ABB’s Louis du Plessis discusses some of the key technologies and challenges in the transformer sector

What products are you offering to the Middle East market?
ABB transformers can be found wherever electricity is generated, transported and consumed – in power plants and substations, industrial complexes, skyscrapers and shopping malls, ships and oil platforms, locomotives and railway lines, wind parks, solar fields and water treatment plants.

The world’s tallest building, the 828 meters high Burj Khalifa in Dubai is equipped with 78 dry-type ABB transformers to ensure power reliability. The nearby Dubai Fountain, which is illuminated by 6,600 lights and shoots water 150 meters into the air, is also equipped with dry-type ABB transformers.

What new technology are you bringing to the sector?
Subsea transformers are aimed at offshore developments, green transformers aimed at the environment with the use of “Biotemp” environmentally friendly insulating natural ester fluid and the latest ultralow-noise transformers, designed for urban areas with strict noise regulations. ABB has recently successfully tested the first single phase, 1200kV AC ultrahigh voltage power transformer. This is currently the highest AC transmission level in the world.

ABB developed a Green-R-Trafo platform which reduces energy consumption and increases transformer efficiency by lowering transformer losses. The performance and the life span of a transformer can be further boosted by an environmentally friendly BIO-TEMP insulating natural ester fluid, made from renewable and biodegradable vegetable-based oil. In comparison to traditional min-
Louis has 23 years’ service with ABB, starting with the firm in 1990 as commissioning engineer at ABB Powertech Transformers in South Africa. He joined ABB Transmission and Distribution, UAE in 2008 as a technical and operations manager, and is currently the manager of its transformer service. He has a diploma in Electro-Mechanical Engineering as well as a BSc, MSc Electrical Engineering. Louis recently completed his Doctorate in Electrical Engineering in December 2012.

**Education, education, education**

Last year, ABB opened its Learning Zone HQ, Abu Dhabi which aims to offer dedicated and customised training, as well as showcasing its products, services and solutions. It has the transformer online monitoring system demo unit (TEC smart) available for training customers. Unplanned transformer failure may cause severe economic damage, with costly blackouts as the worst-case scenario. Online transformer monitoring using TEC Smart reduces the risk and ensures reliable continuous power supply. Extended maintenance intervals and longer transformer lifetime are other benefits that enhance the value of the transformer investment, reduce maintenance costs and shorten the pay-back time.

TEC Smart continuously monitors the condition of mission-critical functions in transformers. Customers can keep track of their entire fleet of transformers and reactors from the office via an easy-to-use web interface, using a standard pc and web browser. Using built-in expert models, TEC Smart performs a complete evaluation of operating conditions, current as well as historical. It can therefore predict and prevent potential failures, thus optimising the performance and lifetime of transformers.

Higher temperatures, the greater the corrosion and formation of metal sulphides.

Many customers know that corrosive sulphur can be a problem but they may not know about the in-depth effect. If not maintained properly, the effects on the transformer can be total disruption, utilities could lose power to transmit to consumers or industries could lose production. ABB can offer customers engineering solutions from remedies to additional services. One example is the on-line monitoring system that allows the measurement, monitoring and continuous follow-up of main operation data, analysis and interpretation of the evolution of one or more specific parameters, identification and evaluation of contingent fault or aging causes.

**A discussion point in the industry has been the effect of corrosive sulphur on transformers. What is ABB doing on this issue?**

During 2012, ABB held seminars on corrosive sulphur Cu2S and the effects it has on transformers. We are currently assisting our customers to solve this issue that can lead to catastrophic failure of the transformers.

The seminars focused on the effect of corrosive sulphur (Cu2S) on oil filled transformers used in power plants, power generation, transmission and distribution. There have been cases of costly transformer failures around the world due to corrosive sulphur compounds contained in the transformer oils, prompting ABB and other parties to investigate the causes, and to develop the techniques and expertise required to remove the corrosive sulphur.

Although there haven’t been any documented transformer failures due to corrosive sulphur in the Middle East, hot climates and high loads are thought to be a contributing factor. Corrosive sulphur is both time and temperature dependent – the longer a transformer operates at higher temperatures, the greater the corrosion and formation of metal sulphides.

**Corrosive sulphur can cause transformer failures.**