

Energy Security & Countering Climate Chaos -- China's Approach and Global Impact

(A short note written for the Asymmetric Threats Contingency Alliance (ATCA) dated 8 August, 2006)

With crude oil prices approaching within a hailing distance of USD 80 a barrel, higher energy bills are coming in the post. Summer grass on the lawn has never looked so scorched. Energy costs and global warming are coming up close and personal by the day.

More and more countries are now waking up to the ramifications of an energy-hungry world. Inhabited by a fifth of mankind and industrialising at a breathless pace, China cannot help but catch the eye. Some US media reports are alleging that coal-burning China is responsible for up to 25% of particle-pollution in some US cities on the west coast.

So it is perhaps opportune for me to share with you some of my thoughts on how China is addressing her energy conundrum and what this would mean to the rest of the world. These thoughts formed the gist of a recent talk I gave, amongst other speakers, at the Foreign and Commonwealth Office in London.

Without too much fanfare, we are witnessing in China the largest and fastest urbanisation in human history. Over 30 years, at a total cost of 2 trillion Yuan, about 3,000 km of road will be added each year to build up a '7-9-18' national expressway network of 85,000 km, longer than the interstate network in the US by 10,000 km. 7 major arteries will radiate from Beijing: 9 from north to south and 18 from east to west.

This huge expanse of expressways is based on the expectation that car ownership will jump from the low average base of 16 per thousand population in 2002 to 267 by 2030, still relatively low by world standards but already accounting for a quarter of world demand and equating to the US total.

President Bush is reported to refer to President Hu by saying "This guy needs 20 million jobs (a year) to stay even. I would be laughing if I get a few million." China needs to industrialise fairly quickly in order to create enough jobs for the masses and build up a consumption-capable middle-class to achieve a more balanced and less export-dependent economy. She is taking advantage of the current period of relative internal stability before she acquires the strength to shoulder the challenges of a rapidly ageing population profile. Underpinning all this growth is energy security.

Relying on her own abundant coal for 77% of her energy, China has a relatively high level of overall energy self-sufficiency – 94% compared with the OECD average of 70%. However, coal is still not a perfect substitute for crude oil for urbanisation and economic development. In aggregate, China accounts for 8% of world crude oil demand (compared with 25% for the US), but one-third of the global demand growth, while both China and the US each sit on only about 3% of world oil reserves.

Global Alliances for Conventional Energy

Like the US, China relies heavily on import (40%) for her crude oil, though she plans to gradually reduce this to 12–15% in the long term. This compares with Japan's almost total import dependence and India's 60 – 70%. With 'Three Billion New Capitalists' in the newly industrialising countries embracing market economy with a vengeance, it is no surprise that global competition for oil and gas is becoming intense.

As a vast proportion of such fossil fuels is concentrated in relatively few and usually less stable countries, geopolitics, spheres of influence and even what the West may perceive as 'unholy alliances' in certain cases have become part of the game.

In the Middle East, where US influence is predominant, China is courting Saudi Arabia, already accounting for 17% of China's oil imports. HRH King Abdullah paid a state visit to Beijing in January this year. On the cards was the supply of Saudi oil for

China's strategic reserves. The first such facility for 100,000 cubic metres of petroleum, which is situated in Zhenhai 160 km south of Shanghai, is to be completed this August. The second in Qingdao, Shangdong Province, is expected to be completed by the end of this year. According to Vice Premier Zeng Peiyan, China is thinking of a strategic reserve equivalent to 90 days consumption involving both government and business participation over the next 15 years. China is now Iran's single largest petroleum export market, having signed a USD 70 billion deal with Iran in November 2004 to develop the Yadavaran, one of the world's largest oil fields.

Not just supply is at stake. As China is now the world's second largest oil consumer, OPEC President Ahmad al-Fahd al-Sabah visited Beijing in late December 2005 to discuss oil price modalities.

In Central Asia, a 1,200 km pipeline from Kazakhstan to North Xinjiang has recently been completed, bringing into China 10 million barrels of crude oil a year. Xinjiang, a province three times the size of France, is China's biggest provincial supplier of crude oil and gas, linked by massive pipelines to China's industrial East Coast.

China's influence in Central Asia has grown over the past five years since the founding of the Shanghai Cooperation Organisation (SCO), originally formed to combat international terrorism. Together with Russia, the SCO's other members comprise Kazakhstan, Kyrjystan, Tajikistan and Uzbekistan. More recently, it has vastly expanded its scope and influence by welcoming, as Observers, India, Pakistan, Iran, Afghanistan and Turkey. [Ref ATCA dialogue on SCO].

Afghan President Hamid Karzai was in Beijing on 19 June following a summit meeting of the SCO in Shanghai. Although the scope of mutual cooperation amongst members is fairly broad, all members are strategic energy players in one form or another.

Likewise, China is building up a network of suppliers and goodwill in Africa, which has now become China's second biggest continental supplier, accounting for one-third of China's oil import. In keeping with China's consistent external policy, her global cooperation efforts are 'ideology-blind', including West-adverse countries as Sudan and Angola.

