

## Laying the foundations for commercialisation

ClearVue Technologies (ASX: CPV) is commercialising its patented solar PV electricity generating glazing.

### ClearVue<sup>PV</sup> can make a difference

CPV is not the only company to offer solar glass, but it is the only company with clear vision solar glass that can be produced at an industrial scale without any material modifications to existing commercial double and triple glazing production lines.

ClearVue<sup>PV</sup> offers its users several benefits including a reduction in powerloads, lower energy costs (20-30%), lower greenhouse gas emissions and energy generation of up to 33W peak of energy per square metre. ClearVue<sup>PV</sup> has a competitive price and provides a carbon payback period within a few years, while also accounting for emissions offset through solar power generation. It has potential to represent a paradigm shift in the way glass will be used in building construction, agriculture, and specialty products.

### 2024 is proving to be another pivotal year

2023 was a pivotal year for the company where its focus moved from research partnerships towards partnerships focussed on commercialisation of the technology and sale of the products. During 2023, CPV showed that its technology had commercial potential and the company won its first distribution and licensed manufacturing agreements.

Steps the company has taken in 2024 include achieving several necessary international certifications, expanding the company's range of products as well as tools to support sales. CPV is particularly eyeing off the US market and envisions that its expanded product range could expand its total addressable market substantially. Developers that employ the suite of CPV solutions including its solar glazing, spandrel panel and wall cladding PV could obtain substantial tax credits and be able to generate a significant proportion of energy onsite.

### Valuation of A\$1.16-1.47 per share

In our initiation report from February 2024, we valued ClearVue Technology at A\$1.16 per share in our base case and A\$1.47 per share in our optimistic/bull case. We reiterate our previous valuation. Please see p.8 for more details on our valuation rationale and p.9 for more details on the key risks to our thesis.

Share Price: A\$0.59

ASX: CPV

Sector: Technology

2 July 2024

Market cap. (A\$m)	136.0
# shares outstanding (m)	230.1
# shares fully diluted (m)	263.4
Market cap. ful. dil. (A\$m)	155.7
Free float	82.4%
12-months low/high (A\$)	0.74 / 0.17
Avg. daily volume ('1000)	557.0
Website	<a href="http://www.clearvuepv.com">www.clearvuepv.com</a>

Source: Company, Pitt Street Research

### Share price (A\$) and avg. daily volume (k, r.h.s.)



Source: Refinitiv Eikon, Pitt Street Research

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## Re-introduction to ClearVue Technologies and ClearVue<sup>PV</sup>

*ClearVue's patented technology complements the existing glazing industry lamination and manufacturing processes*

ClearVue's core technology and product is ClearVue<sup>PV</sup>, a unit of glass (an Insulated Glass Unit such as a double or triple glazed unit) that features a layer of micro and nano-particles that reflect the sun's UV (downconverted to near-IR) and IR light towards embedded solar cells. The rays are converted to energy while allowing up to 70% of the visible light to pass through.

ClearVue's patented technology sits within an activated interlayer between two panes of glass (Figures 1 and 2). The interlayer complements the existing glazing industry lamination and manufacturing processes; and requires limited infrastructure investment. Solar PV cells are incorporated around the edges of an Insulated Glass Units (IGU) used in windows. The company's advanced glazing system combines proprietary nano and microparticles dispersed into an interlayer, a clever internal design and its custom-shaped PV cells. The patented proprietary nano and microparticles interact with UV radiation which is down-converted to longer near-IR wavelengths. The system can also incorporate spectrally selective coatings within the IGU.

