15.78m in capital)	63,148,024
Performance Shares	13,000,000
Market Cap @ $0.165	$18.34 million
Cash Balance (30 Sept 19) (per 4C lodged with ASX 31 October 2019)	$1.118m

Shareholders
(as at 27 November 2019)

Top 20 holding 46.62% of Issued Capital
25.36% held by founders, board and management

Investment Highlights

Near-to-Revenue
ClearVue is completing final steps towards its commercialisation goals. **Pre-sales work is well underway** – ClearVue is awaiting product and technical certifications before sales commence. **Orders expected within 6 months of certifications. Tendering with façade engineers / architects is underway.**

Product & Technical Certifications
ClearVue now tested and certified by **Underwriters Laboratories (UL)** for the USA and other territories.

International Electrotechnical Commission (IEC) testing is progressing with **final certifications imminent**.

Certification is a precursor to sales in the USA, Europe and UAE.

Proprietary Technology / Strong IP Portfolio
ClearVue has **85 granted patents** and 40 patent applications throughout the World with the underlying technologies having been **developed over 8 years with over $9m invested to date**. Product certifications offer a significant further barrier to entry from competitors. Trade marks in place in most relevant jurisdictions.

Investment Highlights

Highly Scalable Business Model
Low capital-intensive manufacturing through multiple licensed manufacturing partners globally presents **large opportunities for the ClearVue business to rapidly scale**. Manufacturing partner(s) being readied for commercial sales.

Focus on Shareholder Value
Board and management are **focussed on delivering long-term shareholder value** with commercial inflection points starting in Q2 FY 2019 and continuing throughout 2020 and beyond – See: **ClearVue's 2020 Vision** below.

Aggressive Growth Strategy
ClearVue is focussed on an **aggressive global growth strategy** to expand into global markets through strategic licensing of manufacturers and distributors in multiple global territories (many discussions already underway) to be supported by regional marketing offices.

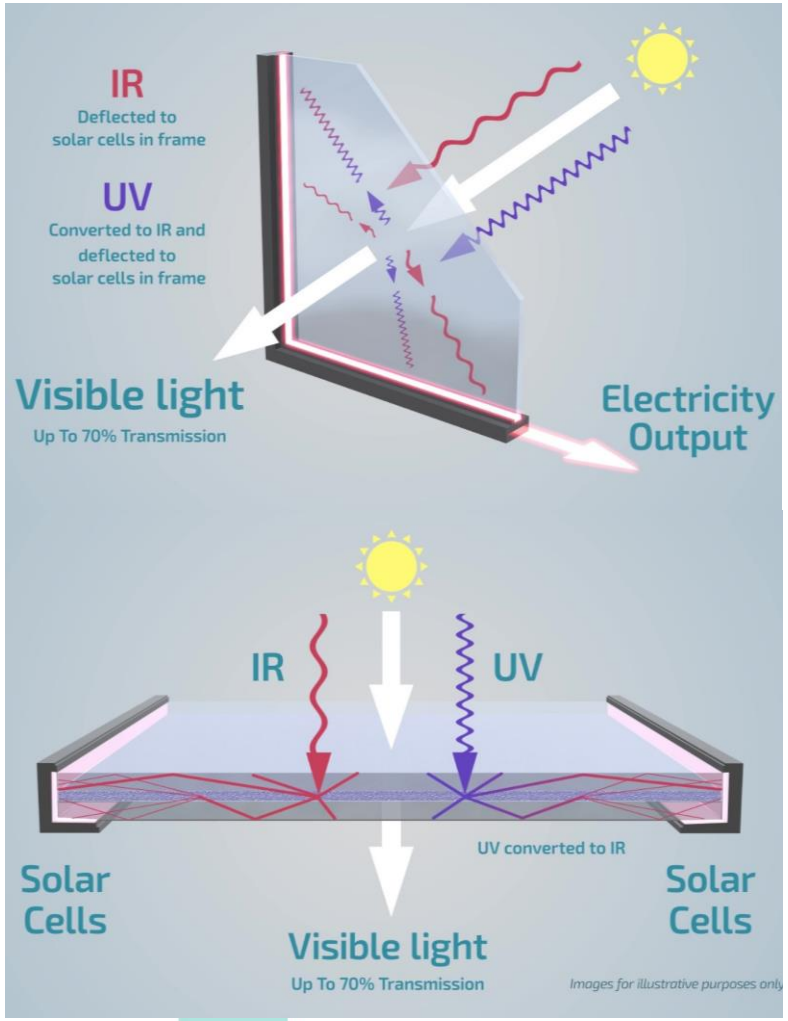
Capable Team
ClearVue is supported by a **capable, experienced and collaborative team** necessary to progress the company's growth goals.

