



# Eskom Energy savings on farms

## Fact Sheet



### Suggestions to use less electricity and water to save



Rising electricity costs and the growing shortage of water are forcing farmers to look at what they can do to reduce their consumption.

Below are suggestions on how to save electricity and water.

### Irrigation systems



Optimizing irrigation systems means meeting water requirements at the lowest possible cost. System design must, therefore, focus on keeping operating costs as low as possible over the long term and not on keeping initial capital outlay as low as possible.

#### Things to consider when improving system efficiency:

- Select the correct pump/motor set.
- Don't throttle to control pressure – trim the impeller according to the system requirement or install a Variable Speed Drive (VSD) to control pressure and flow by varying the motor speed accordingly.

- Pivots - install a pressure transducer connected to a VSD to ensure constant pressure as the pivot moves through varying gradients.
- Operate pumps in parallel/series to meet varying demand where applicable.
- Reduce pipe friction losses by replacing 90° elbows with long radius bends or two 45° bends and using the correct pipe diameter.
- Insert moisture probes into the soil and apply water according to plant requirements– this helps save water and electricity.
- Repair all leaking pipes, tubes, pipe connections, drain valves and flanges.
- Replace worn/broken sprayers.
- Replace worn impellers.
- Avoid cavitation by using the correct design when installing a pump.



### Considering VSDs



Benefits of VSD:

1. The current required for motor start-up is reduced.
2. The motor runs more in stable region.
3. The motor speed will automatically adapt to meet the demand.
4. Improve power factor.

### Remote Control and Automatic Restart of Pumps



Remote control and automatic restarting of pumps have become a very important factor in modern day irrigation farming. With the electricity grid being under pressure and cost of electricity escalating, the solution would be to use an automatic/remote control to switch off during Eskom's peak hour times or when required and restart automatically after power dips or power failures have occurred - saving costs and time. A VSD is an option that can be used effectively to fulfil the stop and restart functionality.



## Other factors that can play a role in opting for remote control and automatic restart :

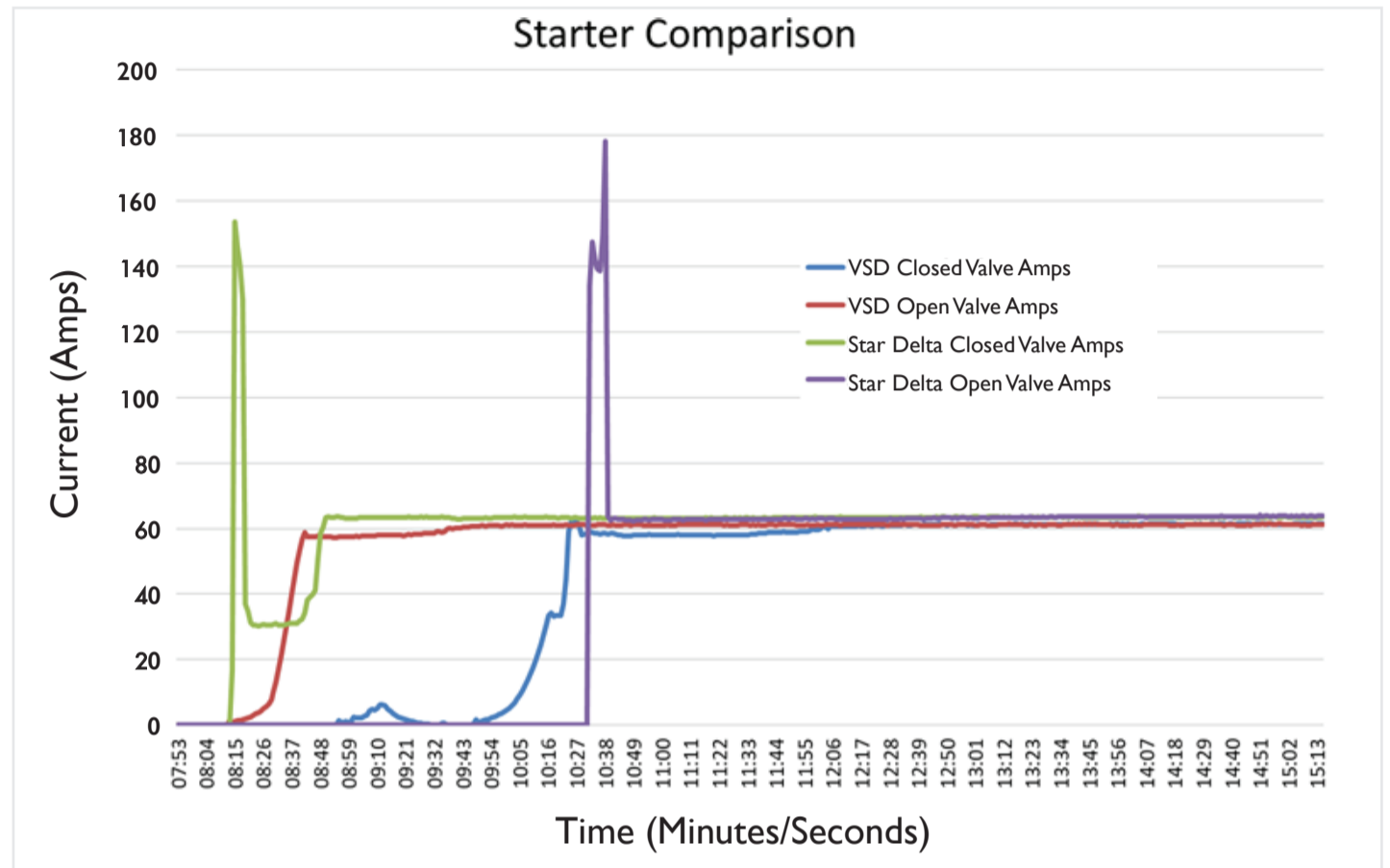
- Number of pumps to be switched on or off.
- Distance and time to travel to pump stations.
- Safety after dark.
- Farm road conditions.
- Saving fuel and vehicle maintenance costs due to the system restarting itself.