Figure 1: ClearVue's technology overview

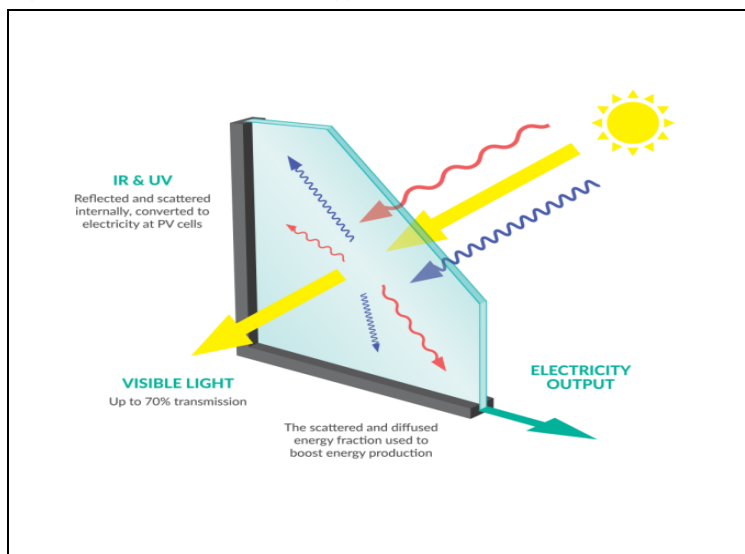
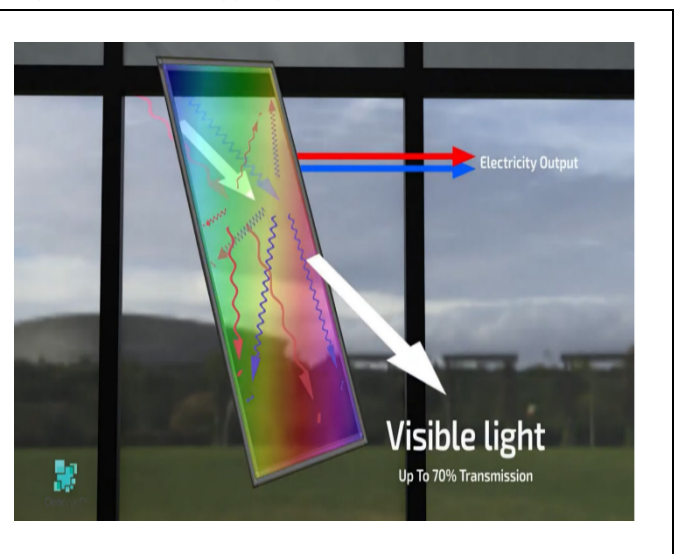


Figure 2: Technology explainer



Source: Company

ClearVue<sup>PV</sup> generates electricity on site, up to 33W peak of energy per square metre of glass. Production on site not only reduces costs to clients, but also helps clients reduce their carbon footprint, and still maintaining the aesthetics of the building.



## ClearVue's road to commercialisation

*ClearVue's strategy to commercialisation has consisted of obtaining necessary certification and undertaking testing with strategic partners that could help with its eventual commercialisation.*

ClearVue's strategy for commercialisation has consisted of obtaining necessary certification and undertaking testing with strategic partners that could help with its eventual commercialisation. In the first few years after its 2018 ASX listing, the company undertook several small non-commercial trials to prove the technology worked.

But 2023 was a pivotal year for the company as it demonstrated the technology had commercial potential and the company won its first distribution agreements (Figure 3).

