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BIPV, Advanced Glazing and Energy Solutions

Thursday, 17 February 2022 | Technical Topic Webinar

Presented By

ClearVue Technologies

Mr. Jamie Lyford - Chief Operating Officer & General Counsel
Mr. Tao Zhang - Senior Engineer
Dr. Mikhail Vasiliev - Lead Scientist

Common Questions/FAQs

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Introduction - Presenters

Mr. Jamie Lyford - Chief Operating Officer & General Counsel

Jamie has over 20 years' experience working in the areas of IP, commercialisation and technology both as an IP and commercialisation lawyer and as a technology commercialisation specialist. In his work as a lawyer he has worked with a number of well-known local and interstate law and patent firms and internationally with a specialist IT law firm as well as in-house with BHP Steel (now Bluescope) and multinational IT services provider SchlumbergerSema (now ATOS). As a commercialisation adviser, Jamie has assisted a number start-up and early stage companies both as an adviser and a Director (of which he retains a number of current positions).

He has also operated and managed the Western Australian government's Innovation Centre incubator under two separate outsourced consultancy terms where he was responsible for assisting innumerable innovative West Australian businesses on their path to successful commercialisation.

Mr. Tao Zhang - Senior Engineer

As a chartered professional engineer in both Australia and China, Tao has extensive experience on project management, engineering study & analysis and civil/structural design for a large number of international projects.

Tao is currently ClearVue's Project Manager & Senior Technical Officer, leading the technical team on ClearVue product certification programmes in compliance with international standards, and participates in R&D on new product models and functionalities. He also supports the sales team and directs the global OEM manufacturers to achieve project timelines with efficiency and quality.

Tao currently manages several projects from small to large scale, in the application of ClearVue products onto residential, commercial and agricultural buildings in Australia, China, Japan, Singapore and other countries/regions.

Dr. Mikhail Vasiliev - Lead Scientist

Dr Mikhail Vasiliev graduated from Victoria University {Melbourne, Australia) in 2002. He is a multi-skilled expert with research interests in the fields of optical physics, optical engineering, photonics, nano-engineered functional materials, and scientific software development. Mikhail has been part of the Australian optics and photonics industry since early 2001, working as Development Engineer at JDS Uniphase Corp., North Ryde, Sydney, and later as Physicist at Optoelectronics Pty Ltd (Melbourne), until 2005. As Senior Research Fellow at Edith Cowan University between 2005-2020 Mikhail has worked on a number of research projects and in particular for ClearVue Technologies' projects since 2010. He is now employed full-time at ClearVue Technologies as Lead Scientist. Mikhail has co-authored multiple high-impact research articles published in international peer-reviewed journals, as well as several scientific book chapters

ClearVue PV

CLEARVUE TECHNOLOGIES LIMITED

BIPV & Advanced Glazing Solutions

Energy Efficient | Energy Generating | Clear Glass

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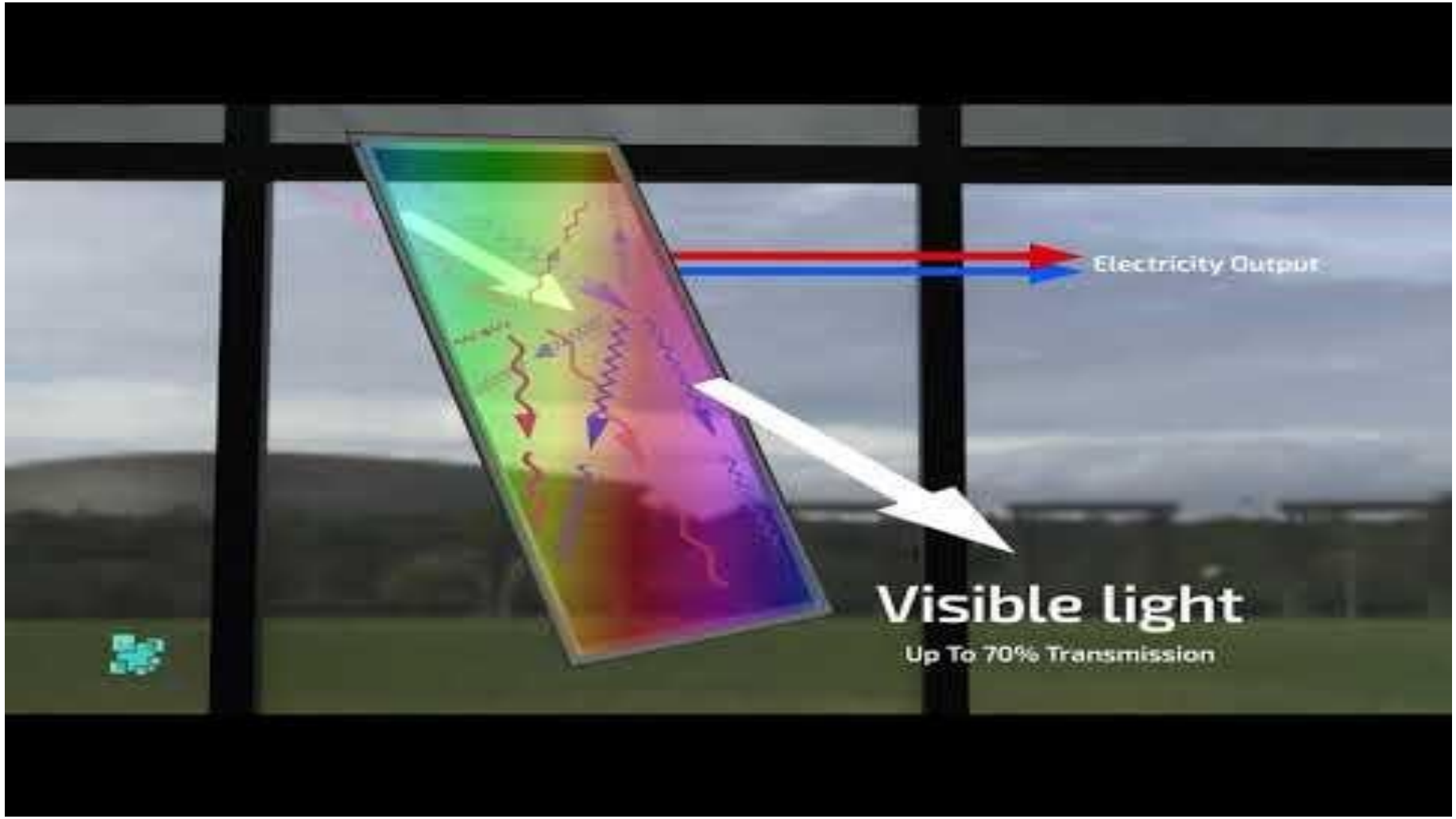
Agenda

- About Us
- The Climate Imperative
- Building / Construction Impact on GHGs
- The Net Zero / ZEB Direction – Directions the support the need for BIPV / BAPV
- BIPV / BAPV Options
- WIPV & Advanced Glazing Solutions
- The ClearVue PV Solution

About ClearVue

Technology Explainer Video



Pilot Project: Vicinity Centres' (ASX:VCX) Warwick Grove Shopping Centre

The Climate Imperative

Climate Imperative

- In October 2018 the Intergovernmental Panel on Climate Change or IPCC released its Special Report 15 to update the World and its governments on the progress (or lack thereof) in relation to meeting the targets set out in the landmark Paris Agreement adopted by 195 nations in December 2015 at the 21st Conference of the Parties to the UN Framework Convention on Climate Change. An update to this came earlier this year in the form of IPCC's 6th Assessment Report (AR6) ahead of COP26.

- The IPCC Special Report tries to remain optimistic but indicates that limiting global warming will require **"far-reaching and unprecedented changes" to human behaviors** if we are to restrain global warming to a 1.5 degrees increase over pre-industrial levels. Panmao Zhai, Co-Chair of one of the IPCC Working Groups said: ***"We are already seeing the consequences of 1 ℃ of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes,"***

- In relation to Special Report 15 from 2018 UN Secretary General Antonio Guterres said:

"This report by the world's leading climate scientists is ***an ear-splitting wake-up call to the world****. It confirms that* ***climate change is running faster than we are*** *– and* ***we are running out of time****"*

- This year in response to AR6 he said that this latest report is a: **"CODE RED for humanity"**

Climate Imperative

UN Secretary General Antonio Guterres following release of the Special Report 15 has said that getting to the IPCC targets and holding temperature rises to 1.5˚c above pre-industrial levels, would require:

"…urgent and far more ambitious action to cut emissions by half by 2030 and reach net zero emissions by 2050.

