Riding the Tiger

The global impact of China's energy quandary.

When riding a tiger," goes the old Chinese saying, "it is difficult to get off." So, too, with China's impact on world energy. Blistering economic growth in China, and its surge effect on demand for energy (along with most other commodities), have pulled international energy markets onto the tiger's back.

The global oil, gas, and coal industries—and increasingly power as well—are now coming to terms with China's emergence, not merely as a new player, but increasingly one of the most decisive factors in their markets. Between 2000 and 2003, China accounted for nearly 40 percent of the total growth in world oil demand. Meanwhile, rapidly rising energy demand is creating new quandaries for China at home. Urgent action is required to ensure that energy supplies are adequate, lest shortages become a brake on the roaring economy. Looming above all this is the specter of an energy crisis: a new sense of "energy insecurity" is deepening in Beijing, as concerns about rising imports, chronic shortages, and the implications of global integration become ever more acute.

China's dramatic impact on the world energy industries also points to an even bigger change in the nation's role in the world economy. Through many years, much of the focus has been on China as an export competitor, as a source of cheaper goods, and, as a result, as a lid on inflation. Today, China is increasingly seen in an altogether different light: as a very significant, and even decisively important, market in its own right. Economic growth has turned China into the world's second largest oil market, third largest new car market, the largest producer of steel, the largest consumer of cement. It is proving to be a critical driver of exports from other Asian countries, revitalizing Southeast Asia and helping Japan to finally recover from its long slump.

By Daniel Yergin and **Scott C. Roberts**. Daniel Yergin is Chairman of Cambridge Energy Research Associates (CERA); Scott Roberts leads CERA's China research and is based in Beijing.

Taking Challenges

How Beijing resolves its energy challenges will not only be felt within China, but will also reverberate around the world. The aftershocks will be lasting: China's growing weight in world consumption virtually assures a heavy long-term impact on energy prices, trade, and investment. This is what we at CERA call a fundamental "predetermined element"—an inevitable trend of the energy future. Foreign suppliers of energy commodities, technology, and capital are now fixating on the long-term structural drivers at work in China, and on the promise of future opportunity.

Yet, beware straight-line projections. It is important to recognize that the current surge in Chinese demand reflects not only longer-term factors, but also powerful cyclical forces. Such temporary drivers are difficult to predict in any market, but especially so in China, where macroeconomic activity—and thus energy demand—has a pronounced boom/bust tendency.

The pace and direction of China's short- to medium-term development is therefore less certain—and far more volatile—than most observers now anticipate. Indeed, there is the possibility within the next several years of a more significant slowing of growth, or worse: a so-called hard landing. Such new uncertainties are an uncomfortable consequence of China's expanding global role.

World energy markets, therefore, will face the following implications:

Season of shortage. Energy shortages are increasingly widespread in China and increasingly affect its patterns of international energy trade. Supply-demand volatility in China is thus a factor affecting Asia's, and the world's, energy markets, with dramatic impact on demand and prices for coal—and decisive importance for a constrained world oil market.

Industry driving demand. How long China's demand surge will continue depends on trends in the industrial economy, which—despite the rapid growth in automobile sales—is the main driver of growing energy consumption. Here there are clear downside risks, and signs already that energy may become a brake on the growth of output.

Coming inflection point. In response to the shortage, an energy supply response is ramping up. The pace is uncertain: if unchecked, supply investment may push China toward an inflection point, and perhaps into at least tem-

porary oversupply by the end of the decade.

The balancing factor will be macroeconomic policy, as Beijing looks, with growing urgency, for an economic soft landing—against a backdrop of growing concern that the alternative may be a hard one.

A Season of Shortage

Chinese growth dominates Asia's economic landscape. A year ago, many observers wondered if economic growth might fall victim to SARS. Instead, economic activity accelerated throughout 2003, with gross domestic product (GDP) growing 9.1 percent over the year, and 9.9 percent in the fourth quarter alone. So far in 2004, growth remained explosive, at 9.7 percent in the first quarter.

Energy demand, meanwhile, is expanding at a staggering rate—and with it have emerged clear signs of shortage:

Oil. China is now the world's second largest oil market, behind the United States, having surpassed Japan in 2003. Only a decade ago, China crossed the line from self-sufficiency into net imports; since then China's oil demand has approximately doubled, with imports accounting for over one third of crude supply. Net imports of crude grew by more than 30 percent (to 1.65 million barrels per day [mbd]) in 2003, and net imports of refined products grew by almost 20 percent; and both imports of crude and products will accelerate in 2004.

