



CLEARVUE TECHNOLOGIES LIMITED

## INVESTOR PRESENTATION

ENERGY EFFICIENT | ENERGY GENERATING | CLEAR SOLAR GLASS

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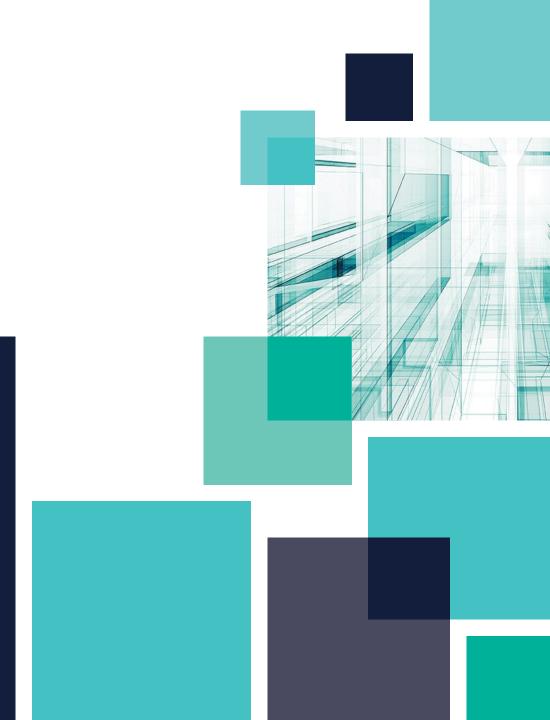
## Outline



- Capital Structure |
   Corporate Structure &
   Governance
- Technology
- Products
- Smart Façade Solutions
- Opportunity
- Company Update



Capital Structure, Corporate Structure & Governance



## Capital Structure



#### **Capital Structure**

(at 31 March 2022)

(de 01 March 2022)	
No debt.	
Ordinary Shares on Issue	211,740,344
Options on Issue AUD \$0.20 exercise price - exp. 31 Dec 2022 - 9,144,867 AUD \$0.25 exercise price - exp. 22 Dec 2023 - 800,000 AUD \$0.1425 exercise price - exp. 11 Jul 2024 - 1,750,000 AUD \$0.75 exercise price - exp. 30 Jun 2024 - 2,000,000 AUD \$0.37 exercise price - exp. 2 Feb 2024 - 3,000,000	16,144,867
Performance Shares Performance Rights	3,000,000 10,000,000
Approx. Market Cap @ \$0.41	≈ \$87 million

#### **Shareholders**

(as at 8 February 2022)

Top 20 holding 39.42% of Issued Capital

Audited Cash Balance (31 Dec 2021)

13.33% held by board

#### **Share Price Performance**

(Mar 2021 – 31 Mar 2022)

≈ \$13.77m



## Corporate Structure – Board





Victor Rosenberg
Executive Chairman &
Founder

#### 25 years glass industry

Serial entrepreneur, recognized globally for his contributions to glass industry. Extensive business experience in senior management and sales over ~50 years.



**Stuart Carmichael** Non-Exec Director

#### 20 years corporate finance

Member of the Institute of Chartered Accountants with over 20 years corporate finance experience. Chairman of Schrole Group Limited (ASX: SCL) and K-TIG Limited (ASX: KTG), Non-Executive Director of De.mem Limited (ASX: DEM) and Harvest Technology Group (ASX: HTG).



Roger Steinepreis
Non-Exec Director

#### 30 years corporate law

Corporate and resources lawyer with 30+ years' experience. Legal adviser to public companies on corporate related matters. Non-Executive Director of Meeka Gold Limited (ASX: MEK).



John Downes
Non-Exec Director

## 30 years' experience in glazing and façade systems

Construction industry professional with over 30 years' experience in glazing and façade systems and construction project management. Global Head of Façade Supply Chain at LendLease based in London, UK. MSc Façade Engineering from the University of Bath & Fellow of the Society of Façade Engineers.



**Deborah Ho**Company Secretary

## Over 12 years corporate and compliance

Company Secretary to ASXlisted and private companies, involved in numerous public corporate transactions. Ms Ho is an Associate of the Governance Institute of Australia.

## Corporate Structure – Management Team





Basil Karampelas CEO - North America 25+ years senior financial, operational & advisory roles

Senior executive with experience in a variety of senior financial, operational, and advisory roles including: MD leading a national advisory firm's energy & sustainability practice; operating partner responsible for ESG investments; and cofounder of BP Energy Financial Services leading investments in energy & renewables projects.