…

*This will take unprecedented changes in all aspects of society – especially in key sectors such as land, energy, industry, **buildings**, transport **and cities**, …"*

*"… we need to end deforestation and plant billions of trees; drastically reduce the use of fossil fuels and phase out coal by 2050; **ramp up installation of** wind and **solar power**; invest in climate-friendly sustainable agriculture; and consider new technologies such as carbon capture and storage. … **The coming period is critical**. We must meet the Paris commitments to bend the emissions curve by 2020."*

Climate Imperative

"We are currently undergoing the largest wave of urban growth in human history. By 2060, two out of every three people will live in cities.

By 2060, the world is projected to add 230 billion m^2 (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.

Improvements in building sector energy efficiency and growth in renewable energy generating capacity have not been nearly enough to offset the increase in emissions from new construction. Only by eliminating CO_2 emissions from new building operations will we begin to reduce building sector emissions before they are locked-in for the foreseeable future." ***Zero Code***

The Net Zero / ZEB Direction

The Net Zero / ZEB Direction

World Green Building Council- advancing Net Zero May 2019 Report:

*"Buildings are responsible for **39% of global energy-related carbon emissions**, with 28% coming from the "in-use" phase – to heat, power and cool them.*

*If we can eliminate these emissions, **buildings represent one of the greatest – and most achievable – ways to respond to the climate emergency** facing us."*

Chris Trott, Partner, Head of Sustainability, Foster + Partners:

"We welcome the Advancing Net Zero Status Report 2019 by the World Green Building Council, as they help to shape our built environment to be low carbon, economically future-proofed and socially inclusive. Amid continuing transformation, these initiatives frame the transition to take building emissions to net zero and avoid dangerous levels of climate change. We plan, through our projects and our own efforts in-house, to lead this transition. We hope you will join us."

The Net Zero / ZEB Direction

Some of the signatories to World GBC's Net Zero Carbon Buildings Commitment as at May 2019 (Businesses & organisations):

- AMP Capital Wholesale Office Fund - Sydney, Australia
- Cbus Property - Melbourne, Australia
- Dexus - Sydney, Australia
- Foster + Partners - London, UK
- Frasers Property Australia - Sydney, Australia
- GPT Wholesale Office Fund - Sydney, Australia
- Local Government Super - Sydney, Australia
- Nightingale Housing - Melbourne, Australia
- Stockland - Sydney, Australia
- Sydney Opera House - Sydney, Australia

Also **The Net Zero Momentum Tracker recently launched in Australia to track Australia's largest property companies (in the ASX 200) with their progress towards achieving net zero by 2050.**

The Net Zero / ZEB Direction

Many Other/Different Initiatives Globally:

Regulatory

- European Commission – “The Energy Performance of Buildings Directive”
- Many others …

Industry Based & Quasi Regulatory

Architecture (unlike many other industries) is already responding to the Climate Crisis - across the world, environmental performance standards are driving up the energy efficiency of new buildings.

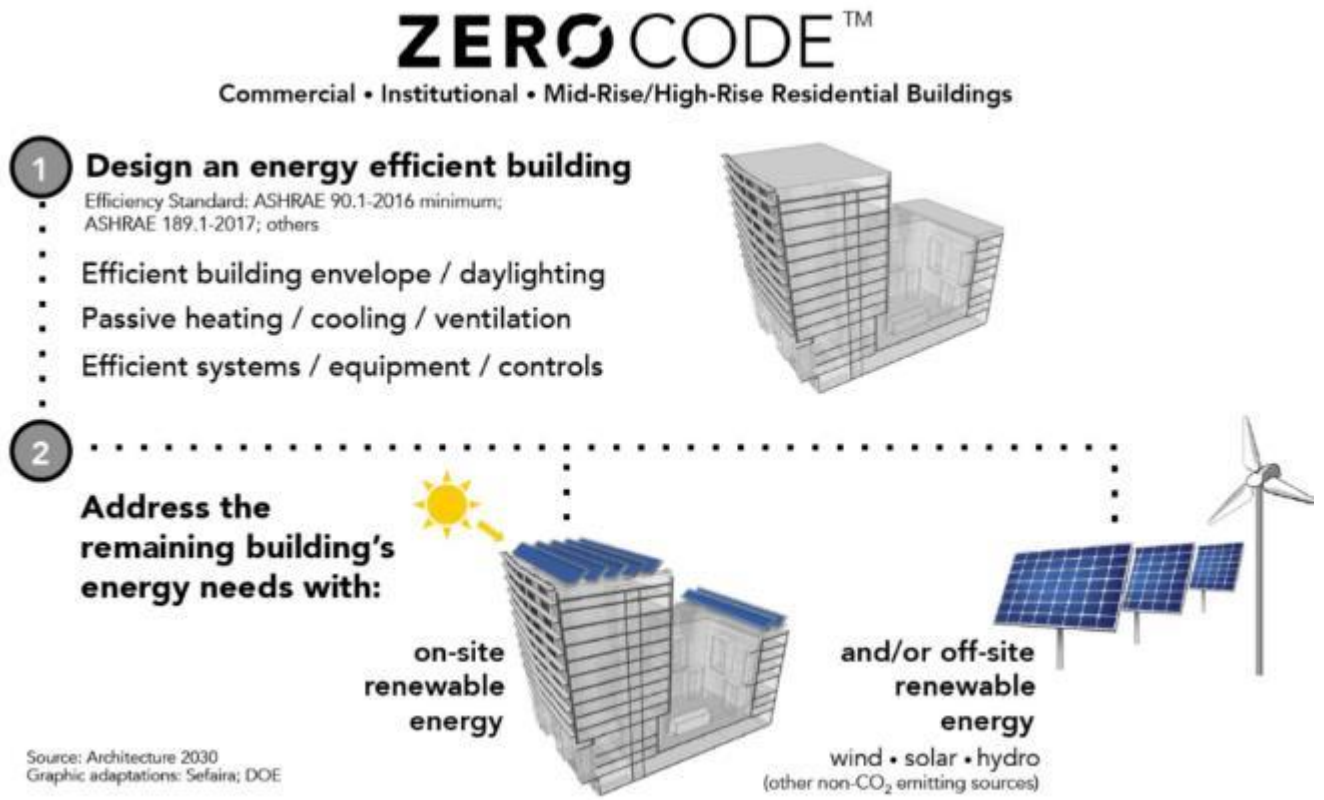
Some initiatives include:

- BRE’s BREEAM sustainability assessment for buildings from the UK – now being used in 80 countries worldwide (www.breeam.com)
- LEED in the US
- Estidama in Abu Dhabi
- Green Star in Australia
- Green Building Label in China
- Achieving Zero (https://architecture2030.org/achieving-zero/)
- Zero Code (https://zero-code.org/) – California / China

The Zero Code

Complying with the **ZERO Code** entails first meeting the minimum prescriptive or performance requirements for building energy efficiency defined by ASHRAE Standard 90.1-2016. As part of a standardized and predictable process to continue to advance energy efficiency, new standards that exceed ASHRAE Standard 90.1-2016 have been incorporated into the ZERO Code, such as the 2018 International Green Construction Code (IgCC) and ASHRAE Standard 189.1-2017. Newer versions of ASHRAE 90.1, 189.1 and the IGCC will be incorporated as they are published.

Once the minimum requirements of the standard are met, then the on-site and/or off-site renewable energy is calculated to achieve a zero-net-carbon building design.



These Steps Are Not Enough!

- Foster + Partner's new Bloomberg Headquarters in London that opened in October 2107 was widely hailed as the "most sustainable building in the World" at its opening and won the RIBA Stirling Prize a year later.
- The building covers over 3.2 acres of central London has created 102,200 square metres of office and retail space. The project was given a score of 98.5 per cent against its criteria – the highest that had been achieved so far for a major office development. It is designed to use **73 per cent less water** and **35 per cent less energy** than a standard office building. The project also received the highest possible **BREEAM certification of 'Outstanding'.**
- Spencer de Grey, Head of Design at Foster + Partners, when presenting the project in Beijing has said that despite this building's serious green credentials if all buildings were built to these standards it would still not be enough and declaring the Bloomberg building itself a **"3 degree building"** (but possibly more) – in other words a building that will contribute to climate change at double the rate of the IPCC's 1.5 degree celsius temperature rise ceiling and tipping point beyond which it may not be possible to recover.