In South America, Venezuela has become a key oil supplier. Brazil also counts China as her third largest oil export destination. Similarly, China has been building up a network of cooperation and goodwill with a host of other countries in South America, the 'backyard of the US', at a time when a large part of the southern continent appears to be turning Centre-Left. China has to be doubly adroit in setting unduly suspicious minds at ease.

With scarce fossil energy in an increasingly energy-hungry world, it is no surprise that China's energy quest meets with fierce competition, often fraught with geopolitical undercurrents. China suffered a major setback in her quest when after a prolonged period of negotiations, Russia eventually decided to build its massive eastward pipeline, even at greater cost, bypassing northern China to go to ports near Japan and the rest of the north Pacific. Only a southward link from eastern Siberia to Xinjiang is provided as a concession. Nevertheless, with an increasingly energy-confident Russia building up growing rapport with China, there remains vast potential for much closer Sino-Russian energy cooperation.

China's energy (and mineral) relations with Australia have become nothing short of legendary in recent years. Even there, China recently lost to Japan's Osaka Gas, which has secured an annual supply of 1.5 million tonnes of Liquefied Natural Gas (LNG) for 25 years from the huge Gorgon field off the NW coast of Australia. The field is operated jointly by Chevron, Royal Dutch Shell and ExxonMobil. 2.5 million tonnes of the fuel will be supplied separately to the West Coast of the US annually for 20 years. LNG, of course, is cheaper and cleaner

than oil and is expected to displace oil in primary consumption by 2050.

Perhaps nowhere else is China's energy competition or rivalry more belligerent than in the East China Sea, complicated by territorial disputes over islets particularly with Japan. Tiny though these islands undoubtedly are (or some may call them rock protrusions), they involve disputed rights over fields with an estimated potential supply of 7 trillion cubic feet of natural gas and 100 billion barrels of oil.

Against a background of continuing acrimony over Japanese Prime Minister Koizumi's visits to the Yasukuni Shrine and Japan's desire to exert greater international influence (especially in South East Asia), commensurate with its economic status, it will continue to be a major diplomatic challenge to both China and Japan on how best to resolve their differences. These do not sit well with their otherwise robust economic relationship. China has already overtaken the US as Japan's largest trading partner while there are over 20,000 Japanese enterprises in China supplying not only 9.2 million jobs but much needed technology and management savvy.

Countering Climate Chaos and Environmental Degradation

Naturally, China's energy challenge -- largely dependent on coal and fossil fuels -- is by no means confined to scarcity, competition and geopolitics. The world is becoming increasingly aware of the risk of climate chaos, likely to result from relentless carbon and sulphur dioxide emissions. China, in particular, is alive to this threat to sustainable economic development and social stability. A Fudan University study puts the cost of air pollution to Shanghai alone at more than 8 billion Yuan a year in health care. China has recently admitted that it is the world's largest emitter of sulphur dioxide. Similar studies have estimated the 'economic losses' caused by sulphur dioxide emissions at some 510 billion Yuan last year.

In any event, it is no rocket science to realise that the whole world will not suffice if China with a fifth of mankind, let alone India, is to replicate the American Dream translated into energy consumption per head.

So it is timely, some may say long overdue, to see a decidedly new chapter in China's planning history in the latest 11th Five Year Plan (2006 – 2010). This puts an overriding emphasis on balanced (and slower) growth, sustainability, agrarian environmentalism, and energy economy. Specifically, provincial party secretaries are mandated to achieve an annual energy saving of 4% and emission reduction of 2% to attain the respective targets of 20% and 10% over the five year period.

Each Chinese uses only about one tenth of primary energy as an American, a fifth as much as a Japanese though twice as much as an Indian. But in terms of energy per unit of GDP produced, China is extremely inefficient: 7 times more than Japan, 6 times more than the US and 3 times more than India.

Added to this is the ever continuing mining disasters resulting from backward technology, local protectionism and vested interests, legitimate or otherwise. Similar difficulties are dogging China's problems of environmental degradation, including water and air pollution. With its relatively short history, the State Environmental Protection Administration is fighting an uphill battle against other Departments or authorities more concerned with their own growth-related agendas. Its resort to a close partnership with local environmental NGOs, the largest NGO grouping in China, is instructive.

It has been widely reported that as at least a medium palliative for energy security, China is committed to building 2 new nuclear power plants annually for 15 years. Although nuclear energy has its security, safety and disposal problems, an over-reliance on external fossil energy supply with its skewed geopolitical profile would be liable to the potential risk of its being used, for real or blackmail, as an asymmetric 'weapon of

mass disruption'. The International Energy Agency estimates that China will be investing USD 2.3 trillion in energy development during the period 2001-30.

