Pump Performance and energy efficiency
Upgrades to your pump site may be required to increase the performance and efficiency of your irrigation pump and electric motors. Investing in conversions or modernisations can effectively be paid for or offset through savings in energy. Relatively conventional upgrades can include Power Factor Correction equipment, variable speed drives or soft starters.

Power Factor Correction equipment
The “Power Factor” of an electrical irrigation pump motor is a technical measure of how efficiently electricity is used on site. A farm using large amounts of electricity will sometimes be charged a penalty for having poor power factor. In these instances, the farm is showing a poor, unpredictable load to the network and in response, the network must provide more power to the transmission pole or transformers than it actually needs.

The Power Factor is calculated by your network service provider and is generally shown on your bill as a number between zero and one – where one represents the most efficient use of electricity.

A Power Factor of less than 0.9 is generally regarded as low, meaning the motor is drawing more energy than it needs to run the motor. This will be reflected in large customers bills as higher electricity demand charges.

Power Factor Correction (PFC) equipment can reduce monthly maximum demand and capacity charges by reducing peak energy use rates that occur during motor start-up or sudden load changes.

Payback can be as low as 1-2 years on PFC equipment. The cost of PFC equipment may vary depending on the size of pump and motor, so it is recommended that irrigators engage a specialist irrigation or electrical motor engineer.

Choosing between Variable Speed Drives and soft starters
Variable Speed Drives (VSDs) are used in irrigation to adjust a pumps flow or pressure to the field. The main advantage of a VSD is it allows changes in energy demand to meet the requirements of the pump under a range of changing circumstances where otherwise, a single-speed pump would be installed for the highest output demand. VSDs allow small variations in pump speed to be made rapidly
and regularly. Therefore, VSDs offer convenience and great potential for cost savings by preventing over-pumping and over pressurising your pipes and irrigation equipment.

A soft starter controls the acceleration of an electric motor through the modification of the applied voltage. A soft starter helps protect the motor and connected pumping equipment from damage by controlling the terminal voltage and a gradual ramp up the full pumping speed. This reduces spikes in energy demand and electricity demand charges generated on start-up. It also prevents water hammer, prolonging the life of pumps, pipes, valves and headworks and has the ability to start additional pumps using the existing electrical supply capacity.

Comparing between VSDs and soft starters will depend on your pump set up and your water source. VSDs are generally not suitable where high static head occurs. E.g. in groundwater pumping applications.

Soft starters are less expensive than VSDs, especially for larger pumps. Soft starters are smaller and occupy less space. A VSD will involve greater initial capital outlay than a soft starter but may offer greater potential for savings over the life of the equipment.

It is recommended that you seek advice from a specialist irrigation consultant to ensure that PFC, VSD or soft starter modifications best suit your needs.