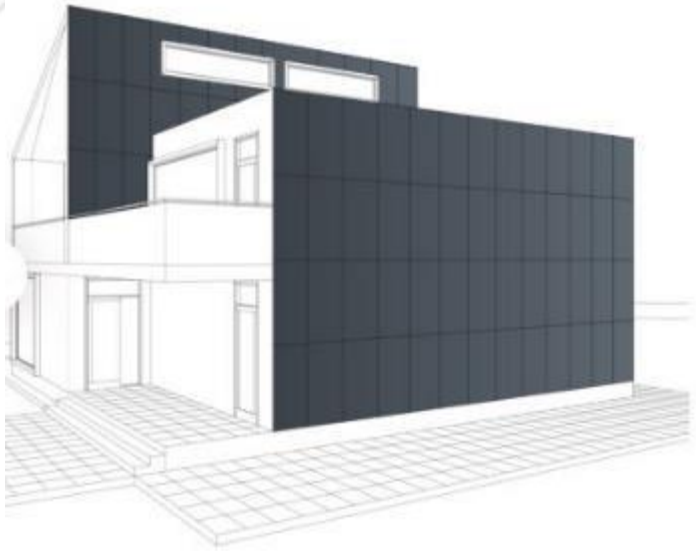
- **Importantly whilst this building uses its façade for energy efficiency savings it FAILS to use its façade for power generation!**

BIPV : A Part of the Net Zero Solution

Building Integrated Photovoltaics (BIPV)

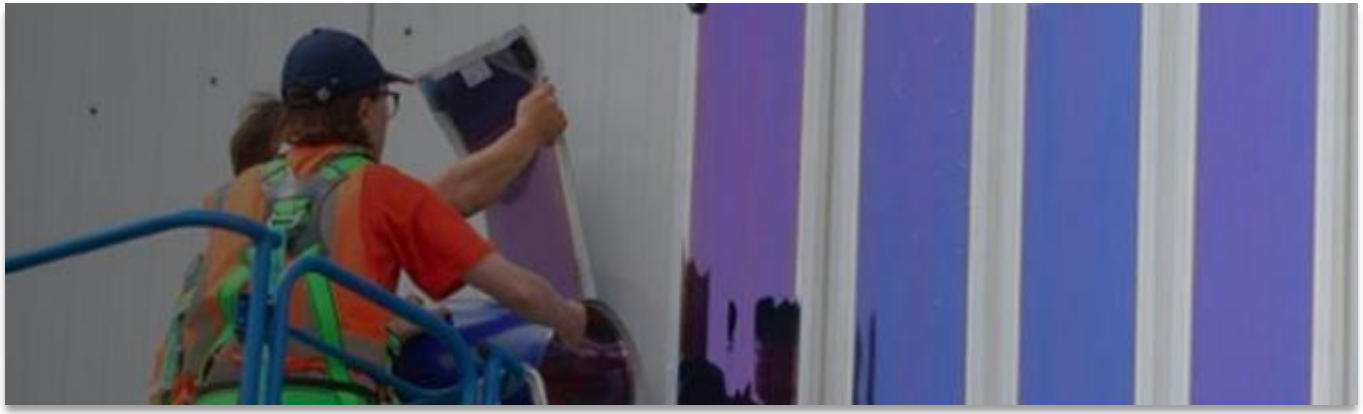
- Building Integrated Photovoltaics (BIPV) v. Building Applied Photovoltaics (BAPV)

Traditional – externally applied roof PV



Building Applied Photovoltaics (BAPV)

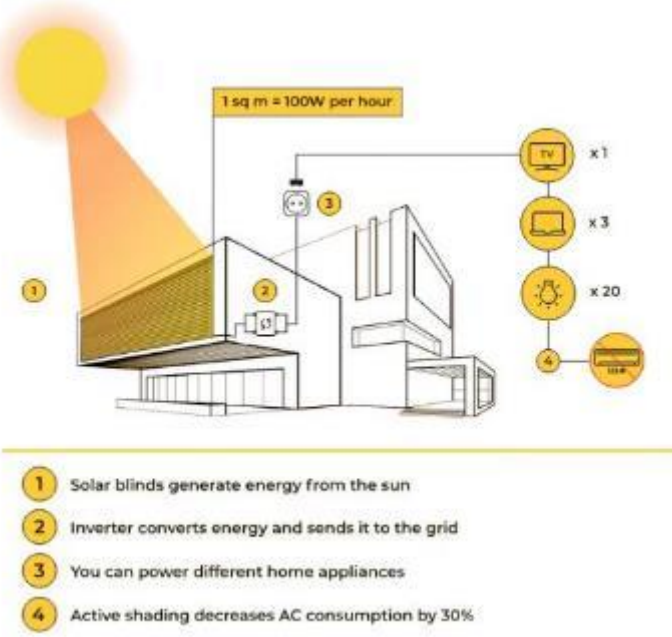
Thin-film Flexible PV – Latest Advances



Heliatek being applied to an industrial façade in Germany

Building Applied Photovoltaics (BAPV)

Other Applied PV Solutions



Solargaps – external solar PV blinds

Building Integrated Photovoltaics (BIPV)

Laminated PV Cells

New Mexico - 3 kw -350 sq. ft.- Insulated Glass (Solaria Corp.)

Installation of Laminated PV

Aspen, Colorado -8 kw - 950 Sq. Ft. - Glass/Glass laminated PV

Typical PV Glass Laminate Makeup

Many variations, but often:

- Light transmission is adjusted by adjusting the spacing between cells
- Heat Treated Low Iron Cover glass - 3 to 6 mm
- EVA 0.5 mm
- PV Cell Circuit
- EVA 0.5 mm
- Heat Treated Float Back Glass

Building Integrated Photovoltaics (BIPV)

Laminated PV Cells

Whitehall Ferry Terminal, New York. Completed 2006. 60 kw – (15kw as façade). With a light through canopy

Building Integrated Photovoltaics (BIPV)

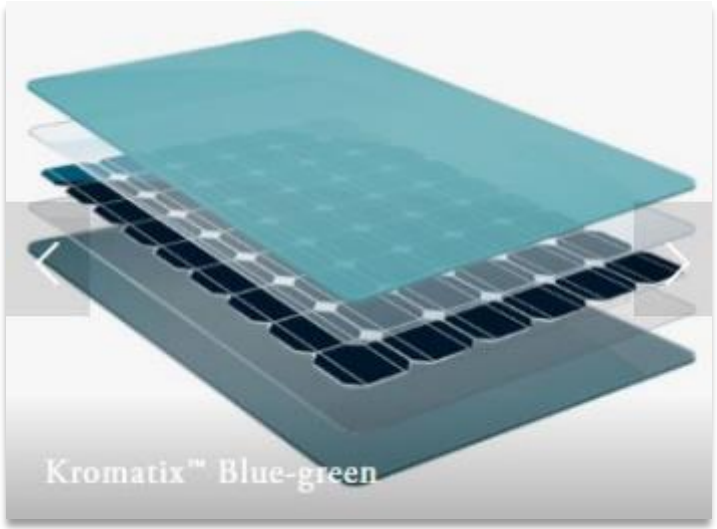
Building Integrated Photovoltaics (BIPV)

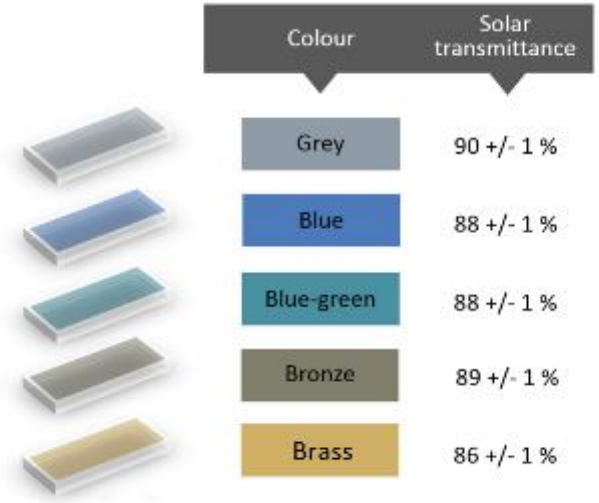
Laminated PV Cells – Latest Technologies

Copenhagen International School, Denmark. Kromatix by SwissINSO. System is 12000 of 0.72m x 0.70m (0.504m2) panels covering 6048 sqm capable of generating 720 kWp (or approximately 119 watts peak per sqm)

Building Integrated Photovoltaics (BIPV)

Laminated PV Cells – Latest Advances





Kromatix Grey used on Normande Energy Building

Building Integrated Photovoltaics (BIPV)

Other Approaches

Suntegra shingled PV

Tesla PV tiles

Eternit S.A. (Sao Paulo, Brazil)

WIPV & Advanced Glazing Solutions

Window Integrated Photovoltaics (WIPV)

A sub-set of BIPV

SolarWindow – Scottsdale AZ

UbiQD – Los Alamos NM

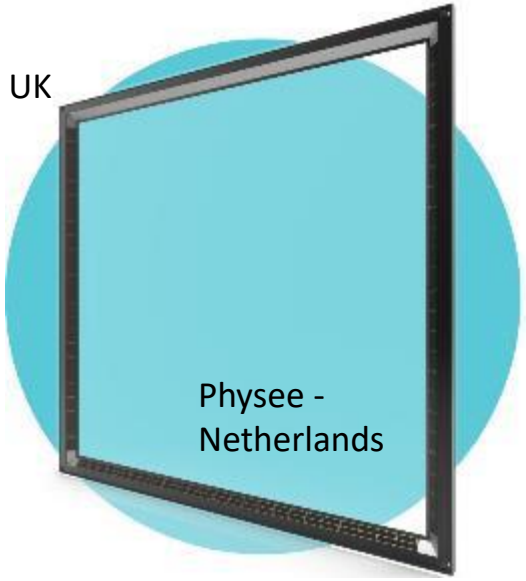
Ubiquitous Energy – Redwood City CA

Next Energy Technologies – Santa Barbara CA

Window Integrated Photovoltaics (WIPV)