**Steve Coonen VP Development**38 years in PVs; 26
year focus on BIPV

Photovoltaic consulting engineer specializing in BIPV (California). A pioneer in the BIPV field with 3,000+ BIPV systems fielded to his credit, including the California Academy of Science in San Francisco, the Whitehall Ferry Terminal in Manhattan and 1,500 new houses for Pulte Homes.



Dieter Moor European CEO 17 years BIPV industry experience

Former co-founder and CEO of Ertex Solar GmbH – a global building integrated photovoltaics (BIPV) supplier with 2,000+ projects delivered worldwide. Civil engineer; BIPV system sales/marketing.



Douglas Hunt
Business
Development
Manager
30+ years senior
management & 7
years renewables
industry experience
(US & Australia)

Former Chief Executive of Europcar Asia Pacific & Regional Director Asia Pacific for Europcar International, responsible for 31 countries in the APAC region. Extensive experience in international franchising & licensing & brings significant experience in the application & integration of alternative energy solutions, with seven years in the renewables industry in the US & Australia.



Jamie Lyford
COO & GC
25+ years IP law /
technology
commercialisation

IP, commercial and licensing lawyer with 20+ years' experience at local and global law firms, BHP, global IT company ATOS and operated Western Australian Government Innovation Centre.



Serjana Sadeq
Product Manager
9+ years in
pharmaceuticals &
management

Experienced in healthcare management and delivery of new products and services. Contributes to R&D activities, planning and business development.



Geoff Edwards CFO 30+ years in CFO, senior financial and commercial roles

CPA with 30+ years CFO experience across a variety of service organisations (including ASX-listed companies).
Significant experience with start ups,
M&A, high growth businesses, equity & debt capital raisings.

## Corporate Structure – Technical Team





Dr Mikhail Vasiliev Lead Scientist 20+ years physics

Multi-skilled expert in optical physics, engineering, photonics, nano-engineering and scientific software development with a PhD (Physics) from Victoria University (Melbourne) and co-author of 50+ research articles in peer-reviewed journals. Senior Research Fellow at Edith Cowan University (15yrs) focused on nanotechnology, materials science and supervising PhD students.



Tao Zhang Structural Engineer 16+ years engineering

Chartered professional engineer in Australia and China. Project Manager & Senior Technical Officer at ClearVue, leading technical team on product certification programs and involved in R&D and sales efforts, manages global OEM manufacturer and supplier relationships.



Chris Cole
Mechatronic Engineer
2+ years engineering
and product
development

Mechatronic Engineering (first class honours), Sydney University. Contributes to the design, development, construction, programming and testing of ClearVue Smart Façade prototypes, and brings a knowledge of integrated software, hardware and AI systems to the team.



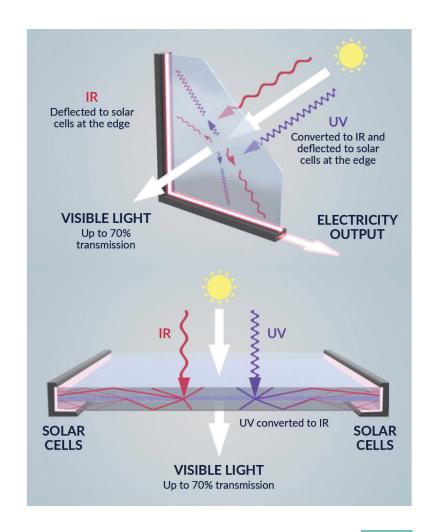
## Technology Overview



ClearVue's (CPV) patented technology sits within an activated interlayer between two panes of glass:

- Visible light (T<sub>vis</sub>) passes through the glass ~70% VLT
- Micro & nano particles interact with ultraviolet (UV) radiation which is down-converted to longer wavelengths
- Light is scattered and reflected to the edges of the glass
- Photovoltaic (PV) cells at the edge of the glass collect photons producing electricity
- ClearVue has extensive IP protection on its technology and products (230+ patents granted)

