

# Energy Savings Checklist

## Lighting systems

- > Ensure lighting levels comply with requirements of AS 1680
- > Check effect of lighting on air conditioning running costs
- > Only power factor corrected luminaires to be used for renovations and new installations
- > Regularly clean and service luminaires
- > Change incandescent bulbs to fluorescent tubes
- > Change standard 40W fluorescent tubes to 36W high-density triphosphor tubes
- > Replace standard fluorescent ferro-magnetic tube ballasts with electronic ballasts
- > Consider de-lamping, voltage reduction, motion detectors, light sensors, time switches, multiple switching, better reflectors and better skylighting
- > Fit windows with blinds/shadecloth/external shading to minimise sunlight penetration and glare
- > Ensure lighting is switched off when areas are unoccupied - fit extra zone switches if needed
- > Discourage use of extra low voltage lights due to total cost, frequent replacement and effect on airconditioning costs.

## Hot water systems

- > Use instantaneous hot water urns where practicable
- > Minimise hot water requirements and allow for local boosting in areas such as kitchens
- > Ensure separate boilers are installed for domestic hot water and space heating
- > Ensure domestic hot water pumps are switched off out of hours
- > Set hot water storage tank thermostats at around 65°C (but not more than 70°C)
- > Install or upgrade insulation on hot water lines

## Heating and cooling buildings

- > Check adequacy of ceiling insulation and install or upgrade as necessary
- > Select most appropriate system (e.g. radiant for most factory heating applications)
- > On large factory and warehouse doors, fit 'Rollfast' doors or clear plastic strips as appropriate to prevent heat gain/loss
- > Set heating thermostats to 18°C in winter and 23°C in summer
- > Use time clocks to control system operation and minimise plant operation
- > Ensure filters and systems are correctly maintained to reduce system pressure loss
- > Minimise air infiltration leakage from airconditioned space
- > Ensure shades are closed when sun is shining on windows
- > Discourage the use of personal radiators and fans
- > Investigate use of evaporative coolers for large space areas
- > Check zoning of airconditioning system
- > Ensure zone thermostats are not competing
- > Use fresh air economy cycles
- > Conversion of constant volume dual duct or terminal reheat systems with backward inclined or airfoil fans to variable air volume (VAV), using variable speed drives (VSD) so that only air volume needed to meet actual load is delivered
- > Assess fan performance of VAV systems. If vanes and dampers are more than 20% closed on a peak load day, the fan speed may be reduced
- > Fit VSDs to fan drives on existing VAV systems that currently use inlet vanes or outlet dampers for air volume control
- > Use VSDs on fan drives - save up to 50% on energy use
- > Recover low-grade heat for space heating purposes
- > Use building thermal inertia and let chilled water temperatures rise in airconditioning systems during periods of peak electricity load to reduce peak demand. Also consider ice storage
- > Check whether chiller plant unit may be retrofitted with electronic TX valve
- > Check all chilled water lines are adequately insulated.

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## Boilers and steam systems

- > Check for use of most appropriate fuel type
- > Check and optimise boiler excess air level to practical minimum
- > Check potential for automatic excess air control on boiler
- > Optimise boiler sizes and scheduling for expected load (winter/summer)
- > Check cleanliness of boiler (tube fouling/scale), water treatment systems and feed water source
- > Check steam supply pressure
- > Observe boiler control cycle
- > Check blowdown cycle amounts and times
- > Check potential for flue dampers in boilers
- > Check insulation of boiler
- > Check for steam leaks from boiler over pressure valves
- > Check potential for economisers to preheat feed water/make-up water
- > Check feed water/hot well vertical separation
- > Check condensate, feed water and deaerator temperatures
- > Check insulation of condensate, feedwater and deaerator tanks
- > Check insulation of feed water lines and fittings
- > Check water treatment records
- > Check exhaust from condensate, feed water and deaerator tanks
- > Check potential for pressurised condensate return system
- > Check potential for blowdown waste heat recovery system
- > Check for steam leaks in distribution system
- > Check for failed steam traps
- > Check condensate return levels (calculate percentage)
- > Check insulation of condensate return lines and fittings
- > Check insulation of steam lines and fittings
- > Check potential for utilisation of flash steam
- > Check potential to convert from steam to hot water for heating
- > Check potential to convert from central plant to satellite plant
- > Check potential to change from calorifiers to direct heating systems
- > Check domestic hot water temperatures
- > Check heating water temperatures
- > Check for potential waste heat recovery from incineration
- > Check cogeneration potential

## Compressed air systems

- > Optimise compressor sizes and scheduling for expected load
- > Regularly check the compressor run time - determine efficiency and compare with best ever efficiency after system installation/refurbishment
- > Investigate the use of a VSD compressor
- > Retrofit low-flow blowdown nozzles on compressed air systems
- > Relocate compressor intakes for lowest intake temperature
- > Ensure compressed air tools operate efficiently and that their air hoses are adequately sized
- > Only use air motors when necessary
- > Ensure compressed air is not over-dry
- > Minimise system water build-up
- > Check system's air pressures are the lowest practical for the application and use pressure regulators where appropriate
- > Check compressed air lines for leaks and repair any leaks found
- > Check potential sequencing of compressors to operate most efficient compressors for total system air requirement

## Plant drives

- > Ensure appropriate drive is used  
(i.e. direct drive, v-belt, notched belt, flat belt, etc)
- > Check belt drives are neither too loose or over tensioned
- > Replace oversized motors
- > Optimise pump/fan flow rates for required duties
- > Use variable speed, or at the least multi-speed motors, on condenser water pumps, cooling tower fans and air-cooled condenser unit fans. Or use a sequential approach. Either way, drives should be controlled by condenser water temperature or condenser leaving air temperature
- > Check potential use of high efficiency motors.