

AN INTRODUCTION TO:  
**VENTILATED  
FAÇADE SYSTEMS  
IN MODERN DESIGN**



## INTRODUCTION

---

Ventilated façade systems can significantly improve the energy efficiency of a building by improving thermal comfort and reducing the reliance of HVAC systems, whilst improving the acoustic performance of the façade.

Also known as double-skin façades or rain-screens, ventilated façade systems can also assist in protecting buildings against the combined action of wind and rain by counterbalancing the effects of water beating on walls and keeping the building dry.

While this system has been used consistently throughout Europe and North America for decades, Australia's varying climatic conditions has created an uncertainty surrounding the suitability and potential benefits for buildings here. Only recently with the greater awareness for sustainable design have ventilated façade systems become a consideration amongst Australian designers and developers.

*This paper provides an introduction to the core concept of ventilated façade systems, key elements for a successful system, and the benefits to be realised as well as the challenges faced using ventilated façade systems in Australian conditions.*

“ At its most basic, a ventilated façade system consists two layers of different facades which are separated by an air cavity ”

## HOW DO VENTILATED FAÇADES WORK?

---

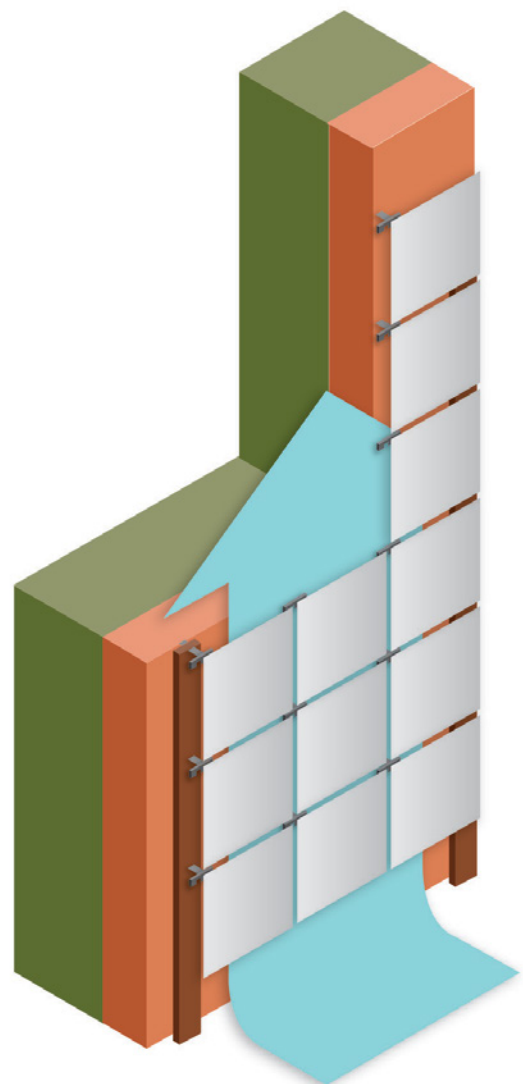
To understand the potential benefits of a ventilated façade it is important to understand the fundamental concepts behind the system.

At its most basic, a ventilated façade system consists two layers of different facades which are separated by an air cavity. This cavity prevents rainwater from penetrating and diffuses water vapour from the inside to the outside. While the external cladding serves to provide the majority of rain and wind protection, the air corridor between the support structure and the external cladding plays a major role in the ventilated façade system.

A naturally ventilated façade results in a temperature difference between the face of the cladding panel and the air cavity behind. This in turn creates a variation in air density and causes air to flow upwards within the cavity according to the stack effect. The airflow transports heat from the cavity out through high level exhausts, aiding convection drying of any residual amounts of moisture that have accumulated within the air cavity.

The four key elements that make up the design and construction of an effective ventilated façade system are:

1. Load bearing wall
2. Fixing system
3. Ventilation cavity
4. Façade panels





## BENEFITS OF VENTILATED FAÇADE SYSTEMS

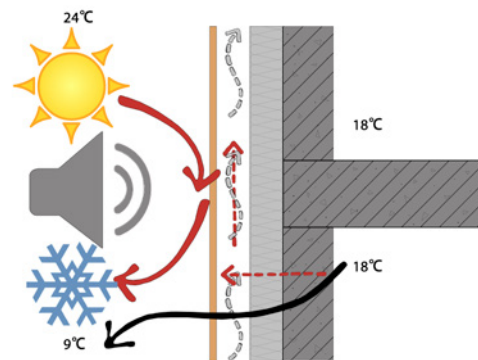
The system provides three main benefits for buildings:

