Networks of the future
The technical requirements placed on energy networks are currently changing faster than ever before, presenting energy providers with huge challenges in the process. The main driving forces behind these changes are smart grid applications such as smart meters and separate network concepts – so-called microgrids integrating energy production, regulation and consumption in local distribution networks. If e-mobility concepts catch on, energy storage mechanisms will also be incorporated into these microgrids. Furthermore, transformer substations and passive secondary substations are being automated and monitored online together with cable and overhead line systems. After all, the same high levels of quality and network availability still need to be ensured even with bidirectional power flows.

Stadtwerke Konstanz
In Konstanz, located directly on the Swiss border, Stadtwerke Konstanz GmbH is setting up and operating a “Fibre To The Home” network. Corporate and private customers are connected directly with fibre-optic cables and are thus integrated in a very fast multimedia data network. Stadtwerke Konstanz GmbH offers the customer a wide range of telecommunication services via this network.

Nexans, the glass fibre specialist, added a 192-fibre optic submarine cable to this fibre-optic cable network in 2007. This submarine cable runs right across Lake Constance between Konstanz and Friedrichshafen. Stadtwerke Konstanz GmbH supplies its customers with electricity, gas and water. The power network distributes 110/20/0.4 kV. The redundant supply is provided from Germany and Switzerland. The energy network contains around 300 secondary substations as well as around 50,000 electricity meters.

Intelligent electricity meters (smart meter)
Stadtwerke Konstanz GmbH launched the “smart X” age with an initial project entitled “Fibre-optics up to the secondary substations”. Networking of the secondary substations is now progressing further and further. This, coupled with the incorporation of the energy meters (smart metering), is designed to provide Stadtwerke Konstanz GmbH with the detailed data that will facilitate secure, cost-optimised energy distribution in the future.
Intelligent street lighting
In order to lower the cost of street lighting in Konstanz (approx. 9,500 light points), a further project has been launched. The goal of this project is to identify faulty lights and hence reduce the number of inspection rounds during the day, thereby making cost savings during operation. Data transmission systems that convert and transmit the interfaces from the remote control systems and other peripheral systems were required in order to transmit the information via the fibre optic cable. After comprehensive tests, the systems manufactured by the Mönchengladbach-based company Nexans were chosen. Konstanz is a pioneer in innovative street lighting systems. This means, for example, that the city’s inhabitants can switch on the street lamps at night along a route in the outskirts of Allmansdorf at the push of a button. After 15 minutes, the LED lighting is automatically switched off again. This means that the inhabitants’ need for safety can be met and costs saved at the same time.

Infrastructure solutions for smart grid applications
As is common practice with energy networks, Nexans also offers infrastructure solutions of the highest quality for communication networks. The S-series compact industrial Ethernet switches for harsh operating environments form a strong basis for this. This range is supplemented with fibre optic cables and passive components from the Nexans Group.

Highest system availability
Nexans implements network solutions with high system availability requirements. As such, the compact and robust Ethernet switches offer a multitude of security and management functions. For example, the monitoring of the route characteristics of the 100/1,000 Mbit/s Vario ports is unique. These recognise rises in attenuation in fibre-optic cables at a distance of many kilometres even before they fail. The end device cabling of the twisted pair ports can be monitored centrally online. A redundant power supply configuration is possible. In the event of critical climatic conditions in substations, availability is ensured thanks to the extended temperature range of between -25 °C and +70°C and protection class IP30. The way in which the system configuration can be restored is also unique: the mirrored system configuration, including the MAC address, is transferred to the new system via an exchangeable MMC memory card in the event of a fault. The master configuration can be changed centrally for all switches at the same time, e.g. for password changes.

Drawing on their positive experience with Nexans systems in the energy network, Stadtwerke Konstanz GmbH uses active switching technology in smart grids, waterworks as well as at office workstations in the field of administration.