**Figure 3: Grants and orders secured by ClearVue**

Orders secured	Benefits of orders secured
Tender from Hong Kong government	<ul style="list-style-type: none"> <li>In March 2023, ClearVue secured a tender from the Hong Kong government to undertake a Solar Glass study with Hong Kong's Electrical and Mechanical Services Department.</li> </ul>
Financial assistance agreement with the WA State Government	<ul style="list-style-type: none"> <li>In May 2023, ClearVue signed a financial assistance agreement with the West Australian government to receive a grant of up to A\$2m to provide assistance in the development of a Western-Australia based photovoltaic and nanoparticle components manufacturing facility.</li> </ul>
Limited exclusive distribution agreement with Greendustrial Global Ltd.	<ul style="list-style-type: none"> <li>In September 2023, ClearVue signed a new limited 5-year exclusive distribution agreement with Greendustrial Global Ltd. in Tel Aviv, Israel.</li> <li>The latter was established to distribute ClearVue's products in Israel for use in curtain wall or façade glass applications in projects up to 20 stories high.</li> </ul>
Commercial order for solar façade in Australia	<ul style="list-style-type: none"> <li>In January 2024, ClearVue secured the first commercial order in Australia from Kapitol Group (a construction company) for a new commercial building project for the Construction, Forestry, Maritime and Employees Union (CFMEU) in Melbourne.</li> <li>The CFMEU project incorporates a version of the Gen-2 ClearVue solar windows into the façade of its new Training and Wellness Centre in Carlton. Installation for this project recently took place in June 2024 and was the subject of a recent news piece on Channel 9.</li> </ul>
Commercial order for solar Greenhouse in the US	<ul style="list-style-type: none"> <li>ClearVue entered the US market with its first commercial order for the supply of ClearVue's clear solar glass solutions for greenhouses valued at A\$252K.</li> <li>The project is likely to be eligible for incentives created by the US Inflation Reduction Act – this will lead to a market opportunity in global solar greenhouse glass.</li> </ul>

Source: Pitt Street Research

In September of 2023, testing done by the company's OEM manufacturer in China showed ClearVue<sup>PV</sup> could be produced at a mass-scale on an unmodified industry-standard production line. Specifically, the testing achieved production of 80 IGUs continuously and introduction of the ClearVue solar PV components added less than five minutes to the production cycle time per IGU compared to non-solar IGU fabrication. A month later, in October 2023, testing of the ClearVue<sup>PV</sup> glass technology was completed with Singapore's Building and Construction Authority (BCA), comparing the technology to a control cell deployed with Singapore's BCA Greenmark Platinum certified double glazed low-e windows. The testing resulted in better-than-expected results with the products being better than the comparable product in terms of solar control performance, better comfort



levels on the inside and lower temperatures. Immediately after this testing, the company landed its first commercial contracts in the US and Australia.

## Further achievements in 2024

### Favourable testing results

The company obtained several necessary certifications for its products, ensuring compliance with international building standards and regulations, with several more pending (Figure 4). The most important of these tests (which total more than 30 across the entire product range) include:

- Insulating Glazing Certification Council (IGCC) – seal certification;
- EN13501-1 – combustibility with rating confirmed to an industry leading rating of A2-s1, d0;
- IEC 61730 – electrical, heat, fire and seal; and
- IEC61215 – electrical and seal.

**Figure 4: Certification Tests ClearVue has Completed to Date**

Product	Certifier	Standard	Test Description	Status
Vision Glass	IGCC	ASTM E 2190	Durability test of IGUs	Completed
	TUV SUD	EN13501-1	Combustibility Test	Completed
	TUV SUD	IEC 61730 & IEC 61215	BIPV Product Electricity Safety	Product Testing Completed; Pending manufacturing facility inspection
All Black Spandrel	TUV SUD	EN13501-1	Combustibility Test	Completed
	ATWA	AS 1530.3	Radiant neat Combustibility	Completed
Solar balustrade railings, greenhouse solar glass	TUV SUD	IEC 61730 & IEC 61215	BIPV Product Electricity Safety	Completed
	TUV SUD	EN13501-1	Combustibility Test	Completed
	ATWA	AS 1530.3	Radiant Heat Combustibility	Completed
Solar Cladding	TUV SUD	IEC 61730 & IEC 61215	BIPV Product Electricity Safety	Testing Completed, Awaiting Certificates
Solar Cladding	TUV SUD	EN13501-1	Combustibility Test	Testing Completed, Awaiting Certificates