Board & Management

Victor Rosenberg	Jamie Lyford	Brett Tucker / Deborah Ho	Sean Rosenberg	Stuart Carmichael	Ivan Wu	Ken Jagger
Executive Chairman	**General Counsel & Corporate Officer / Director**	**Joint Company Secretaries**	**Non-Executive Director**	**Non-Executive Director**	**Non-Executive Director**	**Chief Commercial Officer**
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.	Company Secretaries to a number of ASX listed and private companies and has been involved in numerous public corporate transactions and acquisitions. Both are Chartered Accountants 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 Director of Swick Mining Services (ASX:SWK), Chairman of Schrole Limited (ASX:SCL) and Serpentine Limited (ASX:S3R) and Non-executive Director of De.mem Limited (ASX:DEM) and Osteopore Limited (ASX: OSX)	Corporate adviser to various private & ASX listed companies with over 20 years of corporate and commercial experience in the IT, resource and gas industries	Sales & Finance Executive with 17 years' experience; Established, grew and ran national reseller networks for General Electric, Halifax Bank of Scotland Australia, Commonwealth Bank. Former partner of a boutique investment bank.

ClearVue's Technology – An Overview

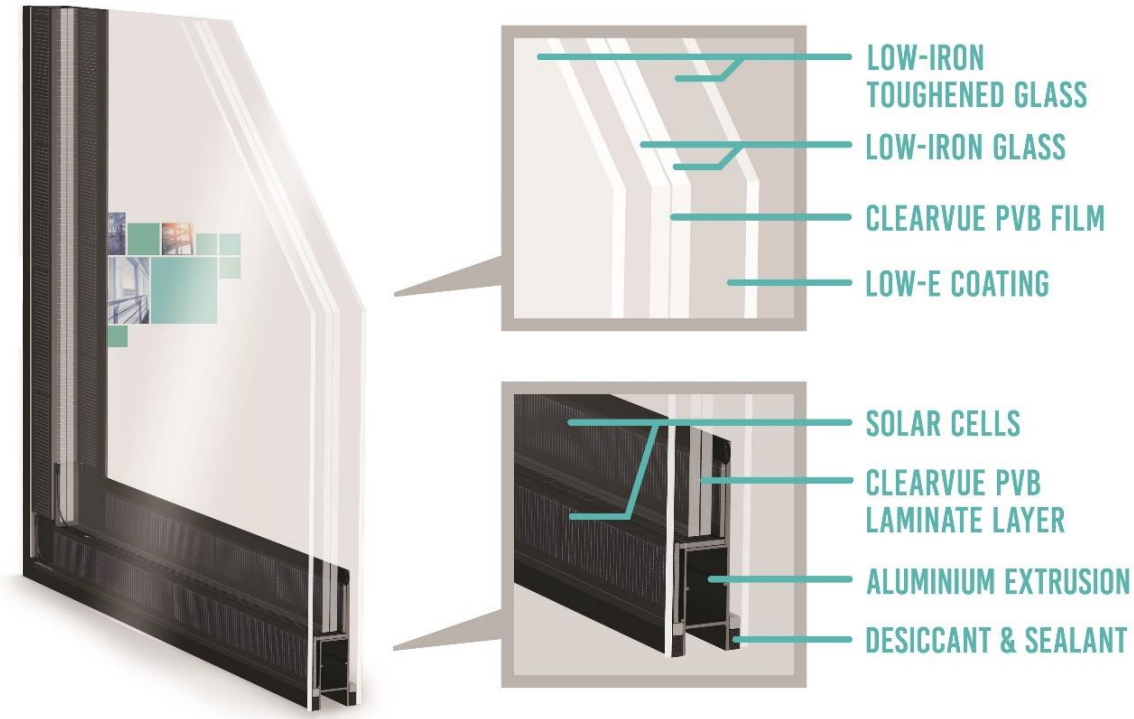
- ClearVue's patented technology sits within an activated interlayer between two panes of glass.
- Visible light (VIS) passes through the glass
- Micro & nano particles interact with Ultraviolet (UV) radiation which is down-converted to longer wavelengths and scattered along with Infrared (IR) light to the edges of the glass
- IR is collected by Photovoltaic (PV) cells and 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 - **85 granted patents** and 40 patent applications throughout the World



