

Innovation

Building design for a sustainable future



What's included in this fact sheet:

It's time to innovate!

- Exceeding best practice standards
- Passive Design Principles
- Understanding your building site's climate conditions
- Identifying synergies
- Redefining the Australian Dream

Where can I find out more?

Mandatory Requirements

Council's Best Practice Standard.

This fact sheet aims to explore the notion of innovation with respect to the design of both our residential and commercial buildings. Council encourages you to explore innovative design solutions in your building project. We hope we can provide you with the inspiration to begin thinking outside the box that will in turn, let you reap the rewards.

It's time to innovate!

Innovative ideas and their implementation led us to the economical and social revolutions that we experienced throughout the last centuries. Most innovative ideas result from defining a problem or need.

The invention of the motor car was born out of the need to travel between places faster. Later, it was the problem of congested cities that led to the development and construction of underground trains. Similarly, it was the need to communicate more efficiently that led to the invention of the internet.

Today, we face the problem of an increasingly polluted environment that will have an ever increasing impact on our quality of life. Many innovations, such as systems for renewable energy production or the growing efficiency of building technologies, have made a contribution to lessen our environmental footprint.

And while we have made huge leaps forward in the efficiency of our buildings, they still consume too much energy, water and other resources. It is now our challenge to take the next step by developing truly sustainable building solutions. Individual examples all over the world have shown that innovative design solutions can lead to outstanding results, including buildings that produce more energy than they use.

It is also important to highlight that innovative design solutions not only lead to highly efficient buildings, but that they are often combined with very high living and working qualities and award winning architectural design.



“ We can't solve problems by using the same kind of thinking we used when we created them. ”

Albert Einstein



It's time to innovate!

★ Exceeding Best Practice

Best Practice

Industry Standards

Minimum Standards



Exceeding best practice standards

Humans have been living in shelters, and later houses, for thousands of years. Ever since the first settlements, our living amenities and quality of life has improved.

Innovative engineering led to unlimited drinking water and electricity in our homes, to thermally improved building shells and easy to handle heating and cooling devices. But not only have our living standards improved, appliances and construction standards have also become increasingly efficient.

There's no doubt that what is described as 'best practice' construction standards today will be overhauled in the very near future. Council therefore encourages you to explore opportunities to exceed current industry standards, not only to lessen your impact on the environment now, but also to future-proof your asset and living amenities in the years to come.

“ Exceeding best practice standards today will help you future-proof your asset, increase living standards and save on utility costs for many years to come. ”

Passive Design Principles

Buildings have a lot in common with humans; in winter they get cold and in summer they get hot. While we respond to a changing climate in the way we dress, buildings are much more inert to these changes. Modern technical solutions seemed to deliver a solution to that problem.

The introduction of air-conditioning and artificial light allowed us to construct buildings in any climate zone with an arbitrary shape and facade and still maintain comfortable temperatures and light levels throughout the year. But only quite recently have we become aware that the use of excessive energy has come at a price.

The use of 'passive' design is as old as human settlement. In the days before active building services, building designers had to design buildings that provided adequate living conditions through passive means.

The size and location of windows balanced access to daylight, heat losses and gains. The provision of external shading allowed occupants to protect themselves from the harsh summer sun while letting in warm winter rays. Ventilation openings were strategically placed to quickly cool a home and building materials were carefully selected based upon attributes for good indoor environment qualities. Small ponds were placed to make the most of summer breezes across their cool surface and living rooms were located adjacent to kitchens to make use of waste heat.

It is the reinterpretation of these old building traditions that will provide us with the ability to cut back on our energy consumption and to condition our homes and work places through passive means.

“ Passive Design describes a building design approach that focuses on the provision of maximum indoor comfort with minimum reliance on energy and building services. That's good for you, the environment and the wider community. ”





It's time to innovate!

Understanding your building site's climate conditions

In order to maximise the effects of passive design, it is vital to understand your building site's climate conditions. Finding answers to the following key questions will provide you with a good starting point for your environmentally sustainable design:

What are the different sun angles for each façade throughout the year?

Knowing the highest sun angles in summer, the minimum sun angles in winter and those for the shoulder seasons in between, allows you to optimise a building's orientation, to strategically place window openings and sun protection (external shading) and to accurately position solar energy devices.

What are the different temperatures throughout the year?

Understanding the different temperatures (minimum, average and maximum) throughout the year will enable you to quantify the benefits of different passive design responses.

What are the different temperatures throughout the day?

Understanding the different temperatures (minimum and maximum) throughout a 24 hour cycle will determine whether passive design strategies, such as night purging (natural ventilation at night), will contribute to comfortable indoor temperatures throughout the year.

What is the prevailing wind direction in summer?

Understanding a site's prevailing wind direction in summer will allow you to place window openings that make the most of cooling summer breezes.

What are humidity levels in summer?

Understanding a location's humidity levels in summer is necessary to making informed decisions on both, passive cooling strategies and active cooling systems.

Identifying synergies

Through the identification of synergies, today's mobile phones for example, are able to provide us with a vast array of applications, functions and services. Similarly, our supermarkets offer a wide selection of groceries and consumables, as has never been seen before. Synergies have not only provided us with new products and services, but have helped us use them in more efficient and cheaper ways.

