The nature of the tourism and hospitality industries leads to the renewal and refurbishment of building layouts, facilities and building structures as often as every 7 to 10 years. Some businesses have seen energy costs reduced by as much as 40% if energy efficiency opportunities are maximised during refurbishment¹.

This fact sheet will provide a broad outline of the opportunities and can be best utilised as a guide for what benchmark to set for your designer and/or builder.

The opportunities at the time of refurbishment extend beyond the optimisation of the efficiency of existing equipment and to the opportunities to improve the efficiency of your business by considering:

- Building orientation and fabric
- Layout of functional areas
- Type of equipment that is used

There is a significant amount of information available on the design of buildings – known as Environmentally Sustainable Design or ESD.

REGULATION

Minimum standards exist in Australia when building, renovating or extending a building. These standards address the energy efficiency of the building and its core service infrastructure.

National Construction Code

All new store and building refurbishments need to be completed in accordance with the National Construction Code (NCC). The NCC incorporates all on-site construction requirements into a single code.

The NCC comprises the Building Code of Australia (BCA) and the Plumbing Code of Australia (PCA). Within the BCA, there is a section that outlines the ‘Deemed to Satisfy Provisions’ for energy efficiency (Part J).

Some of the areas that Part J covers include:

- Energy efficiencies through measuring and monitoring
- Building fabric (floors, walls, ceiling, roof construction and minimum insulation requirements)
- External glazing and shading
- Building sealing
- Heating, ventilation and air conditioning systems
- Artificial lighting
- Hot water supply
- Access for maintenance and facilities for monitoring energy use.

The Australian Building Codes Board (ABCB) has produced a handbook to explain these energy efficiency elements in more detail.

Remember, the principals of energy efficiency are no different in a new building as they are in an existing building. Using the AHA Energy Efficiency guides in conjunction with your developer, architect and/or building practitioner during the planning stages should help to ensure that your building achieves maximum energy efficiencies.

BUILDING ORIENTATION AND FABRIC

Building fabric includes the walls, floors and ceilings including the windows. Improvements to the building fabric are usually undertaken to improve a building’s appearance and improve guest comfort.

However over 60% of the heat in a building is lost through the building fabric. Improvements to the building fabric can also improve the energy performance of the building reducing draughts, solar gain, solar glare, overheating and noise, which also improve guest comfort.

Many hotels or pubs occupy older buildings constructed before energy efficiency was considered as important as it is today. Refurbishments represent an excellent opportunity to significantly improve the energy performance of the building without a substantial impact on building costs.

¹ Hospitality: Saving energy without compromising service (p5); Carbon Trust 2012.  
² Applying energy efficiency provisions to new buildings work associated with existing Class 2 to 9 buildings; Australian Buildings Code Board 2010.
Orientation
Sub-optimal orientation of the building, and its windows, affects the amount of heat entering or leaving the building. Importantly, this often occurs in an uncontrolled manner resulting in guests experiencing their area as either too hot or too cold despite the HVAC settings. When renovating a building, it is important to consider the orientation of the existing building together with the proposed orientation of an addition. It is possible to make substantial improvements to the performance of the building, for example, windows are sized appropriately and shading (both natural and artificial) is installed where appropriate.

A suitably qualified architect or designer should consider the impacts of building orientation in order to maximise comfort and energy efficiency. If carrying out a major refurbishment, undertake thermal modeling to design for appropriate comfort levels.

Glazing
Windows allow heat out of and into a building. The position of windows, i.e. which direction they face, and the nature of the climate are important considerations in determining their contribution to the energy efficiency of the building.

Opportunities to enhance energy efficiency stem from reducing the heat transfer through windows. These include:
- Double glazing
- Thermal coatings
- Blinds
- Shading

Insulation
The thermal performance of the building is made up of the insulation capability of the different elements of the building fabric, including the floor, wall, ceiling, and roofing. Thermal performance is measured in terms of R-values - the higher the R-value the better the insulation and the better the thermal performance of the building.

A more efficient, well-insulated building needs smaller heating and cooling systems. The systems can be smaller as the thermal variations, caused by external influences, are reduced through better insulation. Better insulation can also increase a building’s value and attractiveness to staff, guests and prospective buyers of the business.

LAYOUT AND FUNCTION
The layout and function of your building is important to the energy efficiency of your business. There are many actions that can be taken to increase the energy efficiency of a functional area through a better layout.

Kitchen
The kitchen and food preparation area layout should consider the physical location of equipment that generates heat and cold - hot equipment like ovens and cook tops should not be located next to refrigerators and freezers.

The cooktop and oven heat exhaust fans and extraction hoods should be supplied with additional make-up air to ensure they are not removing excessive amounts of conditioned (HVAC) air from the building as they extract localised heat.

Laundry
Heat from dryers in the laundry can be recovered to pre-heat water supplied to the washers. Dryers should be well ventilated to prevent the buildup of moisture in the laundry from dryer exhaust air.

Guest Rooms
Smart cards are one of the most effective systems at reducing energy consumption in guest rooms. They can be fitted within the rooms and control the lighting, power, heating and cooling. They can also be implemented as a centrally controlled system that communicates with the Building Management System.

