Compact switchgear takes up 95 percent less space

Interview with Denis Imamovic on gas-insulated switchgear for direct current transmissions

Apr 10, 2014

Energy is presenting innovative technologies at Hannover Messe taking place this week. This technology includes gas-insulated, compact switchgear for high-voltage direct current (HVDC) transmission. Denis Imamovic, head of development DC compact systems is at the trade show and explains the innovation. In an interview, he gets to the heart of why this innovation is so important for future power transmission.

Siemens Energy: Mr Imamovic, what is a compact switchgear?

Denis Imamovic: There are two ways to transmit high voltage: with either alternating current or direct current. In order for either type of transmission to work, it needs among others also so-called switchgear. This switchgear can be air-insulated or gas-insulated, and the latter type is much more compact, which means it takes up less space. Both types of switchgear are available for the established technology, that is, three-phase transmission. The same is not true of HVDC technology. Up to now, it has not been possible to build gas-insulated, compact switchgear, since the phenomenon of “how do we control the electrical field under direct current” is highly complex. However, we have successfully developed an insulator in such a way that it can tolerate direct current loads permanently. As a result, we will be able to build gas-insulated switchgear for direct current as well in the future. This means that we can save space by as much as 95 percent! Hence the name “compact switchgear.”

What are the benefits of this technology?

This new technology has an enormous impact primarily on the offshore segment. Space is very expensive on platforms, and the new switchgear will from now on be so small that they don’t take up
any space of their own – which gives us enormous cost advantages. Other onshore converter stations are also being planned close to the populated urban regions. We also offer our customers more compact switchgear for this purpose. A more compact size and lower price will facilitate the approval process.

In addition, the new type of switchgear can be set up without buildings as well. Since we do not have any voltage-conducting parts in the atmosphere but rather encapsulate everything, we can safely install the switchgear even under harsh environmental conditions, for example in coastal regions.

This switchgear can be perfectly combined, since we also developed modules that permit connections from cables, such as overhead lines, to gas-insulated switchgear.

The technology’s strong trend toward modularity means that the switchgear can be shipped easily and with reduced costs by our customers, for example more or less ready for operation out of the box.

**How will the technology continue to develop?**

We have developed the switchgear for the voltage level of 320 kilovolts (kV) ready for market. We chose 320 kV because this is the maximum voltage level available today for DC voltage using polyethylene cables, or in other words plastic cables. These cables are being used, for example, in our offshore projects in the North Sea. We assume that 500 kV will become the most common voltage level in the DC field, which means we will be able to meet all future requirements for HVDC transmission technology. This also enables multi-terminal systems, which allows us to be an important player in the growing DC market in the future.