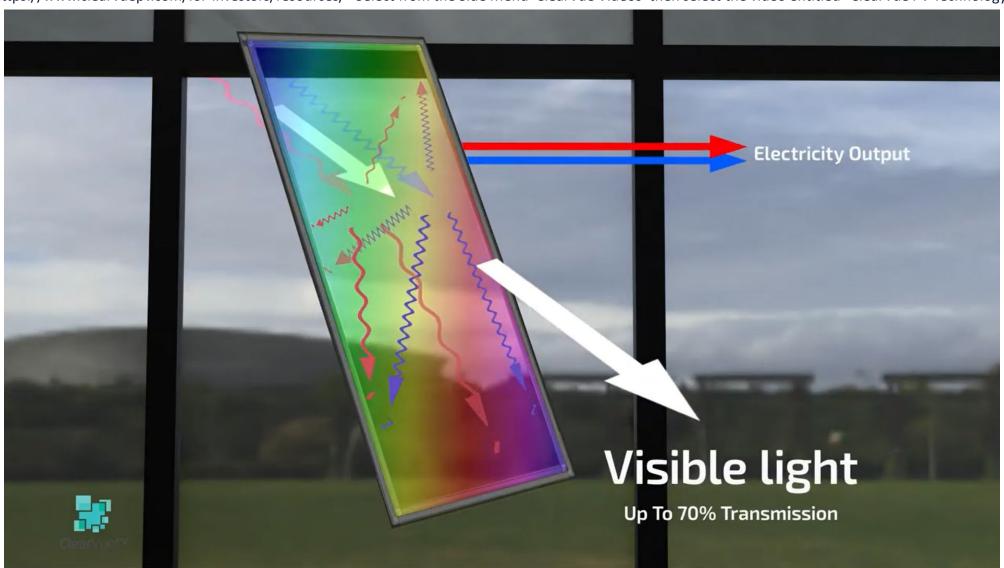
Strong innovation pipeline of new technologies to enable access to new market segments



## Technology Explainer Video



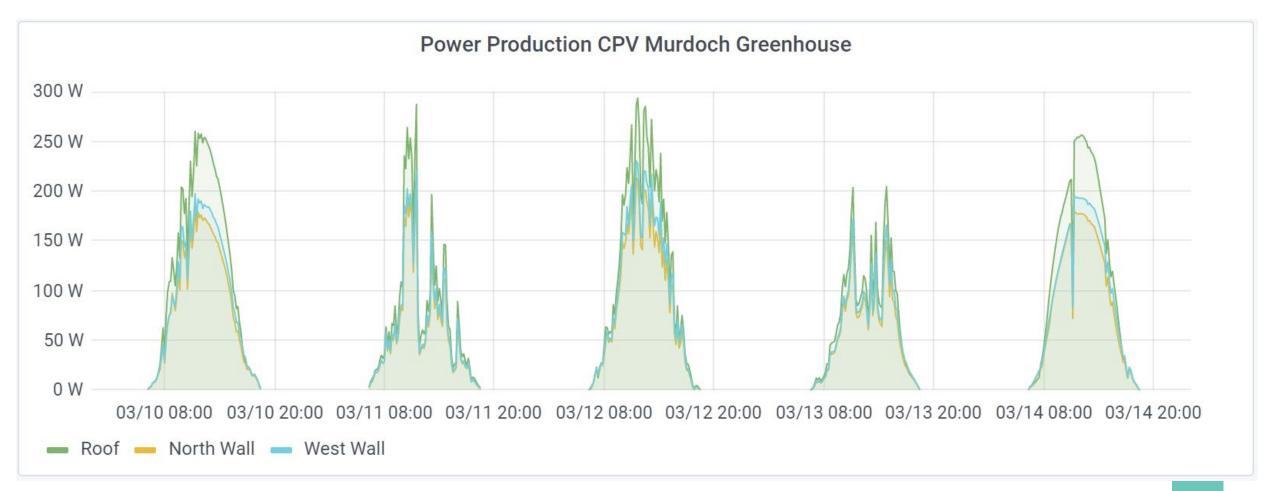
Go to: https://www.clearvuepv.com/for-investors/resources/ Select from the Side Menu 'ClearVue Videos' then select the video entitled "ClearVue PV Technology Explainer"



## Innovation



## ClearVuePV is less affected by tilt and light azimuth than standard PV





## Product Overview



ClearVuePV Insulated Glass Units (IGU) integrate photovoltaics into windows, skylights and curtain walls

#### Core benefits of the ClearVue IGU

- Power generation up to 40 W<sub>p</sub>/m<sup>2</sup>
- Provides high thermal envelope performance
- Works with thermal coating technologies
- Visual light transmission up to 70%
- Configurations to suit all climatic conditions
- Carbon neutral over the lifetime of the product
- Contributes to reducing carbon footprint
- Commercial sizes available now up to 3.2m x 2.0m



## Applications & Deployment

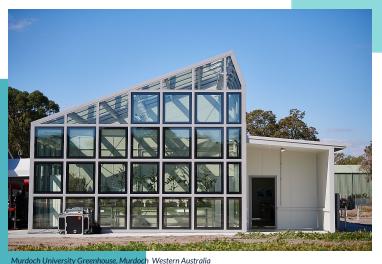


## **Typical Application**

- Suitable for Retrofit
- Triple glazed IGUs in production
- Any application where double or triple glazed IGU's are used
- Completed projects:
  - Warwick Shopping Centre Atrium
  - Murdoch University Greenhouse
  - Tomita Greenhouse Japan
  - Public Space Sydney Light Park
  - Trial in building in NYC







