Zest WEG supplies SA's new helium gas project

Zest WEG is supplying locally manufactured transformers, switchgear and substations to South Africa's exciting onshore natural gas and helium project, Tetra4. Being developed by emerging producer Renergen near Virginia in the Free State province, the natural gas deposit reportedly contains helium concentrations of up to 12% compared to typical levels of around 0.5%.

One of the two six-metre containerised substations being supplied by Zest WEG to the Tetra4 onshore natural gas and helium project.

Tetra4, South Africa's onshore natural gas and helium project, is being supplied with transformers, switchgear and containerised modular substations by local electrical equipment specialist, Zest WEG.

Developed by emerging producer Renergen, Tetra4 is the country's first and only holder of an onshore petroleum production right. Located near Virginia in the Free State, the natural gas in the deposit reportedly contains world-beating concentrations of helium – up to 12% compared to typical levels of around 0.5%.

The first phase of the project is advancing well, with construction of the liquid natural gas (LNG) and helium plant scheduled for completion in early 2022.

According to Lukas Barnard, Zest WEG's sector specialist for oil and gas business development, the equipment ordered from Zest WEG has been delivered for installation. "The transformers we have been contracted to supply are a 7.0 MVA 33/11 KV unit and two 1.5 MVA 6.6/0.4 KV units, manufactured locally at our transformer facility in Wadeville," says Barnard. "We are also supplying the 33 kV, 11 kV and 6,6 kV medium voltage switchgear, which have been installed into two six-metre containerised substations that were locally manufactured by Zest WEG at its Heidelberg facility.

"The medium voltage switchgear was installed in the modular substations in Heidelberg, where a factory acceptance test was conducted before the equipment was transported to site," he says, adding: "the complete package is managed by a single point of contact project manager at Zest WEG, easing the customer's administrative burden".

Renergen says it wanted a supplier with the necessary experience and expertise, but more than that it needed a partner that could meet the tight delivery requirements, with enough flexibility to find solutions to the challenges related to a project of this nature.

Zest WEG switchgear installed inside one of the six-metre containerised substations.

"There have been many benefits to working with local companies, including additional flexibility and control while allowing us to react quickly to changes and challenges that arise as we roll out the project," says Nick Mitchell, Renergen Chief Operating Officer.

"Any support of local business has far reaching economic benefits for the communities in which they operate; and this remains a critical balance for us to achieve in a project where not all the components can be manufactured, or are available, locally. It also reduces currency risk by minimising our exposure to exchange rate fluctuations."

Renergen also emphasises the advantage of Zest WEG's package solutions capability, especially in a project like this with multiple streams of work that need to be coordinated across multi-disciplinary teams. Barnard says this is where Zest WEG's project manager added considerable value in terms of management, procurement and project flow.

"Where multiple contractors and suppliers are involved, the project flow becomes very difficult and can generate significantly more risk," he says. "Our project manager was able to work with the customer to mitigate these risks and streamline the roll-out."

He also notes the advantages of containerised and E-House modular substations in fast track projects. By manufacturing the units in a dedicated facility, Zest WEG provided an efficient solution while reducing the on-site responsibilities of the project developers.

"Building a brick-and-mortar substation means more personnel and activity on site over an extended period, with all the related health and safety implications such as inductions and medical checks," says Barnard. "It is quicker and far more convenient to build it in a well-equipped facility such as ours, where it is also possible to run factory acceptance tests before delivery," he advises.

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The locally manufactured 7.0 MVA transformer ready for transportation to site.

Efficient motors vital for desalination plants

At desalination plants, WEG motors are used for high pressure reverse osmosis pumps and for sea water intake and booster pumps.

With concern growing that climate change will exacerbate South Africa's vulnerability to drought, the country is likely to see more desalination plants being installed along our coastline.

Coastal provinces such as the Western Cape and Eastern Cape have been experiencing intense droughts in recent years, and about 10 desalination plants have already been built. According to Dillon Govender, Zest WEG's public sector specialist, a key cost factor in these plants is the electrical energy required for the high volumes of water being pumped, as well as the volume and high pressure required for the reverse osmosis process, which is the most commonly used technology these days.

"Desalination plants employ numerous pumps for various functions in the process – all of which need to be driven by electric motors," says Govender. "The reverse osmosis system also requires relatively high pressures to be maintained, to enable salts to be removed through the use of semi-permeable membranes."

Reducing the specific energy consumption (kWh/m^3) is therefore a strategic requirement underpinning these plants' viability and performance. WEG's range of high efficiency motors is being employed across the complete range of desalination plant pump applications, Govender says.

These applications include the intake of raw water (sea water) into the pre-treatment section for the first filtering, high pressure pumping through the reverse osmosis phase itself, post-treatment and storage, and final pumping to distribution networks and facilities. "Our motors are also used for the pumping of concentrated sea water or brine back into the ocean," he explains. "Only around 45% or about half of the volume of the seawater entering the plant through the intake system actually leaves as potable water."

To further enhance the efficiency of the pumping circuit, Zest WEG supplies gearboxes and variable speed drives (VSDs) with integrated PLCs. This optimises energy consumption while ensuring the required pressure and flow through the desalination membranes and reliable performance in auxiliary systems such as backwashing, dosing, chemical cleaning and brine pumping systems.

WEG's Pump Genius software enables a standard VSD to be dedicated to specific pumping systems with various motor and pump combinations, thereby providing improved control and monitoring capability as well as maximising energy savings and reducing downtime. "We are able to design and supply the necessary electrical enclosures and motor control centres (MCCs) in low and medium voltages, as well as container-type electrical rooms," says Govender. "Zest WEG also provides solutions for emergency power generation, power distribution and alternative energy generation. Using the Motion Fleet Management (MFM) tool will also reduce operational costs for maintenance tasks."

Due to the corrosive coastal environment typically associated with the location of desalination plants, the WEG high efficiency motors used have integral IP66 protection, facilitating protection against salt water ingress caused by heavy seas and higher tides. Installation of heaters and the epoxy coatings of the motors help achieve greater longevity under these arduous conditions. WEG's Variable Speed Drives (VSD) and soft starters are also available with IP55 ingress protection to improve longevity, while all critical components within the VSDs and soft starters are covered with an additional anti-corrosive coating.

He notes that WEG motors and other electrical equipment have been installed in desalination plants in African countries such as Namibia, Algeria and Tunisia, and more globally in countries including Saudi Arabia, Bahrain, UA E, Chile, Peru, Australia and Spain.

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