Detailed Services Limited
YOUR 24/7 SERVICE PARTNER

SAVE ENERGY!! SAVE MONEY!! SAVE JOBS!!

ELECTRIC MOTORS AND UK ENERGY CONSUMPTION:

It has been estimated that global energy consumption of electric motors is around 9000TWh per year. The Carbon trust has stated that in the UK the industrial use of the electric motors accounts for almost two thirds of the entire industrial electricity consumption. The Carbon Trust document, published in 2007, also notes that the cost of buying an electric motor can be very deceptive, a years running cost can be up to ten times its purchase value.

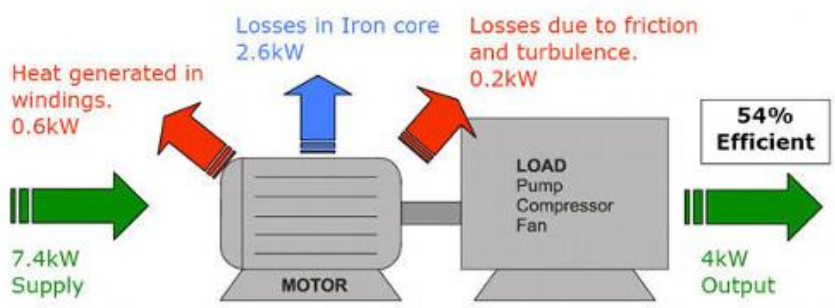
The typical annual running costs for a fully loaded motor were estimated to be around £800 for a 2.2kw motor, rising to £14000 for 37kw. With this scale of running cost per motor, the cost saving initiatives across a number of motors can be huge.

INNOVATION WILL SAVE THE WORLD!!

Close speed control is key!

The key to most factories savings is the closed speed control of fans and pumps, using AC drives. Matching supply with demand and therefore reducing the plant power consumption, either on full production or in an idling state. All industrial fans and pumps should be fitted with an AC drive which can receive a speed reference which will then monitor the system and the pressure and temperature and then in turn predicts and produces running trends.

When working at or near full load, a typical three phase induction motor is relatively efficient, normally achieving in the region of 80-95%. However, efficiency falls dramatically when the load falls to less than 50% of the rated output. Very few motors actually experience consistent full load operation and most operate at much lower loads either due to oversizing, which is a very common situation or the natural load variations.



This is based on a 20kw motor running at 20% load.

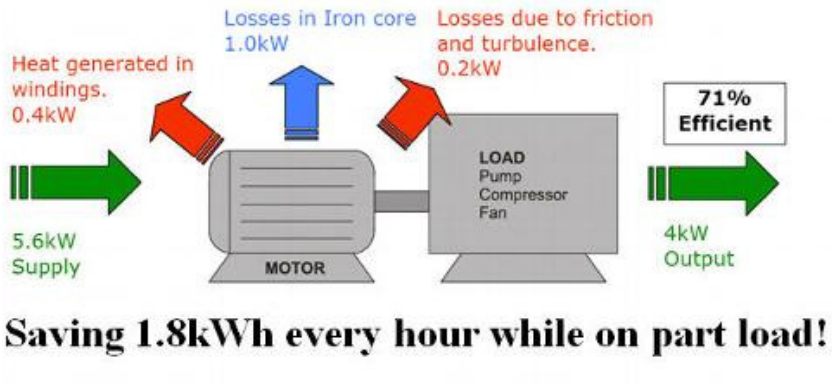
This diagram shows a 20kw motor that is running at 20% of its full load capacity. As you can see the total efficiency is only 54%.

The majority of electric motors are running fixed-speed applications, normally these motors will have some sort of inverter or soft start unit controlling the motor, and these can surprisingly be expensive and complex and will consume and will normally consume 5-8% of the power of the motor being consumed.

The alternative is a voltage optimising version of a semiconductor motor controller, which is an enhanced electronic soft starter. These units are new to the market and can save energy where the loading is less than 50%. This functions by detecting the load at any instant and adjusting the motor terminal voltage accordingly. It is possible to save some of the excitation energy and load loss and improve motor factor when the motor is running inefficiently at loading levels below 50%.

All the necessary calculations are carried out by an internal microprocessor to find the best degree of phase-back of the Thyristors for any load condition. Secondly the start always synchronises with the supply voltage and a special sequence of turn-on pulses virtually eliminates inrush currents normally associated with motor start-up.

The soft start unit basically runs as a power factor correction unit for the motor and maintains the best possible value for all load conditions. Therefore saving energy and running costs throughout the production. Although not fully tested this could also increase the life time of the motor.



20kw motor running at 20% load with a FE Optimising soft start.

Once the optimising process takes place the total energy efficiencies are increased to 71%

% Time Part Load	Annual Hours at Part Load	kWh Saving	Annual Saving
40%	3,494	6289	£818
60%	5,241	9434	£1226
80%	6,988	12578	£1635

Assuming motors run 24/7

Savings calculate: the annual savings amount that could be achieved for 1.8kw per hour reduction is shown in this table.

This is taking the price of electricity at £0.13 per kwh.

above is a worked example: every application is different and will generate different levels of savings.