Globally, the impact is significant: China alone accounted for more than one third of the world's total demand growth in 2003 and nearly 40 percent of the entire growth since 2000. Within China, meanwhile, signs of market tightness are growing: refineries are nearly fully utilized, with some coastal units running above nameplate capacity; barge and truck bottlenecks, meanwhile, are constraining supply in key interior provinces. In such circumstances, possible crude oil pipelines from Russia or Kazakhstan have taken on great strategic value to the Chinese leadership.

Coal. A decade ago, as with oil, China was a negligible factor in the world coal market. But coal production grew quickly in the late 1990s, creating surpluses in many provinces and encouraging an export boom. By the early 2000s China had become the world's second-largest coal exporter, with growing pricing power in Asia's seaborne coal market.

In the years since, China's coal supply-demand balance has changed dramatically. New demand from the industrial and power sectors has simply outpaced the rapidly growing supply—with production reaching 1.6 billion tons in 2003—causing shortages in many provinces. In response, government policy on mining has shifted quickly from a focus on production limits (a holdover from the earlier days of oversupply) to a desperate effort to encourage more production. In a further measure, regulators have capped exports and reduced rebates in order to keep supplies at home. The challenge includes not just production, but also logistics: rail deliveries of coal have increased 20 percent above government expectations, forcing authorities to prioritize coal deliveries over grain and other freight to ensure they reach market.

Power. As the Chinese economy charges ahead, electricity demand is growing at an extraordinary 10–16 percent annual rate, leading to spreading shortages and growing bottlenecks. As of early 2004, 24 of 31 provinces reported shortages. To cope, regulators have approved 40 gigawatts (GW) of capacity to come online in 2004—roughly equal to that in 2002 and 2003 combined—but it will not be enough to rebalance the market. The community of foreign power developers, which shied away from China during the last half decade, is now looking for signs of opportunity amid the boom.

Natural gas. Today, gas is a limited business in China. That, too, is changing, as China's gas market quickly takes on international dimensions. In 2006, the first imports of liquefied natural gas are scheduled to arrive, with the promise of additional terminals and pipeline imports from Siberia several years thereafter. On the strength of overall energy demand, China could well end up a much bigger market for gas imports than is now generally contemplated.

All of these developments are indicators of a much larger role for China in the years ahead. For energy, the drivers behind this growth are unmistakable and clear: rapid industrialization, urbanization, and income growth will increase consumption of materials, including fuels. Indeed, by CERA's forecasts, in the period to 2020, China will likely double its demand for primary energy. The sheer scale of required capital is breathtaking: the International Energy Agency estimates China's total energy investment during 2001–20 at nearly $1.4 trillion—equal to the regional totals of Latin America and Africa combined. Investment of this magnitude, when coupled with market reform and greater access, means inevitable opportunity for foreign participation throughout the industry.

What's Driving Demand?

Rapid market growth—and the consequent supply constraints—is a clear departure from trends of just several years ago. At that time, much of the energy industry faced oversupply. Only several years ago, the average utilization of Chinese refineries was well below 80 percent. Similarly, the coal industry's biggest challenge was chronic overproduction: the number of China's mines had risen tenfold since the mid-1990s, and small producers flooded the market. In electric power, overcapacity was extreme enough to prompt a government moratorium on new coal-fired plant approvals. The supply overhang had created such difficult commercial conditions that many foreign developers ultimately exited the market.

In today's very different market situation, companies, investors, and consumers are left to ask, What has changed, and why so quickly? By far the most important factor at work today is the impact of heavy investment: a surge in fixed asset investment, especially in property and infrastructure, has rapidly expanded manufacturing activity. Fixed asset investment grew by 28 percent during 2003 and by similar rates in early 2004. More striking, investment is now worth almost 50 percent of China's total GDP—a level not seen in the region since Southeast Asia's boom days of the mid-1990s.

This staggering investment surge is

driving demand for raw materials, and especially energy, as inputs to steel, aluminum, cement, and chemicals production. The factories that produce these goods are the most fuel- and electricity-intensive segments of the Chinese economy; for this reason, industry accounts for two thirds of primary energy demand. When electric power sold to factories—75 percent of all power sales—is factored in, industry's true weight in energy demand is even greater.

Indeed, industry's impact extends beyond coal and power, and even to oil. Conventional wisdom would link China's rapid growth in oil imports to the recent boom in automotive transport—and, indeed, passenger car sales grew by 75 percent last year. In reality, however, China's oil consumption is growing mainly due to distillate and heavy fuel oil, consumed in industrial boilers and power generators. Again, industrial activity has been the strongest driver.