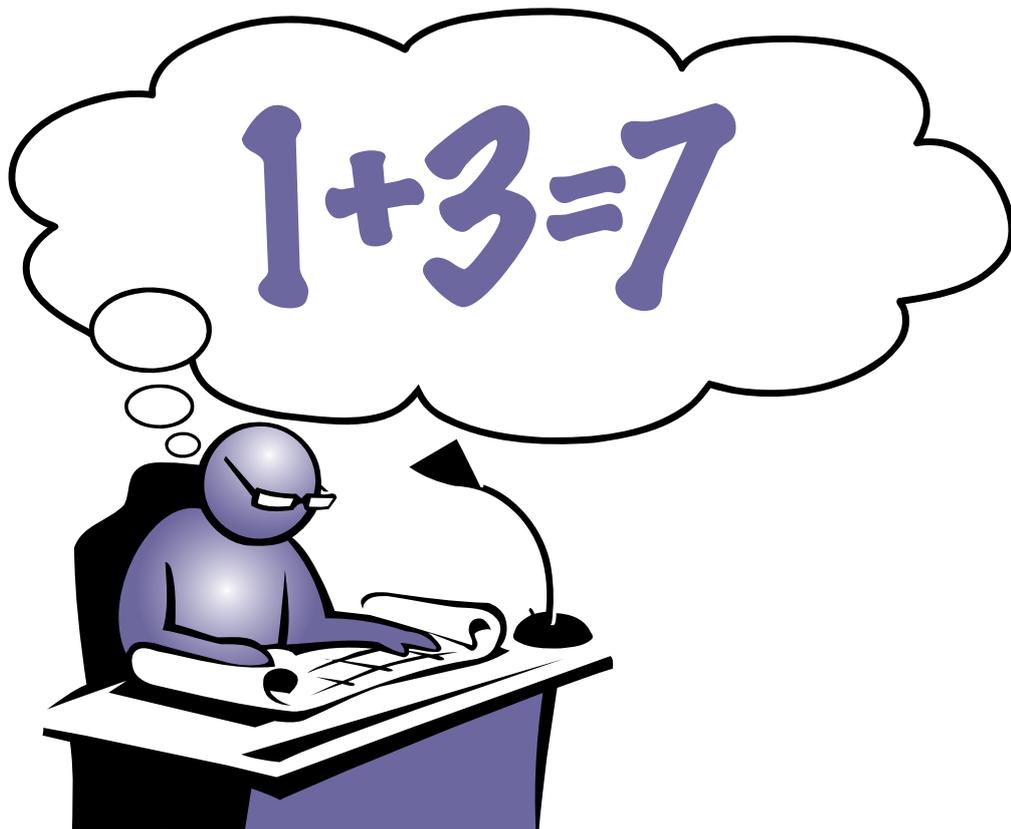
Buildings also provide the opportunity for synergies that will lead to major resource and financial savings:

- External shading elements can replace decorative paints and finishes as they are contributing to the appearance of a façade.
- Solar panels can be installed as roof panels, façade elements or shading devices and therefore replace other building materials while providing renewable electricity.
- Slimline water tanks can act as a garden fence or building wall while providing reusable water to garden and toilets.

- Exposed concrete ceilings not only serve as structural elements but function as thermal mass (storage and release of heat).
- Use common building materials in a new way to improve a building's performance and environmental footprint.

With resources becoming increasingly scarce and our population constantly growing, building designers face the challenge of creating more by using less – most likely by defining successful synergies.

“Synergy is when the whole is greater than the sum of the parts.” Aristotle





It's time to innovate!

Redefining the Australian Dream

The 'Australian Dream' is commonly perceived to be a detached house on a quarter acre block, surrounded by a garden and providing plenty of space for the extended family. While this was a lifestyle we were able to enjoy in the past, recent social and economical changes now require us to redefine the Australian Dream for the 21st century.

The sprawl of our cities has placed both economic and physical strain on the infrastructure that is needed to service them. The long travel distances between work, home and school by car and public transport requires a heavy reliance on the burning of fossil fuels which expands our carbon footprint. Therefore, it's time to 'densify'.

Historic examples in both European and Asian cities and recent projects in Australia have shown that the quality

of living space is not determined by its quantity. Council therefore recommends building designers and their clients to carefully reconsider spatial needs.

Many examples have demonstrated, how living needs can be comfortably met within little space by combining different uses:

- Cupboards under stairs, in podiums and overhead, can substitute separate storage rooms.
- An efficient and concealed kitchen allows combining cooking, dining, playing and resting in one single room.
- Through the use of flexible wall panels, several rooms can be turned into one large space if required.
- Retractable beds save precious space in kid's and guest rooms.
- Hand basins, combined with toilets not only save water but also space.
- A sub basement allows for additional living space without exceeding statutory setback and height limits.



Mandatory Requirements and Council's Best Practice Standards

Mandatory Requirements

None.

Council's Best Practice Standards

In order to claim a truly innovative sustainable design solution, your development should meet at least one of the following criteria:

- Exceed best practice standards in one or more of the other key sustainable building categories.

- Eliminate the need for mechanical heating and cooling through passive design.
- Incorporate technologies or design strategies that deliver environmental and/or social benefits and are new to Victoria.

Where can I find out more?

Passive Design Technical Manual

Your Home
www.yourhome.gov.au

Sustainable building ideas

Sustainability Victoria
www.sustainability.vic.gov.au

Climate data for your location

Bureau of Meteorology
www.bom.gov.au

Finding an architect and design inspiration

Australian Institute of Architecture
www.architecture.com.au

The voice of professional designers

Design Institute of Australia
www.dia.org.au

Other Fact Sheets in this series are also available to provide guidance on the 10 Key Sustainable Building Categories. For further information on Innovation, consider the Fact Sheets entitled:

- Melbourne's Climate
- Indoor Environment Quality
- Energy Efficiency
- Water Efficiency
- Stormwater Management
- Building Materials
- Transport
- Waste Management
- Urban Ecology
- Construction & Building Management