



Heating, ventilation and air conditioning optimisation

Your heating, ventilation and air conditioning (HVAC) could be consuming 40% or more of your total electricity usage – in fact, it may be the largest energy guzzler in your business.

What is HVAC optimisation?

Heating, ventilation and air conditioning optimisation is a cost effective way to improve the efficiency and performance of HVAC systems in new and old buildings, and can mean substantial operating cost savings for businesses.

Unlike costly plant upgrades, optimisation can immediately reduce your energy use and costs, with return on investment measured in months, not years.

It is sometimes as simple as changing controls, altering control schedules and temperature settings, and carrying out minor mechanical repairs and alterations to equipment and systems.

You can save up to 50% of the energy use of your entire air conditioning system through one or more simple measures.

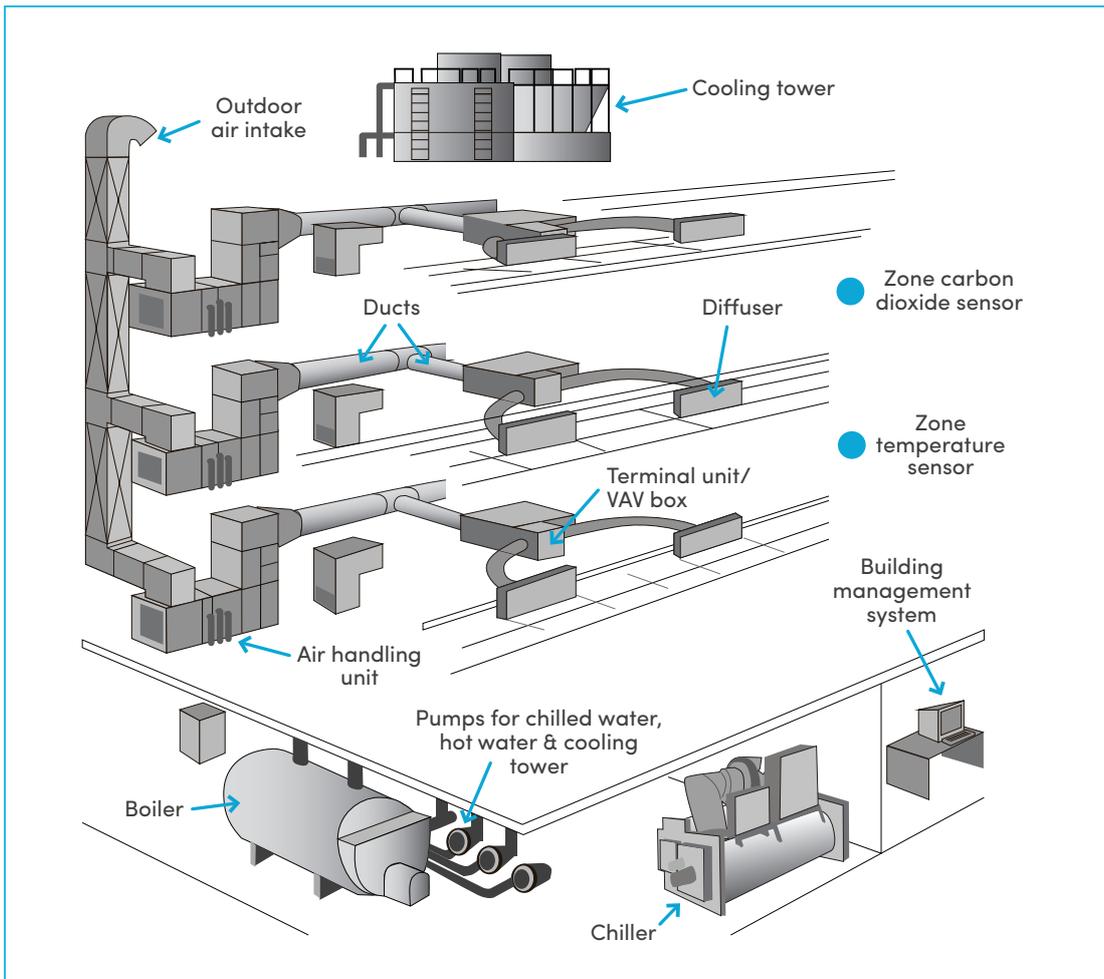


Figure 1: Main components of a typical commercial HVAC system

Savings projects will often involve installing a building management system (BMS) if one doesn't exist, or updating the existing BMS. A BMS controls your air-conditioning system, and you can control it.