Squeeze of Bottlenecks

The strong connection between China's industrial and energy demand trends suggests a clear risk: that energy shortages might become severe enough to constrain manufacturing activity and limit overall economic growth. For this reason, reducing bottlenecks has become a policy preoccupation.

Already, the symptoms of bottlenecks are evident. In many parts of eastern, southern, and central China, factories are forced to ration power use or shift production to non-peak hours. Constraints are worsening for coal transport on China's overstretched rail system; to ensure deliveries, coal from interior producing regions is now prioritized over other freight. New bottlenecks are emerging in oil depots and bargeways along the Yangtze River.

One factor exacerbating the bottlenecks is the increasing challenge of coordinating energy investment. In years past, the answer to a shortage problem was stronger guidance from the state—better planning, more directed lending, and mandated building. But after years of cautious reform, and as China's economy has expanded, the Chinese energy industry is a much more complicated space. More than 90 percent of energy sector assets remain in state hands, but state-owned energy firms themselves are an increasingly heterogeneous group, running the gamut from centrally owned state companies to semi-autonomous provincial investment groups, to companies linked to municipal or township leaders. True "private" companies, while in the minority, are playing a growing role as well. Coordinating this disparate group, under the aegis of a broad national plan—and with an ever-mounting scale of investments required—adds a growing layer of increasing complexity for planning officials.

A second difficulty is a lack of market signals in the energy sector. Were China's energy prices based mainly on the market, the location and severity of bottlenecks would be immediately obvious through higher prices. Instead, years of incrementalism in price reform have meant that many end users still do not pay a market price for energy, and market information is muted. Oil prices, for example, while linked to foreign markets, move within a fixed band adjusted periodically by regulators. Coal prices, theoretically market based, are in realty subject to official guidance: large coal contracts, such as sales to large power companies, are negotiated through the planning bureaucracy. In electric power, nearly all generators receive fixed prices for the electricity they sell.

Inflection Point

These challenges are long term, and depend on structural reform and price liberalization. In the meantime, bottlenecks must be resolved through the sole remaining option: supply development.

Already, there are early indications that such a development response is well under way; investment in new capacity is accelerating dramatically. Coal mines once closed have been ordered reopened, and new budget spending has been announced for mining and coal railway projects. The refinery expansion plans of China's oil firms have been put on an accelerated schedule; some 1.5 mbd of new capacity, or double the expansions seen in the plans of just a year ago, may be online in five years. In electricity, nearly 130 GW of generation capacity is now under construction, with still more projects under review. Across these sectors, approvals for supply projects have been relaxed, and state bank financing easier to obtain.

The rapid supply response will do much to relieve the market tightness over the next few years. The concern is how well this process can be managed. Another tendency of Chinese energy markets is that supply investment, like much of infrastructure project development in China, can accelerate and decelerate quickly, keeping the market in a constant boom and bust cycle. This behavior is common to many energy markets in many places, but in China is especially pronounced for two reasons:

Poor fundamentals. China's economic statistics are improving overall, but much less so for energy data. Sector restructuring—the reshaping of ministries into state-owned firms, and their subsequent restructuring into smaller companies—has affected the traditional channels of reporting energy production. For other energy statistics, such as consumption and inventory, a comprehensive statistical collection system has never been adopted. Indeed, in an era of increasing competition among local firms, this sort of data is treated as highly sensitive information. In some cases, transparency is actively discouraged by the Chinese government, which designates some data as state secrets. The overall consequence—weaker awareness of true market fundamentals—hinders the flow of investment to where it is needed most.

Capital inefficiency. Despite decades of industrial reform, China's energy firms remain overwhelmingly state owned. This structure of ownership dulls the profit motive and, as in many state-owned industries, tends to prioritize scale over efficiency. Projects are typically developed with only a loose sense of their long-term commercial prospects; if ultimately unsuccessful, these failed investments carry few meaningful consequences for their firms. The semi-commercial nature of investment prevents efficient allocation of capital, and allows "herding" to affect energy sector investment.

Together, these tendencies both de-

lay the timely addition of supply capacity and dramatically accelerate capacity additions when a supply response is finally triggered. Such a response, when it occurs, can be huge; the resulting surge in capacity may overwhelm the market. Whether a repeat of this cycle is possible in 2005–07 depends largely on the capital discipline of Chinese energy firms. With energy-related investment now growing at 20 percent, it is entirely possible that a planned wave of new supply turns out to be a tsunami.