A sub-set of BIPV

Polysolar - UK



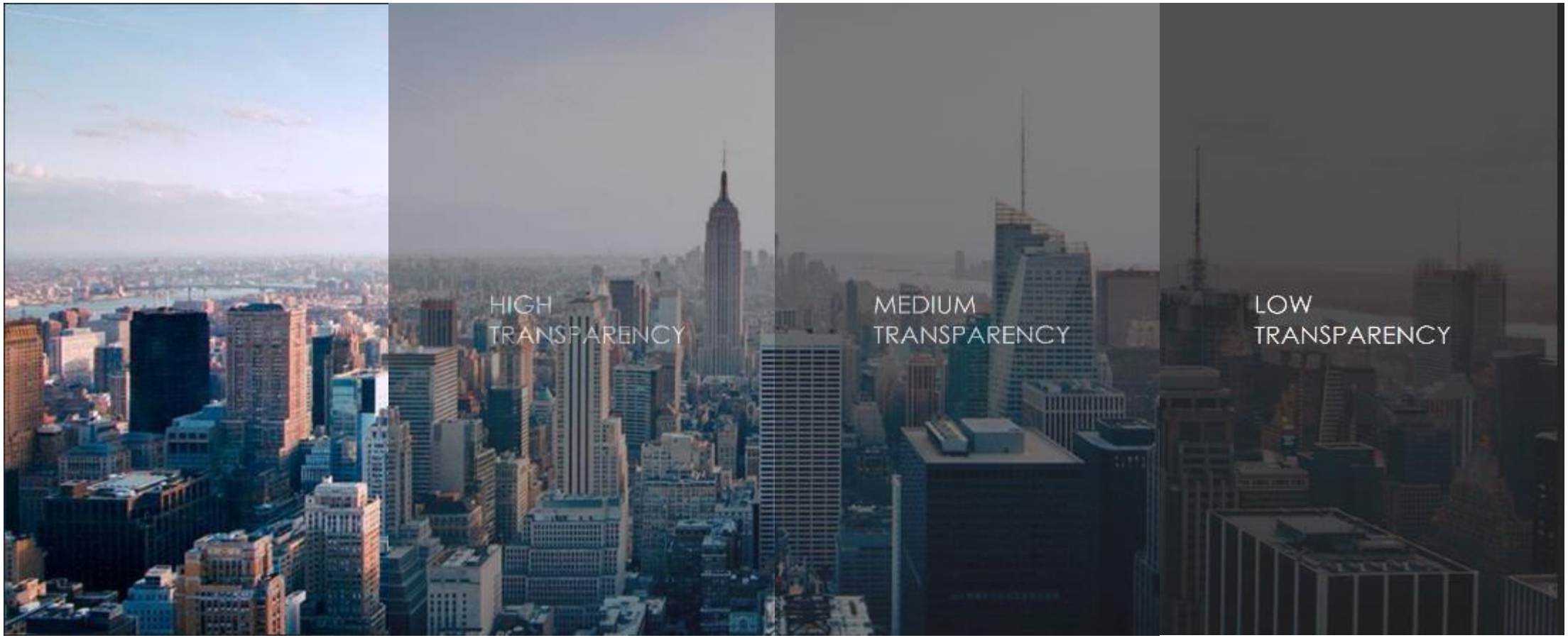
Physee - Netherlands

Onyx Solar - Spain - Crystalline PV

Onyx – Spain - Amorphous Silicon

Window Integrated Photovoltaics (WIPV)

A sub-set of BIPV



Onyx Transparency Range – 0% (57.Wp/m2), 10% (40Wp/m2), 20% (34Wp/m2) to High Transparency at 30% (28 Wp/m2)

The ClearVue Solution

ClearVue's Technology – An Overview

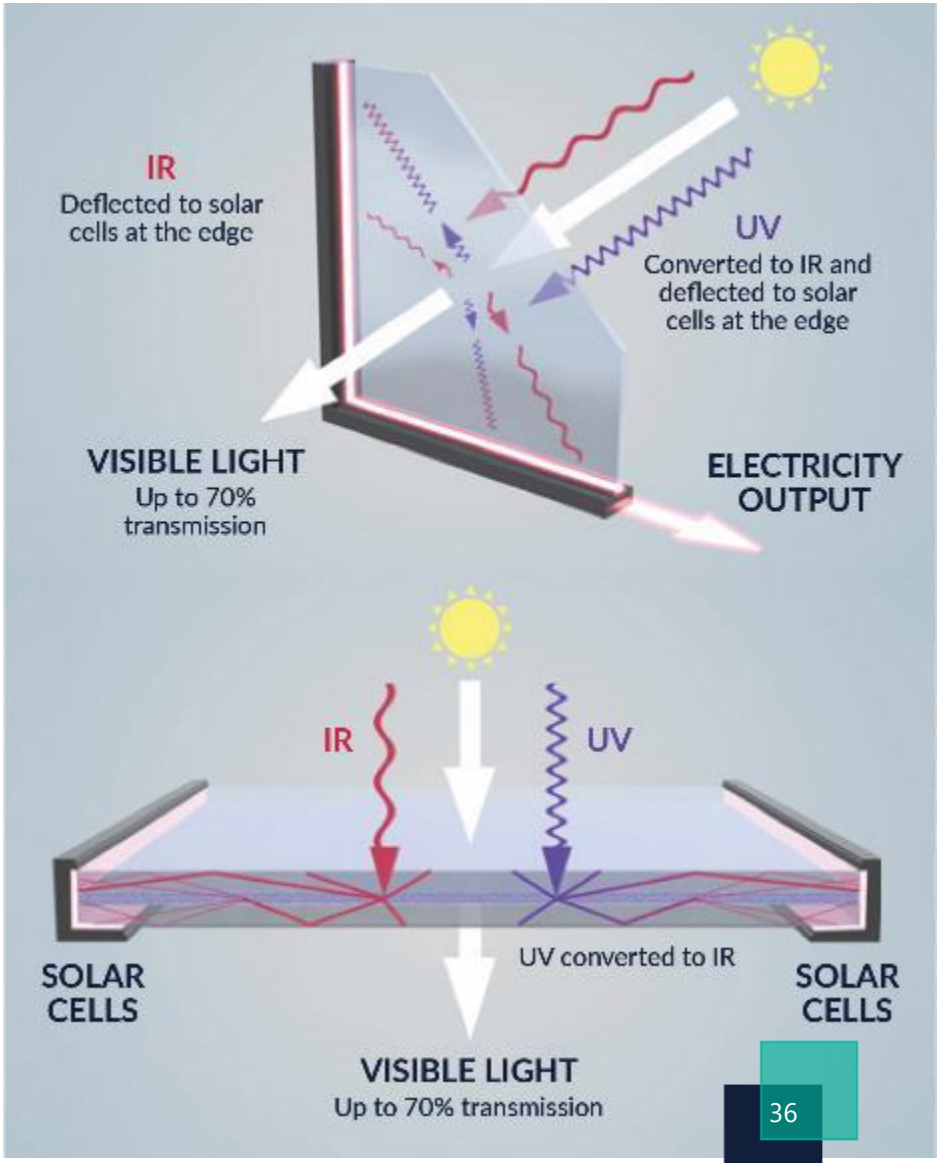
- ClearVue's patented technology sits within an activated interlayer between two panes of glass:
  - ❑ **Visible light (VIS) passes through the glass ~70% VLT**
  - ❑ **Micro & nano particles interact with Ultraviolet (UV) radiation which is down-converted to longer wavelengths and scattered along with Infrared (IR) light to the edges of the glass**
  - ❑ **IR is collected by Photovoltaic (PV) cells and produces electricity**