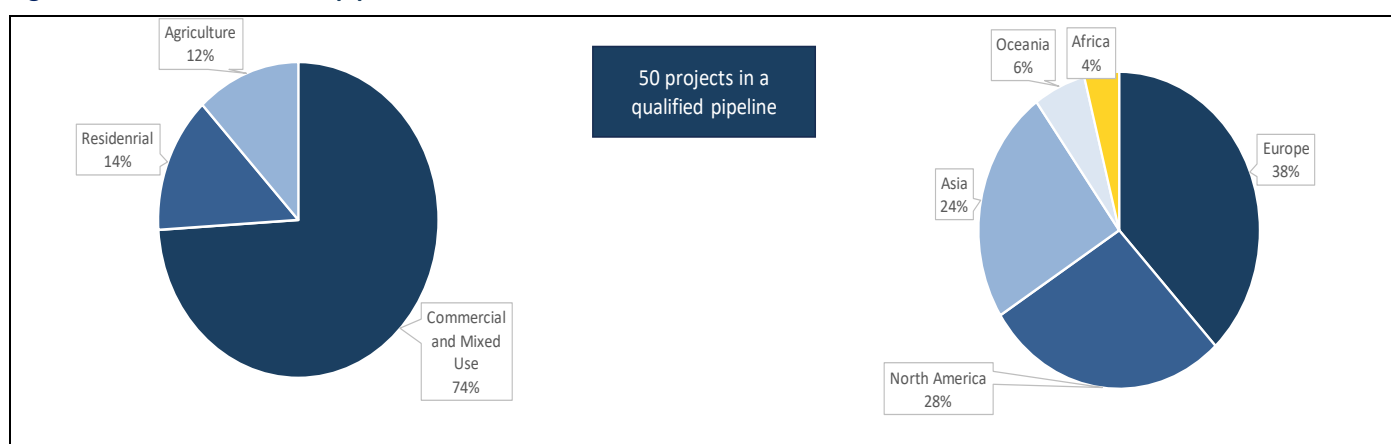
Source: Pitt Street Research, Company



## Eyeing off the US

CPV is eyeing off several markets, but the US is one of the most important given its size and the opportunity it has there. Already over a quarter of projects in ClearVue's pipeline are there (Figure 5), and the company hopes to penetrate the market more substantially. Customers for the ClearVue products have the potential to gain from multiple federal tax incentives under the US Inflation Reduction Act, specifically the Investment Tax Credit (ITC) and Energy Efficient Commercial Buildings Deduction (179D). These incentives could potentially cover up to 60% of the cost of CPV products to be deployed into a project, and would make the product favourable to qualified sales leads.

Figure 5: ClearVue's business pipeline



Source: Company, Pitt Street Research

Since our initiation report (published in February 2024), the company has taken and planned to take further steps to raise its awareness in the North American market. In particular, the company presented itself to the American Institute of Architects' AIA24 Conference on Design and Architecture in early June 2024. It has also appointed existing Director Charles Mowrey as President and CEO for North America.

The company has also upgraded its US OTC market listing from the OTCQB Venture Market to the OTCQX market. This will open the company to a greater proportion of the US investment community as the OTCQX market is designed for established, investor-focused companies that meet a higher set of financial standards and corporate governance regulations than in the OTCQB market.

## New products, with more to come

ClearVue has expanded its PV product range of Building Integrated Photovoltaic (BIPV) products, now branded as the ClearVue Power Façade. This includes solar spandrel, solar cladding, and architectural BIPV (skylight and balustrading glass), designed to cover nearly all façade surfaces. ClearVue believes this expansion increases its total addressable market by US\$350bn<sup>1</sup>.

<sup>1</sup> According to MarketandMarkets' analysis of the Global Markets for Cladding Systems and Spandrel Glass





