

### 4.3.5 Electrical power supply

Quality of the electrical power supply and the manner in which the power is used can affect energy efficiency, see Section 3.5. This may be difficult to understand and is often overlooked. There are often energy losses as unproductive power inside the installation and in the external supply grid. There can also be loss of capacity in the installation's electrical distribution system, leading to voltage drops, causing overheating and premature failure of motors and other equipment. It may also lead to increased charges when buying in electricity.

**21. BAT is to increase the power factor according to the requirements of the local electricity distributor by using techniques such as those in Table 4.3, according to applicability (see Section 3.5.1).**

Technique	Applicability
Installing capacitors in the AC circuits to decrease the magnitude of reactive power	All cases. Low cost and long lasting, but requires skilled application
Minimising the operation of idling or lightly loaded motors	All cases
Avoiding the operation of equipment above its rated voltage	All cases
When replacing motors, using energy efficient motors (see Section 3.6.1)	At time of replacement

**Table 4.3: Electrical power factor correction techniques to improve energy efficiency**

**22. BAT is to check the power supply for harmonics and apply filters if required (see Section 3.5.2).**

**23. BAT is to optimise the power supply efficiency by using techniques such as those in Table 4.4, according to applicability:**

Technique	Applicability	Section in this document
Ensure power cables have the correct dimensions for the power demand	When the equipment is not in use, e.g. at shutdown or when locating or relocating equipment	3.5.3
Keep online transformer(s) operating at a load above 40 – 50 % of the rated power	<ul style="list-style-type: none"> <li>for existing plants: when the present load factor is below 40 %, and there is more than one transformer</li> <li>on replacement, use a low loss transformer and with a loading of 40 – 75 %</li> </ul>	3.5.4

Use high efficiency/low loss transformers	At time of replacement, or where there is a lifetime cost benefit	3.5.4
Place equipment with a high current demand as close as possible to the power source (e.g. transformer)	When locating or relocating equipment	3.5.4

**Table 4.4: Electrical power supply techniques to improve energy efficiency**