## Generators

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Generators are installed to run pumps as a back-up or as a stand-alone power supply. This can be very costly as the generator needs to be sized to handle the start-up current of the motor. Excluding purchase and maintenance costs of a generator, the running costs are currently approximately 5 times that of an electric motor supplied by grid electricity. By installing a VSD, a smaller sized supply of electricity will be required as the VSD will ramp the motor up to full speed, therefore avoiding a high start-up current as per the example to the right.

Current (Amps) Comparison of starters



## Transformers

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All transformers consume power when they are powered up.

This costs a substantial amount each year. Rather install an in-line contactor on the step-up transformer so that it can be switched off when the pivot switches off. Choose a more efficient transformer where possible.

## Dairies

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### Heat recovery

Heating accounts for approximately 30% of energy use in dairies.

Refrigeration units that cool bulk tanks or make ice generate heat ( $\pm 85^{\circ}\text{C}$ ), which is lost to the atmosphere. Install a heat exchanger into the refrigerant line and pre-heat the water for the dairy by circulating it through the heat exchanger. Approximately 30% of the refrigeration load could be used for pre-heating water.

## Vacuum pumps

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Vacuum pumps are crucial in dairies and are at the heart of the milking process. Since the washing cycle usually requires more airflow, the vacuum pump should be sized accordingly. Vacuum pumps run at full speed during the milking and washing cycles, using a vacuum control valve to regulate the vacuum level in the milking system. By installing a VSD and replacing the vacuum control valve with a pressure transducer, the vacuum can be maintained constantly while the speed of the motor varies according to the requirements of the milking system.



### The benefits are:

- Reduced power (kW).
- Reduced heat and noise.
- Increased life of the vacuum pump and motor.
- Energy savings (kWh).
- Short payback periods.
- Quicker vacuum recovery.



Contact your service agent to check if your vacuum pump can be controlled by a VSD, and whether a change would be feasible.



## Refrigeration

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The most important factors playing a role in supplying a quality milk product, are:

1. The efficient working of a milking machine during milking and washing.
2. Proper hygiene control.
3. Efficient refrigeration system for the pre-cooling of milk and to cool down milk as soon as possible.

Whether a direct expansion refrigeration system or an ice bank is used, both have a compressor and a condenser unit.

To ensure the optimal refrigeration conditions, the following need to be kept in mind:

1. Size the refrigeration system correctly and do not overload the cold room.
2. Ensure sufficient space for ventilation of cold air in-between milk containers.
3. Have sufficient cross flow ventilation over compressor/condenser unit to prevent.
4. Ensure that the compressor/condenser units are not exposed to direct sunlight.
5. Ensure that the compressor/condenser unit is installed on the southern side of the building.
6. Stick to an effective preventative maintenance plan to prevent dirty coils and freeze-ups.

## Lighting

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- Replace energy-intensive lighting systems with energy efficient alternatives.
- Use motion sensors, timers or day/night switches.
- Keep lights clean.
- Use opaque roof sheeting for natural lighting.