✓ **Turns damaging UV and IR radiation into energy**

✓ **Insulation properties reduce heating and cooling costs**

✓ **ClearVue has extensive IP protection on its technology and products**

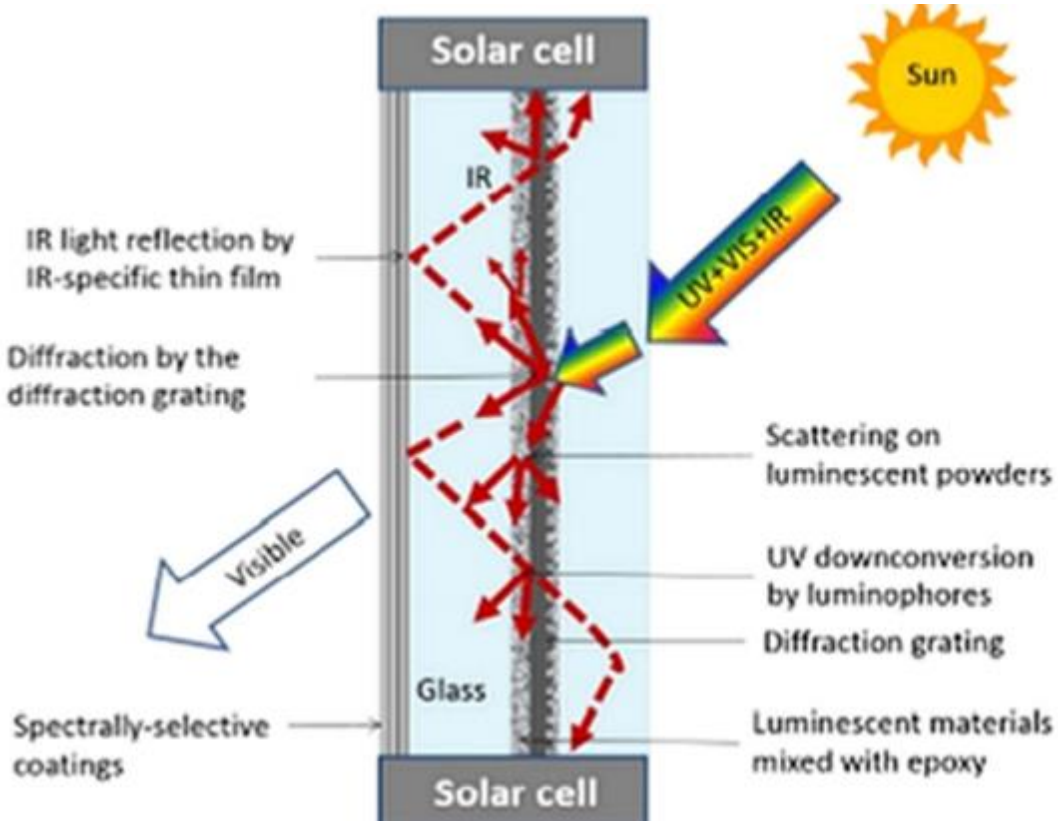
Innovation pipeline of new technologies to improve power performance including R&D into inorganic quantum dots



Technology features and application area: smart energy-efficient building products

Routing UV-blue+NIR energy towards panel edge regions using a combination of mechanisms:

- **Luminescent concentration using inorganic materials with large Stokes shift**
- **Scattering as a light harvesting mechanism working across a short range near edges**
- **Spectrally selective diffraction gratings and optical coatings working in synergy with the above mechanisms to improve light trapping performance**



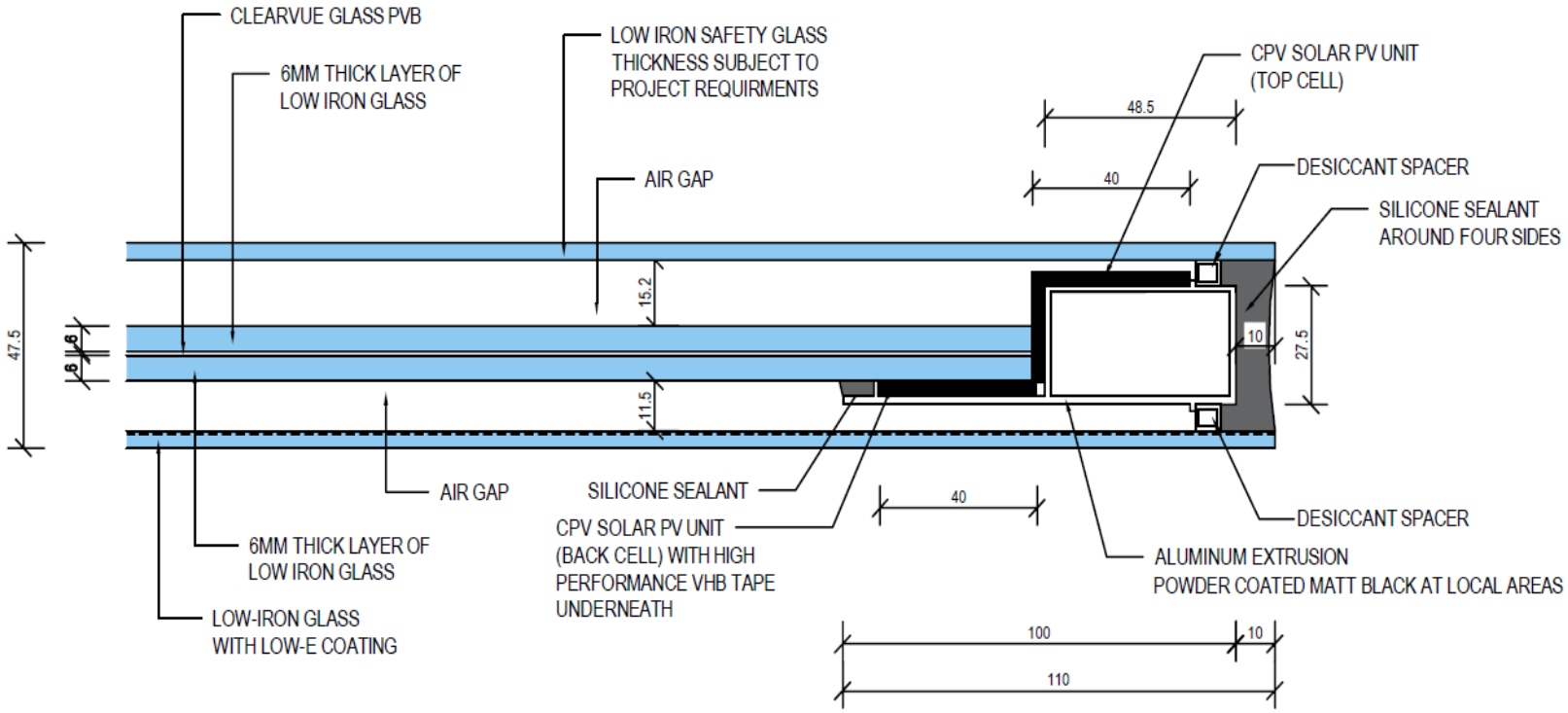
REFS:

M. Vasiliev et al, "Photonic microstructures for energy-generating clear glass and net-zero energy buildings," Scientific Reports, Vol. 6, 31831 (2016).

R. Alghamedi et al, "Spectrally-selective all-inorganic scattering luminophores for solar energy-harvesting clear glass windows," Scientific Reports, Vol. 4, 6632 (2014).

M. Vasiliev et al, "Recent Developments in Solar Energy-Harvesting Technologies for Building Integration and Distributed Energy Generation," Energies, Vol. 12, Iss. 6, 1080 (2019).

ClearVue's IGU Cross Section



CLEARVUE IGU CROSS SECTION – 40MM

Proven Technologies Working Together Seamlessly

ClearVue's patented technology – the nano/microparticle doped PVB sits within an elegantly designed system utilising long standing proven technologies that meet longevity and safety standards around the world.

ClearVue's PVB Interlayer has undergone advanced life cycle testing and chemical analysis to show that optical properties remain constant for more than 5000 hours of accelerated aging equivalent to over 10 years deployment