Products: Smart Façade Solutions

## Smart Options



# Utilising the power generated for smart functionalities in autonomous windows

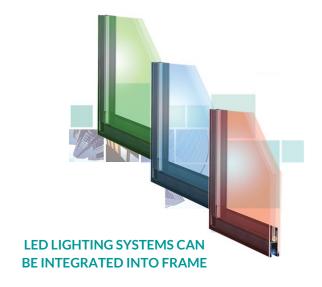
- Casement windows automatically open or close to optimise building temperature and air flow – rain sensors allow the window to close to wet weather
- Electrochromic technology requires power to control tint in response to solar heat gain and lighting requirements
- Frame can house security cameras powered by battery that is recharged by the ClearVuePV IGU
- LED lighting systems can be integrated into frame
- Ventilation systems that respond to CO<sub>2</sub> levels inside the building



AUTOMATICALLY OPENS & CLOSES WITH CHANGING WEATHER



WINDOWS AUTOMATICALLY TINT TO ADAPT TO LIGHTING CONDITIONS





CLOSED CAVITY BLINDS CAN AUTOMATICALLY RESPOND TO OUTSIDE CONDITIONS

## Intelligent Self-Powered Façade System | Video



Go to: https://www.clearvuepv.com/for-investors/resources/ Select from the Side Menu 'ClearVue Videos' then select the video entitled "SmartVuePV | Arup – Intelligent Self-Powered Façade System"



SmartVue<sup>Pv</sup>
Intelligent Self-Powered Facade System

The Future is Clear | The Future is Now

## 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.



## Target & Addressable Markets



Buildings are the largest source of the world's carbon emissions globally, accounting for approximately 40% of total emissions.<sup>1</sup>

Achieving zero emissions from new buildings will require energy efficient buildings that use no on-site fossil fuels and are 100% powered by on- and/or off-site renewable energy.<sup>1</sup>

COP26 made clear that achieving net-zero emissions has become not only an organizing principle for business but a point of competitive differentiation.<sup>2</sup>

#### Sources

- www.architecture2030.org/why-the-building-sector
- www.mckinsey.com/industries/engineering-construction-and-building-materials/our-insights/decarbonizing-the-built-environment-takeaways-from-cop26
- www.raymondjames.bluematrix.com/sellside/EmailDocViewer?encrypt=edddb1da-c175-47ab-b9c8-ca69c60f7531&mime=pdf&co=RaymondJames&id=REPLACEMEEMAIL&source=libraryView
- 4. www.prnewswire.com/news-releases/glass-facade-market-size-worth-92-6-billion-by-2028--cagr-3-9-grand-view-research-inc-301464729.html
- 5. www.bccresearch.com/market-research/energy-and-resources/building-integrated-photovoltaics-markets-report.html

#### **Glass and BIPV Market Size Estimates**

- North America has \$120 billion of window glass installed annually<sup>3</sup>
- The global glass facade market size is expected to reach USD 92.6 billion by 2028 expanding at a CAGR of 3.9% from 2021 to 2028<sup>4</sup>
- The global market for building-integrated photovoltaics (BIPV) expected to grow from \$3.9 billion in 2020 to \$11.3 billion by 2025, at CAGR of 23.9% for the period of 2020-2025 by conservative estimates.<sup>5</sup>

#### **Target Market**

- Current product is competitive within curtain wall / façade glass, sky lights market – new build and replacement
- Products in development will have applications within residential and other market segments

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## Government Incentives - US



### **US Federal Incentives for Green Energy**

#### Solar Investment Tax Credit

A tax credit that can be claimed on Federal Taxes at 26% in 2022 and 22% in 2023. Project must commence within the Year but maybe completed 4 years later. This credit is claimable on the solar Glass, installation labour, wiring and inverters.

#### **MACRS Accelerated Depreciation**

Solar installations are eligible for bonus depreciation meaning 100% tax deduction for the cost of the project glazing when a project is commissioned in 2022 and 80% of the project cost if commission in 2023.

