Motor systems checklist

Many energy saving opportunities exist within motor systems, it can however be difficult to know where to start looking for these opportunities. This checklist is intended for managers of motor systems and other personnel interested in energy savings; it presents a systematic approach to identifying opportunities and suggesting possible improvement measures. Before carrying out steps 1 to 9 below for each motor system, compile an inventory of all the motor systems on site. Ensure the listing is created by motor size and annual running hours, and prioritised by the largest energy users.

Maintenance musts	Complete Y/N	Action/comment
1. Determine the process demands. Review each system and determine the process demands including throughput rates of the system. Identify opportunities to reduce the overall process demand. Include a review of process set points.	☐	
2. Review the service that the system is delivering Establish the following: a) Is it necessary? b) Can it be delivered by some other more energy efficient means? c) Does the throughput of the system match the (varying) demands of the process?	☐	
3. Look for opportunities to optimise the whole system. Can the system be optimised? Review the throughput of the system and look for ways to ensure it is working near its peak efficiency.	☐	

4. Optimise the performance of components. Once the throughput is right, look for ways to optimise the performance of components in the system, for example: ☐

   a) Is the pump/fan the correct size and working at its best efficiency point?
   b) Can high efficiency motors and other equipment be installed?
   c) Is the equipment in good condition, does it need repair/upgrading?
   d) Are components redundant, can they be removed (e.g. valves, dampers)?

5. Improve the way the system is controlled. Look for opportunities to improve the way the system is controlled: ☐

   1) Where motor/equipment runs for long periods without doing useful work look for opportunities to implement automatic switch off (Stop-Start) controls. Implement manual switch off procedures if that is appropriate.

   2) Replace control by dampers/throttle valves:
   a) where loads are constant, by reducing the input speed to fans/pumps, or;
   b) where loads are variable, by controlling the speed of fans/ pumps with variable speed drives.

   3) In other systems where loads are variable:
   a) Use variable speed drives to match the speed to the load or;
   b) Use sequencers to switch banks of parallel equipment.

6. Review mechanical power transmission systems: ☐

   a) Are belts in good condition, correctly tensioned & aligned?
   b) Are there opportunities to switch to direct couplings?

7. Check electrical supplies. Ask your electrician to check the electrical supply: a) Are the supply voltages within 10% of the rated nominal values for the motor? b) Are the phases balanced to within 1%? (See CTV016 – "Motors Technology Overview" for further guidance. c) Is the electrical power factor within acceptable limits for the site? (Different sites set different limits; optimum motor performance will be attained when it is between 0.95 and 1).	☐
8. Look out for persistent faulty equipment. Rectifying the equipment/cause of the fault may lead to energy savings.	☐
9. Look at the overall health of the system. a) Are ductwork and pipes clean? b) Are filters clean? c) Have all leaks (including leaky valves) been repaired?	☐
10. Review/develop the site motor management policy. A motor management policy (MMP) will provide a structured approach to the repair and maintenance of motors, realise notable cost savings on most motors in an organisation, and achieve other benefits such as reduced downtime.	☐
11. Review and amend the site maintenance schedule. Ensure the maintenance schedule takes account of measures to maintain or enhance the energy efficiency of motor system operation.	☐
12. Always seek specialist help where you are uncertain about energy saving measures to implement. Many motor systems require specialist knowledge about their operation; always obtain their input to help prevent unintended outcomes.	☐