INCREASING DEMAND

for power transmission and energy savings

Economic growth in India, China and Southeast Asia has been fast compared with European countries and the US. Apart from a period of stagnation at the end of the 1990s, the growth rate has varied from five to 10 percent in most of these Asian countries. Because of the rapid commercial growth, industrialisation and the growth of the big cities, the demand for electricity has been increasing at a fast rate. Heavy investments have been made in electricity generation, but the need for electricity has increased even faster – in some countries by 10 percent a year. This has led to shortages of electricity, blackouts or planned disconnection of loads.

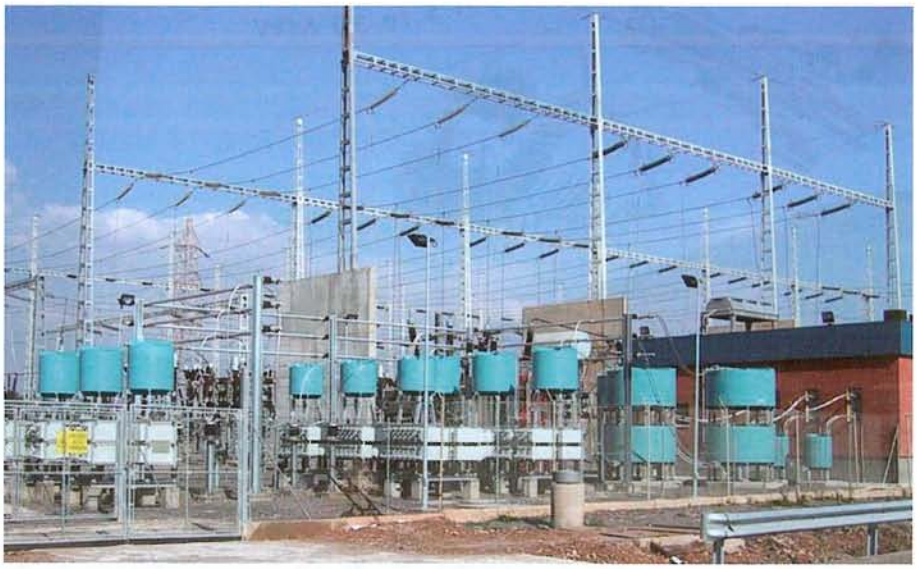
The increase of oil prices in the last few years and, more dramatically, the exceptionally powerful hurricanes in the US and typhoons in Southeast Asia in 2005, have increased oil prices to an unpredictable level. In addition, the consumption of oil in countries such as China and India is increasing very fast. All of these developments mean increasingly high energy prices.

To optimise electricity generation and transmission, existing separate networks are being connected to each other. This is going on in countries such as India, where 400kV networks will be interconnected. The same will be done for 500kV networks in China. Thailand is planning to connect the southern and northern provinces with 500kV lines. In Malaysia the existing network will be strengthened.

The above environment has increased the need for optimum power transmission to help reduce transfer losses and to provide adequate high-quality electrical energy at the receiving end. What really matters is how much energy can be transmitted to the locations where it is needed, not how much is generated.

Optimising the transmission of electricity

Power transfer capability can be increased by different methods. Long high-voltage transmission lines can be compensated with series capacitors, which is a very cost-effective way to increase power transmission. Static var compensators (SVCs) are used to stabilise steady-state voltage and to overcome transmission line faults. The SVCs can also control mechanically switched shunt devices (shunt capacitors and shunt reactors).



Nokian Capacitors has been working with reactive power compensation for almost 50 years. The company has been pioneering the design and delivery of sophisticated series capacitors and SVCs, shunt capacitors and shunt reactors. The latest additions to its range of products are the STATCOM and active filters. STATCOM is especially effective in situations where there is a need for fast capacitive and inductive compensation at the same location.

Nokian Capacitors has delivered series capacitors to countries with extreme ambient conditions, from very hot to very low temperatures and severe seismic conditions. For example:

- Five 500kV series capacitors were delivered to China to increase power transmission to the Beijing area.
- There are currently orders for three SVCs to the US.
- Numerous series capacitors have been delivered to Brazil in recent years.
- A STATCOM will be delivered to Australia in 2006.

Deliveries are either complete, on a turnkey basis, or as product deliveries including supervision and commissioning. The company's high product quality and effective customer training

ensures the high availability and reliability of its reactive power compensation equipment. By agreement, Nokian Capacitors can take care of the complete service and maintenance of installed products for a period of time (five years, for example) from energisation.

NC-Watch is the online supervisor device that detects all necessary events and sends messages to the local Nokian Capacitors service personnel, who can react immediately.

Solving industrial problems

Energy shortages and blackouts cause problems in industries, notably in process-oriented industries such as steel factories (arc furnaces, rolling mills), the pulp and paper industry and the textile industry. Voltage control and energy saving with reactive power compensation is the fastest and most economical way to solve these problems. This can be done with SVCs. A number of SVCs by Nokian Capacitors have been supplied to the steel industry in recent years. They help to reduce losses, stabilise voltage, reduce flicker and filter harmonics. In the steel industry with arc furnaces, energy losses will be reduced and the productivity will typically increase five to eight percent with the use of SVCs.

"Voltage control and energy saving with reactive power compensation is the fastest and most economical way to solve these problems"

In Finland, a 60Mvar SVC was delivered to a rolling mill steel factory in 2003. The steel factory is fed through two main transformers. In 2004, while one of the main transformers was out of use during maintenance work for one week, the steel factory and its rolling mill could still operate at full production. Previously, before there was an SVC, production was decreased during the maintenance of one of the main transformers. Full production with the SVC during the one week of maintenance means extra sales with the value of approximately €15 million. Thus, the payback time of the SVC was less than one week. In a normal situation, when both main transformers are in operation, the payback time of the SVC is calculated to be approximately one year because of lower losses and lower reactive power tariffs. In addition, the SVC will reduce voltage distortion, flicker and telephone interference. ■