Building Access
Entry and exit points to a building enable external, unconditioned air into the controlled building environment. Air locks are a great way to limit this effect. They reduce the load on the heating and cooling systems and reduce operating costs.
There are a number of AHA Energy Efficiency Guides in this series that detail the simple actions that you can undertake to improve energy efficiency. The actions presented in those guides often yield greater efficiencies still if they are applied at the time of a refurbishment as there is more flexibility to optimise the design of a system and the choices of equipment are often broader.

**Heating, Ventilation and Air-conditioning**

Refurbishment presents the greatest opportunity to optimise the energy efficiency of an HVAC system as it is best configured as a building wide system. The most efficient system will include:

- Centralised heating and cooling plant that incorporates economisers, heat recovery, variable speed drives and high efficiency motors.
- Capacity to utilise natural ventilation.
- Zoned ducted system to high occupancy areas.
- Building wide HVAC control system with energy performance monitoring.
- Easy maintenance access.
- Localised/distributed heating and cooling in low occupancy areas.

The AHA Energy Efficiency Guide ‘Heating, Ventilation & Air-conditioning’ provides further details on what drives HVAC energy costs and how to make your systems energy efficient.

**Lighting**

Refurbishment offers an excellent opportunity to effectively match lighting needs and solutions with natural light levels. To get the best outcome start by determining desired lighting levels and the impact of windows. Then determine the most effective means of providing the necessary lighting levels whilst considering the energy cost. Remember the cheapest light is the one that isn’t on; so think about using sensors to control lights in areas that don’t have high occupancy levels or where there is daylight.

LEDs are fast becoming the go-to solution for a lot of lighting systems because they have long life, require minimal maintenance, use very little energy for their light output and produce very little waste heat. However they are not the only viable solution – ensure you engage an experienced lighting technician when designing your system.

The AHA Energy Efficiency Guide ‘Lighting’ provides further details on how to reduce lighting energy consumption including different energy efficient lighting solutions.

**Equipment**

When buying new equipment for a refurbishment or renovation/extension always compare equipment’s true cost of operation. Equipment that is cheaper may be more expensive to operate and cost more over its life. Look for the Energy Rating label on equipment as an easy way to compare energy operating costs.

The AHA Energy Efficiency Guide ‘Other Equipment Energy Efficiencies’ provides much more detail on how to reduce energy consumption of equipment throughout your business.

**Building Management System**

A Building Management System is a centralised system that controls the core infrastructure and equipment in your building. A simple system may just control the HVAC system. A comprehensive system may also control lighting and equipment power throughout the building.

The Building Management System is likely to be receiving information on the state of the building like the condition of the air, air temperature, occupancy, and natural and artificial lighting levels. A Building Management System can also be used to monitor and report on energy consumption throughout the building.

When used effectively, a Building Management System is one of the most effective ways to control energy use.

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**CASE STUDY – Alto Hotel, Melbourne**

The Alto Hotel, renovated in 2005, has retained the original neo-baroque façade with its original leadlight window and the marble terrazzo in the foyer. The original façade now hides a comprehensive refurbishment that, at the time of construction, set new benchmarks for energy and water efficiency.

The building incorporates energy efficient lighting, high efficiency air conditioning, hot water flow restrictors, double glazed windows and range of other energy, water and waste initiatives. To find out more about the changes and the savings made during their refurbishment check out: www.altohotel.com.au/green-star-accommodation-melbourne.php
UNDERSTANDING THE BUSINESS CASE

When renovating or refurbishing your building always consider the business case for selecting the more energy efficient option. Remember two key rules:

• Most of the opportunity to influence the energy performance of a building, and the business that operates in it, is locked-in during the design phase.
• The cost of operating a piece of equipment over its life far exceeds the cost of paying for it in the first pace.

Understanding the business case for investment across equipment life is therefore critical to making a sensible business investment decision. More information on understanding the business case for investment in energy efficient solutions can be found in the AHA Energy Efficiency Guide ‘Energy Efficiency in Business Planning’.

CASE STUDY – Airley Beach Hotel, Queensland

The Airlie Beach Hotel has been expanded and redeveloped in recent years and this had lead to a dramatic increase in energy use. The proprietors saw the opportunity to counter this by implementing a range of efficiency initiatives including:

• Replacement of inefficient fridges.
• Implementation of a room key tag systems
• Installation of water saving shower heads and taps.

To find out more about the changes and the savings made during their refurbishment check out:


MORE INFORMATION


ABOUT THE PROGRAM

In response to rising energy costs the AHA has developed a range of targeted resources to assist small and medium businesses to improve energy efficiency and reduce energy costs.

These resources were developed with support in the form of an Energy Efficiency Information Grant from the Australian Government.

This program has been designed to assist small to medium businesses to understand where and how energy is used, carbon emissions that result from the use of energy, and to understand and communicate the opportunities for reduction and resource efficiencies.

The resources, tools and information available under the program identify energy efficiency improvements that can be incorporated into day-to-day operations and factored into future capital expenditure budget.

For more information please visit www.aha.org.au/energy