### Thermal

Significant reductions in HVAC reliance through:

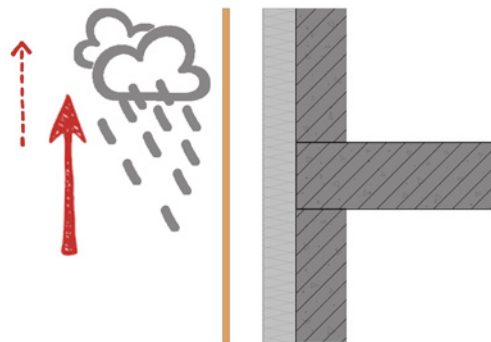
- A reduction in the amount of heat that buildings absorb in hot weather conditions from the partial reflection of solar radiation by the outside façade, and the naturally ventilated air cavity.
- In cold weather conditions ventilated walls retain heat, resulting in a lower reliance on heating.

HVAC electricity consumption typically accounts for around 40% of total building consumption. Research has shown ventilated facades systems can easily achieve savings of about 30% on energy consumption.



### Acoustic

Ventilated façade systems provide an increase in the reflection of external noise, with a recent Australian project realising an average reduction of up to 8dB. With the primary external noise sources affecting buildings being road traffic noise, a reduction of this level can greatly improve occupant comfort.



### Structural

In addition a secondary façade provides protection against wind and rain the natural bottom-to-top airflow through the cavity assists in eliminating moisture accumulation on the facades, preventing mould and water ingress, helping to prolong the structural integrity and ultimately the lifespan of a building.

## VENTILATED FAÇADE SYSTEMS FOR HEALTHY BUILDINGS AND OCCUPANTS

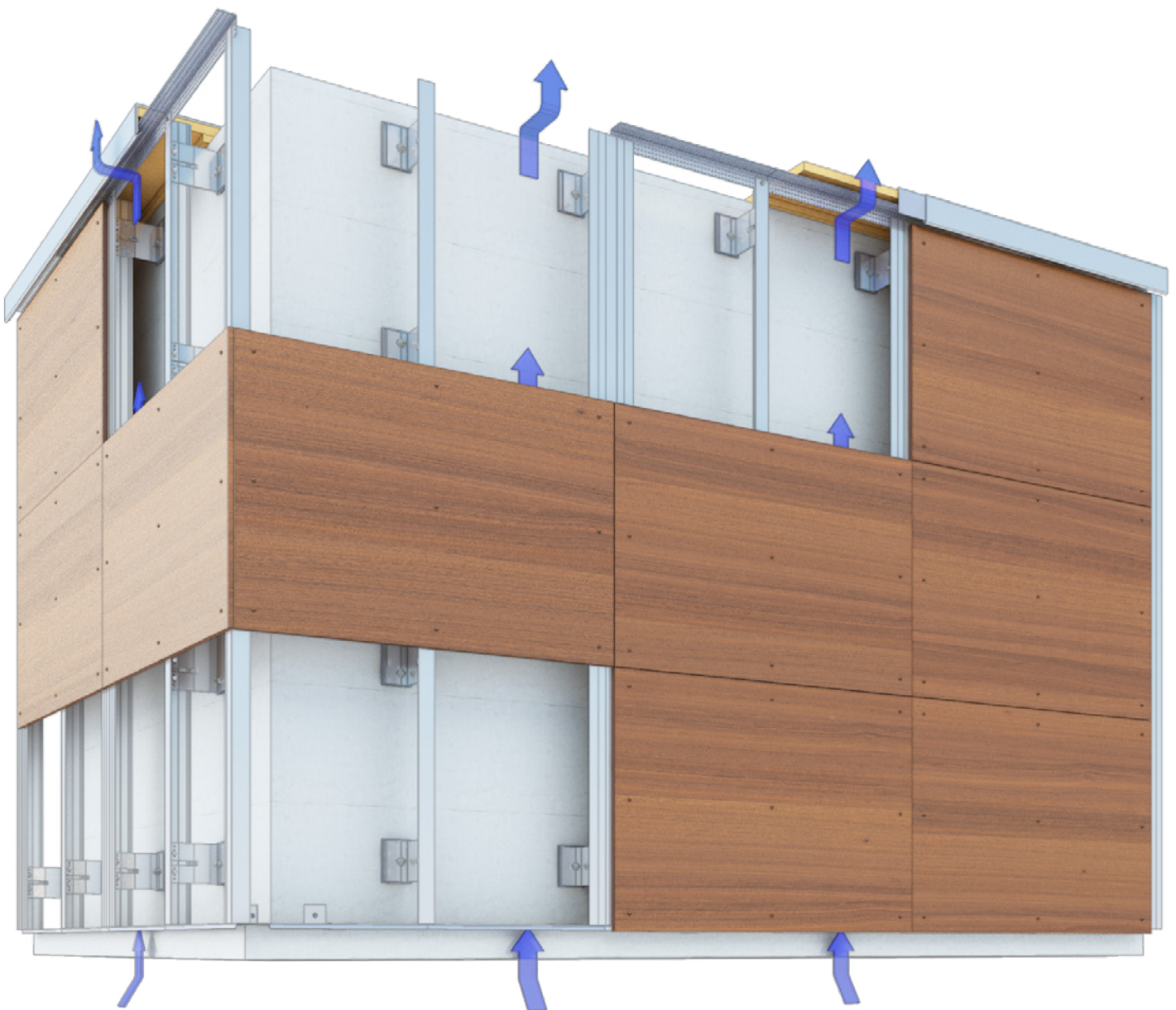
In her article on Façade Engineering, Sara Hart explains that *"The evolution of the building envelope from static wrapper to a complex, active building system has been partly motivated by the economics of energy consumption and the promise of sustainability. The proliferation of private and public research and development has produced a juggernaut of products and processes."*

