



Zongbin Zheng

The Jiujiang Branch of China energy giant Sinopec is implementing an intelligent factory strategy as a model for Industry 4.0. >>

Sinopec Jiujiang Pioneers an Intelligent Factory

By Zongbin Zheng, Reporter for *Energy Magazine*

On the bank of the Yangtze River and at the foot of famous Mount Lushan, Sinopec Jiujiang began as Jiujiang Refinery in 1980, and eventually became one of Sinopec's forty-four subsidiaries. Thirty-five years later, the Jiujiang refinery's production plant, equipment, and methods were lagging behind its peers. In response, the management of Sinopec Jiujiang is acting on the promise of Industry 4.0 technologies by committing to build smart business applications for planning and scheduling, energy management, safety, environmental protection, device operation, and IT governance. The company's efforts have created a model for implementing Industry 4.0 factory intelligence in other Sinopec subsidiaries throughout China.

Industry 4.0 in the Petrochemical Industry

Any enterprise choosing to deploy an "intelligent factory" is aiming to achieve operational and management excellence through the use of innovative technology. The concept of "Industry 4.0" includes highly computerized, modular, and integrated factories under visualized control.

According to Jianfeng Li, Deputy Director of Information Management for Sinopec, their intelligent digital factory for oil and gas production is designed to incorporate and achieve the following:

- Build a comprehensive sensor system.
- Coordinate business operations at all levels.
- Improve forecast and warning capabilities to enhance production safety and meet best-practice standards for environmental protection.



- Use cloud computing and Big Data technologies to support better decision-making.

Operationally, the goal of every intelligent factory is to provide data capture, analysis, forecasting, and process optimization capabilities for the enterprise. Although the Intelligent Factory embraces the advanced concepts of fully-networked Industry 4.0 solutions, real-world implementations remain in their infancy. According to Jianfeng Li, intelligent hardware deployments for pilot projects in China are doing well, but progress with application systems is slow, as many systems must be developed from the ground up.

To achieve company objectives, Sinopec Jiujiang plans to construct three large platforms, consisting of eight primary production systems and two supporting IT systems for each. The three platforms are expected to handle every business activity inside the company, from development and construction to production operations management and control. To help guide their business focus, the intelligent factory project at Sinopec Jiujiang is incorporating input from business departments across the organization in contrast to previous projects within Sinopec that were run by the IT department alone.

Intelligent Factory Initiatives

Sinopec Jiujiang began planning for the intelligent factory in March 2011. The 2012 goal was to define a foundation that included upgraded ICT systems and applications such as Enterprise Resource Planning (ERP) and Manufacturing Execution Systems (MES). Through 2014, key systems installed include:

- Health, Safety, and Environment (HSE) emergency command.
- Energy optimization.
- 3D factory visualization.
- Enterprise business analytics and operations monitoring.
- Business process optimization.

Completion of these items has pushed Sinopec Jiujiang to the top tier of Sinopec's ICT capabilities. Once fully operational, Sinopec Jiujiang expects to achieve an annual production capacity of one million tons.

Strategic Partnership with Huawei

Sinopec Jiujiang chose Huawei to design and build its intelligent factory solution.

The Huawei intelligent factory solution for the oil and gas industry includes a converged wired and eLTE wireless communication platform that considers the special conditions of petrochemical refineries. For example,

oil refineries are dense with thousands of meters of steel pipe that block and interfere with radio transmission signals. The Huawei eLTE solution uses radio frequency technologies with optimized diffraction and penetration performance.

"In the future, new intelligent sensor technologies and smart applications will continue to emerge," says Qiming Tian, Senior Solution Architect for Huawei IoT. "Various information systems will be gradually integrated to form a unified intelligent platform and communication network. Technical development will also contribute to changes in organizational structures and gradually dismantle the barriers between departments. The result is that intelligent factory construction will play an increasingly important role in business development across all industries."

The development of Industry 4.0 intelligent factories is a long-term process. In the petrochemical sector alone, it will take years of continuous investment to achieve the desired result — and Sinopec Jiujiang has only just begun.

With a clear vision of the improvements that a completed intelligent factory will offer, Weizhong Qin, Sinopec Jiujiang General Manager said, "Imagine the complete interconnection of everything: from digital oilfields to chemical logistics, from oil and gas exploration to intelligent process control automation, where all goods and devices carry an electronic label for unified communication between devices, devices and things, things and things, and everything with people. Thanks to Huawei's leadership, our vision for an intelligent refinery is becoming a reality." ▲

Voice of the Customer

"Once we begin intelligent factory construction, our journey will not end. We will continue to advance our efforts as new technologies and business needs emerge."

— Jianfeng Li, Sinopec Deputy
Director of Information
Management