

## HEATING, VENTILATION AND AIR CONDITIONING

### Energy smart tips for business

Heating, ventilation and air conditioning (HVAC) is essential in most settings to ensure a pleasant, comfortable and safe work environment. Air conditioners can be one of the biggest users of power for modern businesses. It is estimated HVAC typically accounts for 25–50 per cent of the total energy costs for businesses and commercial buildings. It may be required 24 x 7 for special applications, such as preserving valuable art-work and maintaining climate control in computer server rooms.

The design and construction phase of new buildings is a great time to implement an effective HVAC system. There are also opportunities to retrofit or replace an existing HVAC system and introduce an updated energy management plan for your business to improve heating and cooling performance, offering energy and cost savings.

An efficient HVAC system can increase employee and client comfort levels, work performance and offer cost and environmental benefits:

### Cost benefits

- reduced energy consumption
- reduced maintenance costs for HVAC equipment
- reduced HVAC replacement costs due to increased life of equipment
- reduced running costs.

### Environmental benefits

- resource conservation from avoided maintenance and repairs
- reduced greenhouse gas emissions.

### Quick wins

- **Use only when necessary**

Ensure HVAC systems are turned off when the building is not occupied, for example overnight and on weekends.

- **Adjust the temperature with the season**

For maximum comfort, the thermostat should be set between 23-25°C in summer and 18-21°C in winter. Additional heating or cooling results in energy waste - in summer, increasing the thermostat temperature of your air conditioning system by 1°C can reduce related energy consumption by around 10 per cent, and reduce carbon pollution.<sup>2</sup> And in winter, the reverse is true – the higher the set-point, the harder the system works.

- **Section off unused areas**

When heating or cooling, ensure vents and thermostats in unoccupied areas are sectioned off to avoid energy waste. Air conditioning is not recommended in areas that don't need it, such as most storage rooms.

- **If possible, use fans**

Temperature, humidity, and air movement all affect the comfort of a room. Fans can reduce the need for air conditioning and provide a comfortable temperature setting, at a much lower running cost.

- **Avoid peak demand periods**

If your business is connected to a 'Time of Use' Tariff, consider adjusting workplace schedules to reduce energy use during peak demand periods. 'Time of Use' Tariffs mean a higher price is charged for electricity at peak periods, and lower prices during periods of lower demand.

- **Maintain filters**

HVAC filters should be maintained or changed on a regular basis as recommended by the manufacturer, which can be as frequently as monthly during peak cooling or heating seasons. Proper filter maintenance will help avoid energy waste and overwork of equipment.

- **Use timers**

Heating, ventilation and air conditioning running hours can be reduced by using switches and timers, ensuring HVAC systems are turned off when the building is unoccupied if not required for vital functions.

- **Keep your employees informed**

Encourage employees to keep doors and windows closed where appropriate to retain the temperature in specific areas and help reduce energy waste. You can also encourage energy smart behaviours in your employees by sharing your energy management plan.

- **Maintain the system**

HVAC equipment needs to be maintained on a regular basis to ensure efficient operation, reliability and a longer life. Ensure the maintenance program includes the cleaning of condenser coils, evaporators and filters, and fix any duct leaks. Check refrigerant levels and airflows, and adjust each year as required. Old and inferior valves and steam traps can waste energy if not replaced.

- **Install a thermostat**

Programmable thermostats can be used to automate HVAC systems. You can program the thermostat to ensure the HVAC system turns on half an hour before arrival and turns the system off half an hour before leaving. This avoids heating or cooling unoccupied space. Older inefficient systems operate at low, medium or high levels. Programmable thermostats allow the unit to turn off when the set

temperature has been reached and turn back on when the temperature registers a two degree difference, rather than running continually. Ensure a locking cover is used to prevent tampering with thermostat settings. You can also reduce air conditioning demands by locating thermostats away from heat sources such as photocopiers, natural sunlight or space heaters.

- **Avoid unnecessary lighting**

Turning off lights in unused areas and replacing incandescent light bulbs with compact fluorescent (CFL) or LED globes may not only result in lower electricity usage but also in less heat being emitted, potentially saving on air conditioning and ventilation running costs.