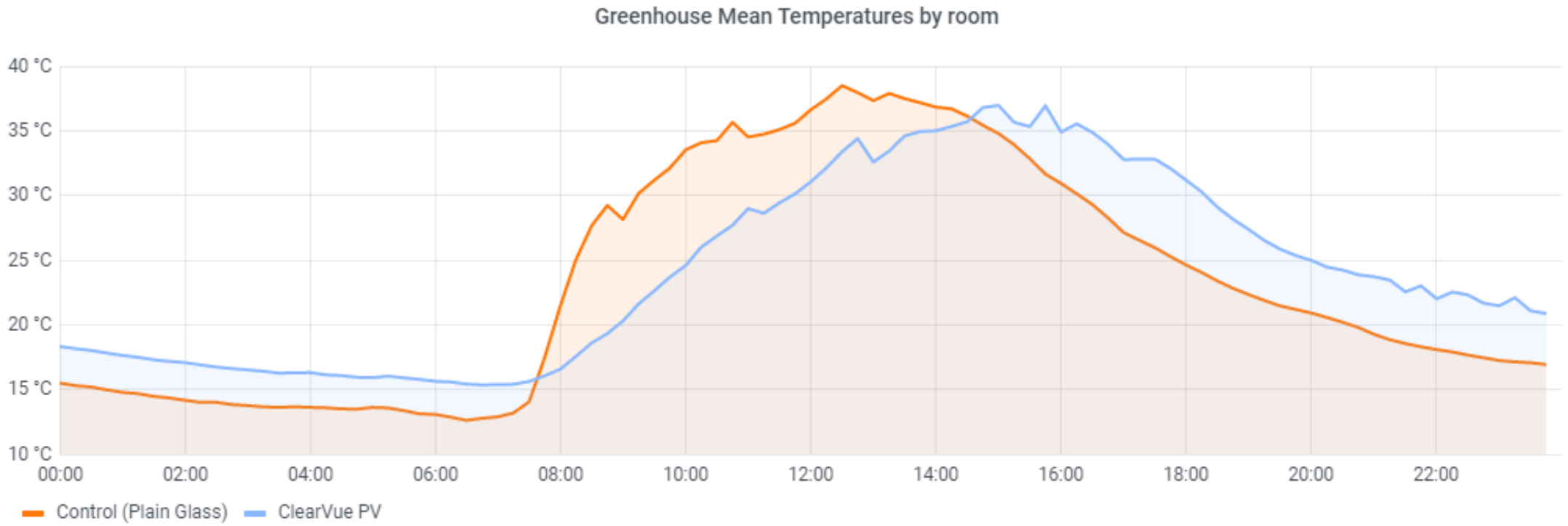
- **Xenon Weatherometer Exposure Test for Durability**
- **Pummel Adhesion Test**

Test Results for ClearVuePV PVB Interlayer Optical Properties			
Hours Exposed	Yellowness Index	Visual Light Transmission %	Pummel Adhesion Score
0	2.1	82.0	6
500	1.8	81.9	-
1000	1.8	82.0	6
2000	1.8	82.0	6
3000	1.8	82.3	6
4000	1.8	81.9	-
5000	1.8	82.6	-

How does ClearVue Solar Glass compare?

Thermally

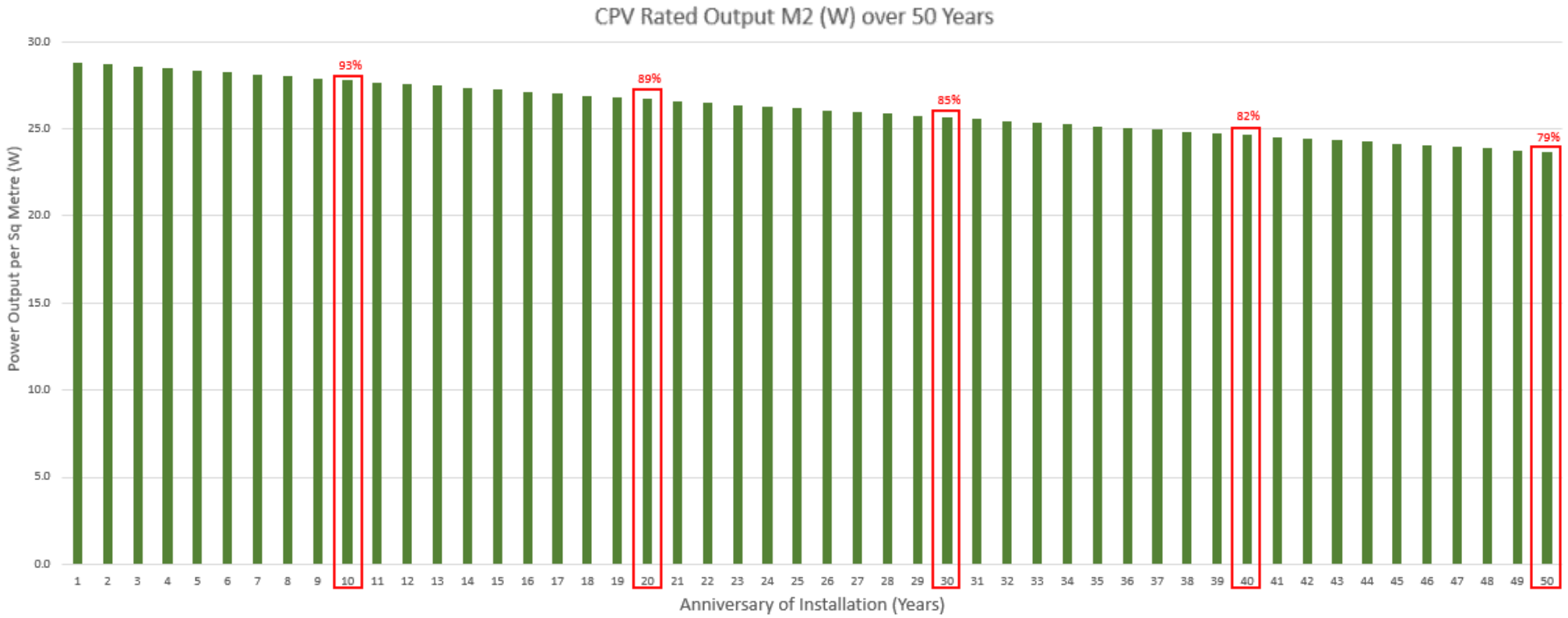
- ✓ Comparative to 4 mm Laminated Glass
- ✓ Fenestration Rate over 70 %
- ✓ No Thermal break framing
- ✓ No Gas Injection
- ✓ Data Set from completed building
- ✓ No HVAC



How does ClearVue Solar Glass compare?

Longevity

- ✓ Degradation rate from 30w per sqm 4% Year 1 and 0.4% per year thereafter. Similar to standard roof top PV Panels
- ✓ **85% of Initial Output at Year 30**



Electrical Components & Installation

The generating component of ClearVue glass units are silicon wafers, the same technology that has been deployed on traditional rooftop / ground mounted solar panels for many years. These degrade over time as do traditional solar panels. ClearVue's design delivers the following advantages:

1. **The silicon solar strips are in a sealed and dry environment inside the Integrated glass unit (IGU) as such they never get dirty or need cleaning.**

2. **As the solar strips and connections are inside the IGU they are also protected from moisture as they are in a dessicated environment.**

3. **Each ClearVue IGU is a self contained system and can be seamlessly in to most framing and curtain wall systems.**

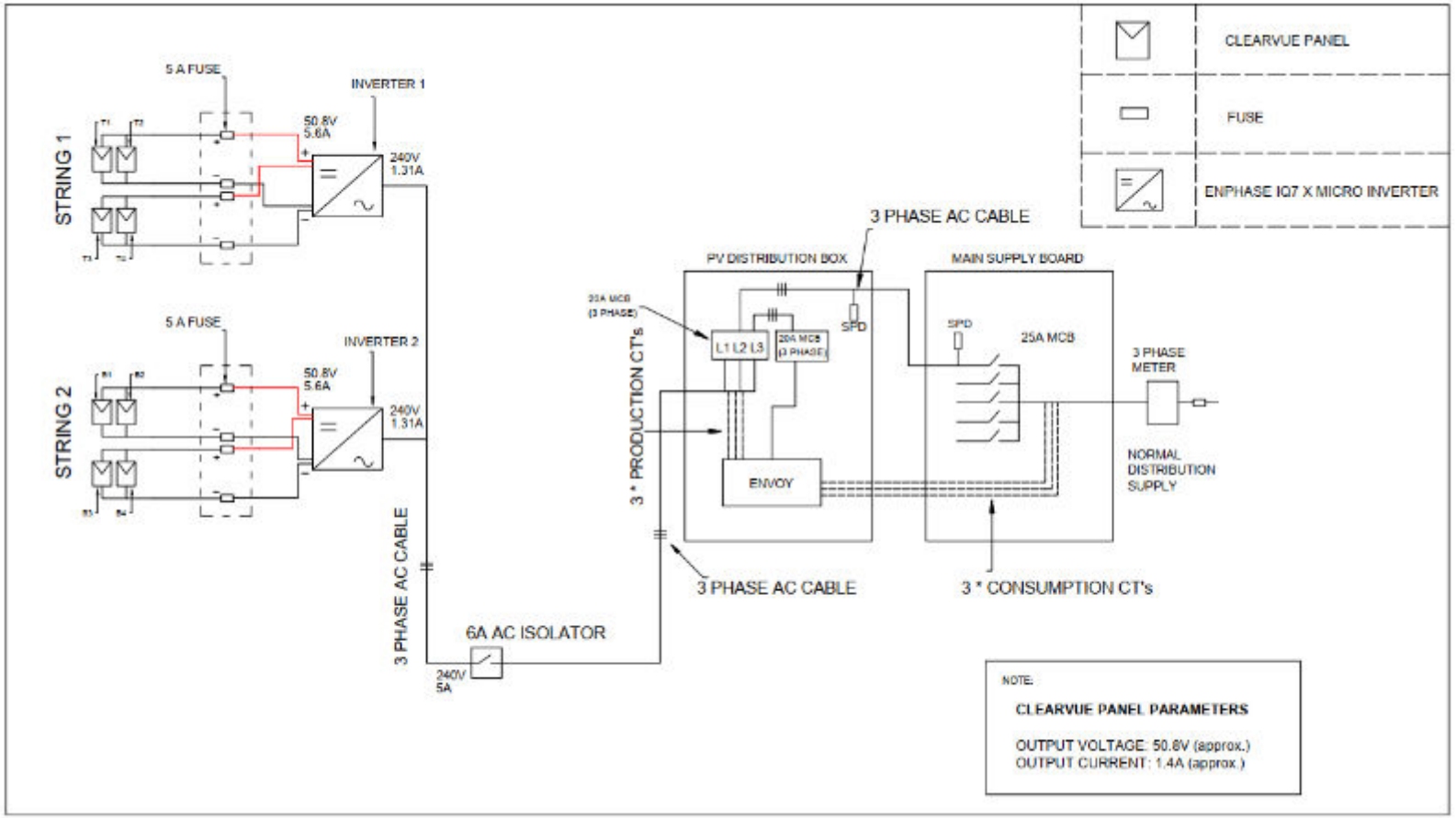
4. **Wiring runs unseen inside the framing system**

