

ClearVue PV

POWERING THE FUTURE

OUR TECHNOLOGY

At ClearVue Technologies, we see a world where consumers are part of the energy solution. We see a world where nearly all buildings and other surfaces become solar photovoltaic (PV) collection sources and where the ClearVue PV Building Integrated Photovoltaics (BIPV) and glass PV solutions form an integral part of that new future.

ClearVue's patented innovative glazing technology uses an activated interlayer, sandwiched within a panel composed of a number of glass panes, some of which are coated by specialised thin-films.

Our advanced glazing system combines: our proprietary nano and micro particles dispersed into an interlayer; a clever internal design; and our custom shaped PV cells. The combined solution prevents heat and unwanted solar radiation (UV and infrared) from penetrating the glass pane. The unwanted solar radiation is then redirected towards the edges of the glass pane for harvesting through standard crystalline PV cells to create clean energy - all while allowing natural visible wavelength light to pass through, largely unaltered, to provide maximum natural daylighting.

***"Our technology presents
a paradigm shift in the way
glass will be used in building
construction, automobiles,
agriculture and specialty products.
Glass will no longer be just a component
of construction but also a renewable
energy resource."***

Victor Rosenberg
EXECUTIVE CHAIRMAN

PRODUCT QUALITIES INCLUDE:

- Reduced electricity costs through improved glass insulation qualities and on-site electricity generation.
- Has a lifespan exceeding 20 years by using inorganic materials.
- Safe, clean renewable energy with reduced reliance on fossil fuels.
- High transparency (up to 70% of visible natural light passes through the glass).
- Reduced fuel consumption for the automotive industry: this is not only a cost saving for customers but also reduces CO₂ gas emissions in the environment.
- Reduced electricity network infrastructure costs, especially in remote and rural areas.
- Back-up for existing energy systems.
- The glass will provide a robust payback to a building or structure's owner and operator.

WHY CLEARVUE PV SOLAR GLASS?

ClearVue PV glass offers more than just electricity generation through glass surfaces. **ClearVue PV offers high performance, highly energy efficient, triple glazed, low-e glass that can by itself deliver up to 40% of heating and cooling energy savings over ordinary single glazed laminated glass.**

With reduced building power load for heating and cooling, adding to the power generated by the glass through ClearVue's patented technology of around **40 Watts per 4ft x 4ft** (at peak), you have a glazing system that in short order¹ pays for itself *firstly* through the savings made in energy used and *secondly* through the savings made in building costs from the electricity generated at source. No other glazing product on the market can deliver this.

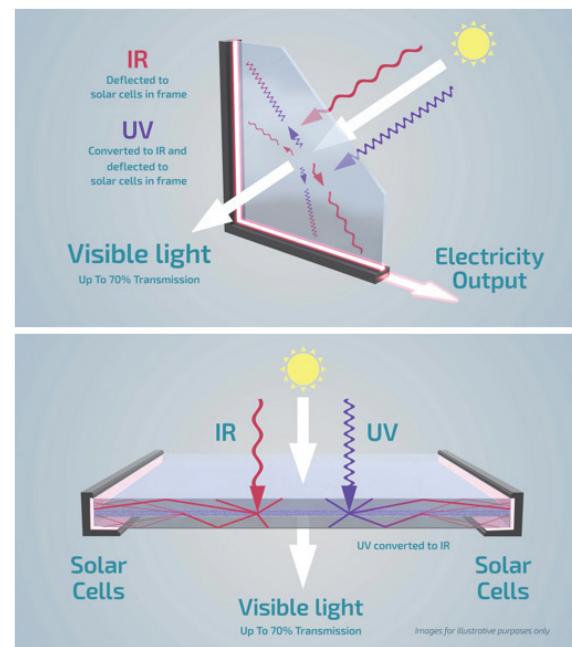
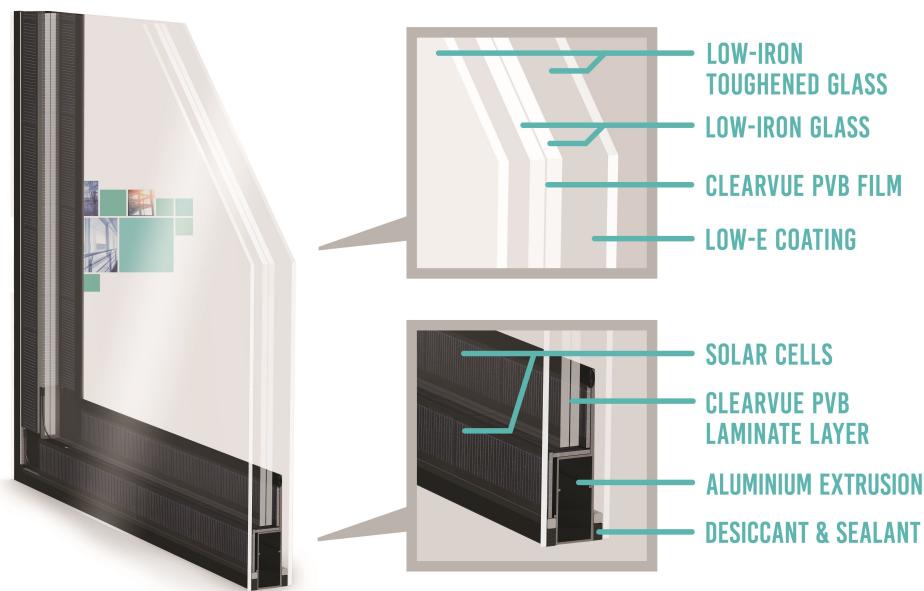
In addition, the proprietary combination of micro and nano particles used to capture and convert infra-red and ultraviolet light wavelengths for use in electricity generation, in combination with ClearVue's spectrally selective coatings, also **permit maximum tolerable visible daylight into a building (up to 70%) during building operating hours.** This again reduces the building power load and the need for artificial lighting, leading to known health and safety benefits.

