

Guide to Best Practice Maintenance & Operation of HVAC Systems for Energy Efficiency

Background

The Heating, Ventilation and Air-Conditioning High Efficiency Systems Strategy (HVAC HESS) is a ten year strategy under the National Strategy on Energy Efficiency (NSEE) that aims to drive long term improvements in energy efficiency of HVAC systems Australia wide. Under The Energy Efficiency Working Group (E2WG), the Commercial Buildings Committee (CBC) manages the implementation of the HVAC Strategy. The CBC is comprised of representatives from Australian, State and Territory Governments.

The Strategy takes a whole of life perspective in targeting HVAC efficiency improvement, encompassing the design, manufacture, installation, operation and maintenance stages of the HVAC lifecycle. The Strategy consists of a number of complimentary measures that fall under the three broad initiatives - People, Practices and Systems.

This Guide to Best Practice factsheet specifically relates to Practices. It is one of a suite of factsheets developed to provide a quick overview and reference to inform, educate, and encourage energy efficiency in the HVAC industry.

What the Guide covers

The Guide to Best Practice Maintenance & Operation of HVAC Systems for Energy Efficiency is designed to encourage those working with the maintenance and operation of HVAC systems to focus on improving energy efficiency.

Historically, maintenance and operation of HVAC systems has focused on complying with statutory requirements for health and safety and providing occupant comfort, with little consideration given to long term value for money. Therefore, opportunities for achieving energy and efficiency gains have been missed and lifecycle costs not given due diligence.

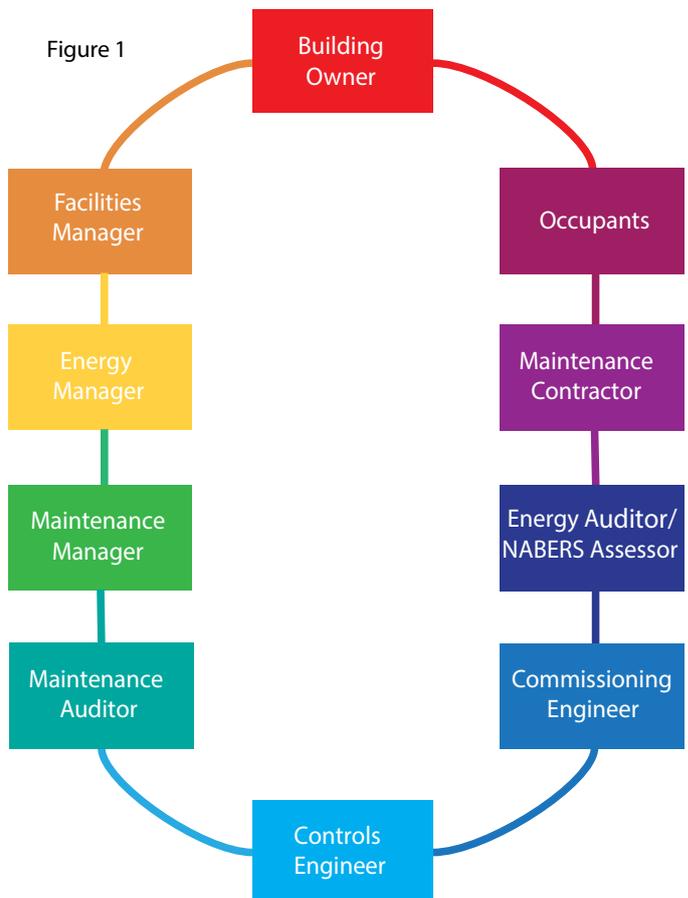
The Guide provides valuable information to those who are engaged in managing, operating and maintaining HVAC systems and endeavours to achieve the sustainability goals typically set by the Building Owner.

Within the Guide you will find:

- ▶ Information for Facilities Managers on key factors that influence the performance and efficiency of HVAC systems
- ▶ Solutions for issues relating to Building Occupants and information on how they make an important contribution to efficient building operation

- ▶ Practical advice to assists Maintenance Service Providers to proactively identify energy and water saving opportunities during routine maintenance and operational activities
- ▶ Beneficial information for Maintenance Technicians regarding training opportunities
- ▶ Dedicated sections for Controls and Commissioning Specialists who make an important contribution towards the delivery of high building performance
- ▶ Key issues identified for Design Engineers to consider when working on concept design through to documentation, installation, commissioning and sign-off
- ▶ Solutions to key issues relating to Energy and Maintenance Auditors and the monitoring of the environmental performance of buildings and the effectiveness of maintenance.