ClearVue's Product

SCALABLE - The ClearVue product is both scalable in size: ¼sqm, ½sqm, ¾sqm, 1sqm , 1.2sqm , 1.4sqm, etc. up to **3 sqm**; *and* scalable in terms of production and manufacturing (via multiple licensed manufacturers in different territories)

The ClearVue glass/window product is both **CLEAR** and **FUNCTIONAL**



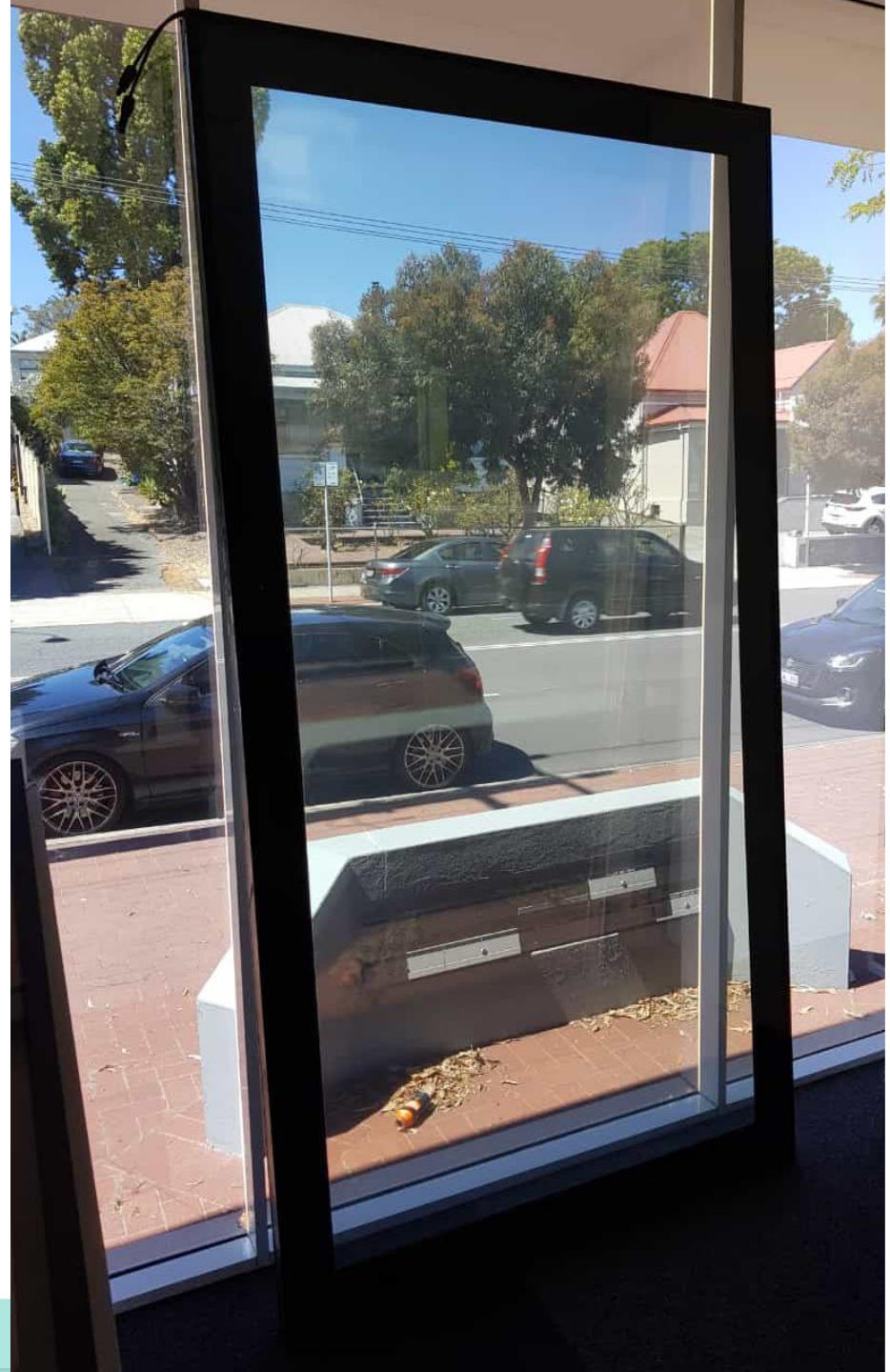
Key Target Markets:	Key Specifications:
❑ Agriculture and Horticulture	❑ **Ultra clear** - up to 70% transparency (VLT/AVT)
❑ Commercial and Residential	❑ **Power generating** - 30 W/m2 peak power (anticipated ≈ 50 W/m2 possible through ongoing R&D)
❑ Public Amenities	❑ **Insulating** - U-factor 1.26 W/(m2 ˚K)