Implications

In the meantime, what can energy markets expect from China during 2004? We take some cues from the new policy directions of the economic leadership. Concerns about overheating—and especially about a hard landing—are forcing Beijing to move away from policies oriented solely toward rapid growth. The worry is that excessively rapid investment will lead to manufacturing overcapacity, increase industry's bad debt problem, and perhaps touch off a cycle of inflation and overall decline. As of early 2004, the focus has shifted to stability and managed growth. At the National People's Congress, convened in March, Premier Wen Jiabao pledged to cut China's 2004 economic growth to 7 percent—a full two points below the year before. At the end of April, Premier Wen said, "We need to take effective and very forceful measures."

If Wen and his team succeed, if fiscal and monetary policies can be tightened gradually, investment activity should slow over the course of the year. Under this scenario, CERA would expect energy demand growth to slow accordingly—to approximately 11 percent growth for electric power in 2004 (from 15 percent in 2003) and to slightly above 7 percent for oil in the second half of 2004.

But dismounting from a tiger is never easy, and there remains the possibility of a hard landing by next year. This result would have a sharply corrective effect on industry and would directly affect energy demand—including oil imports. A hard landing scenario, therefore, could be a surprising event for international oil markets that are now betting on straight-line growth. Under such conditions, China's crude import growth could during 2004–05 begin receding as quickly as it appeared in 2003.

This turn in trend, taking place amid strong gains in non-OPEC oil production and expansion of oil production capacity in some OPEC members, could have a chilling effect on global oil prices. The last period of dramatic price weakness—in 1998 and early 1999—was catalyzed by the rapid and unexpected onset of weak demand in East Asia amid large gains in world oil production. Although a price collapse is far from certain if China hits a rough patch, OPEC cohesion would be put to the test.

Beyond the near-term balancing act in 2004–05 are several trends that will affect China's energy industry, and the world's, for the foreseeable future:

China's national energy-supply balance continues to shift, as some fuels move into net import territory and exports fluctuate. Gasoline exports are falling, imports of middle distillates will likely begin in 2004, and in several years China will be a net importer of naphtha. Although the global coal industry has long feared a flood of cheap Chinese exports, the most likely outlook is for export volumes to swing according to domestic demand, as has occurred this year. China's natural gas development program will accelerate, and by 2020 could push imports above 33 percent of total supply, up from zero today.

Officials and consumers alike are waking up to the current reality about energy security in China: reliable supplies of energy depend, first, on market conditions at home. This lesson is an impetus among decision makers to develop a comprehensive energy policy for China; despite years of discussion, there remains no overarching blueprint, nor a ministry yet empowered to implement one.

Beijing has long planned an energy reform program involving sector restructuring, partial privatization of key enterprises, and gradual liberalization of prices. But reform in China is predicated on favorable conditions of macroeconomic stability, balanced supply and demand, and managed volatility in energy prices. Perceptions of an "energy crisis" may feed back to delay the reform timetable, and may call some reforms into question altogether.

Cautious opening remains the touchstone of energy import policy, but protectionist impulses are weakening. Officials will seek to increase the flexibility and efficiency of imports by relaxing—gradually—import controls in oil products and coal. The interests of Chinese domestic energy firms will still influence how barriers are set, but may cease to be the driver of policy.

Chinese oil firms, partly privatized, are under mounting political pressure to acquire producing assets abroad. The "go abroad" strategy has been in place for several years but has accelerated dramatically from 2003. The current wave of acquisitions of foreign oil and gas fields by Chinese firms will likely continue, with increasing activity outside of the Middle East, ranging from the Former Soviet Union to Africa and Latin America. National political goals may not always align with commercial objectives.

New energy technologies and alternative fuels have long been studied in China. But state development strategy has tended to favor proven technologies, especially low-cost solutions. Beijing's sense of energy insecurity will accelerate trial applications of new coal-based technologies (including gasification and liquefaction), hydropower, and wind and other renewables. Further, if policy support and international collaboration can help achieve costs breakthroughs, advances in these technologies will have a global impact. Policy will also increasingly focus on conservation and building efficiency into new capital stock. China's environmental authorities have already announced draft fuel efficiency standards for SUVs that, if implemented, would be stricter than those in the United States.

Underlying all these trends is a common driver: torrid economic growth in China. Whether this can be sustained is now a signpost of global significance, helping to set the tone for world energy markets in 2004–05. Much depends on how Beijing manages the next stage of economic development, and how effectively it can tame China's industrial tiger.