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Electricity savings: the power is in your hands

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Refrigeration is by far the biggest user of electricity in a packhouse, accounting for 59% on average.

Photo: Lindi van Rooyen

Lindi van Rooyen

Increasing energy costs have cut into many a farmer's profitability. With more increases from Eskom on the cards, producers need an action plan to cut usage wherever possible. Koos Bouwer, an industrial engineering consultant, gives practical advice on reducing a farm's electricity bill. Lindi van Rooyen reports.

Electricity consumption is a major input cost on most modern farms, so it stands to reason that any significant reduction could save many thousands of rands in the long term. The good news is that big cuts in consumption can be made through small changes in farm management.

"Without investing any money in expensive equipment, a farmer can save about 30% of electricity costs," says Koos Bouwer, an industrial engineering consultant. "The first step is to establish which part of the farm is absorbing the bulk of your electricity consumption. Then decide which changes are worth the effort."

In a case study conducted on a citrus farm, Bouwer found that although the packhouse absorbed 36% of total power usage, it accounted for 44% of total cost. By contrast, the irrigation system used 51% of the total power, but accounted for only 44% of the cost, while electricity in the houses accounted for 13% of power usage and 12% of the total bill.

Timing power usage correctly

“On just one farm, the cost can vary from 48c/kWh to R3/kWh, depending on when the electricity is used and how much is drawn,” he explains. “About 50% of the price paid for electricity is linked to the farm’s maximum demand (kVA). Eskom uses this as the base rate for calculating the farm’s electricity costs each month. The lower this figure, the cheaper your power.” Boucher advises that in order to prevent a high kVA, farmers should use electricity during off-peak periods.

Alternatively, they should delay activities that draw a lot of current to periods when farm appliances are not being used. “Don’t, for example, switch on all cold stores at the same time,” he says. “If you do this for only half an hour, then the demand peaks and the farm’s electricity consumption is measured according to that peak for the rest of the month. “Switching off cold stores for a few hours during peak times can also make a big difference to electricity costs.”

Boucher adds that a power factor corrector can reduce the peak consumption rate considerably. Even though the initial cost of the device is high, it can pay for itself within a year through electricity savings. “A farm can move from paying R1,04/kWh to 70c/kWh with a corrector,” he says. Boucher notes that a farmer may also be able to save on power costs by buying directly from Eskom rather than from the local municipality.



Koos Boucher

“Find out what neighbouring farmers are paying and where they are buying from,” he advises. “Sometimes there’s no difference in prices between buying directly from Eskom and buying from the municipality, but often the latter adds a considerable mark-up. If the municipality is more expensive, discuss it with them. You might not get an answer or a solution immediately but if you put pressure on them for long enough, you could benefit.”

Stepping up efficiency

Boucher says that while some packhouses operate at 35kWh per ton of fruit, others are run at 15kWh per ton – simply through greater efficiency. “The most obvious component to look at is lighting,” he explains. “For example, roofs that let in natural light can save on electricity costs. However, lights make up only 14% of energy consumption in a packhouse, so you must decide if the cost to switch is worth it.”

Refrigeration is by far the biggest user of electricity in a packhouse, accounting for 59%, so reducing heat loads on the system can cut energy costs significantly. “If you harvest fruit in the heat of the day, leave the produce outside to cool down before putting into cold stores. Otherwise the fridge needs more energy to cool down the fruit,” Boucher suggests. “In winter, if it’s colder outside than inside, allow nature to assist you. Switch off the fans and let the outside air in. It’s such a simple thing to do, and it will save you money.”

He stresses that cold stores should ideally be used at full capacity. “It takes the same amount of energy to cool five pallets of fruit as it does to cool 50. I’ve visited a farm where three cold stores were running with three pallets in each.” To cut the costs of operating fruit driers, Boucher suggests re-routing and re-using the hot air from the chimneys. “Why use up unnecessary power to heat up cold air all the time? The air leaving the chimneys is at about 50°C while air in the drier is at 64°C,” he says. Shorter distances on packing lines can also reduce electricity consumption. “If fruit is travelling 20m to arrive at the first work station, you’re wasting power,” he points out.

Planning

Boucher’s advice to farmers is to draw up an action plan to benchmark electricity usage, set targets, reduce heat loads and maximise energy utilisation. “Confirm which electrical components on the farm draw the most energy and decide where you are going to reduce usage,” he says. “Log the figures, do the calculations and identify saving opportunities. Then get farm management on board or it won’t be effective.”

Boucher emphasises that there is no quick fix or a one-size-fits-all solution to saving electricity on a farm. “Analyse your own unique situation. You might be doing well and might not need huge changes. Benchmark and then decide.”

Contact Koos Boucher on bouweb@orangenet.co.za

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