5. **The product can be deployed with either string inverters or micro inverters depending on the application and size of the array.**

Electrical Components & Installation

The deployment of the product is a simple wiring process similar to traditional solar panels. Windows are formed into strings reflecting deployment compass azimuth and deployment location specific issues. The example of a Single Line Diagram (SLD) (right) was created for an Installation on a test bed in Singapore.

This example is delivered with micro inverters, which for most projects would sit in the ceiling cavity. It should also be noted that the string nature of the deployment means there is no AC high voltage travelling in the framing system but rather low voltage DC current until the windows wiring is combined inside the ceiling cavity.



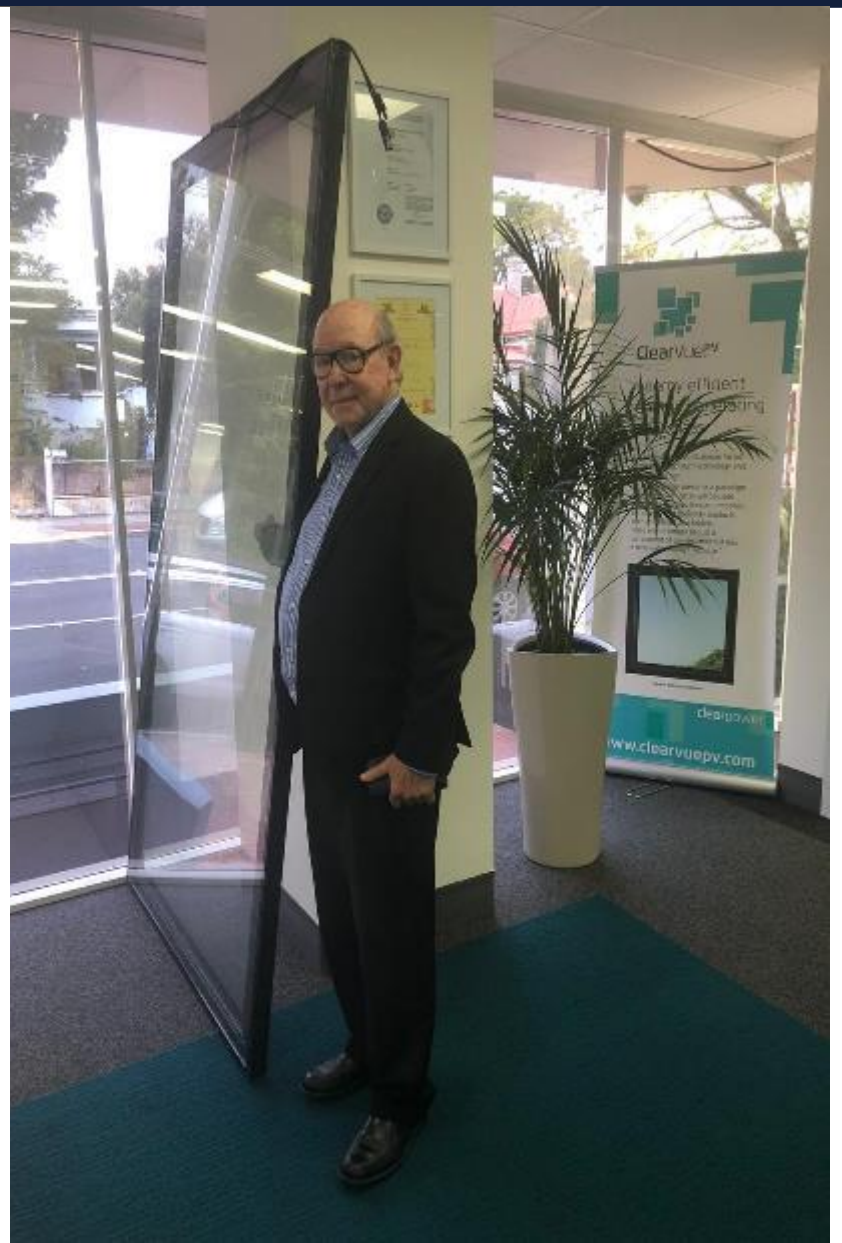
Sample SLD Demonstrating Electrical Installation of ClearVuePV

The Clear Advantage

- ✓ **CLEAR & FUNCTIONAL** – fits multiple applications
- ✓ **EFFICIENT** – 3 to 4% conversion of radiance to energy
- ✓ **SCALABLE** – Large Sizes Available
- ✓ FLEXIBLE - Use your preferred glass provider/window manufacturer.
- ✓ **CERTIFIED** - USA – UL; Europe - MEA & IEC; Australia under AGWA & Intertek
- ✓ **COST EFFECTIVE** - Competitively priced, short payback periods
- ✓ **READY TO DEPLOY** - Commercialisation commenced

ClearVue's Product – Large Sizes

3+m high x 1.5m wide



Certifications and Compliance Details

Structural & Mechanical

- ✓ EN 14351-1:2006+A2:2016 Windows and doors – Product Standard, performance characteristics – Part 1: Windows and external pedestrian doorsets;
- ✓ AS 2047:2014 Windows and external glazed doors in buildings;
- ✓ AS/NZS 4284:2008 Testing of building facades;
- ✓ AS 1191:2002 Acoustics – method for laboratory measurement of airborne sound insulation of building elements;
- ✓ ISO 717-1:2013 Acoustics- Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation.

Electrical

- ✓ IEC 61730-1 Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction;
- ✓ IEC 61730-2 Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing;
- ✓ IEC 61215-1 Terrestrial photovoltaic (PV) modules – Design qualifications and type approval – Part 1: Test requirements;
- ✓ IEC 61215-2 Terrestrial photovoltaic (PV) modules – Design qualifications and type approval – Part 2: Test procedures;
- ✓ UL 61730-1 Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction;
- ✓ UL 61730-2 Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing;
- ✓ UL 790 Standard Test Methods for Fire Tests of Roof Coverings.

ClearVue's First Installation

- ClearVue has successfully deployed its technology at the 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 power being generated is being publicly displayed on site inside the centre and provides management an insight into energy management and cost savings.

Peer Reviewed published research paper by Edith Cowan University - ClearVue works

3rd Party Analysis of your Building

SolarScore Overview

SYSTEM INVESTMENT

$24,000 USD

Marginal Cost

Projected Levered Rate of Return

46.88%

6.70 Years

Projected payback period for the project

6,634 kWh

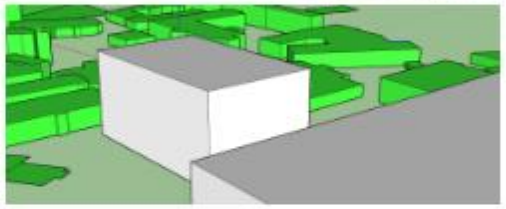
Annual energy produced by solar installation

$84,787 USD

Total increase in the value of the asset

264.1 Metric Tons

Total project carbon emission reductions



Technical Analysis

The solar panel materials used in calculating the technical capacity of this building include ClearVue PV 1.2m X 1.2m standard solar windows.