## Reading your meter

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- Eskom's Landrate customers' meters are read once every 3 months and the other 2 months are estimated. Consider reading your own meters every month and send it to Eskom on the following channels:

My Eskom Customer App (download it from the App Store or Google Play); or CS Online at [www.eskom.co.za](http://www.eskom.co.za) or SMS – 35328.

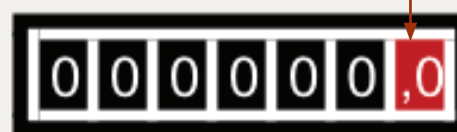
Alternatively, phone in your readings to the Contact Centre – call **08600 37566**.

### Note:

- Various types of meters are used - below are the typical 4, 5 and 6-dial meters with a decimal. (The decimal may appear in red.)



Do not read the decimal





## Sizing your supply

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- New installations can be costly, so it is essential to get the transformer sized correctly from the start. You will need to pay to get it changed.

### When applying for a new supply consider:

- What you need power for?
- When do you need power?
- Your future expansion plans?

Get your electrician or a consultant to help you with these details.

### To keep your demand down, consider the following:

- New technologies like VSDs.
- Heat recovery.
- Load management; stagger-starting equipment.
- Power factor correction.
- Stockpiling to limit the number of motors running simultaneously.
- Load profile optimisation to prevent an oversized electricity supply.

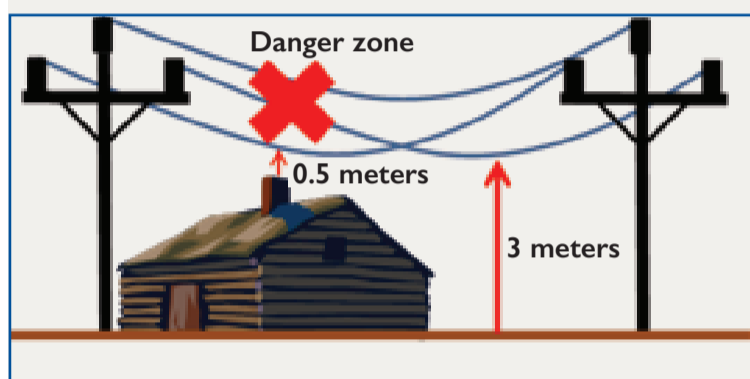
### An incorrectly sized load costs money:

- The contract period of 5 years (Eskom electricity supply agreement) can not be decreased or terminated.
- Connection fees.
- Cost of a transformer change.
- New meter and kiosk.
- Conversions.

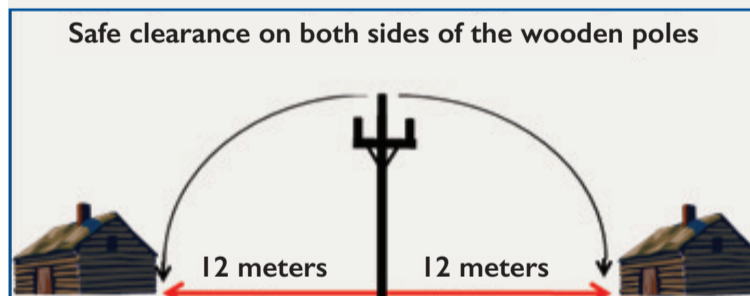
## Positioning your supply - safety is critical

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- Avoid vehicle routes or machine operating areas.
- Avoid flood plains, below dam walls, dams and wetlands.
- Determine the possible load centre.
- Determine the kVA you need.
- Always be aware of power line routes, movement of people, vehicles, machinery or buildings under or near the transformer or power lines.
- The safe distance from the ground to the power lines is 3 meters for all woodern pole structures.



- The clearance distance from the pole centre to any structure should be 12 metres



## Choosing a tariff

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### Consider:

- Operating hours.
- Operating outside peak periods.
- Can you achieve your required production level without overtime?
- Will you be able to irrigate sufficiently during these times?
- Are you located in an industrial, residential, commercial or rural area?
- On certain tariffs the high demand season needs to be considered.

Go to [www.eskom.co.za](http://www.eskom.co.za) to look at the tariffs, and request a tariff comparison from an Eskom Energy Advisor.

### Incorrectly selected tariffs will cost you money:

- New meter and kiosk.
- Network capacity charge.
- Service charge.
- Administration charge.
- Active energy (kWh) charges.
- Reactive energy charge (bad power factor).

E-mail an enquiry to [advisoryservice@eskom.co.za](mailto:advisoryservice@eskom.co.za) or call **08600 37566** and ask that an Energy Advisor contacts you. For more information go to [www.eskom.co.za/advisoryservice](http://www.eskom.co.za/advisoryservice).