## ClearVue Technologies

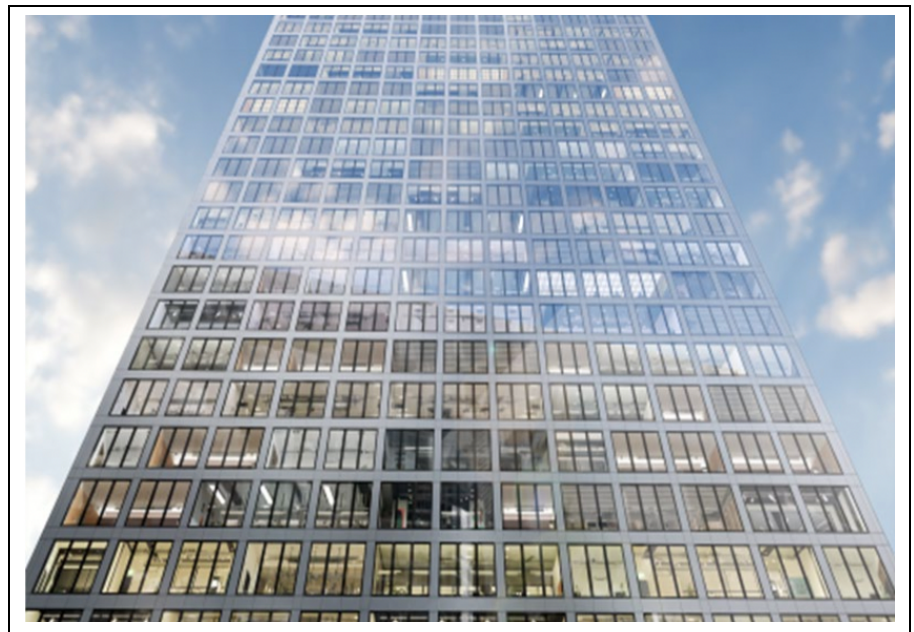
The solar no longer needs to be black – there is a large range of colour, pattern and transparency options for the solutions.

The company has also developed new licensee tools to support sales including:

- **High-rise Archetype 3:** Reflects the positive impact the ClearVue Power Façade has on the performance of a building and showcases what is possible for a building and architectural firms through an energy model validated in 15 global locations including demonstrating how ClearVue's products' can generate a large share of a buildings' energy demands (see Figure 6 below).
- **Custom Flash Tester:** The flash tester will be custom-made for licensed producers to test the power performance of Generation 2 solar PV glazing. It works with standard IGU production lines and gives quality assurance and important electrical data to licensees. Importantly the flash tester works without slowing down the CPV licensee's IGU production rate, or taking the glass off the line.
- **The aforementioned tax analysis** which was completed by BRAYN Consulting.

ClearVue has re-engaged with independent Canadian consultancy Footprint to produce building energy modelling on a high-rise building. The new modelling, 'Archetype-3' validates the potential of ClearVue products to assist end-customers to create buildings that meet decarbonisation goals. The model is a 36,800m<sup>2</sup> forty-story office building and it shows products could generate sufficient solar on-site to meet between 50-100% (or more) of the building's energy demand, subject to the project's location and site shading considerations.

**Figure 6: Artist's impression of the Archetype-3 40-storey building**



*Source: Company*



## Our valuation of ClearVue

Our initiation report outlined a valuation for ClearVue A\$1.16 per share in our base case and A\$1.47 per share in our optimistic/bull case (Figure 7). This was based off a Blended 50-50 DCF/RV (Discounted Cash Flow/Relative Valuation) methodology.

**Figure 7: Aggregate Valuation**

ClearVue Valuation (A\$m)	Base case	Bull case
<b>Enterprise value</b>	<b>306.2</b>	<b>308.7</b>
Net (debt) cash	0.2	1.6
Provisions	(0.2)	(0.2)
<b>Equity value</b>	<b>306.2</b>	<b>387.1</b>
Diluted shares (m) <sup>1</sup>	263.9	263.9
<b>Implied price (A\$)</b>	<b>1.16</b>	<b>1.47</b>
Current price (A\$)	0.59	0.59
Upside (%)	96.7%	148.7%
<b>Mid-point Target Price</b>	<b>1.314</b>	
Upside (%)	122.7%	

*Estimates: Pitt Street Research*

<sup>1</sup> We have assumed further shareholder dilution in the exercise of all options currently under issue and a further \$5m in capital raised over the next couple of years.

Our DCF approach valued ClearVue at A\$1.38 per share in the base case and A\$1.89 per share in the bull case, or an enterprise value of \$365.6m in our base case and \$501.4m in our bull case. This was based off the following assumptions:

- CPV undertaking a licensing model, with a 15% royalty on sales,
- CPV reaching a 5% market share of the Global Solar Greenhouse Market in our base case and 6% in our bull case by FY30,
- The Global Solar Greenhouse Market growing from US\$7.7bn in CY23 to US\$13.4bn in our bull cases, and
- The company becoming EBITDA and NPAT profitable in FY27, 5.5% and 1.9% respectively, growing to reach 45% and 30% by FY30.