6,634 kWh

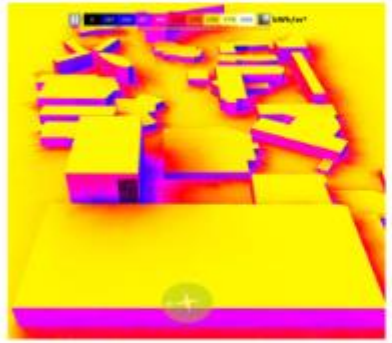
Annual energy produced by solar installation

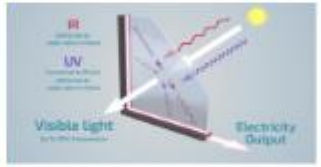
211.7 m²

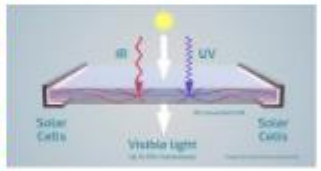
Usable surface area

0.5 %

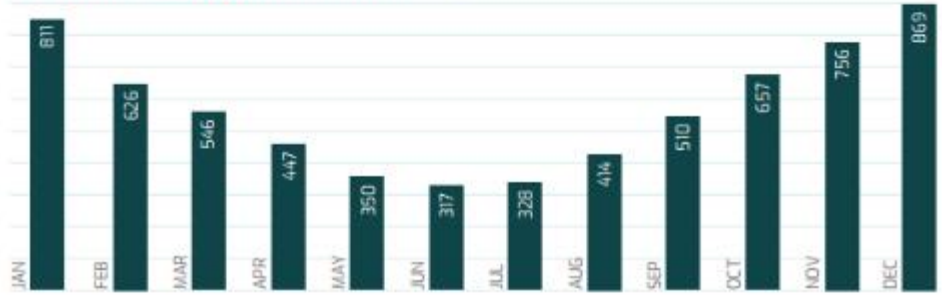
Portion of building energy offset by solar







Estimated Energy Generation kWh



We make Economic & Environmental Sense

Economic Analysis

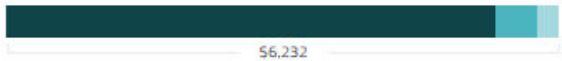
The annual average project cash flows for this building from five available sources is esmated to be **$6,698** annually on average over the life of the project. This is estmated to **increase the building value by $133,960 based on a $81,892 inital investment.**

$133,960 AUD
Projected asset value increase

$3,010 AUD
Annual energy value produced by solar installation

13.49 %
Projected Levered Rate of Return

Estimated Asset Value Increase AUD

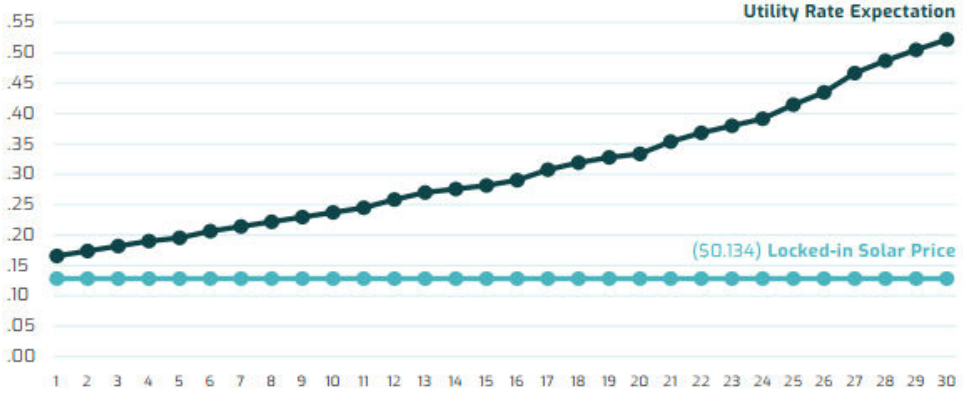


Estimated incremental income
$6,698

Total asset value increase
$133,960

Energy Value	$3,010
HVAC	$2,818
Depreciation Tax Shield	$819
Small-Scale Technology Certificates (STCs)	$51

Estimated Energy Savings



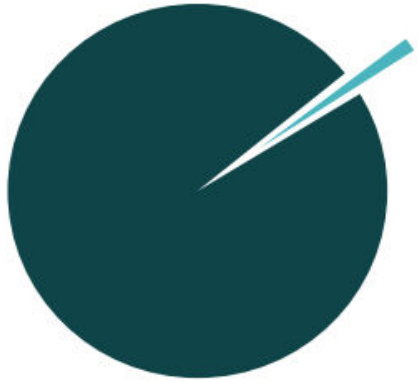
Green Analysis and Additional Benefits

The total carbon offset of the project equates to the electricity use from over **0.56 homes** or **1 vehicle** off the road for 1 year.

Increase Asset Resilience
Reduced reliance on grid power, protection from rising tariffs, and increased resilience during network disruptions.

Corporate Responsibility
Showcase commitment to reaching renewable energy portfolio standards and climate change mitigation.

Differentiate Assets
Attract ethically/environmentally-minded tenants and gain exposure through environmental, real estate, and energy innovation.



Total Project Reduction in Greenhouse Gas Emissions
Metric Tons

Remaining Emissions	32,500.0
Total Reduction	264.1

Carbon Cost (Carbon Embodiment)

Embodied CO2 payback results:

- ClearVue is the **only transparent building material capable of embodied energy/embodied carbon payback multiple times** during its operational lifetime.
- It is also the **only transparent construction material that saves and generates energy simultaneously** during its operation.
- **~ 10 years** for building-optimized windows orientation and using Silicon PV (**only 1.36 years if using thin-film PV**).

Measure	Typical Cost	Typical Savings (per year)	Typical Payback Time
Double Glazing	£10,000	£100	100 years
Cavity Wall Insulation	£1,000	£150	7 years
Loft Insulation	£300	£150	2 years

https://www.thegreenage.co.uk/important-windows-retaining-heat-home/ (2014)

- The total embodied energy in 1m2 of ClearVue products is 604.2 kWh (if using silicon PV).
- This reduces to about 166 kWh (if using thin-film PV). components, compared to crystalline Silicon.
- In carbon terms, this is 72.6 kg CO2 for monocrystalline silicon PV + 42.5 kg CO2 for glass, totalling 115.1 kg CO2.
- Or, 20.1 kg CO2 for thin-film PV + 42.5 kg CO2 for glass, totalling 62.6 kg CO2.

Smart Façade Developments

CLOSED CAVITY BLIND

*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*

ClearVue PV ARUP

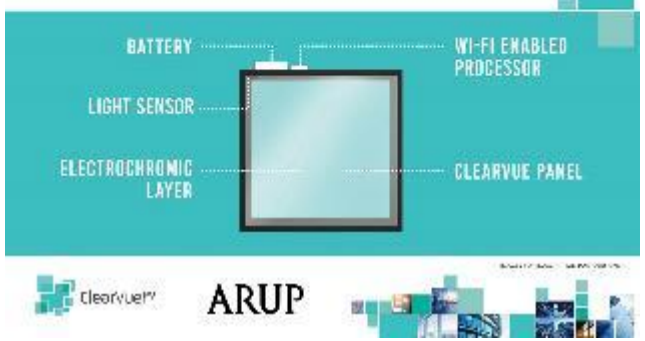
AUTO SWITCHING GLAZING

*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



ClearVue PV ARUP

MULTI-FUNCTION FACADE

*This self-powered, multi-functional smart façade incorporates a **closed cavity blind** and a **smart ventilation system** to enable optimised control of lighting, temperature and air quality.*

*The environmental multi-sensor monitors **light, temperature and CO_2**. The WI-FI enabled processor uses deep learning algorithms to learn the optimal conditions and can control both the blind motor and the ventilation system within the façade.*

AUTOMATIC BLIND AND VENTILATION

ClearVue PV ARUP

Intelligent Self-Powered Façade System | Video

‘ClearZero’ – Archetype Office Building Modelling

Archetype Building Key Points

Building Size	15,000 m²
Storeys	6
Construction	Wood and low concrete (Lightweight Construction) as defined in Canada
Energy	40% of the building energy use is produced by CPV and traditional PV within the building footprint
Net Zero	Canadian Code requires 400 car parks for this structure. Net Zero can be achieved by applying traditional solar panels to 37% of the car park area
Location Climate	Location climate model is set as Toronto Canada. The performance of the Archetype in more temperate climates such as those in Australia will lead to better performance than modelled
Fenestration Rate	South Elevation 90% East & West Elevations 70% North Elevation 40%

Highlights

- ClearVue has completed design of an Archetype model building of 15,000 m² to demonstrate how ClearVue product can achieve a Net Zero or Near Zero energy-use building
- Modelling was completed on a design in Toronto, Canada, benchmarked against the Toronto Green Standard (TGS) from 2030 - one of the world’s highest standards of building performance
- The Archetype was shown to achieve the highest level of performance under the TGS from 2030 and an ENERGY STAR score in the top 1% of Canadian office buildings for energy performance
- The Archetype – a computer simulation and detailed thermal model – will support ClearVue’s sales teams when engaging with architects and engineers seeking to design Net Zero buildings

Murdoch University Solar Glass Greenhouse Project

Murdoch University Solar Glass Greenhouse Project

Questions?

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SCAN ME

Q&A

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