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Mr. Jinjian Operations

China Huaneng Group Powers up for Growth

Goals
- Build a power plant in the Anhui Province to service its high commercial and industrial energy demands.

Challenges
- In light of China’s rapid economic growth, there has been inadequate construction of power plants, resulting in shortages. Rapid expansion in capacity is required to service demands and avoid additional shortages.
- Connect thousands of stations at data speeds up to 1GB between switches.

Solutions and Products
- Foxboro Distributed Control System - I/A Series®
- Foxboro Mesh Network

Results
- The plant reduced the power shortage risks in the Anhui Province and has helped accelerate the development of its economy.
- The digital control system reliably monitors and controls the power plant’s 19,000 I/O points, production and process optimization.
- The fault-tolerant system design provides continuous and reliable power to the province.
- The more advanced control system improved equipment and unit performance
Chaohu, China - In 1978, after years of state control, the government of China embarked on a successful program of economic reform. As China’s economy grew, the Chinese workforce slowly began to evolve. Prior to the 1978 reforms, nearly four in five Chinese worked in agriculture; by 1994, the ratio was one in two.

Economic growth and the changing demographic of the Chinese worker have gone a long way to create unprecedented demand for power and electricity. In 2006, China’s electricity demand grew by 14% over the previous year, while installed capacity increased by approximately 100,000 Megawatts (MW) to reach 622,000 MW, a 20.3% increase over the previous year.

Looking ahead, the growth in power demand is expected to remain strong. Unfortunately, power plant construction rates have been unable to keep pace with the growing demand for electricity.

With power plants in 23 provinces, China Huaneng Group (CHNG) had already supplied more than 70,000MW of electricity by 2007, making it the largest power generator in China. With a market share of 10% of national installed capacity, CHNG is still expanding extensively.

In accordance with the national economic development plan, China’s industry policies and the market demand, CHNG has identified its development strategy that by the year 2010, it will increase its generation capacity to 80 Gigawatts (GW), becoming one of the world’s top 500 power companies.

To meet the ever-growing power needs in China, CHNG is accelerating its market expansion plans. The new Huaneng Chaohu power plant is its first digitally automated plant. CHNG has chosen Invensys Operations Management, one of the world’s leading names in the automation industry to provide a range of advanced control and safety solutions services.

A Bright Road Ahead

CHNG’s Huaneng Chaohu power plant is a new, technologically advanced, digital power plant that is specially designed to house four supercritical generating units, each with a capacity of 600 MW. The construction is divided into two phases with the first two units completed in 2008.

The plant is located in Chaohu City, Anhui province. This region is enjoying the most vigorous economic growth in China and, therefore, the highest demand for power. The goal of this new plant is to not only reduce the risk of power shortages, but to facilitate the economic growth of the province.

In order to achieve these goals, CHNG required a partner who could effectively implement an automation solution under an aggressive timeframe while keeping an eye on safety. To do so, CHNG forged a mutually beneficial and strategic relationship with Invensys.

Invensys’ consultative service, advanced technology and customer-centric solution proved to be a perfect fit. Invensys provides a reliable and advanced automation solution that enables a real-time convergence of plant operations and enterprise performance.
Overcoming Obstacles

More than just a product-provider, Invensys was a strategic partner to CHNG. As a global technology, software and consulting firm leading significant change in process manufacturing, plant optimization, business operations and enterprise performance, Invensys supplied CHNG an integrated automation consulting service backed by critical technical support and training.

Invensys’ critical insight helped CHNG to maximize their return of assets through balancing the availability and utilization of equipment, energy, and fuel optimization.

“We are very pleased with Invensys’ successful process control implementation as this is the first digital power plant for CHNG. Invensys has been an important partner, offering us a cost-effective process control solution and has helped to sharpen our competitive edge,” said Mr. Jinjian from CHNG’s Operations Department. “The fast data communication in real-time and the system’s open architecture helps to preserve CHNG’s original investment.”

This solution included an advanced Foxboro I/A Series Distributed Control System of more than 19,000 I/O points. It was used to control the new plant’s boilers, turbines and generators.

Subsystem applications included Data Acquisition System (DAS), Furnace Safety Supervisory System (FSSS), Boiler and Turbine Sequence Control System (SCS), Turbine Digital Electro-Hydraulic (DEH) control system, Feed Water Pump Mechanical Electro-Hydraulic (MEH) control system, and Environmental Control Systems (ECS).

Dedicated to digital communication effectiveness, Foxboro I/A Series Distributed Control System used a 1 Gigabyte (GB) Mesh network that provided high-availability and self-healing network performance.

Moreover, Invensys supplied a general interface, which could communicate with other systems equipped with Modbus, Profibus and Hart protocol. This open system revolutionized how Invensys sold, delivered and serviced its clients, exceeding even CHNG’s automation and information needs.

A Brighter Future

By the end of August 2008, Phase I of this power plant project had passed successfully through 168 stringent tests. This resounding success demonstrated the ease and reliability of the Invensys solution.

This best-in-class approach involving superior technology, reliable and accurate information was implemented enterprise-wide. The success of Phase I has been applauded by CHNG. Invensys’ high-performance culture coupled with the unified project implementation team resulted in the successful implementation.

The results are impressive. Invensys provided a fault-tolerant system design which extended unit availability, advanced control that improved equipment and unit performance and control optimization that improved unit and station performance.

Overall installation costs were reduced and the open architecture preserved CHNG’s initial hardware investment. Working together, Invensys and CHNG are paving the way to a brighter future for China.