- **Use energy efficient office equipment**

Selecting efficient office equipment and electronics can help to minimise heat generation. This, coupled with turning off equipment when not in use, may also yield energy and cost savings.

#### **Did you know?**

- HVAC typically accounts for between 25-50 per cent of the total energy costs for businesses and commercial buildings.<sup>1</sup>
- By reducing draughts via leaks, gaps and cracks, you may save up to 25 per cent of your heating and cooling costs.<sup>4</sup>
- In summer, increasing the temperature of your air conditioning system by 1°C may reduce energy consumption and your bill by around 10 per cent.<sup>2</sup>
- By keeping your HVAC system well maintained, you may save on air conditioning operating costs.

#### **Long-term**

- **Avoid over sizing**

Over sizing HVAC equipment will result in unnecessary investment as well as operation costs. Ensure a proper and well configured system is in place.

- **Insulate buildings**

Reduce heat loss and heat gain by insulating ducts, pipes, wall and roof spaces - this can save up to 40 per cent on your energy costs.<sup>3</sup> Proper insulation may reduce the need for supplementary heating and cooling.

- **Consider energy recovery**

An energy recovery ventilation system can be used to take advantage of waste energy from the exhaust air stream by using it to condition the incoming fresh air.

- **Use radiant heating where suitable**

It may be beneficial to 'spot' heat in areas such as warehouses, garages and patios using direct radiant heating. With this method, objects rather than the air are heated and less energy is used.

- **Avoid losses through windows**

Double-glazing windows can reduce heat loss during winter and also the amount of heat gain during summer. In cooler months, up to 40 per cent of your generated heat can be lost through the windows. The use of shades, drapes, blinds and tinting can be used as climate control tools. Close drapes and shades to prevent solar entry and air conditioning loss during summer and open on winter days to allow the sun to warm the building. Keep them closed at night to keep generated warmth in and prevent possible draught and heat loss. Skylights can also be used to allow natural light to enter which can save on both lighting and heating. Skylights can be covered during summer months and at night to avoid the need for additional air conditioning.

- **Consider variable speed drives**

Where applicable, usually for larger installations,<sup>5</sup> ensure adjustable speed drives regulate motor output fans, chiller water pumps and heating pumps. Variable speed drives (VSDs) save energy in HVAC systems by optimising fan and pump speeds. The speed of the fan motors can be controlled to match the amount of air needed to be moved throughout your building, therefore reducing energy use and costs.

- **Utilise waste heat**

For facilities that have heat-generating processes such as cooking, or onsite distributed generation equipment, consider heat recovery as a way to capture waste heat and use it to offset facility heating and cooling costs.

- **Use dehumidification in humid climates**

In humid climates, the use of a dehumidification system can provide increased comfort at higher temperatures, making smaller sized HVAC equipment suitable.

- **Install economisers**

Energy can be saved if inside cooling is required when the outside temperature is lower than the inside temperature by using economisers. These take fresh air from the outside for cooling rather than using refrigeration equipment to cool re-circulated air.

- **Implement an energy management system**

Energy management systems can be useful when the air conditioning system is too complex to control with timers or thermostats, particularly for larger buildings. The system allows for the use of different cooling temperatures for different zones and optimum equipment start and stop times etc.

These systems may save 5-30 per cent in energy costs and have a payback of two-four years, depending on the type and extent of the system and hours of operation used.<sup>6</sup>

- **Choose to use efficient inverter technology**

When replacing HVAC systems, consider high-efficiency units. Replacing air conditioners that are more than 10 years old can save 20-40 per cent of your climate related energy costs annually, and reduce your carbon emissions.<sup>7</sup> New inverter technology can save up to 30 per cent of energy consumption, compared to conventional air conditioners. Fixed speed compressors will run at full capacity and will stop and start automatically to maintain the desired temperature, whereas an inverter unit will reach the desired temperature quicker and adjust its capacity to maintain a consistent temperature.