Size Range

ClearVue can create varying IGU panel side lengths of between 600mm up to 2550mm and provide for more than **45 different IGU panel size combinations** catering for most window use-cases and applications.

Latest Size

2.3m high x 1.2m wide (2.76 sqm)



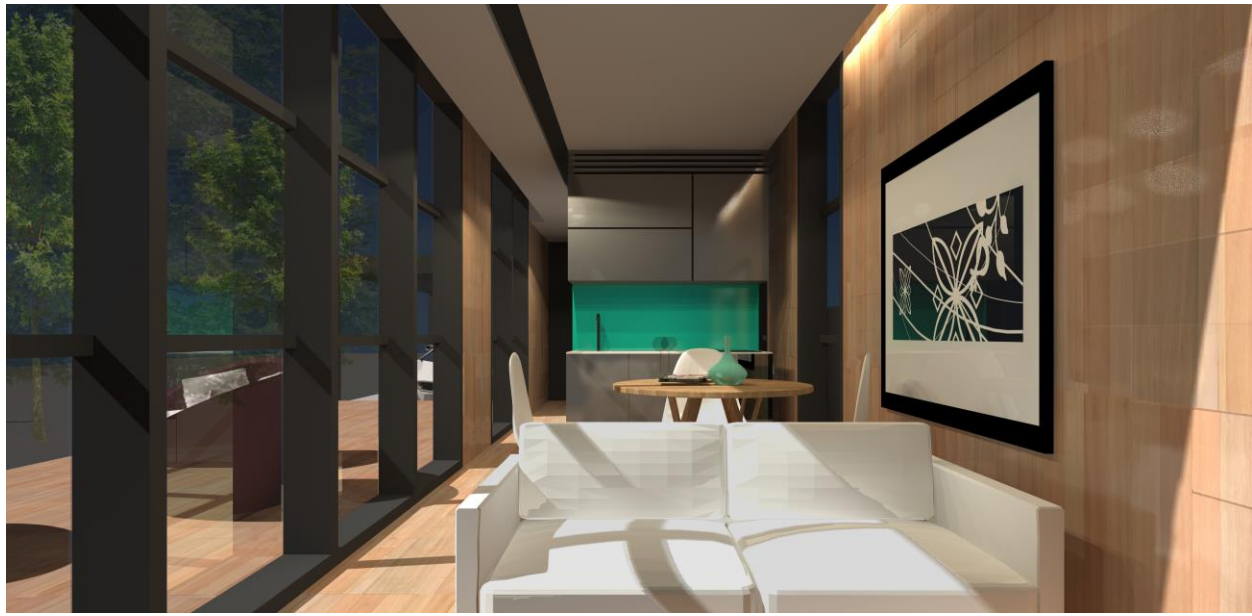
Commercial & Residential Applications

Large market opportunity – demand for BIPV solutions is limited by product characteristics – **there are no other architecturally acceptable transparent colourless BIPV products except 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
- **One of few glass products with a realistic carbon embodiment payback**
- Skylights are the fastest new window market globally
- Emerging opportunities in mini-homes. Collaboration agreements for Sweden and Australia in place.

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

Small Home Applications



Mirreco mini-home project preparations well underway. Please see 30 September ASX Announcement for information: https://www.asx.com.au/asxpdf/20190930/pdf/44902xbqfldxnc.pdf

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

Recent Agriculture Collaboration

- Technology presents opportunity for self powering greenhouses
- ClearVue is collaborating with Israeli based company **Roots Sustainable Agriculture Technologies (ASX: ROO)** that has a unique method of cooling *or* heating plant roots to significantly increase crop yield
- ClearVue glass will be trialled with this technology to power the pumps used to move water around the system