Traditionally, ventilated façade systems have been used predominantly in the colder climates of Europe and North

America, where air in the cavity is intended to be warmed by the sun to reduce the load on the artificial heating systems.

More recently they have begun to be used in warmer climates such as Australia to benefit from the reduced solar heat gain of the building through reduced thermal transfer as well as the ventilation of the warm air in the stack effect of natural air circulation within the cavity, hence reducing the load on the artificial cooling systems.

“ Ventilated facades have begun to be used in warmer climates such as Australia to benefit from the reduced solar heat gain of the building ”





## VENTILATED FAÇADES SYSTEMS AND THE AUSTRALIAN CLIMATE

---

Ventilated façade systems are used throughout the world on any building that demands strictly controlled internal environments, including health and aged care facilities. This sophisticated façade system provides an extra layer of protection for your building against noise, moisture and water ingress whilst delivering thermal advantages in hot and cold climates through the naturally ventilated façade system.

## VENTILATED FAÇADE SOLUTIONS FROM INNOWOOD

---

INNOWOOD Australia in partnership with recognised market leaders in the international façade industry Allface Smart Fixing Systems provide complete ventilated façade solutions to the Australian market.

With the fixing system and cladding type making up the two most important elements in an effective ventilated façade solution, the benefits of having two of the world's leading companies in their respective fields coming together offers an unprecedented level of expertise and insight into ventilated façade systems for Australian conditions.

INNOWOOD's innovative industry leading composite timber cladding in conjunction with Allface Smart Fixing Systems provide the complete ventilated façade solution.

INNOWOOD offers support on projects from design to completion including load calculations, product design and drawings and on-site project management for fully customised solutions.



## INNOWOOD AUSTRALIA

---

INNOWOOD was established in 2005, the first Australian company to be involved in design, manufacturing and supplying of composite timber products nationally and internationally. INNOWOOD products contribute to the prevention of forest depletion and uses recycled material to produce a hardwearing solution to timber.

Over the past 10 years INNOWOOD products have proven their versatility in various applications achieving performance requirements and are the chosen supplier for composite timber by architects, designers and builders.



## REFERENCES

<http://www.architectureanddesign.com.au/features/features-articles/ventilated-facades-for-healthy-walls-and-building>  
<http://www.greenbuildingadvisor.com/stack-effect-when-buildings-act-chimneys>  
[http://www.academia.edu/180367/Innovative\\_Building\\_Skins\\_Double\\_Glass\\_Wall\\_Ventilated\\_Facade](http://www.academia.edu/180367/Innovative_Building_Skins_Double_Glass_Wall_Ventilated_Facade)  
<http://eex.gov.au/technologies/heating-ventilation-and-air-conditioning/>  
<http://solar.org.au/papers/08papers/233.pdf>  
[https://www.acoustics.asn.au/conference\\_proceedings/AAS2013/papers/p31.pdf](https://www.acoustics.asn.au/conference_proceedings/AAS2013/papers/p31.pdf)