

## Drives give South African farmer 40% energy savings, smoother operation and less work

Sometimes, when you are trying to solve one problem you can inadvertently cause another one. However, in the case of Riecor Farming in South Africa an attempt to resolve one problem actually solved it extremely well and, in addition, gave numerous side benefits that decreases costs, work and headaches while making the farmer's job easier.



1 Riecor Farm located in North West Province of South Africa irrigates 700 hectares of its 1,645 total hectares.

The country of South Africa is developing at a fairly rapid, though certainly not smooth and steady, rate. With industrial and economic development comes increasing demand for electricity, which in South Africa is mainly based on coal-fired power plants. Rising demand, but limited supply, has meant that for the past three or four years electricity prices have increased for consumers and commercial users by more than 20% on average per annum. Price hikes like that are difficult for anyone to handle and this is especially true for the hard-pressed farmers in the country.



For Riecor Farming one of its biggest operating expenses is in the irrigation systems, which are an obvious necessity for farming but also expensive to operate. Therefore, faced with rising electricity prices and knowing that there must be some efficiencies to be gained in the water pumping process, the farm owner began to investigate alternatives.

## **Manual valves and power outages**

The old irrigation system had worked by running the water pumps at constant speed, with control then being done by manual opening and closing of valves in the pipelines. Thus it was analogous to driving a car with your foot on the accelerator and brake at the same time. The system still worked, but it was certainly not efficient with respect to control or energy use.

In addition, the need for manual opening and closing of valves during startup combined with frequent power outages and voltage dips from the electrical utility, made the whole process very labor-intensive. To start one of the six pumping stations could take one person up to an hour and with sometimes as many as three power outages a day, startups became almost a full-time job.



2 Manual restarting of the pumping stations was a very labor intensive operation.

The young owner at Riecor, Mr. Tiaan Riekert decided to see what technical solutions might be available to cut electrical costs and also simplify the irrigation system's operation. Although he was not previously a customer of ABB, upon meeting with ABB South Africa's energy efficiency engineers it was agreed that Riecor would test variable speed drives (VSD) on the water pumps at one of its six pumping stations. The one pumping station in question feeds an irrigation system covering close to 400 ha.

ABB recommended its ACS550 drives. Working with the system integrator Aludar Electrical, ABB assisted in the design, installation and commissioning of five VSDs running irrigation pumps with 45-75kW motors, and the sixth VSD used on the water transfer pump.



3. One of the ABB drives installed at the pumping station.

### **40% savings in electricity**

The results were quite dramatic. With the change from valve-based control to drive control with the new VSD units, Riecor saw a significant drop in electric energy use, as demand from the irrigation system went from 291 kW, 308 kVA down to only 175 kW, 186 kVA. This amounted to 116 kW or an impressive 40% reduction in electric consumption for just one pumping station.

In financial terms, based on the local crop factor for this region that indicates the irrigation pumps would operate at 2,970 hours per year means an annual savings of \$19,700 USD in electricity costs. When considering the investment cost for the VSD's alone, the payback time amounted to 7 months. Since the farm has six such pumping stations the potential for savings are very significant. Indeed the farm quickly made a repeat order and has installed similar drives on a second pumping station.

In future, energy efficiency initiatives on irrigation systems like this will bear fruits to not only their owners, but also help relieve pressure on the local electrical utility that is under huge pressure to supply to an ever growing market.



4 Riecor Farming had a 40% energy reduction in just one of their pumping stations. The payback time was a quick seven months.

## **Side benefits extremely important**

Over and above the financial savings on the electricity bill, the client also had additional operational improvements. Examples include savings in both man-hours and trouble during the startup process where operators now only need to flick a switch to start, and in the event of power interruptions the system would start-up automatically at pre-set times.

The VSDs give a long ramp-up time that allows for a very smooth pipe filling process, so the previous mechanical stresses on the pump couplings during start-up were completely eliminated, together with fewer friction losses in the pipes. Additionally water hammering following switching off disappeared and fewer losses on the impeller were seen due to these extended “ramp up” and “ramp down” times.

## **Reduced costs, work and headaches**

Fanie Steyn and Christo du Plessis, the ABB South Africa Energy Efficiency engineers who worked most closely on the project, says that the Riecor Farming installation is a good example of how energy efficiency projects can also give additional benefits on the operational side.

“The young owner of the farm was looking for creative ways to cut electrical consumption but also quickly realized that the drives, and better control they gave him, would not only do that but also help him with the very labor intensive startup process,” explains Christo du Plessis. “He was the first farmer in the area to do it, and many of the other neighboring farmers were a little bit skeptical. Now however they are making lots of inquiries and seem quite interested in finding out more about his efficiency results.”

“We should also add,” clarifies Fanie Steyn, “that the figures for energy savings which we have seen have been both measured and verified by a local university, which we thought was important to do. We’ve had a great relationship with the customer and the integration into his processes has been both smooth and effortless.”

“I think that our excellent application knowledge combined with the VSD products’ superiority including features like the patented swing choke, built-in EMC filter and intuitive control panel made it easy for him to believe we had the right solution. Now that he has made a repeat order for the next pumping station leads us to believe his neighbors might be doing the same soon.”

Text ends

ABB ([www.abb.com](http://www.abb.com)) is a leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 150,000 people.

For help with any technical terms in this release, please go to: [www.abb.com/glossary](http://www.abb.com/glossary)