Roots' RTZO technology in field trials

Aquagen Project

Case Study – Shopping Centre at Warwick Grove WA

- ClearVue has **successfully deployed** its technology at the Vicinity Group's **Warwick Grove Shopping Centre** in Western Australia.
- The atrium entry glass includes 18 of ClearVue PV's triple-glazed, low-e, power-generating IGU panels.
- The PV glass charges a battery for energy storage and is providing power for lighting and outside signage.
- Live data of power being generated is being publicly displayed on site inside the centre to provide centre management an insight into energy management and cost savings.
- **Peer-reviewed high-impact paper** published 24 September 2019 on the performance and efficacy of the Warwick Grove installation **confirms power performance and commercial importance** of the ClearVue product and technology. Paper reached **top 5% readership of all published research papers globally** shortly after publication.[1]

[1] See: ASX Announcement https://www.asx.com.au/asxpdf/20190930/pdf/44902xbqfldxnc.pdf and Media Release http://www.clearvuepv.com/scientific-paper-validating-cpv-technology-trending-gloablly-in-top-10-of-research-publications-tracked/

Product Pipeline

- In conjunction with Arup, ClearVue are developing a number of new products to broaden the Company's product offering and drive further growth.
- In particular, the Company are developing a range of 'smart façade' solutions which integrate ClearVue's proprietary solar technology with smart systems such as automatic blinds, electrochromic window tinting and open and closing functionality.
- Arup estimates that integrating a battery for blind motors or electrochromic switchable glass powered by ClearVue PV eliminates the need for electrical wiring to the window with **potential savings of up to $1000 per façade panel**.

*This self-powering automatic casement window can be **retrofit into existing buildings**.*

*It will learn the optimum **temperature and airflow** requirements of the building occupants.*

*The window will **automatically open and close** to optimise building temperature and airflow. The **rain sensor** allows the window to close in wet weather.*

AUTOMATICALLY OPENS & CLOSES WITH CHANGING WEATHER

*This smart façade uses an **automated blind** to regulate building **temperature and lighting** comfort.*

*The blind operates within a **closed cavity** and is powered by a small motor that activates in response to outdoor solar conditions and the requirements of the building occupants.*

*Our ClearVue PV panel makes the system fully **self-powered**, removing the need for cabling to the façade.*

*These smart facades utilise **electrochromic technology**. This enables our glass to automatically tint and therefore adjust building **temperature and lighting** comfort.*

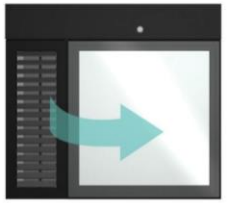
*The panels can be **retrofit** into existing buildings with **no need for cables**, as they are completely self-powering.*

*Light sensors and learning algorithms give these windows intelligence to **optimise occupant health and wellbeing**.*

WINDOWS AUTOMATICALLY TINT TO ADAPT TO LIGHTING CONDITIONS

EXTERIOR
FRESH AIR ENTERS VENTS

INTERIOR
AIR FLOW REGULATED BY DAMPER



*This intelligent panel incorporates **natural ventilation** with an **automatic motorized damper**, enabling optimized control of a building's ventilation.*

*The interior of the façade is embedded with a **CO_2 sensor**, while the exterior contains a **rain sensor.***

