

HEATING, VENTILATION & AIR CONDITIONING

– Minimising your heating and cooling costs

Heating, ventilation and air conditioning account for more than 20% of the energy most supermarkets use. However, if you understand how heating, ventilation and air conditioning interplay in your premises, there are some simple things you can do to reduce your heating and cooling load and save money.

A heating, ventilation and air conditioning (HVAC) system controls the temperature, humidity and quality of the air in a premise. It is particularly important for supermarkets, where maintaining air temperature and humidity is essential, to preserving product quality, creating a comfortable environment for customers and staff and balancing out the cool air released from refrigeration cabinets and the hot air generated in food preparation areas such as kitchens or bakeries.

Your HVAC system may actually comprise two or three separate systems, which also interact with your refrigeration system in maintaining a conditioned environment. The best way to save energy and money is to consider all systems together when fine tuning each component.

COMMON HVAC INEFFICIENCIES

Five factors determine how much energy your HVAC system uses: external impacts, indoor environmental requirements, internal sources, HVAC system efficiency and effectiveness, and operational control. Some common examples of heating and cooling inefficiencies include:

- Kitchen or bakery extraction fans extracting conditioned air from within your store, because there is no makeup air to supply the area.
- The heating and the cooling systems are both operating at the same time. For example, because the heating set-point is set to 20°C and the cooling set-point is set to 21°C.
- The heating system is operating through the night to balance the cold air being released into the store by refrigeration cases and cabinets that don't have blinds to trap the cold air inside the cabinet.
- It's been a while since the HVAC system maintenance has been undertaken and filters, the evaporator and condenser coils/fins and ventilation ducts are dirty. As a result, ventilation ducts are leaking air and the refrigeration system coolant is not at full pressure.
- The HVAC system runs continuously as there are no electronic controls to manage temperatures differently outside of operating hours.

SAVE MONEY BY INCREASING HEATING AND COOLING EFFICIENCY

There are five actions you can take to improve the performance of your HVAC system:

1. Mitigate the negative and harness the positive external environmental impacts that can affect the internal temperature and humidity of your store. For example, on warm days, use ambient air to heat your building.

2. Assess the temperature and air quality needs of your premises and products. Set heating to switch on at 19°C and cooling to switch on at 24°C.
3. Reduce the impact of other heat sources in your store to reduce the load on the HVAC system and its energy consumption. For example, if you install more efficient lighting, such as LED, it won't produce excessive amounts of waste heat that must be balanced by your cooling system.
4. Ensure your HVAC equipment is operating as designed by implementing a preventative maintenance program. In particular, clean air filters every month and check for air ventilation duct leaks every six months. A poorly maintained system is an inefficient system that costs more to run and has a shorter service life.
5. Look for opportunities to operate your HVAC system more efficiently, for example, by switching the system off or to a less energy intensive setting when the store is closed.

SUCCESS STORIES

Acacia Ridge store owners Rob and Helen Gibson recently engaged SEDAC to undertake an energy efficiency assessment of their store. By focusing on areas of high energy consumption, the assessment led to a review and optimisation of the sites controls to ensure more efficient operation. Some of the initiative that were identified including a review of when lights were left on overnight, if the air conditioning was running when not required and if the night blinds were put down correctly.

Overall, the site is now saving 14% on their electricity costs each month.

Capital cost: \$15,000

Savings: \$7,600

Payback: Less than 2 years

Cost	\$\$
Benefit	☺☺☺
Simplicity	✓

"SEDAC Energy Management have really assisted me with understanding energy, ways to reduce consumption and ensure the savings are sustained"
- Rob Gibson, Store Owner

THE BUSINESS CASE – DECREASING COOLING COSTS USING COOL ROOF TECHNOLOGIES

Painting roofs white can reduce air-conditioning loads by as much as 20% because it reflects and reduces heat infiltrating the building.

When Westfield Doncaster Shopping Centre in Victoria applied a coating of white solar reflection paint, the surface temperature of their galvanized roof reduced by approximately 38 degrees and the corresponding roof space by 6.5% as a result.

Feedback from Centre staff acknowledged that the internal cooling effect felt 5 to 10 degrees celcius cooler after the paint was applied to the roof surface.

Cost	\$\$\$
Benefit	☺☺☺
Simplicity	✓

MORE INFORMATION

For further information about how your HVAC system works and the opportunities to improve its energy efficiency including an HVAC action planning checklist, refer to **Section 4.2** of the Handbook.

Cost	\$ = lowest cost, \$\$\$ = highest cost
Benefit	☺ = lesser energy efficiency, ☺☺☺ = greater energy efficiency
Simplicity	✓ = requires external/technical expertise, ✓✓ = can be undertaken in-house but may require some external expertise, ✓✓✓ = can be undertaken in-house.