

Chinese Firms Emerge as Formidable Competitors in Global E&P

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When I first came to work in the People's Republic of China back in 1979, domestic production exceeded demand by a comfortable margin. Although production has risen steadily over the past three decades, China has been consuming more oil than it produces since 1993. In 2007, China consumed about twice the amount of oil it generated (BP 2008). Meanwhile, demand continues to grow. How are Chinese oil firms trying to meet the nation's surging energy requirements?

Expanding Domestic and International Activities

China's three main state-owned oil companies—Sinopec, China National Petroleum Company (CNPC), and China National Offshore Oil Company—are fully integrated upstream and downstream, and now compete with one another both domestically and internationally. Domestically, they have explored every viable sedimentary basin in China, using an increasingly sophisticated arsenal of oilfield technologies. Over time, China's oilfield service companies have acquired tools and equipment comparable with those available anywhere else in the world. Like other countries, China's remaining reserves have become more difficult to find, often in deeper or subtler plays, hostile terrains, and environmentally sensitive areas. As seismic and drilling technologies have evolved, Chinese oil firms have gone back and re-evaluated many old fields with new methods and fresh ideas. Reservoirs considered marginal or unproductive in the past are yielding additional reserves.

Nevertheless, demand continues to outstrip China's domestic capacity. As a result, the Chinese have been moving into virtually every key oil and gas province in the world, either as an active player or a nonoperating partner. China's oil companies have forged deep relationships with the major international oil companies (IOCs) and the big oilfield service providers both at home and abroad. They have proven themselves competent peers of the IOCs, and have partnered successfully with many national oil companies.

Chinese seismic and drilling contractors pride themselves on being able to perform efficiently in a variety of remote and hostile regions. For example, BGP, CNPC's geophysical service company, operates more than 100 crews in 24 countries in terrain as diverse as mountains, deserts, gravel plains, jungles, swamps, marshes, shallow water, and transition zones. Since 2006, they have been operating offshore as well (BGP).

In general, Chinese state-owned enterprises appear willing to accept higher risks than some of their international counterparts. Leveraging their association with the government, they have entered a number of situations that the IOCs might normally avoid. If they believe there is significant potential to be exploited, these Chinese companies carefully analyze their options and when they decide to act, they go full speed. This, of course, is providing China with important opportunities to fill its domestic energy needs.

To expand their global footprint, China's oil firms have been actively acquiring oil companies, oil and gas fields, and other vital industry assets worldwide. Since 2002, for example, they have acquired billions of dollars worth of assets in Indonesia, Australia, Canada, Kazakhstan, Syria, Ecuador, Nigeria, Angola, Russia, Colombia, Iran, and Yemen (Aizhu et al. 2008). As a result, China has emerged as a formidable competitor in the global energy business, just as it has in manufacturing and sports.

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In exploration and production, as in other industries, China is continuously expanding its current technical capabilities. To supplement their own intensive research and development efforts, energy company managers have also shown a heightened interest in adopting advanced commercial technologies and leading edge concepts to improve efficiencies in finding and extracting oil and gas reserves.

Turning to More Advanced Technologies

This drive to leverage advanced technology comes from the highest levels of the government, according to a recent article in *The International Herald Tribune*. "We will make serious efforts to strengthen our nation's competence," said President Hu Jintao, speaking to the Chinese Academy of Sciences. "We are ready for a fight to control the scientific high ground and earn a seat on the world's technology board." The article reported that Chinese firms have been conscientiously expanding into, and purchasing, successful companies in software, supercomputers,

biotechnology, automobiles, and medical devices (Barboza 2008). Of course, some of the most sophisticated software and most powerful supercomputers in the world are deployed in the upstream energy industry.

As modern China has developed, Chinese oil firms have been effective technology adopters. Like energy companies elsewhere, they have become expert at using commercially available technology as a framework for their particular needs. In addition, a considerable amount of high technology has been developed by the Chinese military. Recently, with encouragement from the government, those innovations have begun to flow out of the military into the private sector. No doubt, some technologies—navigation and guidance systems, advanced sensors, and the like—may find a home in the oil business.

What is more, China has a steady stream of highly educated graduates getting involved in the development of new systems. Many have been educated in the West. Many more are graduating from the technical colleges and univer-

sities found in every province throughout China.

In the past, Chinese oil companies often partnered with the IOCs to benefit from technological innovations. Today, what they do not develop themselves, the Chinese can purchase—with only a few restrictions—directly from international contractors and software suppliers. To identify and tap subtler stratigraphic traps and complex reservoirs, for example, the Chinese have been deploying wide azimuth seismic acquisition and horizontal drilling systems more broadly than ever before. In terms of E&P software, Chinese asset managers are interested in the latest data processing algorithms and 3D Earth-modeling applications.

For example, Chinese oil firms have shown interest in advanced software solutions, such as the Subsurface Knowledge Unified Approach, which uses a high-speed 3D paleo-geochronologic modeling technique to honor all discrete subsurface models and geostatistical processes, without deforming grid cell geometries like conventional tools. Another technology in use is Common Reflection Angle Migration, a prestack depth migration technique that uniformly illuminates the subsurface by performing dense ray tracing from every image point up to the surface.

China's ability to meet future demand depends on combining its proven ways of doing business with the latest technological advancements. The Chinese have a significantly different perspective on risk than most Western oil companies, and a clear national energy policy that encourages state-owned enterprises to take an aggressive stance toward finding and producing the energy demanded by its rapidly expanding economy. As China demonstrated in the recent Olympic Games, it is, and will remain, a major player on the world stage.

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