ABB helps feed the fastest-growing economy in the world

China's appetite for power is growing as fast as its economy, and currently the most urgent need is in a flourishing industrial area around the cities of Shanghai and Guangdong.

To support Chinese economic development, ABB has in the last one and a half years commissioned two of the world's most powerful high-voltage direct current (HVDC) transmission links, each with a nominal rating of 3000 MW.

This year, it won a $390 million contract to build another 1,100 kilometer-long HVDC link. These HVDC transmission lines will transport power from the massive Three Gorges hydropower plant in China's interior to the eastern coast and southern regions, where power is urgently needed to support rapid development.

In addition to HVDC links, ABB is also supplying power transformers and high-voltage gas-insulated switchgear for the right-bank power plant of the Three Gorges power station itself.

ABB's HVDC systems offer a number of important economic and technical benefits. In addition to supplying power to roughly six million households in China, an HVDC power supply eliminates emissions from 3,000 MW of fossil-fuel power plants in densely populated areas.

HVDC systems are compact, and the small footprint preserves roughly 17,000 hectares of farmland and forest. HVDC's efficient technology also saves about 78 MW by loss avoidance – equivalent to the power needed by 156,000 households.

The transmission links from Three Gorges power plant are a key part of China's goal to build an integrated national grid. Power generated from Three Gorges will be transmitted to grids in central China, east China, Sichuan and Guangdong province.

The more than 10,000 km of HVAC and HVDC lines will form the core of a new national grid in China, combining seven regional networks and

five independent provincial networks to create two new interconnected regional networks.

China intends to eventually create a unified national grid, complete with a modern power market in which plants sell power to the grid at market-determined prices.

HVDC technology is ideal for transmitting power over long distances, and for connecting separate networks because it eliminates the need for complex network synchronization.

Since the central and eastern China/Guangdong AC networks are not synchronized, an AC transmission scheme would have required coordination, and ensuring adequate stability margins would have been difficult.

It would also have been difficult to build an AC transmission line in stages, i.e. one link after another, as a very strong inter-tie would have been required from the outset to keep the generators of the two grids synchronized.

HVDC allows controlled transmission of power between the networks, which retain their independence.

ABB's HVDC transmission links in China include the 890-kilometer-long transmission line from Three Gorges power plant to near Shanghai, which began operation in May 2003. A 940-kilometer-long HVDC link from the same power plant to Guangdong province in southern China was commissioned in June 2004.

Working with Chinese manufacturers, ABB is now building the 1,100-kilometer line from Three Gorges to Shanghai.

The Guangdong link set a number of world records, including the fastest project completion time for such a project – just 31 months, one year ahead of the industry norm.