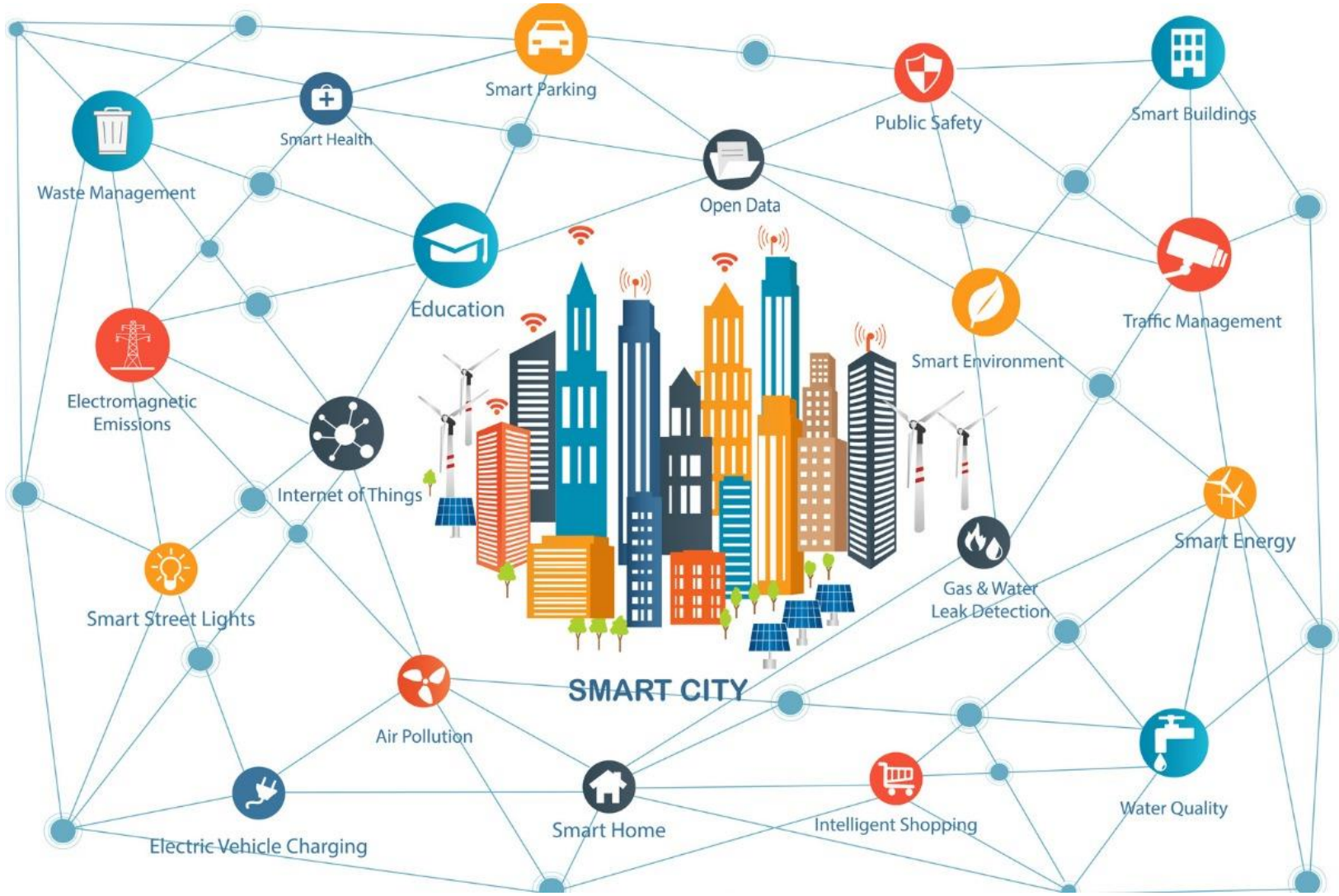
*This system allows for **automatic night flush**, and has the added benefit of **acoustic damping**.*

ARUP

Smart City Integration

Industry experts estimate that smart cities will demonstrate impressive increases in efficiency: using many of the concepts in the image and on the next slide, cities can expect to improve energy efficiency by 30% in 20 years.

Simultaneously, it's estimated that the broad market for smart city products and services will be worth $2.57 trillion by 2025 (growing at 18.4% per year on average) (PR Newswire).



Business and Revenue Model

ClearVue will derive revenues from:

- **Direct sales:** The Company will initially sell and supply fully assembled IGU/window products direct to distributors and licensed channel partners in Australia and worldwide. Then, **as manufacturing licensees are appointed in different territories the revenue streams that follow will apply**:
- **Component sales:** The company will sell technology/product components to its manufacturing licensees including its proprietary nano and micro particle doped activated interlayer *and* its proprietary mini solar photovoltaic strips for use inside of each integrated glazing unit;
- **Royalty payments:** The Company intends to charge a flat USD royalty fee per sqm of ClearVue glass/technology sold by a manufacturer or distributor business;
- **Licence fees:** The Company will in some cases charge a fee to manufacturers and/or distributors for the right to manufacture and/or distribute and sell the ClearVue products; and
- **Upsell opportunities:** The Company will offer upsell opportunities to its licensees including the sale of data and access to information (eg. IOTStream) for which it will receive a commission/percentage.

Size of the Market

"By 2060, the world is projected to add 230 billion m2 (2.5 trillion sq ft) of buildings, or an area equal to the entire current global building stock. This is the equivalent of adding an entire New York City to the planet every 34 days for the next 40 years." *(Zero Code: https://zero-code.org/)*

- 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).[1]
- ClearVue's target market represents in excess of 2.1 billion sqm² of glass per annum (total market size 5.5 billion+ sqm of glass per annum)# (***Target Market***).