Figure 1 identifies Stakeholders who will benefit from using the Guide:



The Guide provides detailed information on:

- ▶ HVAC Maintenance Implementation Process
- ▶ Building Operation
- ▶ Documentation
- ▶ Financial and Environmental Evaluation
- ▶ HVAC Equipment and Efficiency.

Maintenance implementation process

Maintenance is an important factor in making HVAC systems more efficient and a proper maintenance specification for a building must be site specific. Generic documents with cut and pasted clauses will not deliver good results for energy and efficiency, or HVAC system performance. This section provides valuable information for energy and efficiencies and increases awareness of important issues.

Building Operation

The building operation section of the Guide outlines important factors for people of various roles to remember when working with HVAC Systems. Building Owners, Facilities Managers, Building Occupants and Maintenance Contractors are provided with information that summarises their overall responsibilities and provides suggestions to assist with ensuring that the performance and efficiency of the HVAC System is maintained.

Documentation

It is essential to maintain and update the important documentation related to a building and its services, from design through to demolition stages. Good documentation is essential for a number of reasons including health & safety, maintenance & operation, financial accountability and for achieving energy and water efficiencies. The Guide provides important factors to remember when establishing:

- ▶ Operating & Maintenance Manuals
- ▶ Maintenance log books
- ▶ Building User Guides
- ▶ Tenancy Fit-out Guidelines
- ▶ Asset Registers
- ▶ Environmental Impact Rating.

Financial & Environmental Evaluation

This section outlines the methods available for maintenance contractors to assess cost effectiveness and environmental outcomes. This will assist Facilities Managers achieve energy and water consumption reduction measures.

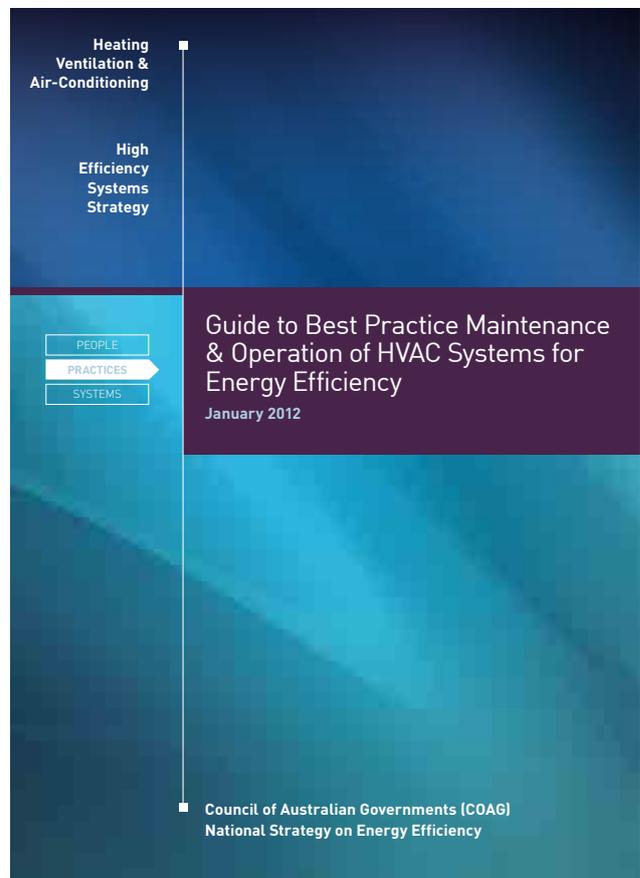
To deliver long term benefits and good outcomes for best practice, operation and maintenance in buildings, a combination of maintenance strategies, informed judgment and economic analysis should be employed. It is important to understand the principles of basic economic analysis discussed in this chapter.

HVAC Equipment & Efficiency

HVAC electricity consumption forms a significant amount of total building consumption – typically around 50% of total building electricity consumption and 70% of base building (i.e. landlord) electricity consumption. Within HVAC systems there are a number of key areas of consumption, including:

- ▶ Fans
- ▶ Cooling
- ▶ Heating
- ▶ Pumps
- ▶ Cooling towers.

This section provides essential information regarding these elements of a HVAC system and methods of reducing energy usage.



Checklists

At the back of the Guide you'll find a suite of checklists designed as a quick reference for the users and managers of HVAC Systems. The checklists provide the specified user with the steps that they need to take and what information may be required in implementing them.

The Guide and Checklists are available on the Australian Government Department of Climate Change and Energy Efficiency website at: www.climatechange.gov.au/government/initiatives/hvac-hess