We used a WACC of 14.3% - a figure derived from a risk-free rate of 4.1%, a beta of 1.2, and an equity premium of 8.5%.

Our Relative Valuation Approach involved comparing the company with a list of its peers, companies building integrated photovoltaic solutions. We have considered six peer companies globally. These include: ML System S.A. (WSE:MLS); SolarBank Corporation (CNSX:SUNN); Umbrella Solar Investment, S.A. (BME:USI); Atrato Onsite Energy plc (LSE:ROOF); Enerside (BME:ENRS); Westbridge Renewable Energy Corp (TSXV: WEB). We arrived at a valuation of A\$0.936 per share in the base case and A\$1.041 per share in the bull case, derived by using the average EV of A\$190.5m and applying a percentage premium to CPV's enterprise value – 25% in our base case and 40% in our bull case.





## Catalysts for a re-rating

We believe the following catalysts could cause CPV to move towards our valuation range:

- ClearVue gradually growing its revenues as its existing partnerships ramp up. The company's licensing model and know-how from its glass fabricator partners can enable the company to scale quickly without significant infrastructure investment requirements, headcount, and operational costs that would otherwise be required.
- The company's first revenues attained with a strong pipeline bolstered by global strategic manufacturing and distribution partnerships. The company has 50 projects in its pipeline spread across various geographies and sectors. The projects majorly represent commercial construction projects. These can be a potential catalyst for the company.
- ClearVue's building envelope (Solar Cladding, Vision Glass, Solar Spandrel) expands its target market to the Cladding systems market and Building Spandrel glass market. This market opportunity is a potential catalyst for re-rating.
- More broadly, we believe decarbonisation of the economy, aided by Government stimulus measures such as the United States Inflation Reduction Act will aid investor sentiment towards companies like CPV with technologies that can play a part in reducing the world's emissions.

## Risks

We foresee following key risks to our investment thesis for ClearVue:

- **Competitive risk:** ClearVue is in a highly competitive market. There is risk of major competitors obtaining the market share through development of superior technology and/or capital to get to the market faster.
- **Licensee risk:** There is risk that the company will not be able to engage licensees to manufacture and distribute its products, or that the actions of ClearVue's licensees may impact the final products and the company's reputation.
- **Supply chain risk:** ClearVue's ability to commercialise its technology will depend heavily on its ability to source underlying products and to manufacture them to an acceptable quality. Any disruption to supply chains will impact the delivery of its products.
- **Cost inflation risk:** There is the risk that the company could be hit by cost inflation. At the current stage of this company's life, it may need to raise further capital than it otherwise would have had to. Looking further ahead, even when the company is profitable, higher inflation could hit by denting the company's margins.
- **Key personnel risk:** ClearVue's performance is highly dependent on its management team and the staff. There is a risk that the company might lose these individuals and might be unable to replace them and/or their contribution to the business.



## Appendix I - Analysts' Qualifications

Stuart Roberts, lead analyst on this report, has been an equities analyst since 2002.

- Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).
- Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research speciality at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies, such as CSL, Cochlear and Resmed, and numerous other emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.
- After 15 months over 2015–2016 doing Investor Relations for two ASX-listed cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Sciences companies.
- In July 2016, with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Sciences companies.
- Since 2018, Stuart has led Pitt Street Research's Resources Sector franchise, spearheading research on both mining and energy companies.

Nick Sundich is an equities research analyst at Pitt Street Research.

- Nick obtained a Bachelor of Commerce/Bachelor of Arts from the University of Sydney in 2018. He has also completed the CFA Investment Foundations program.
- He joined Pitt Street Research in January 2022. Previously he worked for over three years as a financial journalist at Stockhead.
- While at university, he worked for a handful of corporate advisory firms.

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