The first renewable energy resource for China that comes to mind is water, not least because, paradoxically, China is extremely short of it. China has only 7% of the world's arable land to feed 20% of the world's population, Her per capita fresh water resource is only one third of the world's average. Moreover, China's water resources are very unevenly distributed: 36% of China's land south of the Yangtze has 80% of China's water, prone to flooding of devastating proportions. The 64% of land north of the Yangtze has only 20% of China's water. Worse still, all of China's 7 main rivers and 25 out of her 27 largest lakes are polluted. Two thirds of China's cities have some degree of water shortage.

Water, in one form or another, has in fact taxed China for millennia. Such is China's water imperative that she has recently launched the gigantic 'South to North Water Diversion' project at a cost in excess of USD 60 billion. The project is to construct three huge canals connecting the flooding Yangtze to the much drier Yellow River. This, of course, is in addition to the well-publicised Three Gorges Dam, the largest dam in human history, which will help increase China's hydroelectric power from 108 GW to 290 GW by 2020. China's hydroelectric power potential is estimated at 400 GW.

China is likely to commit USD 200 billion for renewable energy within the next 15 years. The development of renewable energies is expected to grow from 7% to 10% annually by 2010 and 20% annually by 2020.

Wind power, much of it in Inner Mongolia, is expected to grow from 1 GW to 30 GW, to power some 13-30 million households by 2020.

According to the Worldwatch Institute in Washington DC, China already has 30 million solar households, or 60% of the

world's current solar capacity, with photovoltaic energy accounting for 65 MW. China expects to increase solar panels to 300 million sq metres providing 2 GW of power by 2020, displacing 40 million tonnes of coal annually. Concurrently, plans are being drawn up for a new generation of energy efficient buildings for possible application nationwide.

To make better use of her abundant coal resources, China has recently entered into a deal with South Africa's SASOL to build a Coal to Liquid (CTL) plant in each of the inner provinces of Ningxia and Shaanxi at a total cost of USD 10 billion. The production target is 10 million tonnes of crude oil by 2010, and 30 million tonnes by 2020, equivalent to about 16% of China's overall crude oil output.

As for bio-fuels and mixed fuels, China is already the world's third largest ethanol producer, generating 1 billion gallons annually in such provinces as Heilongjiang, Jilin, Liaoning, Anhui, and Henan. The use of gasohol, a mixture of petrol and ethanol, is mandatory in certain farming provinces. Economic support is provided for China's energy crops such as corn, sugar cane, sweet sorghum and sweet potato. The use of genetically modified crops for energy is encouraged. As James Lovelock says in his much-acclaimed book, *The Revenge of Gaia*, there are no free lunches with the ecosystem. China's quest for bio-fuels is likewise not without controversy. In Indonesia, China is financing a USD 8 billion project to create the world's largest plant-oil plantation in Kalimantan near the border with Sarawak, threatening 1.8 million hectares of virgin forest, two-thirds the size of Belgium.

A coal-dependent China would definitely benefit from cleaner (and safer) technology as much as cleaner fuel. The International Finance Corp, the World Bank's private sector lender, has recently signed an equity-and-loan deal with China's Xinao Group to convert coal into clean-burning dimethyl ether, a gas used for cooking and heating or as a substitute for diesel fuel.

Perhaps an epitome of China's energy vision is the building of the world's sizeable eco-city named Dongtan on Chiongming Island 15 km north of Shanghai with the help of Ove Arup and Partners. Designed for half a million inhabitants living close to their work, the city will be equipped with photovoltaic, biomass, and wind energies with infrastructure to capture and use rainwater, amongst other environmentally-friendly measures and installations. The first phase of the city is scheduled to be launched to coincide with the opening of Shanghai's World Expo in 2010.

Conclusion

China has identified her five major energy challenges:

- (a) supply shortfall;
- (b) production capacity;
- (c) coal pollution;
- (d) obsolete technology; and
- (e) international volatility.

These chime with President Hu's following energy emphases during the recent G8 Dialogue at St Petersburg:

- (a) cooperation, coordination and diversification in exploration and utilisation to ensure global energy security and stability;
- (b) promotion of technological research and development for clean, safe, economic, and reliable energies; and
- (c) maintaining and safeguarding a geopolitical environment conducive to global energy security and stability.

But with the world population multiplying and more and more countries and peoples wanting to be lifted out of poverty and to have their long-awaited fair share in higher standards of living, will the world be running out of energy in the not too remote future? This is no doubt a subject rich for philosophical, economic, scientific, cultural, political and environmental debate.

Without too much song and dance yet, there is perhaps a little glimmer of hope in the International Thermo-nuclear Energy Reactor (ITER) project, jointly undertaken by the EU, Japan, China, India, Korea, Russia, and the USA. It is the world's largest international cooperation research project (next to the International Space Station venture) spanning 35 years to research and develop what would be virtually inexhaustible, clean and safe fusion energy.

Before we reach nirvana, let's hope, and better still, work together, to ensure that the Gaia of countries, peoples and nature are moving along a path of sustainable mutual support and not one of eventually irreversible mutual destruction.

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