Sources:
1. https://www.bccresearch.com/market-research/energy-and-resources/building-integrated-photovoltaics-markets-report-egy072C.html
2. https://www.nsg.com/~/media/NSG/Site%20Content/Temporary%20Downloads/Japanese/NSGFGI_2011%20EN2.ashx
3. ClearVue does not represent that it will be able to obtain such market share or that such revenue can be achieved. **See Disclaimer Slide Page 2.**

Revenue Opportunity

- ClearVue's business plan is based around a licensing model where **(1) a royalty** and CPV's two main IP components (**(2) nano/micro particle doped interlayer** and **(3) photovoltaic strips**) are sold to ClearVue's manufacturing licensees at approximately USD $245 per sqm (combined revenue to CPV)*
- It is expected that a small 10 floor 25,000 sqm building could deploy approx. 3,150 sqm minimum of ClearVue product (assuming 3 building sides of 50m long and part floors of 2.1m high only)#.
- A single large building, for example the One World Trade Center (Freedom Tower) New York City (right) has over 93,000 sqm of glass.
- Minimum sales requirements of a distribution only licensee or a manufacturing/distribution licensee is: 5,000 sqm for year 1, 10,000sqm for year 2, 20,000 sqm for year 3, 30,000 sqm for year 4 & 40,000 sqm for year 5.
- One licensee (only) achieving their performance criteria equates to over USD $25m in revenue over 5 years.

Notes:
*Complete ClearVue IGU's initially to be sold in Australia by ClearVue to gain market acceptance. Approx. per sqm rate may change based on order quantities and scaling, country and project specific requirements.
See ASX Announcement - Technical Update 28/03/2019 - https://www.asx.com.au/asxpdf/20190328/pdf/443v6jr2zhbvm7.pdf

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 a **luminescent solar concentrator** (LSC). ClearVue has entered into an exclusive agreement for contracted R&D for the development of ClearVue's core technologies.

ECU is also working on a new research project to develop **all-inorganic micropatterned clear thin film solar** cells onto glass which we hope to integrate into the exiting products and as a new stand alone technology.

Nanyang Technological University

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

University of New South Wales

ClearVue has signed a Research Agreement with the World renowned UNSW School of Photovoltaic and Renewable Energy Engineering to explore the use of **quantum dots** in combination with ClearVue's existing LSC technology or as a stand-alone for new applications.

Roadmap End 2019

2H 2019

- For earlier milestones please see earlier Investor Presentation released 09/09/2019
- Aim to Increase size (greater than 2m x 1m) to ensure architectural buy-in (building floor height) ✓
- Appoint Chief Commercial Officer ✓
- Beyond PV Taiwan manufacturing MOU expected to convert to a signed contract (PV Strips); exclusive OEM supply agreement. Expected USD $3.5m investment in their automation capabilities for a dedicated CPV production line. ✓
- US Trip and GreenBuild Atlanta ✓
- Achieve certification necessary for USA and North America sales - Underwriters Laboratories (UL) ✓

End 2019

- Achieve certification - International Electrotechnical Commission (IEC) for Europe, U.A.E. etc.
- Seiko Wall manufacturing MOU expected to convert to signed Manufacturing Agreement for Singapore and Malaysia.
- Aim to appoint licensee(s) in South Africa.

Roadmap 2020 – Goals for the Following 12 Months:

1H 2020

- Appoint licensee(s) and continue negotiations on first direct commercial sales
- Appoint experienced CFO and Production Engineer
- Begin recruitment for experienced International CEO
- **Aim to increase power to 50w+ per sqm**

2H 2020

- **First orders expected from licensee Grafsol in the U.A.E.** (performance requirements beginning post IEC certification)
- **First orders expected from Asia Pacific**
- Appoint licensee(s) in Europe / US
- Look to close first orders (both direct sales and via licensees)
- **First orders expected from US Licensee**
- Establish North American marketing office
- **First Orders expected from South African / European Licensees**
- Establish European marketing office
- Appoint licensed distributor and/or manufacturer / JV in China for sales inside mainland China

info@clearvuepv.com

www.clearvuepv.com

facebook.com/clearvue/

linkedin.com/company/clearvuepv/

+61 8 9220 9020

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