

## AUTOMATIC VOLTAGE REGULATOR INCREASES POWER PLANT'S RELIABILITY



Wärtsilä performed an important upgrade to the automatic voltage regulation (AVR) system on Tsavo Power Company Limited's power plant, the Kipevu II in Mombasa, Kenya. Since Kipevu II is bound to a power purchase agreement, it is important to have stable AVRs in order not to lose any production and revenue.

– Normally, one does not expect everything to work just like that from the beginning, but in this case it has and the voltage regulator is much more efficient than the old one, says **Mwaka Mungatana**, Chief Technical & Environmental Officer at Tsavo Power Company LTD.

The Tsavo Power Company (TPC) was established in 1998 as a special-purpose corporate entity. TPC is an electric power producer that operates the Kipevu II power plant in Mombasa and sells the electricity to the Kenya Power and Lighting Company (KPLC), through a power purchase agreement with KPLC. The power station entered commercial operation in 2001, with an ISO 14000 compliant system. The 74MW station has increased thermal generation capacity in Kenya by almost 25%, injecting a much needed stable source of energy into the

national power grid. TPC is a Nairobi based company that is counted as one of the four independent power producers in Kenya.

### PREVENTING THE UNEXPECTED

Kipevu II consists of seven Wärtsilä 38 generating sets, with a total electrical output of 74.5 MW. Commercial operation of the oil fuelled power plant began in September 2001. Power plants, like many other operations, need stable voltages to satisfy customer demand, keep critical control systems operating, and their operations safe ■ ■ ■

# “Wärtsilä not only did a good job, but an excellent one”

and running. Voltage problems can lead to unexpected downtime with costs, which are among the highest of all maintenance expenses.

Like most electronic systems, at some point in time, the automatic voltage regulators (AVR) come to a stage in their product lifecycle when spares and support are no longer available. This was the case at Kipevu II.

– We could not risk having a component failure that might result in the loss of a generator. The old AVR was of an old design and becoming obsolete, so we needed a retrofit solution, says Mwaka Mungatana.

## NEW AVR IMPROVING RELIABILITY

Upgrading older power plants to the latest automation standards provides benefits, such as:

- a safer and more reliable operation
- lower operation and maintenance costs
- an extended plant lifecycle.
- faster reaction to load changes
- enhanced control through modern technology

The AVR-unit that Wärtsilä chose for the retrofit at Kipevu II has excellent dynamic performance characteristics.

– Wärtsilä has operated the plant successfully for 13 years, so they know what

needs to be done to the plant to get the most out of it. Besides an extended life time for the plant, we also obtained an increased capacity, says Mwaka Mungatana.

## INSTALLATION WITH MINIMAL INTERRUPTION

As the plant operations are managed by Wärtsilä, the installation was planned and executed causing minimal interruption. Not only were the existing systems upgraded and obsolete systems replaced, but Wärtsilä took care of removing the old system, installing the new system, integrating it with existing systems, and commissioning the complete installation.

– The installation went according to plan and, actually, it went faster than planned, but still within budget. It was truly a quick installation process and hardly disturbed the electricity production at all.

– Not only did the Wärtsilä staff carry out a good job, but an excellent one. The only small challenge during the installation was that the mounting of the old AVR was a little bit different from the new one, praises Mwaka and adds that Wärtsilä showed good leadership and trustworthiness during the whole project.

## KIPEVU II – THE ICON OF POWER PLANTS

The engines of the Kipevu II power plant are also remotely monitored to ensure optimal functionality and to prevent failures from happening. The experiences of the new AVR have so far only been good. The new AVR is efficient and work well.

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Mwaka says that the Tsavo Power Company is very impressed by Wärtsilä’s performance on this project and has gained clear benefits thanks to the new AVR. The plant generators now react very quickly to changes in loads.

– Based on the experience that I have with Wärtsilä engines and with Wärtsilä’s operations and maintenance, I have always and will always recommend Wärtsilä. Thanks to the professionalism of Wärtsilä, the Kipevu II power plant has become an icon of plants in eastern Africa, concludes Mwaka Mungatana, Chief Technical & Environmental Officer at the Tsavo Power Company.

### Challenges

- The power plant’s AVR system was of an old design and becoming obsolete
- The plant needed a stable voltage regulation to function properly

### Solution

- An upgrade of the automatic voltage regulation (AVR) system, including all AVR designs and installation

### Benefits

- The power plant now has a reliable and stable platform for producing power
- The new AVR system is much more efficient and the generators react quickly to changes in loads