Furthermore, the triple glazed system has a significant reduction in acoustic transfer that has the effect of creating very quiet working environments for building users.

An additional benefit of having localised power at the floor level through a buildings glazing, is that **the power can be deployed for use in smart facade applications and into smart building integrated control systems,** combined with IOT sensors integrated into the glass or window. This can further reduce building power loads and allows for adjusting building comfort levels by monitoring light and heat levels, as well as monitoring personnel and user activity within the space.

ClearVue and its partners' own software are able to interoperate with HVAC systems and internal or external blinds, electrochromic switchable glass coatings, lighting systems etc. The data collected through these systems is gathered over time to model building operation and provide a dashboard to building owners and operators, with the net effect to the building owner being:

- **a highly energy efficient building; that permits maximum daylighting;**
- **creates a low noise environment; and generates localised power which, when employed at scale;**
 - **has a significant reduction to a building's overall energy load; and**
- **through the use of additional software and hardware can be managed and monitored at a granular level.**



¹ Safety-enhanced product versions are also available, customized to provide walkable glass surfaces and/or safety-laminated inner-pane structures.

Imagine windows that help produce energy to power your business

Given the superior insulation properties of ClearVue glass, our findings suggest that not only will the ClearVue advanced glazing produce electricity for commercial buildings, but deliver significant cost savings through a reduction in the heating and cooling costs associated with a building.



Imagine windows that help produce the energy supply for your residential home

ClearVue has the potential to have a meaningful impact on the energy bill of a home including home windows and doors through to skylights as an energy source.

Imagine windows that help put food onto our tables

26% of all food imported into the United States is a horticultural product.
(Source: United States Department of Agriculture). ClearVue is working on a prototype greenhouse that provides superior insulation properties but also the ability to generate its own energy to power watering systems and lighting.



Imagine windows that help power our public places

ClearVue can be used to provide energy at the source of public places such as bus stops, train stations and community areas for powering lighting, security cameras, active advertising panels, device charging points etc.

Imagine windows that help power our automobiles

20% of the total oil consumed in the United States is for air conditioning cars.
(Source: National Renewable Energy Laboratory (USA), Conference Paper. NREL/CP-540-41155 - June 2007). ClearVue is confident that our technology can be incorporated into the glass of cars (such as panoramic sunroofs) to provide additional power and reduce the carbon footprint of the vehicle.



Energy Efficient Energy Generating Clear Glass Windows

ClearVue PV technology can transform a glass building into a solar PV array generating power where it's needed, reducing power transmission requirements across large distances.

Our technology is cost effective, environmentally friendly and provides a sustainable and innovative new power generation capacity. ClearVue glass also has the potential to add efficiency to automobiles, public transport, agriculture and mobile electronic devices.



%Breakdown of Office Building Energy Usage	Typical Single Glazing (U=1.021 Btu / (h · ft ² · °F))	Double Glazing with Low-e (U=0.352 Btu / (h · ft ² · °F), 0 W/ft ²)	ClearVue Window (2.79 W/ft ²) (U=0.246 Btu / (h · ft ² · °F))
	Actual Costs (approx.)	Potential Savings *	Potential Savings
Lighting	30%	0%	Up to 15%
Heating	25%	Up to ~30% (for WWR = 20%)	Up to 40%
Cooling	25%	~14% (for WWR = 20%)	Up to 30%
AHU/Fans	8%	0%	0%
Other Mechanical Equipment	8%	0%	0%
Hot Water	3%	0%	0%
Elevators	1%	0%	0%
% of Original Electricity Bill	100%	~89%	~67.5%
% Savings		~11%	Up to ~32.5%

* Typical dependencies of building energy savings on the window-to-wall ratio (WWR) & glazing types are described in Energy Procedia (Elsevier) 122, pp. 565-570 (2017) & other academic sources. Sustainability Victoria (<https://www.sustainability.vic.gov.au/You-and-your-home/Building-and-renovating/Windows/Glazing-treatments>) discloses that double glazed windows can reduce both the heatloss and heat gain by up to 30%. Heating/cooling savings data evaluated using an online calculator at www.efficientwindows.org, for a moderate-climate location (Nashville, TN).

Email info@clearvuepv.com
Telephone +61 (8) 9220 9020
Fax +61 (8) 9220 9029
Address Suite 7, 567 Newcastle Street West Perth, WA 6005, Australia



www.clearvuepv.com
facebook.com/clearvue
twitter.com/ClearVuePV