A summary of key HVAC optimisation opportunities and potential energy savings is outlined in the table below. Our **HVAC optimisation guide** shows you how you can take action on each of these opportunities.

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How can HVAC optimisation benefit your business?

As well as saving you money through reduced electricity usage, optimising your HVAC can:

- improve the comfort of your workers and therefore boost productivity
- improve tenant satisfaction
- improve the reliability of your HVAC system
- reduce your annual HVAC maintenance costs
- improve the overall energy performance of your building as measured by rating schemes such as the National Built Environment Rating System (NABERS) and Green Star.

Summary of key optimisation opportunities

Strategy type	Action	Potential energy savings
System supervision	Optimise start/stop settings	Up to 10% total energy
	Optimise space/zone temperature set points and ranges	Up to 20% HVAC energy
	Change master air handling temperature signal	Up to 15% HVAC energy
	Stage compressors and chillers	Up to 10% HVAC energy
Plant controls	Optimise hot water, chiller and condenser water temperature sets	Up to 15% HVAC energy
	Reset duct static air pressure	Up to 30% of energy used by fans serving ducts
	Retrofit electronic expansion valves to compressors	Up to 15% compressor energy
Ventilation and air flow	Use outdoor air directly for cooling (economy cycle)	Up to 20% compressor energy
	Use 'night purge'	Up to 20% compressor energy during start-up
	Use demand control ventilation for carbon dioxide and carbon monoxide control	Up to 20% fan energy in occupied spaces and 80% in carparks
Variable speed controls	Set up variable secondary chilled water pumping	Up to 30% on secondary chilled water energy use
	Install variable speed drives (VSDs) on condenser fans	Up to 30% of fan energy
	Install VSDs on water pumps for water cooled condensers	Up 30% chilled water pump energy
Best practice and maintenance	Adopt an integrated energy management plan	Up to 50% total energy
	Train staff in energy management practices	Up to 10% total energy
	Carry out regular maintenance	Up to 20% HVAC energy

Case study: Queanbeyan Hospital

This large regional hospital is saving more than \$120,000 a year after undertaking a comprehensive optimisation of its HVAC system. Strategies that were implemented included:

- reducing the operating hours of its air handling and fan coil units to match each area's use
- shutting down chillers in winter and boilers in summer when not required
- setting zone temperatures
- adjusting the control logic of the boilers and chillers to reduce unnecessary operation.

Implementation was just \$3000, with the payback period measurable in weeks, not years.

Is HVAC optimisation right for you?

You should consider HVAC optimisation if:

- your electricity bill for HVAC operation is very high
- you have an old HVAC system
- you haven't updated your building management system for some time
- your building gets too hot or too cold.

Where do you start?

You will need to collect information about your HVAC system from the building management system, facilities and maintenance staff. You can then focus on identifying and prioritising the most cost-effective opportunities and implementing them in a systematic way. A range of technical service providers can assist you to do this, including:

- energy management consultants
- BMS/controls contractors
- HVAC design consultants
- HVAC contractors and maintenance providers.



The NSW Office of Environment and Heritage (OEH) has a detailed guide to optimising HVAC which is available at: www.environment.nsw.gov.au/resources/business/150317HVACGuide.pdf.

OEH also runs HVAC optimisation training courses. When you attend a course you will receive post-training support to help you implement HVAC optimisation at your site. Find out more at: www.environment.nsw.gov.au/business/hvac-training.htm.

OEH has a panel of pre-approved specialists who can assist with your optimisation project. Visit: www.environment.nsw.gov.au/business/energy-efficiency-expert.htm.

You may be eligible to create Energy Saving Certificates – an additional financial benefit from HVAC optimisation. Talk to an accredited certificate provider to find out more. A directory of accredited certificate providers can be found at: acpdirectory.environment.nsw.gov.au.