#### **SREC Carbon Credit Incentive**

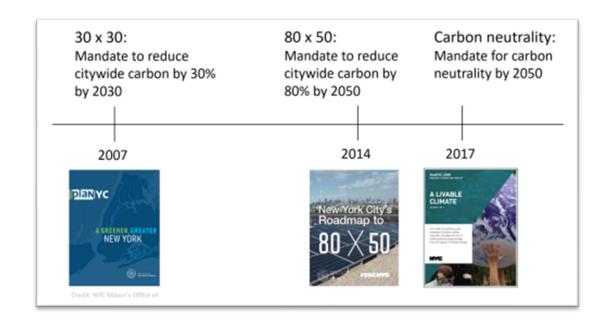
SREC is an incentive payable in cash for 10 years based on the electricity generated by alternative energy on the project. It is paid at the rate of USD 288 per mWh of energy produced. This incentive is payable in the following states. New Jersey, Massachusetts, Pennsylvania, Maryland Washington D.C, Delaware and Ohio.

## Government Disincentives - NYC



# Buildings account for 67% of New York City's carbon emissions - NYC Setting Increasingly Stringent Carbon Targets

- Implementation of "gas ban" from 2024 for <7 stories, all new buildings from 2027
- Starting in 2024, New York City's Local Law 97 (LL97)
   will place stringent annual GHG emission limits on new and existing buildings
  - Annual fine of \$268 per tonne of CO<sub>2</sub>



Electrification is a strategy for GHG emissions reduction

## Case Study: 1 Centre St, NY Fine in Effect 2030



## Calculation of a building's LL 97 Annual fine from 2030 - 2034

## 1 Centre Street DCAS - Office **GHG Intensity Target\* GHG** Intensity engineer or architect ▶ Building Information ▼ Distribution Comparison 6.0 4.0 2.0 All DCAS - Office Peer Buildings

NYC Energy and Water Performance Map:
https://energy.cusp.nyu.edu/#/

Building GF	HG Intensity	Building Area (ft²)	Total Excess CO <sub>2</sub> Emissions (t.)	Penalty Amount \$USD Per Ton CO <sub>2</sub>	Total Annual Penalty from 2030
Current Emissions	7.71 kgCO <sub>2</sub> /ft <sup>2</sup>	1,070,800		\$268	\$1,087,624.4
2030 Target	3.92 kgCO <sub>2</sub> /ft <sup>2</sup>		4,058.3 t.		
Excess Emissions Above 2030 Target	3.79 kgCO <sub>2</sub> /ft <sup>2</sup>				

## **Real Money**

## Modelling Net Zero: 'ClearZero' – Archetype Office Building ClearVue?'



### **Archetype Building Key Points**

Building Size	15,000m <sup>2</sup>		
Storeys	6		
Construction	Wood & 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 90% North Elevation 40%		

#### Highlights

- ClearVue has completed design of an Archetype model building on 15,000m<sup>2</sup> 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 STASR 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





## Deployment Strategy



## **Current Deployment Strategy**

- Supply completed IGUs
- Continued testing and certification
- Partner with industry innovators
- Focus on obtaining first commercial building deployment



## Manufacturing Development Strategy

Integration of system into traditional IGU Manufacture

- Incorporate into partner's preferred
   IGU manufacturing assembly line
- Capability to manufacture worldwide
- Increase current volume capacity
- Lower cost of production



## Upcoming Milestones



#### During 2022

- US trip/roadshow with Executive Chairman Victor Rosenberg and North American CEO, Basil Karampelas during month of April 2022 presenting to construction groups, building owners and developers, investment groups and visiting development partners (commencing 4 April 2022)
- Commencement of second plant science trial at Murdoch ClearVue greenhouse
- Completion of JV establishment with eLstar Dynamics
- Demonstration project New York City
- Completion of product Life Cycle Assessment (LCA) and Environmental Product Disclosure (EPD)
- Update of Archetype modelling to include LCA and EPD
- Japan greenhouse at Ignis Sendai resort completion of installation and opening
- Sydney park installation opening
- Securing additional licensees in target geographies of US and Europe
- Conversion of showcase projects, licensees and marketing efforts into purchase orders primary focus on US and European markets, focus on quicker sales (greenhousing)

## Investment Highlights



#### **Attractive industry thematic**

- ESG investment opportunity in global growth sectors of BIPV, smart cities and food security
- Unique with high consumer buy in
- Regulatory support across multiple jurisdictions EU and US focus – change in Govt in US anticipated to impact growth
- Large Addressable Market

#### **Proprietary Technology**

- First in class product
- Strong IP portfolio
- Regulatory requirements met for sales in key regions
- Price competitive with payback period
- Strong product and tech development pipeline

#### **Near term catalysts**

- Showcase deployments under way
- Continued deal flow
- High quality counterparty engagement

#### **Refocussed Business**

- Investor entry remains low compared to competitors
- New North American CEO
- Experienced Board





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